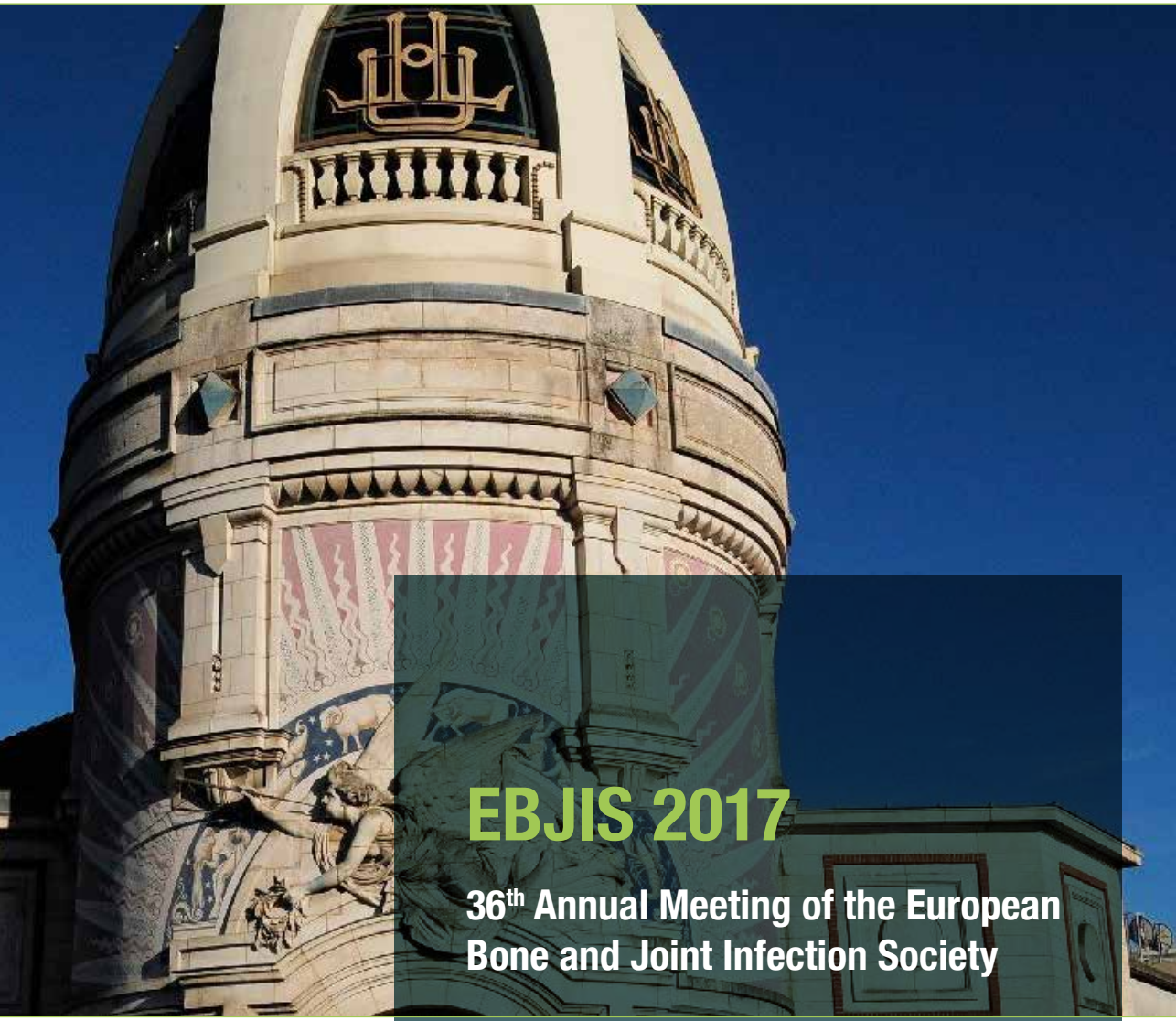
Programme and Abstracts



EBJIS 2017

36th Annual Meeting of the European Bone and Joint Infection Society

7 - 9 September 2017

Nantes · France · La Cité, Nantes Events Center

www.ebjis2017.org

European Bone & Joint Infection Society
EBJIS

Download the Conference App

SEARCH FOR

"EBJIS/EBJIS 2017"

IN APPSTORE OR GOOGLE PLAY

Available on the iPhone App Store

ANDROID APP ON Google play

Index

Become a member of EBJIS!

The aim of the Society is to promote the knowledge of all infections affecting the Musculoskeletal system (bone and joint infections), and to promote the prevention and treatment of these infections.

The most important aspect of becoming a member of the Society is that you support this development.

Benefits of your membership

- Reduced registration fee at the EBJIS annual meetings
- Society benefits, e.g. access to all EBJIS newsletters and to all recent news related to bone and joint infection
- Access and submission to the EBJIS Journal of Bone and Joint Infection **www.jbji.net/ms/submit** The EBJIS members are granted a 30% discount on publication of papers.
- Applying for the Travelling Fellowship programme granted by EBJIS

At the moment, the annual membership fee is 110 euro.

Visit the EBJIS website to find more information: www.ebjis.org/membership and sign up: www.ebjis.org/ebjis-registration

The journal of bone and joint infection

The Journal of Bone and Joint Infection (JBJI) is a publication of the European Bone and Joint Infection Society and publishes papers of highest quality in all areas of orthopaedic infections.

The journal has met all PubMed requirements and is now being indexed in PubMed Central.

Types of articles:

- Research papers
- Short research communications
- Reviews and mini-reviews
- Commentaries, opinions

Call for papers - submit your paper now!

Original papers covering the field of BJI may be submitted to JBJI.
Find more information on the website: www.jbji.net

Welcome

Dear participants,
Dear colleagues,

It is a great pleasure to welcome you to the 36th Annual Meeting of the European Bone and Joint Infection Society in Nantes.

During the 2,5 conference days, you will experience a diverse programme that includes keynote sessions, free paper sessions, industry symposia and poster presentations. You will get a unique opportunity to meet experts within the field and be updated on bone and joint infection research happening across Europe.

The main subjects of the conference are:

- New strategies and biotechnologies in MSI
- The “aseptic” joint arthroplasty revision: From Prosthetic Joint Infection misdiagnosis to excessive antibiotic treatment
- Pediatric and adult osteoarticular oncologic surgeries - Infection management: Where are we?
- Low grade infections with rare and multidrug resistant pathogens
- Shoulder protheses and osteosynthesis: Management of the osteoarticular infections
- State of the art: Diabetic foot osteomyelitis
- Prosthetic Joint Infection in elderly people

Furthermore, we have arranged some exciting social events, so you will get the chance to experience the cultural side of the city.

We hope you will enjoy the conference and your stay in Nantes!

On behalf of the local organising committee and the EBJIS board,

Gérard Giordano
Conference Chair

Klaus Kirketerp-Møllller
President of EBJIS

Organisation

EBJIS Executive Committee

President	Klaus Kirketerp-Møller
Vice President	Martin McNally
Past President	Heinz Winkler
General Secretary	Charles Vogely
Treasurer	Olivier Borens
Members	Alex Soriano
	Lorenzo Drago
	Associate Member
	Carlo Romano
	Christof Wagner

Local Organising Committee

Chair	Gérard Giordano
Members	Thomas Bauer
	Eric Bonnet
	Stéphane Corvec
	Jean-Philippe Lavigne
	Eric Senneville

General information

Conference website
www.ebjis2017.org

Conference venue
La Cité, Nantes Events Center
5 rue de Valmy
44041 Nantes
France

Badges
The conference name badges must be worn at all times during the conference. Access to the conference venue will not be granted without the name badge issued by the conference organisers.

Entitlements for participants
Admission to all scientific sessions and industry symposia, admission to exhibition, conference bags with programme- and abstract book, CME credits, coffee breaks and lunch, Welcome reception Thursday 7/9, Farewell cocktail Saturday 9/9 and certificate of attendance.

CME credits
The conference has been granted 15 European CME credits (ECMEC) by the European Accreditation Council for Continuing Medical Education (EACCME). In order to obtain the CME credits please log your attendance each day before 14.00 by scanning your badge at the logging stations in the registration area.
You are able to print out your certificate after 14.00 on your last day of attendance.

Conference app
Download the conference app to your mobile device. Search for "EBJIS 2017" in your app store. You will be able to view the day-by-day programme, select sessions, and make your own agenda. All accepted abstracts will be published in the app.

Cloak room
A cloak room located in the great hall will be available throughout the conference.

Conference language
The conference will be held in English, but with simultaneous translation to French.

Information for Speakers
Bring your presentation to the Speakers' Preview room at the venue. An assistant will help you upload the presentation to the computer. Please make sure to upload your presentation at least 30 min. before your session starts. Please bring your presentation on a CD, DVD or USB stick. We do not allow the use of personal laptops for presentations.
At the end of the conference, all presentations will be deleted in order to secure that no copyright issues will arise.

WIFI
Free access to the WIFI at La Cité is provided.
Wireless network name: EBJIS
Security key: ebjis2017

Social events

Welcome Reception

Date 7 September 2017
Time 18.30 - 21.00
Place The Machines of the Isle of Nantes
Parc des Chantiers
Boulevard Léon Bureau, 44200 Nantes

The Welcome Reception will take place at the Machines of the Isle of Nantes at 18.30 - 21.00. Make sure to be there – it will be an evening full of surprises. The reception is included in the registration fee.

EBJIS Gala Dinner

Date 8 September 2017
Time 19.30-22.30
Place Bateaux Nantais
Pont Général de la Motte Rouge
44008 Nantes Cedex 1

The gala dinner will take place on board the boat, "Hydramour", from 19.30-23.00.
The boat will take off from the harbour in Nantes, and you will be served a delicious French dinner during the cruise.
NB: The dinner is not included in the registration fee, but can be bought at the registration desk.

Conference Secretariat
CAP Partner
Nordre Fasanvej 113, 2
DK-2000 Frederiksberg
Denmark

info@cap-partner.eu
Tel.: +45 70200305

Social media
Find EBJIS on Facebook (Search for "European Bone and Joint Infection Society")

Map of Nantes

A **Conference venue**
La Cité, Nantes Events Center
5 rue de Valmy
44041 Nantes

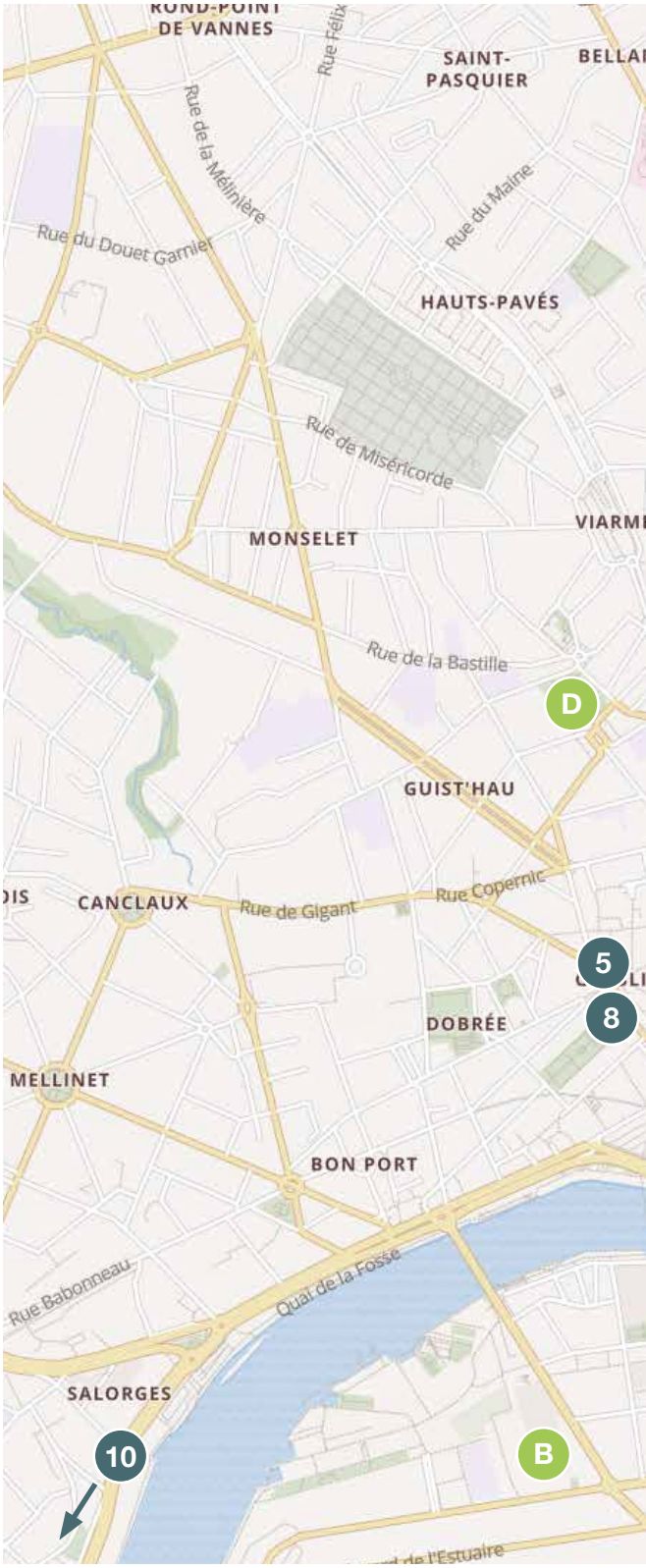
B **Welcome Reception**
The Machines of the Isle of Nantes
Parc des Chantiers, Boulevard Léon Bureau
44200 Nantes

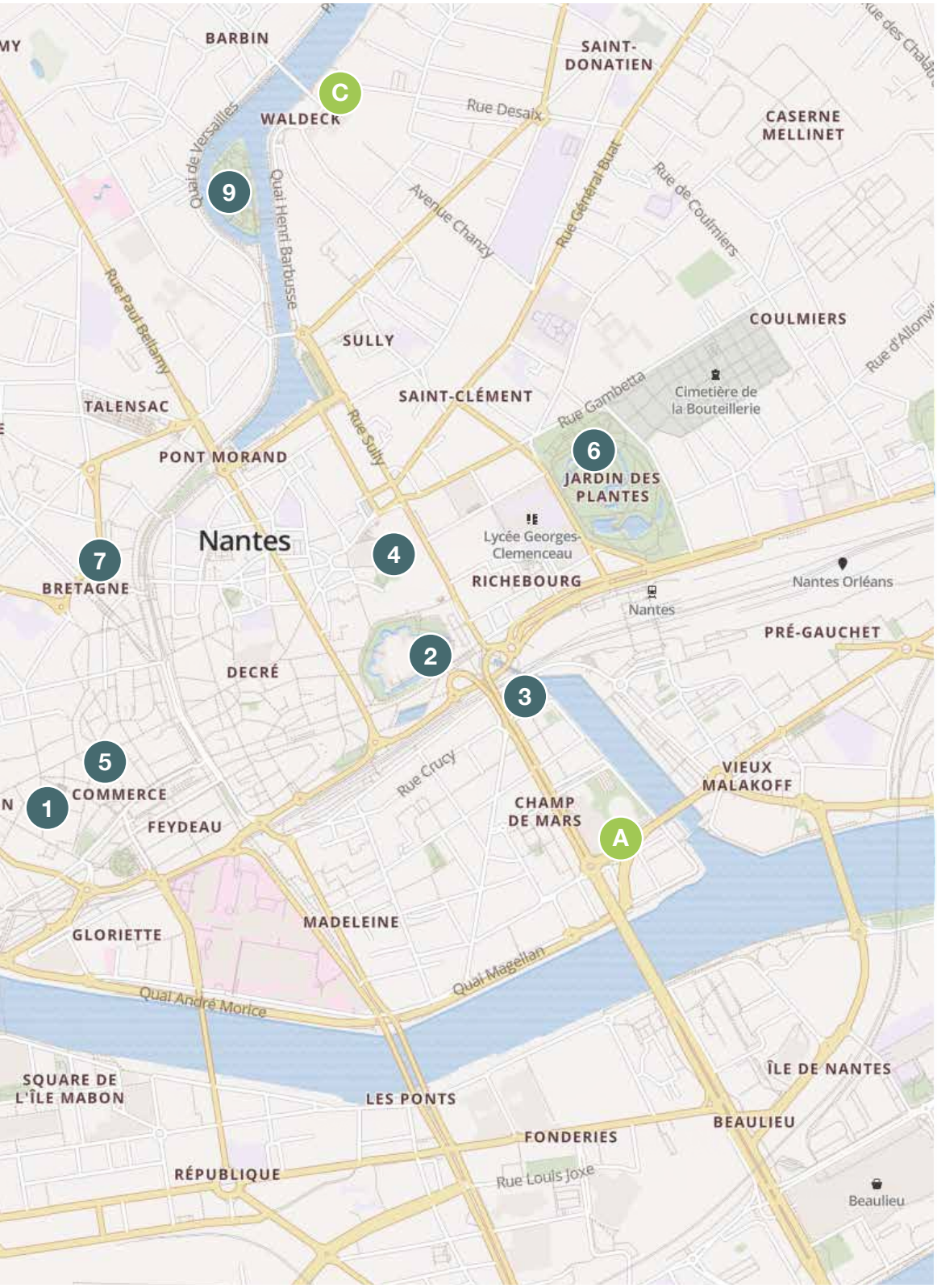
C **Gala Dinner**
Bateaux Nantais
Pont Général de la Motte Rouge
44008 Nantes Cedex 1

D **Radisson Blu Hotel**
6 Place Aristide Briand
44000 Nantes

The TOP 10 places to be seen in Nantes

1. Passage Pommeraye
2. Château des ducs de Bretagne
3. Le Lieu unique Tower
4. Cathédrale Saint-Pierre- et-Saint- Paul
5. Place Royale and Place Graslin
6. Jardin des plantes
7. Bar le Nid – Tour de Bretagne
8. La Cigale
9. Jardin Japonais, Ile Versailles
10. Trentemoult




BARBIN
SAINT-DONATIEN
C
WALDECK
Rue Desaix
CASERNE MELLINET
Quai de Versailles
9
Quai Henri Barbusse
Avenue Chanzy
Rue Général Buat
Rue de Coulmiers
COULMIERS
Rue Paul Bellamy
SULLY
SAINT-CLÉMENT
Rue Gambetta
Cimetière de la Bouteillerie
TALENSAC
Rue Sully
6
JARDIN DES PLANTES
PONT MORAND
Nantes
Lycée Georges-Clemenceau
7
4
BRETAGNE
RICHEBOURG
Nantes Orléans
Nantes
PRÉ-GAUCHET
2
DECRÉ
3
5
Rue Crucy
VIEUX MALAKOFF
COMMERCE
1
CHAMP DE MARS
A
FEYDEAU
MADELEINE
GLORIETTE
Quai Magellan
Quai André Morice
ÎLE DE NANTES
SQUARE DE L'ÎLE MABON
LES PONTS
BEAULIEU
FONDERIES
RÉPUBLIQUE
Rue Louis Joxe
Beaulieu

Programme overview

7 September	Room: 800 Auditorium
07.00	Registration
08.15 - 08.30	Welcome
08.30 - 09.40	Key Session 1: The ”aseptic” joint arthroplasty revision: From PJI misdiagnosis to excessive antibiotic treatment
09.40 - 10.40	Key Session 2: State of the art: Diabetic foot osteomyelitis
10.40 - 11.15	Coffee, poster visit and exhibition
10.45 - 13.00	Country Delegate Meeting
11.15 - 12.35	Free Papers A
12.35 - 14.00	Lunch
12.50 - 13.50	Industry Symposium A
14.00 - 15.15	Key Session 3: PJI in the elderly people
15.20 - 16.00	Rapid Fire Papers 1
16.00 - 16.30	Coffee, poster visit and exhibition
16.30 - 17.30	Key Session 4: Low grade infections with rare and multidrug resistant pathogens
18.30 - 20.00	Welcome Drinks Reception

8 September	Room: 800 Auditorium
7.45 -	Registration
08.15 - 09.20	Key Session 5: Pediatric and adult osteoarticular oncologic surgeries - Infection management: Where are we?
09.20 - 09.30	2016 Travelling Fellowship Report
09.30 - 10.00	Coffee, poster visit and exhibition
10.00 - 11.30	Free Papers D
11.30 - 13.00	Lunch
11.50 - 12.50	Industry Symposium C NB: This symposium will take place in ”Room 150”
13.00 - 14.00	Key Session 6: Shoulder protheses and osteosynthesis: Management of the osteoarticular infections
14.00 - 14.15	Coffee, poster visit and exhibition
14.15 - 15.35	Free Papers F
15.35 - 16.10	Coffee, poster visit and exhibition
16.10 - 17.10	Key Session 7: New strategies and biotechnologies in MIS
19.30 - 23.00	EBJIS Gala Dinner

9 September	Room: 800 Auditorium
09.00 - 10.20	Key Session 8: Definition of infection: What is infection?
10.20 - 10.50	Coffee, poster visit and exhibition
10.50 - 12.20	Best Papers
12.20 - 12.35	The history of EBJIS
12.35 - 13.00	Closing Remarks & Prizes
13.00 - 14.00	**Farewell cocktail**

Room 300	
07.00	
08.15 - 08.30	
08.30 - 09.40	
09.40 - 10.40	
10.40 - 11.15	
10.45 - 13.00	
11.15 - 12.35	Free Papers B
12.35 - 14.00	Lunch
12.50 - 13.50	Industry Symposium B
14.00 - 15.15	
15.20 - 16.00	Rapid Fire Papers 2
16.00 - 16.30	
16.30 - 17.30	
18.30 - 20.00	

Room 300	
7.45 -	
08.15 - 09.20	Free Papers C
09.20 - 09.30	
09.30 - 10.00	
10.00 - 11.30	Free Papers E
11.30 - 13.00	Lunch
11.50 - 12.50	Industry Symposium D
13.00 - 14.00	
14.00 - 14.15	
14.15 - 15.35	Free Papers G
15.35 - 16.10	
16.10 - 17.10	Free Papers H
17.20 - 18.45	EBJIS General Assembly (for members of EBJIS, by invitation only)

Due to CME regulations no industry names or logos are allowed in the programme.
Detailed information about industry sessions is available on pages 25-29

7 September

		Room: 800 Auditorium	Speaker
07.00		**Registration**	
08.15 - 08.30		**Welcome**	
		Opening ceremony	Gérard Giordano (Local Chair) Klaus Kirketerp-Møller (EBJIS President)
08.30 - 09.40		**Key Session 1:** **The "aseptic" joint arthroplasty revision: From PJI misdiagnosis to excessive antibiotic treatment**	**Chairs:** **Thomas Bauer & Lorenzo Drago**
08.30 - 08.45 (5' discussion)		Diagnostic strategy to distinguish aseptic revision arthroplasty from septic revision	Olivier Borens
08.45 - 09.00		Antibiotic strategy for doubtful situations	Eric Bonnet
09.00 - 09.15		Intraoperative criteria and surgical management	Philippe Rosset
09.15 - 09.30		Postoperative a posteriori diagnosis: management?	Thomas Bauer
09.30 - 09.40 (5' discussion)		Algorythm and take home message	Thomas Bauer
09.40 - 10.40		**Key Session 2:** **State of the art: Diabetic foot osteomyelitis**	**Chairs: Eric Senneville & Jean-Philippe Lavigne**
09.40 - 09.55 (5' discussion)		What surgeons should know about antibiotic treatment of diabetic foot osteomyelitis	Eric Senneville
09.55 - 10.10		Place of the conservative surgical strategies: inclusive criteria, techniques and limits	Klaus Kirketerp-Møller
10.10 - 10.25		The microbiology management: new concepts	Jean-Philippe Lavigne
10.25 - 10.40		How to prevent or to manage it? The role of the diabetologist	Jacques Martini
10.40 - 11.15		**Coffee**	**Posters/Exhibition**
10.45 - 13.00		Country Delegate Meeting NB: This meeting is by invitation only. The meeting will take place in meeting room B	
11.15 - 12.35		**Free Papers A** **(10 x 6 min + 2 min)**	**Chairs: Tristan Ferry & Carlo Romano**
11.15 - 11.23	FP 1	The spread of foot infection and its impact on the outcomes of major amputations of lower extremities in diabetic patients	Danguole Vaznaisiene
11.23 - 11.31	FP 2	Vascularized fibula flaps for segmental bone loss secondary to osteomyelitis in children	Antonio Loro
11.31 - 11.39	FP 3	Outcomes of free tissue transfer in treatment of chronic osteomyelitis	Alex Ramsden
11.39 - 11.47	FP 4	An algorithm protocol comparison of Ilizarov techniques in the management of infected tibial non-union	Jamie Ferguson
11.47 - 11.55	FP 5	Association of TNF-α and lymphotoxin-α gene polymorphisms and susceptibility to extremity chronic osteomyelitis in Chinese population	Nan Jiang
11.55 - 12.03	FP 6	Evaluation of the in vitro activities of ceftobiprole and comparators against Gram positive and Gram negative strains isolated from bone implant-associated infections	Eric Bonnet
12.03 - 12.11	FP 7	Pre-Hospital antibiotic prophylaxis reduces bacterial burden at time of debridement in a rabbit open fracture model	Alejandro Vallejo
12.11 - 12.19	FP 8	Synergistic activity of lytic bacteriophage and antibiotics against methicillin-resistant *Staphylococcus aureus* biofilm	Tamta Tkhilaishvili
12.19 - 12.27	FP 9	Assessment of antibiotic adherence in bone and joint infections using the Morisky Adherence Questionnaire and Medication Event Monitoring System	Ho Kwong Li

7 September

	Room 300	Speaker
	Coffee	Posters/Exhibition
	Free Papers B (10 x 6 min + 2 min)	**Chairs: Olivier Borens & Frederic Laurent**
FP 11	Role of Sonication in revision for presumed aseptic loosening	Boštjan Kocjancic
FP 12	Is infection predictable before repeat surgery after total hip arthroplasty? A preliminary study with definition of an “infection score”	Jeannot Gaudias
FP 13	Agreement between pre-operative and intra-operative bacteriological samples in 85 chronic peri-prosthetic hip and knee infections	Valérie Matter-Parrat
FP 14	Detection of the etiological agent in pre-surgical joint aspiration fluid using a commercial multiplex PCR system (Unyvero i60, Curetis) designed for diagnosis of implant and tissue infection	Beate Heym
FP 15	18F-FDG uptake in non-infected total hip prostheses	Stefan Gelderman
FP 16	PTX3 as a new biomarker for the diagnosis of periprosthetic joint infection: a single-center pilot study	Mattia Loppini
FP 17	The Alpha Defensin lateral flow test in diagnosing PJI of THA and TKA	Akos Zahar
FP 18	Comparison of quantitative and qualitative alpha-defensin test for diagnosing periprosthetic Joint infections	Irene Katharina Sigmund
FP 19	Performance of the alpha defensin lateral flow test for diagnosis of hip and knee periprosthetic joint infection (PJI)	Nora Renz

7 September

		Room: 800 Auditorium	Speaker
12.27 - 12.35	FP 10	It's not over when the infection's gone: Long-term growth disturbance following subacute osteomyelitis	Andrew Hotchen
12.35 - 14.00		**Lunch**	
12.50 - 13.50		**Industry Symposium A**	
14.00 - 15.15		**Key Session 3:** **PJI in the elderly people**	**Chairs:** **Eric Bonnet &** **Charles Vogely**
14.00 - 14.15		Limits of curative treatment and suppressive antibiotic therapy	Aurélien Dinh
14.15 - 14.30		Antibiotic tolerance and drug interactions	Valérie Zeller
14.30 - 14.45		Management of pre- and post-operative nutritional status	Pauline Coti Bertrand
14.45 - 15.00		Specificities and adaptation of surgical strategies	Carlo Romano
15.00 - 15.15		Take home message and discussion	Eric Bonnet
15.20 - 16.00		**Rapid Fire Papers 1** **(8 x 3 min + 2 min)**	**Chairs:** **Frederic Laurent &** **Klaus Kirketerp-Møller**
15.20 - 15.25	RFP 21	The new treatment protocol and Multi-Stage Classification of Chronic Osteomyelitis	Anton Semenistyy
15.25 - 15.30	RFP 22	For how long, should we review patients after treatment of chronic osteomyelitis? An analysis of recurrence patterns in 759 patients	Martin McNally
15.30 - 15.35	RFP 23	Clinical characteristics and treatment of clavicular osteomyelitis: An analysis of 188 reported cases	Nan Jiang
15.35 - 15.40	RFP 24	Pressure ulcer-related pelvic osteomyelitis: evaluation of a two-stage surgical strategy (debridement, negative pressure therapy and flap coverage) with prolonged antimicrobial therapy	Tristan Ferry
15.40 - 15.45	RFP 25	Prognostic factors of streptococcal prosthetic bone and joint infections managed in references centers	Rafael Mahieu
15.45 - 15.50	RFP 26	Endoprosthesis implantation is associated with increased risk for infection due to oral cavity bacteria	Eva Vacha
15.50 - 15.55	RFP 27	Higher risk of revision for infection using systemic Clindamycin prophylaxis compared to Cloxacillin in primary knee arthroplasty	Anna Stefánsdóttir
15.55 - 16.00	RFP 28	Prosthetic joint infections and Vitamin E phosphate coating: promising formulation having antimicrobial and antibiofilm activity	Lorenzo Drago
16.00 - 16.30		**Coffee**	**Posters/Exhibition**
16.30 - 17.30		**Key Session 4:** **Low grade infections with rare and multidrug resistant pathogens**	**Chairs:** **Stéphane Corvec** **& Alex Soriano**
16.30 - 16.45		How pathogens interact with bone cell matrix leading to low grade infection?	Stéphane Corvec
16.45 - 17.00		How to avoid missing pathogens and to improve the detection?	Susanne Feihl
17.00 - 17.15		Prophylaxis and antiseptic prevention: which surgical strategies for low grade infections?	Lluis Puig Verdie
17.15 - 17.30		Which best treatment options for low grade and multidrug pathogen infections?	Efthymia Giannitsioti
18.30 - 21.00		**Welcome Drinks Reception** **at The Machines of the Isle of Nantes** **Address: Parc des Chantiers, Boulevard Léon Bureau**	
20:00		**Industry Sponsored Dinners, Free Evening**	

7 September

	Room 300	Speaker
FP 20	Improving the diagnosis of periprosthetic joint infection (PJI) - the role of circulating and synovial fluid biomarkers	Mike Reed
	Lunch	
	Industry Symposium B (12.50-13.50)	

	Rapid Fire Papers 2 (8 x 3 min + 2 min)	**Chairs: Heinz Winkler & Jean-Philippe Lavigne**
RFP 29	Impact on length of hospital stay from dedicated infectious diseases input for orthopaedic infection patients compared to sporadic infection specialist input	Emma Nickerson
RFP 30	Sonication: Influence on time to result. A retrospective cohort analysis	Tobias Kramer
RFP 31	Clinical evaluation of efficacy using PCR lateral-flow assay for Gram-positive and Gram-negative bacterial infection detection in joint fluid	Katsufumi Uchiyama
RFP 32	Place of serology for the diagnosis of chronic prosthetic joint infection	Martin Rottman
RFP 33	Can blood culture be used to diagnose periprosthetic joint infection?	Ahmed Siddiqi
RFP 34	The acute presentation of prosthesis joint infections can be deceiving: whole genome sequecing as a diagnostic tool	Faten El Sayed
RFP 35	Phage therapy for bone and joint infections. Report of French cases	Olivier Patey
RFP 36	Isolation of new lytic bacteriophages for treatment of prosthetic joint infection	Andrej Trampuz
	Coffee	**Posters/Exhibition**

8 September

		Room: 800 Auditorium	Speaker
7.45 -		**Registration**	
08.15 - 09.20		**Key Session 5: Pediatric and adult osteoarticular oncologic surgeries - Infection management: Where are we?**	**Chairs: François Gouin & Lee Jeys**
08.15 - 08.20		Overview	François Gouin
08.20 - 08.35		Specificity of post-operative infection after musculokeletal tumor resection	Lee Jeys
08.35 - 08.50		What is the impact of bone infection or wound complication on adjuvant oncologic treatment and oncologic and functional outcome	Nicolas Penel
08.50 - 09.05		Do oncologic surgeons have specific surgical procedures to prevent post operative infections and deal with infection?	Fabrice Fiorenza
09.05 - 09.20		Antibioprophylaxy: When? How? How long? The same for each site? Experience of parity trial	Sophie Mottard
09.20 - 09.30		**2016 Travelling Fellowship Report**	
09.30 - 10.00		**Coffee**	**Posters/Exhibition**
10.00 - 11.30		**Free Papers D (11 x 6 min + 2 min)**	**Chairs: Gérard Giordano & Christof Wagner**
10.00 - 10.08	FP 44	Septic outcome after megaprosthesis reconstruction of musculoskeletal tumours of the lower limb	Irene Katharina Sigmund
10.08 - 10.16	FP 45	Bone defects in septic two-stage knee revision surgery - implant survival using metaphyseal sleeve fixation	Mathias Glehr
10.16 - 10.24	FP 46	The use of tantalum metaphyseal cones in the management of severe bone defects in septic knee revision	Luca Cavagnaro
10.24 - 10.32	FP 47	Spinal instrumentation surgery, a well-known but neglected orthopaedic procedure deserving more attention on perioperative care	Koji Yamada
10.32 - 10.40	FP 48	Functional results of partial calcanectomies for the treatment of chronic osteomyelitis of the calcaneus	Olivier Demay
10.40 - 10.48	FP 49	Pubic osteomyelitis: epidemiology and factors associated with management failure in two French reference centers	Agathe Becker
10.48 - 10.56	FP 50	Evidence Based Protocol for Management of Persistent Draining Wounds After Total Hip and Knee Surgery	Ali Oliashirazi
10.56 - 11.04	FP 51	Coating of Cementless Stems with Commercially Pure Antibiotic-Loaded Calcium Sulfate Reduces Infection Rate in Revision THA	Edward McPherson
11.04 - 11.12	FP 52	99mTc-Sulesomab and 99mTc-nanocolloid bone marrow imaging in prosthethic joint infection	Arnaldo Sousa
11.12 - 11.20	FP 53	Are difficult-to-treat periprosthetic joint infections really difficult-to-treat? Good outcome applying a two-stage exchange with long interval	Doruk Akgün
11.20 - 11.30	FP 54	Does *staphylococcus* nasal decontamination affects the rate of early surgical site infections in adolescent idiopathic scoliosis surgery?	Marion Caseris
11.30 - 13.00		**Lunch**	
11.50 - 12.50		**Industry Symposium C NB: This symposium will take place in "Room 150"**	
13.00 - 14.00		**Key Session 6: Shoulder protheses and osteosynthesis: Management of the osteoarticular infections**	**Chairs: Hervé Thomazeau & Cédric Arvieux**
13.00 - 13.15		Shoulder prosthesis infection: What do we learn from European registers? Is it a gender, a device-related problem or others? Evolution and prospective	Jeppe Rasmussen

8 September

	Room 300	Speaker
	Free Papers C (7 x 6mins+3mins)	**Chairs: Parham Sendi & Thomas Bauer**
FP 37	Prosthetic joint infection in elderly patients	Camille Fourcade
FP 38	Epidemiology of prosthetic joint infection in the elderly: a 10 year retrospective multicentric study	Marlene Amara
FP 39	Increased Mortality after Prosthetic Joint Infection in Primary THA	Per Hviid Gundtoft
FP 40	Prosthetic-joint infections: mortality rate over the last 10 years	Arnaud Fischbacher
FP 41	AVAPOM - Complete oral versus intravenous antibiotic documented treatment in prosthetic joint infections	Alexandre Coelho
FP 42	Oral versus Intravenous Antibiotics for the treatment of bone and joint infection (OVIVA): A multi-centre randomised controlled trial	Matthew Scarborough
FP 43	Functional Outcome of Patients with Hip and Knee Infections Treated in the OVIVA (Oral Versus Intravenous Antibiotics) Multi-Centre Randomized Controlled Trial (RCT)	Abtin Alvand
	Coffee	**Posters/Exhibition**
	Free Papers E (11 x 6 min + 2 min)	**Chairs: Eric Bonnet & Alex Soriano**
FP 55	B.A.C.H. - A New Classification System for Long-Bone Osteomyelitis	Andrew Hotchen
FP 56	AntibacterialBioglass for the Treatment of Septic Bone Defects in Osteomyelitis: Experience in a Consecutive Series of 104 Cases	Carlo Luca Romanò
FP 57	Combined dead space management and prevention of infection in open fractures using intramedullary nail in association with an injectable antibiotic eluting composite bone substitute: a preliminary case series	Damiano Papadia
FP 58	Establishment of an implant-associated osteomyelitis rat model to test micro-structured antibacterial implant surfaces	Marie-Luise Schröder
FP 59	Antibiofilm efficacy of antibiotic-loaded synthetic calcium sulphate beads in a *P. aeruginosa/S. aureus* co-culture model for prosthetic infections	Robert Howlin
FP 60	Histopathological diagnosis of biofilm	Louise Kruse Jensen
FP 61	The effects of a novel decontamination-recirculating system in reducing airborne particulate: A laboratory based study	Gareth Davies
FP 62	Pharmacokinetics of single-dose cefuroxime in porcine intervertebral disc and vertebral cancellous bone determined by microdialysis	Pelle Emil Hanberg
FP 63	Duration of antibiotic prophylaxis with intravenous cefuroxime affects infection rate with *Staphylococcus aureus* in an open fracture model in rabbits	Jan Pützler
FP 64	Microcalorimetric detection of staphylococcal biofilm growth on various prosthetic biomaterials after exposure to daptomycin	Christen Ravn
FP 65	Phenotypic and genotypic characterization of *Staphylococcus epidermidis* from orthopedic device-related infections correlated with patient outcome	Mario Morgenstern
	Lunch	
	Industry Symposium D	

8 September

		Room: 800 Auditorium	Speaker
13.15 - 13.30		Special microbiological features and strategic specificities to prevent shoulder infections	Stéphane Corvec
13.30 - 13.45		Shoulder PJI revisions: How to manage? An update of techniques and strategies	Jean Kany
13.45 - 14.00		Septic arthritis and osteomyelitis around the shoulder	Martin McNally
14.00 - 14.15		**Coffee**	**Posters/Exhibition**
14.15 - 15.35		**Free Papers F (10 x 6mins+2mins)**	**Chairs: Pierre Mansat & Andrej Trampuz**
14.15 - 14.23	FP 66	One-stage exchange procedure in the management of infected shoulder prosthesis: a retrospective study of 16 cases	Laëla El Amiri
14.23 - 14.31	FP 67	Preoperative topical benzoyl peroxide reduces the presence of *P.acnes* on the skin and prevents recolonization after operating room skin preparation of the shoulder	Vendela Scheer
14.31 - 14.39	FP 68	*Propionibacterium acnes* related shoulder prosthetic joint infections: effectiveness differences depending on the medical or surgical treatment	Maxime Pradier
14.39 - 14.47	FP 69	Infected total elbow arthroplasty: management and results. About 11 cases	Pierre Mansat
14.47 - 14.55	FP 70	Chronic empyema of the elbow joint-treatment and outcome	Ulf-Joachim Gerlach
14.55 - 15.03	FP 71	Comparison of leukocyte esterase strip with sonication fluid cultures and frozen sections for diagnosis of periprosthetic joint infections	Paolo Di Benedetto
15.03 - 15.11	FP 72	Efficacy of Bio-active glass BAG-S53P4 for the reconstruction of segmental bone defects of septic origin. A comparative study	Thierry Begue
15.11 - 15.19	FP 73	Adverse events (AE) during prosthetic joint infection (PJI) empirical antimicrobial therapy: a five years prospective cohort study	Claire Triffault-Fillit
15.19 - 15.27	FP 74	Use of rifampicin for the treatment of two time surgery for prosthetic joint infections: multicenter retrospective study	Fanny Pierret
15.27 - 15.35	FP 75	Bone and Subcutaneous Tissue Pharmacokinetics of Vancomycin in Total Knee Replacement Patients	Mats Bue
15.35 - 16.10		**Coffee**	**Posters/Exhibition**
16.10 - 17.10		**Key Session 7: New strategies and biotechnologies in MIS**	**Chairs: Martin McNally & David Boutoille**
16.10 - 16.25		Overview of the developments in MIS in the scientific field: Biomaterials – coatings – 3D technologies	Christele Combes
16.25 - 16.40		The diagnosis tools: synthesis of the state of the art and perspectives	Martin Rottman
16.40 - 16.55		Surgical management: strategies, techniques and technologies - New paradigms?	Gérard Giordano
16.55 - 17.10		Approaches against infections in the next century: New antibiotics or old bacteriophages?	Andrej Trampuz
17.20-18.45			
19.30-22.30		**EBJIS Gala Dinner at Bateaux Nantais Address: Pont Général de la Motte Rouge, 44008 Nantes Cedex 1**	

8 September

	Room 300	Speaker
	Coffee	**Posters/Exhibition**
	Free Papers G (10 x 6mins+2mins)	**Chairs: Piseth Seng & Antonios Papadopoulos**
FP 76	Corynebacterium bone and joint infection (BJI): a retrospective cohort study in a reference center for BJI management	Pierre Chauvelot
FP 77	Orthopaedic implant-associated infections (OIAI) caused by *Propionibacterium spp*.: difficult to detect, easy to treat?	Nora Renz
FP 78	Clonal relationship of *Propionibacterium acnes* isolates recovered from bone and joint infections: Do microbiological definition of prosthesis joint infections apply to this microorganism?	Faten El Sayed
FP 79	*Propionibacterium acnes* can increase its arsenal of resistance: in vitro emergence of fluoroquinolone resistance and molecular characterization of the gyrA gene mutations involved	Stéphane Corvec
FP 80	Innovative treatment of acute and chronic osteitis of the lower extremity: Case-series of 15 patients	Stefan Huber-Wagner
FP 81	Infectious spondylitis after vertebroplasty: 18 cases in 5749 patients, and comparisons between pyogenic and tuberculosis	Jen-Chung Liao
FP 82	Clinical Experience of Treating Fungal Periprosthetic Joint Infection in a Specialist Orthopaedic Hospital	Tariq Azamgarhi
FP 83	Characteristics of prosthetic joint infection (PJI) due to *Enterobacter cloacae*: a serie of 20 cases	Bouige Aurelie
FP 84	Minocycline: a competitive agent to treat methicillin-resistant staphylococcal prosthetic joint infections	Géraldine Bart
FP 85	Primary foci of hematogenous periprosthetic joint infections: an analysis of 70 consecutive episodes	Anastasia Rakow
	Coffee	**Posters/Exhibition**
	Free Papers H (7 x 6mins+2mins)	**Chairs: Andreas Tiemann & Charles Cazanave**
FP 86	Input of a pharmacist in a regional referral center for bone and joint infections	Frédérique Bouchand
FP 87	An example of Infectious Disease advice in private health care facilities	Camille Fourcade
FP 88	The importance of cleanliness: a single center study of I & D-procedures	Jeroen Neyt
FP 89	Successful treatment of six weeks of antibiotics in hip and knee peripros-thetic joint infection after one-stage replacement arthroplasty: a French cohort study	Gabriella Chieffo
FP 90	Cementless one-stage revision of chronic infections in hip arthroplasties (CORIHA); Clinical outcome of the CORIHA protocol in 56 patients after a mean 4-year follow-up period	Jeppe Lange
FP 91	Importance of mazEF toxin-antitoxin system for intracellular development of *Staphylococcus aureus* in osteoblasts	Jerome Josse
FP 92	Two-stage Revision for Periprosthetic Joint Infection of the Hip: Culture-negative Versus Culture-positive infection	Shin Youngrok
	EBJIS General Assembly (for members of EBJIS, by invitation only)	

37th annual meeting of the
European Bone and Joint Infection Society

SAVE THE DATE

6 - 8 September 2018 · Helsinki · Finland

Main conference topic: Infection After Trauma

The expected session topics will be:

- Prosthetic joint infection: diagnosis, treatment, prevention
- Traumatology - treatment of bone infection in tibia, pelvis, ankle and calcaneus
- Plastic Surgery - role of flap reconstruction in bone and joint infections, reconstruction of tissue defects after prosthetic joint infection of the knee
- Biomaterials – role of bone substitutes in the treatment of infected bone

Important dates

Open abstract submission	2 January 2018
Preliminary Programme	27 February 2018
Abstract Submission Deadline	20 April 2018
Confirmation of Abstract Acceptance	5 June 2018
Early Registration Deadline	29 June 2018

We look forward to seeing you in Helsinki!

www.ebjis2018.org

European Bone & Joint Infection Society
EBJIS

9 September

		Room: 800 Auditorium	Speaker
09.00 - 10.20		**Key Session 8: Definition of infection: What is infection?**	**Chairs: Martin McNally & Gérard Giordano**
09.00 - 09.20 (5' discussion)		What is the definition of infection in TJA ?	Mario Morgenstern
09.20 - 09.40		Difference between AAOS definition and Swiss definition	Andrej Trampuz
09.40 - 10.00		What is the definition of infection in fracture treatment	Willem-Jan Metsemakers
10.00 - 10.20		Discussion on how to find an EBJIS definition	Olivier Borens
10.20 - 10.50		**Coffee**	**Posters/Exhibition**
10.50 - 12.20		**Best Papers (11 x 6 min + 2 min) Judges: EBJIS Vice President, Secretary General and Treasurer**	**Chairs: Martin McNally & Stéphane Corvec**
10.50 - 10.58	FP 93	Infection after spinal surgery. A prospective case-series including 2706 patients	Charles Peltier
10.58 - 11.06	FP 94	CSA-90 reduces implant-associated *Staphylococcus aureus* infection in a novel rat model	Rebecca Mills
11.06 - 11.14	FP 95	Results of the application of m. vastus lateralis flap plasty in treatment of chronic recurrent periprosthetic hip joint infection	Vasilii Artyukh
11.14 - 11.22	FP 96	Can Leucocyte/Bone marrow SPECT CT diagnose deep infection of shoulder arthroplasties?	Thomas Falstie-Jensen
11.22 - 11.30	FP 97	Cyclooxygenase-2 (COX-2) polymorphism rs689466 may contribute to the increased susceptibility to post-traumatic osteomyelitis in Chinese population	Nan Jiang
11.30 - 11.38	FP 98	Evaluation of the double-layered antibiotic-loaded cement spacer	Shinsuke Ikeda
11.38 - 11.46	FP 99	Radiographic, µCT and histological remodeling pattern of a gentamicin-eluting hydroxyapatite / calcium sulphate biocomopsite. One year results from a large animal model	Michael Diefenbeck
11.46 - 11.54	FP 100	Local gentamicin delivery from a thermoresponsive hyaluronan hydrogel successfully treats a chronic implant-related infection in a single stage revision in sheep	Willemijn Boot
11.54 - 12.02	FP 101	Synovial fluid D-lactate for the diagnosis of PJI and evaluation of treatment success	Svetlana Karbysheva
12.02 - 12.10	FP 102	Metagenomic sequencing for orthopaedic device-related infection	Teresa Street
12.10 - 12.18	FP 103	Early and delayed fracture-related infections are treated successfully with implant retention in a rabbit model of *Staphylococcus aureus* infection	Jan Pützler
12.20 - 12.35		**The history of EBJIS**	**Geert Walenkamp**
12.35 - 13.00		**Closing Remarks & Prizes**	
13.00 - 14.00		**Farewell cocktail**	

BONESUPPORT™

SYMPOSIUM

Thursday 7th September
12:50 – 13:50 ROOM 300

Meet the Experts
One Stage Surgery for Bone Infection

We invite you to join us, and find out about:

CERAMENT®|G and CERAMENT® V the only CE-marked injectable antibiotic eluting bone graft substitutes.

with reduced*

- Infection recurrence rate
- Fracture rate
- Wound leakage rate

*CERAMENT®|G **compared to other bioabsorbable antibiotic carriers**[1]

Expert Panel:
Mr. Martin McNally
Dr Matthew Scarborough
Mr. Jamie Ferguson
Dr. Michael Diefenbeck

To learn more about BONESUPPORT™
please email us at info@bonesupport.com

BONESUPPORT AB
Scheelevägen 19
SE-223 70 Lund
Sweden

T: +46 46 286 53 70
F: +46 46 286 53 71

PLATINUM SPONSOR
EBJIS 2017

Please come and visit us at the congress exhibition

www.bonesupport.com

*, [1]: data on file BONESUPPORT AB

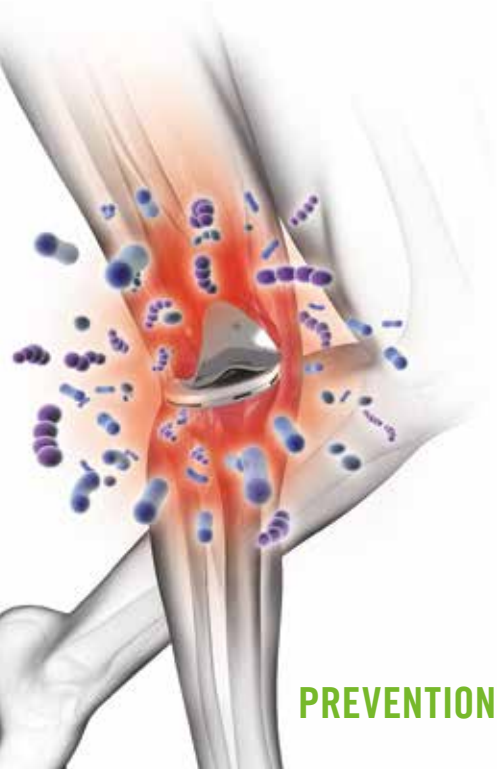
PR 0642-01 en EU

Industry Section

Heraeus

INFECTION MANAGEMENT

"Did you know that with targeted infection management you could achieve a healing rate of 90 % for periprosthetic infections (PPI)?"



THE KEY:
Interdisciplinary cooperation with integrated diagnostics and treatment – Infection Management from Heraeus.

Satellite Symposium

DEFECT-INFECT-REGENERATION

Infection Management with ALBC in bone surgery

O. Borens, T. Ferry, M.R. Reed
07.09.2017, 12.50 – 13.50, Main Auditorium

PREVENTION. DIAGNOSIS. TREATMENT.

HERAEUS MEDICAL

www.heraeus-medical.com

Thursday 7 September, 12.50 - 13.50 | **800 Auditorium**

Industry Symposium A
Defect-Infect-Regeneration

Heraeus

Infection Management with ALBC in bone surgery

Speakers: O. Borens, T. Ferry, M.R. Reed

Thursday 7 September, 12.50 - 13.50 | **Room 300**

Industry Symposium B
Meet the experts - one stage surgery for bone infection

BONESUPPORT™

CERAMENT®|G and CERAMENT® V the only CE-marked injectable antibiotic eluting bone graft substitutes

Expert Panel:
Mr. Martin McNally
Dr Matthew Scarborough
Mr. Jamie Ferguson
Dr. Michael Diefenbeck

STIMULAN

POWER TO TRANSFORM OUTCOMES

Only STIMULAN® is recrystallised to revitalise your infection management strategy

STIMULAN® is a calcium sulfate with a unique crystal structure which may be placed directly at the site of infection[1,2]. STIMULAN® is the perfect partner for your infection management strategy - enabling you to transform outcomes and reduce associated costs of care across a wide range of settings[2].

Discover the true potential at biocomposites.com

The mixing of antibiotics with the STIMULAN® Kit/STIMULAN® Rapid Cure device has not been assessed by a European Medicines Competent Authority and is considered off-label usage of the medicinal product and of the device. To do so is at the professional risk of the surgeon / healthcare professional. **References 1.** Cooper, J.J., Method of producing surgical grade calcium sulphate, patent GB 2367552; EP 1204599; 678039, 1999. **2.** Schlatterer, D., Early Clinical Experience with a New Calcium Sulphate Bead alongside Vancomycin and Tobramycin for Management of Infections and Dead Space: Bead Resorption and No Wound Drainage,, in 24th Annual Scientific Meeting Limb Lengthening and Reconstructions Society ASAMI-North America. 2014 : Montreal, Quebec, Canada. Patents Granted: GB2496710; EP2594231 B1; US8883063; ZL201210466117. X MA0117R1

Biocomposites®

Friday 8 September, 11.50-12.50 | **Room 150**

Industry Symposium C
Relevance and new approaches in PJI diagnostics

ZIMMER BIOMET
Your progress. Our promise.™

Moderator: J. Neyt

PJI, an emerging problem – Evidence from the national registries, L. Jeys
Alpha defensin – Has the era of the biomarker arrived?, J. Neyt
The algorithm to diagnose PJI in low grade infection – A protocol, C. Romano
How pathways help in the treatment of PJI, L. Jeys

Friday 8 September, 11.50-12.50 | **Room 300**

Industry Symposium D
Improving outcomes in infected cases

Biocomposites®

- surgical tips, tricks and lessons learnt from over 1,000 cases

Speaker: Edward J. McPherson, M.D., F.A.C.S.

Exhibitor Directory

Booth	Company	Description
E 38	aap Implantate AG info@aap.de Tel: +49 (0) 30 75019-111 www.aap.de	aap Implantate AG is a globally operating medical device company developing, manufacturing and marketing trauma products for orthopaedics. The IP protected portfolio includes tree innovative platform technologies: • the anatomical plating system LOQTEQ®, • antibacterial silver coating technology, • resorbable magnesium implant technology. All these technologies address unmed needs and challenges in orthopaedics.
E 04	Aerobiotix Inc. sales@aerobiotix.com Tel: 1-888-978-7087 www.aerobiotix.com	Aerobiotix, Inc. is a company driving leadership in advanced air quality products for the health-care market by manufacturing and marketing novel technologies to build healthy environments worldwide. Our focus is to build awareness of the contribution of air quality issues to hospital acquired infections and provide safe, effective and economical devices to re-mediate those issues.
E 26	Adler Ortho srl info@adlerortho.com Tel: +39 02 6154371 www.adlerortho.com	Adler Ortho is an Italian based Orthopaedic Company specialized in designing and manufacturing hip, knee and Custom made implants. Adler Ortho has the longest and widest experience with powder manufacturing technology and it's the Company offering 3D printed implants made of Titanium, CoCrMo and Stainless Steel.
E 24	Biocomposites info@biocomposites.com Tel: +44 (0) 1782 338 580 www.biocomposites.com	At Biocomposites, we are proud to be driving improved outcomes across a wide range of clinical applications for patients and surgeons. Our team of specialists is singularly focused on the development of innovative calcium compounds for surgical use. With over 25 years' experience and an unrivalled dedication to quality, the products we research, engineer and manufacture are at the forefront of calcium technology.
E 08	BonAlive Biomaterials Ltd. contact@bonalive.com Tel: +358 (0)401 77 44 00 www.bonalive.com	BonAlive Biomaterials Ltd is a privately held Class III medical device manufacturer that is based in Finland. We manufacture CE-marked and 510k approved products for bone regeneration. For the past 15 years our products have shown unmatched clinical performance in cranio-maxillofacial, ear, nose and throat, as well as orthopaedic and trauma surgery.
E 02	BONESUPPORT AB info@bonesupport.com Tel: +46 46 286 53 70 www.bonesupport.com	BONESUPPORT™ is an orthobiologic company specializing in the development of innovative injectable bone graft substitutes that remodel into bone within 6 to 12 months. Used in more than 30,000 patients, and includes the only CE marked injectable antibiotic eluting bone graft substitutes; CERAMENT|G with gentamicin, and CERAMENT|V with vancomycin.

Exhibitor Directory

Booth	Company	Description
E 16	Ceramisys info@ceramisys.com Tel: +44 (0) 114 232 7070 www.ceramisys.com	For over 15 years Ceramisys has been specialised in the manufacture and development of unique synthetic biomaterials. Working in collaboration with renowned research institutions and manufacturing to international quality standards enables the provision of innovative high quality products to customers globally. Ceramisys products are approved in the majority of international markets.
E 20	Curetis GmbH contact@curetis.com Tel: +49 (0)7031 / 49195-10 www.curetis.com	Founded in 2007, Curetis is a molecular diagnostics company which focuses on the development and commercialization of reliable, fast and cost - effective products for diagnosing severe infectious diseases. The diagnostic solutions of Curetis enable rapid multi - parameter pathogen and antibiotic resistance marker detection in only a few hours.
E 36	Exactech International Operation AG eio@exac.com Tel: +41 31 300 35 20 ww.exac.com	Exactech develops and produces bone and joint restoration products that help surgeons worldwide make patients more mobile. Since 1985, Exactech has looked at clinical challenges through the eyes of a surgeon, because it was founded by one. For more information, please visit www.exac.com.
E 14	Heraeus Medical GmbH contact.medical@ heraeus.com Tel: +49 6181 35 3399 www.heraeus.com	Heraeus Medical brings value to the patient and the healthcare professional by providing cost-effective solutions for the fixation of joint implants and driving infection management. The company has extensive experience in the field of therapeutic support for PJI with local antibiotics and is a reliable and committed partner in all aspects that deal with the management of musculoskeletal infections.
E 28	IMPLANTCAST f.briant@implantcast.fr Tel: +33 4 78 02 34 00 www.implantcast.de	IMPLANTCAST is a highly specialised, innovative, midsize company located in Buxtehude near Hamburg. Currently more than 460 employees are working in the departments of Research and Development, Manufacturing, Packaging, Quality Management, Sales and Marketing of Primary, Revision and Tumor Prostheses. We provide orthopedic medical devices in partnership with orthopedic surgeons in order to deliver the highest quality revision and tumor prostheses in the world to patients.
E 30	Merete GmbH service@merete.de Tel: +49 30 779980-0 www.merete-medical.com	As an owner-managed German medical technology company and inventor of the BioBall® System, Merete has been the competent partner for reliable solutions to surgical challenges for more than 20 years, in more than 40 countries. Merete's top-quality implants are developed and manufactured in Germany and have been proven internationally.
E 12	Noraker contact@noraker.com Tel: +33 (0)4 78 93 30 92 www.noraker.com	Since it was founded in 2005, NORAKER has been specialised in the design, production and marketing of synthetic and absorbable biomaterial-based implantable medical devices for bone substitution and osteosynthesis
E22	Pro-implant Foundation info@ pro-implant-foundation.org Tel.: +49 30 450 615073 www.pro-implant- foundation.org	The PRO-IMPLANT Foundation is committed to supporting research, education, global networking and care of patients with bone, joint or implant infection. Final aim is to improve the quality of patient lives.

Zimmer Biomet, Surgeons' Partner to Defeat Periprosthetic Joint Infections

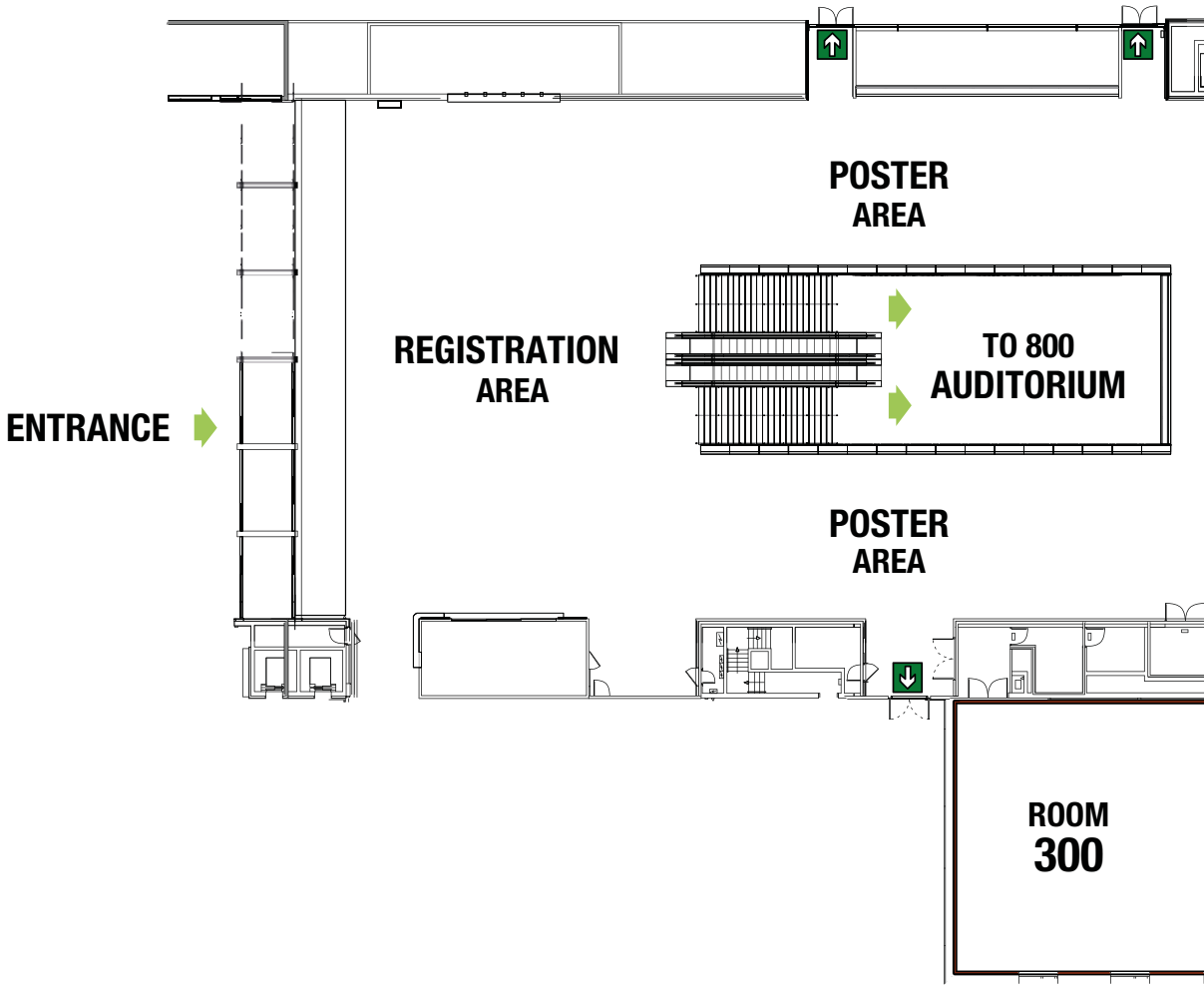
ZIMMER BIOMET
Your progress. Our promise.™

0759.1-FR-en-REV0717

Exhibitor Directory

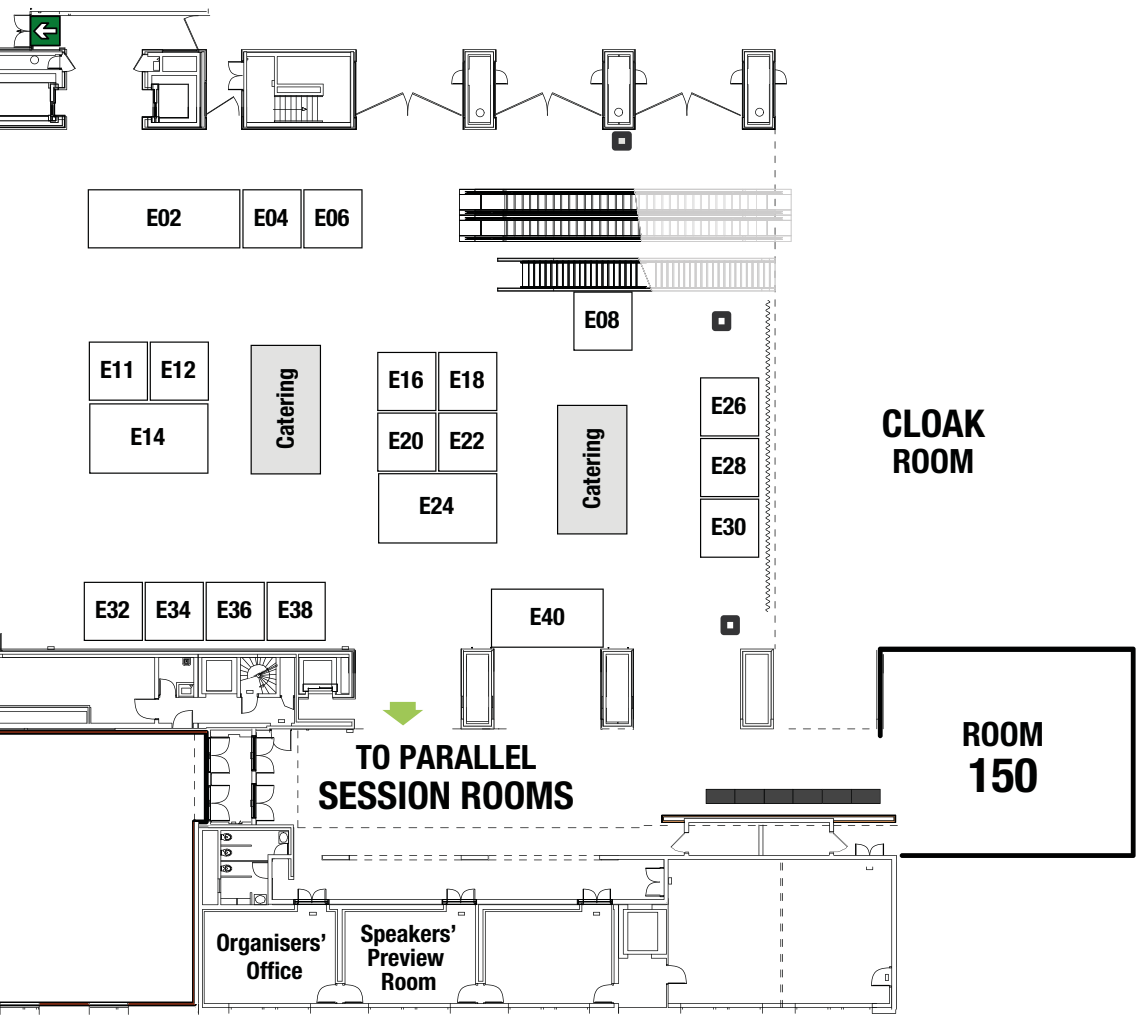
Booth	Company		Description
E 06	Smith & Nephew Advanced Wound Management maricel.pamely@ smith-nephew.com Tel: +44 1482 673632 www.smith-nephew.com	smith&nephew	We're here to help you reduce the human and economic cost of wounds. We do that through a pioneering approach to the design of our products and services that improve patient outcomes, and at the same time conserve resources for health care systems.
E 34	Synimed synimed@synimed.com Tel: + 33 5 55 98 31 38 www.synimed.com	Synimed	Synimed specialized in design, manufacturing and marketing of medical devices and implants. Biomaterials and Spinal implants:Cements for orthopedics, vertebroplasty, kyphoplasty and cranioplasty, Mixing and application systems for these cements, Hip and knee spacers with antibiotics, Antibiotic Coated Nails Tibia-Femur, Femoral Canal kit. Spinal implants division: Kyphoplasty Balloons and Vertebroplasty Kits.
E 11	STRYKER Tel: +33 04 72 45 36 00 www.stryker.com	stryker	Stryker is one of the world's leading medical technology companies and, together with our customers, we are driven to make healthcare better. The Company offers a diverse array of innovative products and services in Orthopaedics, Medical and Surgical, and Neurotechnology and Spine that help improve patient and hospital outcomes. Stryker is active in over 100 countries around the world.
E 18	Tecres S.p.a. info@tecres.it Tel: +39 045 9217311 www.tecres.it	TECRES Advancing High Technology	Tecres is a company with more than thirty years of experience as manufacturer of bone cements for orthopaedics. Cemex bone cements and Spacer, the unique temporary antibiotics-loaded prostheses for two-stage septic revision, are on the market with Gentamicin and with a special line Vancogenx, containing Vancomycin and Gentamicin.
E 32	Waldemar Link GmbH&Co.KG events@linkhh.de Tel: +494053995383 www.linkorthopaedics.com	LINK	More than 60 years in endoprosthetics with innovative designs LINK pioneered new developments in revision and tumor surgery. The current LINK product range includes a wide range of highly sophisticated endoprostheses for all major joints, trauma implants and instruments for hand, spinal and shoulder surgery. Modern production facilities, high safety standards and the ongoing quest for new developments underpin the quality of LINK product quality.
E 40	Zimmer Biomet Tel: +41 58 854 80 00 www.zimmerbiomet.com	ZIMMER BIOMET Your progress. Our promise.	Founded in 1927 and headquartered in Warsaw, Indiana, Zimmer Biomet is a global leader in musculoskeletal healthcare. We design, manufacture and market orthopaedic reconstructive products; sports medicine, biologics, extremities and trauma products; office based technologies; spine, craniomaxillofacial and thoracic products; dental implants; and related surgical products.

Floor plan



Booth	Company
E 02	BONESUPPORT AB
E 04	Aerobiotix Inc.
E 06	Smith & Nephew Advanced Wound Management
E 08	BonAlive Biomaterials Ltd.
E 11	STRYKER
E 12	Noraker
E 14	Heraeus Medical GmbH
E 16	Ceramisys
E 18	Tecres S.p.a.
E 20	Curetis GmbH

Booth	Company
E 22	Pro-Implant Foundation
E 24	Biocomposites
E 26	Adler Ortho srl
E 28	IMPLANTCAST
E 30	Merete GmbH
E 32	Waldemar Link GmbH& Co. KG
E 34	Synimed
E 36	Exactech International Operation AG
E 38	aap Implantate AG
E 40	Zimmer Biomet


E02
E04
E06
E08
E11
E12
E14
Catering
E16
E18
E20
E22
E24
Catering
E26
E28
E30
CLOAK
ROOM
E32
E34
E36
E38
E40
TO PARALLEL
SESSION ROOMS
ROOM
150
Organisers'
Office
Speakers'
Preview
Room

Oral Abstracts

[FP 1] THE SPREAD OF FOOT INFECTION AND ITS IMPACT ON THE OUTCOMES OF MAJOR AMPUTATIONS OF LOWER EXTREMITIES IN DIABETIC PATIENTS

Danguole Vaznaisiene[1], Rita Sulcaite[2], Astra Vitkauskiene[4], Beltrand Eric[3], Arturas Spucis[4], Anatolijus Reingardas[4], Vytautas Kymantas[3], Aukse Mickiene[1], Eric Senneville[5]

[1] Lithuanian University of Health Sciences, Kaunas Clinical Hospital, Infectious Diseases Department, Kaunas, Lithuania
[2] Lithuanian University of Health, Science, Department of Endocrinology, Kaunas, Lithuania
[3] Orthopedic Surgery, Tourcoing Hospital, Tourcoing, France
[4] Lithuanian University of Health Sciences, Republican Hospital of Kaunas, Kaunas, Lithuania
[5] Centre Hospitalier Gustave Dron, Service Universitaire des Maladies Infectieuses et du Voyageur, Tourcoing, France

Aim: To assess the spread of foot infection and its impact on the outcomes of major amputations of lower extremities in diabetic patients.

Method: In a multicentre retrospective and prospective cohort study, we included adult diabetic patients (≥ 18 years) who underwent a major amputation of a lower limb in 5 hospitals between 2000 and 2009, 2012 and 2014. A total of 51 patients were included (of which 27 (52.94%) were men and 24 (47.06%) were women) with the mean age of 65.51 years (SD=16.99). Concomitant section's osseous slice biopsy (BA) and percutaneous bone biopsy of the distal site (BD) were performed during limb amputation. A new surgical set-up and new instruments were used to try and reduce the likelihood of cross-contamination during surgery. A positive culture was defined as the identification of at least 1 species of bacteria not belonging to the skin flora or at least 2 bacteria belonging to the skin flora (CoNS (coagulase negative staphylococci), *Corynebacterium spp*, *Propionibacterium acnes*) with the same antibiotic susceptibility profiles. A doubtful culture was defined as the identification of 1 species of bacteria belonging to the skin flora. The patients were followed-up for 1 year. Stump outcomes were assessed on the delay of complete healing, equipment, need of re-intervention and antibiotics.

Results: In total, 51 BA were performed during major lower limb amputations (17 above the knee and 34 below the knee) in diabetic patients. Nine (17.65%) bacterial culture results from BA specimens were positive, 7 (13.73%) doubtful and 35 (68.63%) sterile. Before amputation, 23 patients (45.1%) had not received any antibiotics, including 16 (31.37%) with an antibiotic-free interval of 15 days or more. Microorganisms identified in BA were also cultured from the distal site in 33.33% of the cases. Positive BA was associated with prolonged complete stump healing, delay of complete healing (more than 6 months), re-amputation and the need of antibiotics

Conclusions: The microorganisms identified from BA play a role in stump healing in diabetic patients. BA is useful during major limb amputation due to infectious complications and antibiotic therapy could be corrected on the basis of the BA culture results.

[FP 2] VASCULARIZED FIBULA FLAPS FOR SEGMENTAL BONE LOSS SECONDARY TO OSTEOMYELITIS IN CHILDREN

Antonio Loro[1], George Galiwango[2], Paul Muwa[3], Andrew Hodges[2], Robert Ayella[3]

[1] *Corsu Rehabilitation Hospital, Kisubi, Uganda*
[2] *Corsu Rehabilitation Hospital, Plastic Surgery, Kisubi, Uganda*
[3] *Corsu Rehabilitation Hospital, Orthopedic, Kisubi, Uganda*

Aim: Segmental bone defects following osteomyelitis in pediatric age group may require specifically designed surgical options. Clinical and radiographic elements dictate the option. Different elements play a role on the surgeon's choice. Among them, the size of the defect, the size and the quality of the bone stock available, the status of the skin envelope, the involvement of the adjacent joint. When conditions occur, vascularized fibula flap may represent a solution in managing defects of the long bones even during the early years of life.

Method: A retrospective study, covering the period between October 2013 and September 2015, was done. Fourteen patients, nine males, five females, aged 2-13 years, with mean skeletal defect of 8.6 cm (range, 5 to 14 cm), were treated; the mean graft length was of 8.3 cm. The bones involved were femur (4), radius (4), tibia (3) and humerus (3). In 5 cases fibula with its epiphysis was used, in 5 cases the flap was osteocutaneous and in the remaining 4 cases only fibula shaft was utilized. After an average time of 8 months from eradication of infection, the procedure was carried out and the flap was stabilized with external fixators, Kirschner's wires or mini-plate. No graft augmentation was used.

Results: Total limb reconstruction was achieved in 13 of 14 cases. The average integration period was 3.5 months. The mean follow-up period was 20.7 months (range 22-43). Mean time for full weight bearing in reconstructed lower limb was 5.8 months. All patients were walking pain-free and none with a supportive device. The fibular flap with epiphysis had good functional outcomes. A few early and delayed complications were observed. Lengthening through one graft on the forearm was achieved and the radial length restored.

Conclusions: In low resource setting, provided that the technical skills and the right equipment are available, reconstruction of segmental bone defects secondary to hematogenous osteomyelitis in children using vascularized fibula flap is a viable option that salvages and restores limb function.

[FP 3] OUTCOMES OF FREE TISSUE TRANSFER IN TREATMENT OF CHRONIC OSTEOMYELITIS.

Alex Ramsden[1], James Chan[2], Robert Millar[2], Martin McNally[1]

[1] *Nuffield Orthopaedic Centre, Oxford University Hospitals, The Bone Infection Unit, Oxford, United Kingdom*
[2] *Nuffield Orthopaedic Centre, Oxford, United Kingdom*

Aim: Free tissue transfer is an important tool in successful reconstruction of chronic osteomyelitis but can be challenging due to extensive scarring. Our unit follows a multidisciplinary approach including excision of osteomyelitis and immediate microvascular soft-tissue reconstruction simultaneously with orthopaedic reconstruction. We aim to evaluate the success of free tissue transfer and disease recurrence in patients with chronic osteomyelitis.

Method: This is a retrospective consecutive cohort study between 2010-2015 inclusive by a single microvascular surgeon in a single centre. All patients had one stage excision of osteomyelitis, orthopaedic reconstruction and microvascular soft tissue reconstruction, with a minimum follow-up period of 1 year.

Results:

		Number
Total no of patients		73
Total no of flaps		76
Age (years)		Mean age (at time of flap): 45 Range: 18 – 82
Male		51 (70%)
Female		22 (30%)
Location of Osteomyelitis		
	Tib/fib	63 (83%)
	Ankle/foot	9 (12%)
	Femur	4 (5%)
Host ASA grade		ASA 2 or more in 80% patients
Flap	Gracilis	57 (75%)
	Latissimus Dorsi	12 (16%)
	Fibula	3
	Anterolateral thigh	1
	Vastus Lateralis	2
	Rectus Abdominis	1
Arterial Anastomosis	Technique	
	End to End	36 (47%)
	End to Side	40 (53%)
	Zero intra-operative revisions	64 (84%)
	1 or more revisions	12 (16%)

Venous Anastomosis (**88 total in 76 flaps**)		
	Choice of recipient veins	86 (98%) deep 2 superficial
	One vein	66 (75%)
	Two veins	11 (25%)
	Vein graft	1
	End to End (suture)	74 (84%)
	End to End (coupler)	11 (12.5%)
	End to Side	1
Ischaemic time (mins)		Mean: 83.6 Range: 40 – 210
Op time (hours)		Mean: 7.76 Range: 5 – 16
Complications		
	Total flap failure	3 (<4%)
	Partial flap failure	1 requiring secondary local flap
	Return to theatre (reasons)	11 emergency return to theatre episodes in 7 patients (flap salvage *8, further reconstruction *3)
	DVT/PE	3 (2 x PE, 1 x DVT)
	Residual / persistent infection	8 6 of 8 ultimately eradicated with further surgery + antibiotics
	Death secondary to procedure	0

Conclusions: Chronic osteomyelitis can be treated with simultaneous excision, orthopaedic reconstruction and free soft tissue reconstruction with high level of success (>90% infection-free at one year).
Microvascular soft tissue reconstruction in these patients is almost always technically challenging and consequently a range of flaps and anastomotic techniques are required for these long operations. However, despite this, our study shows that free tissue transfer has a flap survival rate of >95%.

[FP 4] AN ALGORITHM PROTOCOL COMPARISON OF ILIZAROV TECHNIQUES IN THE MANAGEMENT OF INFECTED TIBIAL NON-UNION

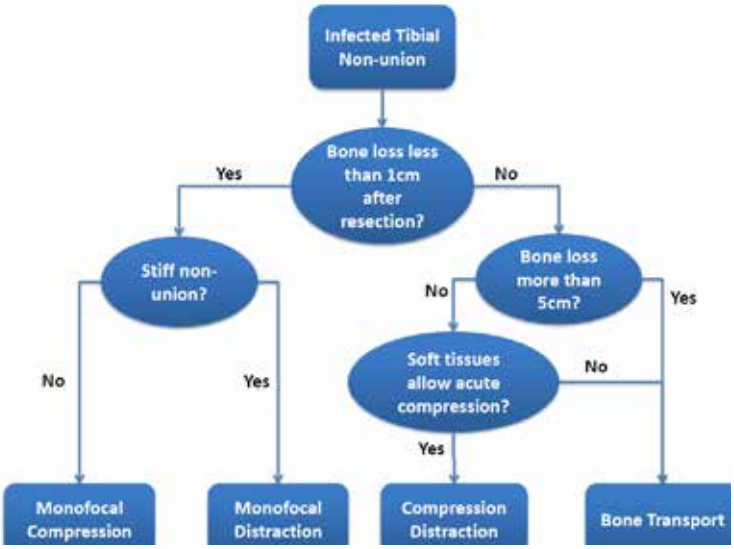
Jamie Ferguson[1], Martin McNally[1], Raj Kugan[1], David Stubbs[1]

[1] *Nuffield Orthopaedic Centre, Oxford University Hospitals, Oxford, United Kingdom*

Aims: Ilizarov described four methods of treating non-unions but gave little information on the specific indications for each technique. He claimed, 'infection burns in the fire of regeneration' and suggested distraction osteogenesis could effectively treat infected non-unions.
This study investigated a treatment algorithm for described Ilizarov methods in managing infected tibial non-union, using non-union mobility and segmental defect size to govern treatment choice. Primary outcome measures were infection eradication, bone union and ASAMI bone and function scores.

Patients and Methods: A consecutive series of 79 patients with confirmed, infected tibial non-union, were treated with one of four Ilizarov protocols, consisting of; monofocal distraction (26 cases), monofocal compression (19), bifocal compression/distraction (16) and bone transport (18). Median non-union duration was 10 months (range 2-168). All patients had undergone at least one previous operation (mean 2.2; range 1-5), 38 had associated limb deformity and 49 had non-viable non-unions. Twenty-six cases (33%) had a new simultaneous muscle flap reconstruction at the time of Ilizarov surgery and 25 had pre-existing flaps reused.

Treatment algorithm based on assessment of bone gap and non-union stiffness, measured after resection of non-viable bone.



Results: The treatment algorithm was easy to apply, being based on easily assessable criteria.
Infection was eradicated in 76 cases (96.2%) at a mean follow-up of 40.8 months (range 6-131). All three cases of infection recurrence occurred in the monofocal compression group. They required repeat excision and Ilizarov distraction in two cases and below-knee amputation in one.
Union was achieved in 68 cases (86.1%) with the initial Ilizarov methods alone. Union was highest amongst the monofocal distraction and bifocal compression/distraction groups, 96.2% and 93.8% respectively. Mean external fixator time was 7.5 months (range 3-17).
Monofocal compression was successful in only 73.7% of mobile non-unions, with significantly lower ASAMI scores and a 26.3% re-fracture rate.
Bone transport secured union in 77.8% (14/18) but with a 44.4% unplanned reoperation rate. However, after further treatment, infection-free union following bone transport was 100%.

Conclusion: We cannot recommend Ilizarov monofocal compression in the treatment of infected, mobile non-unions. Distraction (monofocal or bifocal) was effective and is associated with higher rates of union and infection clearance.

[FP 5] ASSOCIATION OF TNF-A AND LYMPHOTOXIN-A GENE POLYMORPHISMS AND SUSCEPTIBILITY TO EXTREMITY CHRONIC OSTEOMYELITIS IN CHINESE POPULATION

Nan Jiang[1], Xing-qi Zhao[1], Bin Yu[1]

[1] *Nanfang Hospital, Guangzhou, China*

Aim: Previous studies have indicated that TNF-α and lymphotoxin-α (LTA) gene polymorphisms are involved in the pathogenesis of inflammatory diseases. However, potential associations of TNF-α and LTA gene polymorphisms with extremity chronic osteomyelitis remain unclear. This study aimed to investigate association of TNFA gene polymorphisms (rs1800629, rs361525, rs1799964, rs1800630, rs1799724 and rs1800750) and LTA gene polymorphism (rs909253) with the susceptibility of extremity chronic osteomyelitis in Chinese population.

Method: A total of 233 patients with extremity chronic osteomyelitis and 200 healthy controls were genotyped for the above 7 single-nucleotide polymorphisms (SNPs) in TNFA and LTA genes using the genotyping method*.

Results: Significant difference was found regarding the genotype distribution of rs909253 between patients and healthy controls. The mutant allele C frequency in rs909253 in patient group was significantly higher than that in control group (P = 0.001). In addition, significant associations were identified between rs909253 and the risk of developing chronic osteomyelitis by dominant model (P = 0.040), recessive model (P = 0.002) and homozygous model (P = 0.001). However, no significant associaitions were identified between TNFA gene polymorphims and the susceptibility of developing chronic osteomyelitis.

Conclusions: The present study suggests that LTA gene polymorphim rs909253 may participate in the pathogenesis of chronic osteomyelitis in Chinese population.

* SNaPshot

[FP 6] EVALUATION OF THE IN VITRO ACTIVITIES OF CEFTOBIPROLE AND COMPARATORS AGAINST GRAM POSITIVE AND GRAM NEGATIVE STRAINS ISOLATED FROM BONE IMPLANT-ASSOCIATED INFECTIONS

Bouige Aurelie[1], Fourcade Camille[2], Alain Bicart See[2], Marie-Pierre Felice[1], Gautie Laurence[3], Guillaume Krin[4], Pascale Marlin[4], Gérard Giordano[4], Eric Bonnet[2]

[1] *Hôpital Joseph Ducuing, Biological Department, Toulouse, France*
[2] *Hôpital Joseph Ducuing, Infectious Disease Unit, Toulouse, France*
[3] *Hôpital Joseph Ducuing, Pharmacy, Toulouse, France*
[4] *Hôpital Joseph Ducuing, Orthopedy, Toulouse, France*

Aim: Ceftobiprole, a broad-spectrum cephalosporin, could be used for post-operative treatment of bone implant-associated infections. The aim of the study is to evaluate the in vitro susceptibility of bacteria isolated from bone implant-associated infections to ceftobiprole.

Method: We conducted an in vitro, retrospective and comparative study between July 2013 to April 2017 including patients with bone implant-associated infections (prosthesis joint infection (PJI) and osteosynthesis material (OM)). To evaluate MIC distribution of ceftobiprole against Gram positive and Gram negative strains and to compare activity of ceftobiprole to vancomycin for Gram positive and ceftriaxone or ceftazidime for Gram negative strains, we tested all strains (stored in Cryobank storage system) for minimal inhibitory concentrations (MIC) determination by E-test bandelet for ceftobiprole and comparator antibiotics.

Results (Table): We collected 63 Gram negative strains (57 *Enterobateriaceae* and 6 *Pseudomonas aeruginosa*), isolated from 25 patients with OM and 38 patients with PJI (23 hips and 15 knees), and 100 Gram positive strains (85 *Staphylococcus sp*, 8 *E. faecalis*, 7 *Propionibacterium sp.*) isolated from 38 patients with OM and 62 patients with PJI (33 hips, 28 knees, 1 shoulder).
A total of 61.4% of *Enterobacteriaceae* were susceptible both with ceftobiprole and ceftriaxone, 100% of *P. aeruginosa* were susceptible with ceftazidime and 83,3% with ceftobiptrole and finally 100% of Gram positive were susceptible both with ceftobiprole and vancomycin (susceptibility interpretation was based on EUCAST breakpoints)

Conclusions: Our results suggest that ceftobiprole has a good in vitro activity against strains isolated from bone implant-associated infections. It could be an effective alternative to vancomycin and ceftriaxone or ceftazidime in post-operative treatment but pharmacokinetics and pharmacodynamics studies must be performed in bone tissue.

				Ceftobiprole		Comparators: Vancomycin		Ceftriaxone		Ceftazidime	
				MIC_{90} [1]	MIC range	MIC_{90}	MIC range	MIC_{90}	MIC range	MIC_{90}	MIC range
	Staphylococcus sp.	All	All (n=85)	0,75	0,002-1,5	1,5	0,25-2				
			Methi-S[2] (n=51)	0,5	0,002-1,5	1,5	0,25-2				
			Methi-R[3] (n=34)	1	0,094-1,5	1,5	0,38-2				
		S. aureus	All (n=39)	0,5	0,012-1	1	0,25-1				
			Methi-S (n=35)	0,38	0,012- 0,5	1	0,25-1				
			Methi-R (n=4)	0,75	0,50-1	0,75	0,38-0,75				
		Coagulase negative staphylococci	All (n=46)	1	0,002-1,5	1,5	0,25-2				
			Methi-S (n=16)	0,75	0,002-1,5	1,5	0,25-2				
			Methi-R (n=30)	1	0,094-1,5	1,5	0,38-2				
	E. faecalis (n=8)			0,19	0,047-0,38	2	0,38-2				
	Propionibacterium sp. (n=7)			0,032	0,006-0,047	0,19	0,094-0,38				
	Enterobacteriaceae[4] (n= 35)			0,064	0,016-0,094			0,19	<0,016-0,50		
	P.aeruginosa (n= 6)			3	0,75 - >32					2	0,75-8

[1] (mg/L)
[2] methicillin-susceptible strains
[3] methicillin-resistant strains
[4] extended- spectrum beta-lactamase and hyperexpressed cephalosporinase not included (n=22)

[FP 7] PRE-HOSPITAL ANTIBIOTIC PROPHYLAXIS REDUCES BACTERIAL BURDEN AT TIME OF DEBRIDEMENT IN A RABBIT OPEN FRACTURE MODEL

Alejandro Vallejo[1], Mario Morgenstern[2], Jan Puetzler[3], Daniel Arens[1], Thomas Fintan Moriarty[1], Geoff Richards[1]

[1] *Ao Research Institute, Davos, Switzerland*
[2] *University Hospital Basel, Basel, Switzerland*
[3] *University Hospital Muenster, Muenster, Germany*

Aim: Antibiotic prophylaxis is critical for the prevention of fracture related infection (FRI) in trauma patients, particularly those with open wounds[1]. Administration of prophylactic antibiotics prior to arrival at the hospital (e.g. by paramedics) may reduce intraoperative bacterial load and has been recommended [2]; however scientific evidence for pre-hospital administration is scarce [3].

Methods: The contaminated rabbit humeral osteotomy model of Arens[4] was modified to resemble the sequence of events in open fractures. In an initial surgery representing the "accident", a 2mm mid-diaphyseal hole was created in the humerus and the wound was contaminated with a clinical *Staphylococcus aureus* strain (mean $1.6x10^6$ Colony Forming Units, CFU). The animals were allowed recover for 4 hours mimicking the period from trauma to debridement. At this time, a second procedure was performed in order to debride and irrigate the wound, and to fix a complete osteotomy that was made through the initial defect. Three test groups were included (n=8 rabbits per group): 1) no antibiotic therapy; 2) standard "in-hospital" antibiotic prophylaxis (24 hours therapy starting 30 minutes before surgery); 3) "pre-hospital" antibiotics (single dose 15 minutes after the "accident"). The antibiotic used was cefuroxime and was administered in a weight-adjusted dosage.

Results: In the absence of any antibiotic administration (group 1), high bacterial counts were identified at fixation ($1.89x10^6$ CFU) and at euthanasia (day 7, $7.70x10^7$ CFU) in all rabbits. When 24 hours of antibiotics were administered commencing "in hospital" (group 2), the bacterial load during fixation surgery was slightly reduced (CFU $9.88x10^5$) and 50% of animals were infected at euthanasia. When one single shot of antibiotics was administered in the "pre-hospital" setting (group 3), the bacterial load during fixation surgery was significantly lower than for both groups 1 and 2(CFU $2.34x10^3$) yet all animals were infected at euthanasia.

Conclusions: Early pre-hospital administration of antibiotics significantly reduced the bacterial load in the operative field at the time of debridement compared to regular prophylaxis. However, continuation of systemic antibiotics is necessary in order to prevent infection in this model.

References:

1. Patzakis MJ (1989*) Clin Orthop Relat Res*. Jun ;(243):36-40.
2. National Institute for Health and Care Excellence, nice.org.uk/guidance/ng37 17 February 2016.
3. Thomas SH (2013*) Air Med J.* Mar-Apr;32(2):74-9.
4. Arens D, et al. (2015*) European Cells and Materials* Vol.30 2015 p148-162.

[FP 8] SYNERGISTIC ACTIVITY OF LYTIC BACTERIOPHAGE AND ANTIBIOTICS AGAINST METHICILLIN-RESISTANT STAPHYLOCOCCUS AUREUS BIOFILM

Tamta Tkhilaishvili[1], Mariagrazia Di Luca[2], Andrej Trampuz[2], Jeannot Gaudias

[1] Berlin-Brandenburg Centrum for Regenerative Therapies, Universitätsmedizin Charité, Berlin-Brandenburg School for Regenerative Therapies, Universitätsmedizin Charité, Berlin, Germany
[2] Charité-Universitätsmedizin Berlin, Berlin, Germany

Aim: The increase of antimicrobial resistance reduces treatment options for implant-associated infections caused by methicillin-resistant *Staphylococcus aureus* (MRSA). Bacteriophages present a promising alternative to treat biofilm-related infections due to their rapid bactericidal activity and activity on multi-drug resistant bacteria. In this study, we investigated the synergistic activity of lytic bacteriophage Sb-1 with different antibiotics against MRSA biofilm, using a real-time highly sensitive assay measuring growth-related heat production (microcalorimetry).

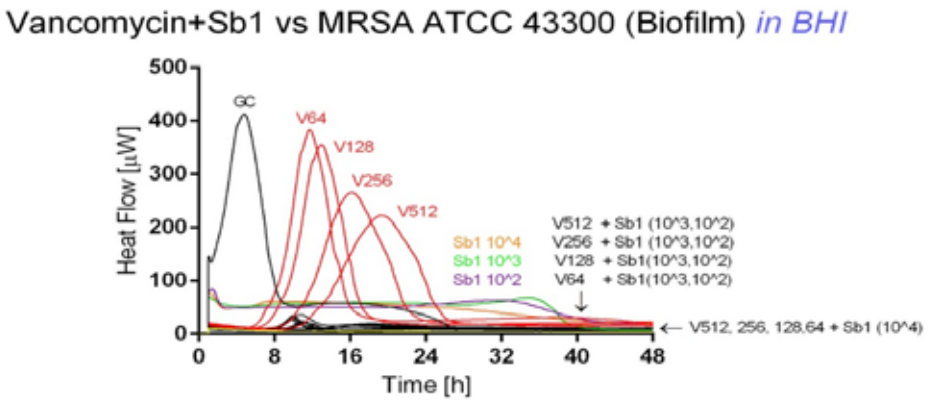
Methods: Rifampin, fosfomycin, vancomycin and daptomycin were tested alone and in combination with *S. aureus* specific phage, Sb-1, against MRSA (*Staphylococcus aureus**). MRSA biofilm was formed on porous glass beads (Φ 4 mm, pore size 60 µm) and incubated for 24 h at 37° C in BHI. After 3 times washing biofilms were exposed first to different titers of bacteriophages, ranging from 10^2 to10^4 plaque-forming unite (pfu)/ml and after 24h treated again with subinhibitory concentration of antibiotics (corresponding to 1/4, 1/8, 1/16, 1/32 x $MHIC_{biofilm}$). After 24h antibiotic treatment, the presence of biofilm on glass beads was evaluated by isothermal microcalorimetry for 48h. Heat flow (µW) and total heat (J) were measured.

Results: MHICs of rifampin, fosfomycin, daptomycin and vancomycin when tested alone were 256 µg/ml, >4096 µg/ml, 128µg/ml and 2048µg/ml, respectively. Synergistic activity against biofilm MRSA was observed when vancomycin was tested at subinhibitory concentrations 512 µg/ml, 256 µg/ml, 128 µg/ml and 64 µg/ml in combination with subinhibitory titers of Sb-1 at 10^2, 10^3, 10^4 pfu/ml. Complete inhibition of heat production was observed only in combination with a higher titer of Sb-1 (10^4 pfu/ml). High synergistic activities were also observed in the presence of rifampin, fosfomycin and daptomycin (Figure 1).

Conclusions: While MHICs of antibiotics against MRSA biofilm were above drug concentrations reachable in clinical practice, the co-administration with bacteriophage Sb-1 strongly reduced the antibiotic doses needed to eradicate MRSA biofilm. The use of bacteriophage and antibiotics in combination represent an effective strategy to treat implant-associated infections.

Figure 1. Synergistic activity of vancomycin and Sb-1 against MRSA biofilm measured by microcalorimetry.

* ATCC 43300



[FP 9] ASSESSMENT OF ANTIBIOTIC ADHERENCE IN BONE AND JOINT INFECTIONS USING THE MORISKY ADHERENCE QUESTIONNAIRE AND MEDICATION EVENT MONITORING SYSTEM

Ho Kwong Li[1], Ines Rombach[2], Rhea Zambellas[2], Simon Warren[3], Damian Mack[4], Susan Hopkins[4], Carolyn Hemsley[5], Bridget Atkins[1], Mark Rogers[1], Martin McNally[1], Matthew Scarborough[1], Valérie Matter-Parrat

[1] Nuffield Orthopaedic Centre, Oxford University Hospitals NHS Foundation Trust, United Kingdom
[2] Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Science, University of Oxford, United Kingdom
[3] Royal National Orthopaedic Hospital NHS Trust, United Kingdom
[4] Royal Free London NHS Foundation Trust, United Kingdom
[5] Guy's and St Thomas' NHS Foundation Trust, United Kingdom

Aim: Management of bone and joint infection can be technically complex and often requires a prolonged course of antibiotics [1]. Traditionally, bone and joint infection management utilises nurse-led outpatient parenteral antibiotic therapy (OPAT) where adherence is unlikely to be an issue. However, with increasing evidence in favour of oral therapy [2], the question of adherence merits further consideration. We describe the adherence of both oral (PO) and self-administered intravenous (IV) antibiotics in the treatment of bone and joint infection using paper questionnaires (8-item Modified Morisky Adherence Score (MMAS)) and, in a subset of participants, electronic pill containers (Medication Event Monitoring Systems*) [3-4].

Method: All eligible participants enrolled in the OVIVA trial (2010–2015) were randomised to six weeks of either PO or IV antibiotic treatment arms. Self-administering patients were followed up with questionnaires at day 14 and 42 [5]. A subset of PO participants was also given the medication event monitoring system* in order to validate the adherence questionnaires. The results were correlated with treatment failures at one-year follow-up.

Results: 1,054 participants were enrolled in the OVIVA study. At day 14, 68% of participants recorded high adherence in both the IV (N=72) and PO arms (N=303) using the 8-item MMAS. At day 42, only 51% maintained high adherence in the PO arm (N=323) as compared to a 68% in the self-administered IV arm (N=80). The medication event monitoring system* results at day 42 demonstrated that 51% of participants achieved adherence of 100% (range 45-100). There was no statistically significant correlation between adherence and treatment failure in either randomised treatment arm.

Conclusions: This is the first large scale study to quantitatively assess compliance with antibiotics in bone and joint infections using established adherence tools. Our results suggest that oral antibiotic adherence decreases significantly over time. Despite the absence of apparent excess risk of therapeutic failure in this trial, we strongly advise careful patient education and adherence support in order to optimise clinical outcomes.

References:

Zimmerli W. Infection. 2003;31(2):99-108.
Proceedings of the 27th European Congress of Clinical Microbiology and Infectious Diseases (Scarborough M, 2017).
Morisky DE. J Clin Hypertens (Greenwich). 2008;10(5):348-54.
Farmer KC. Clin Ther. 1999;21(6):1074-90;discussion 3.
Li HK. Trials. 2015 Dec21;16:583.

Acknowledgements:
The OVIVA study is funded by the National Institute for Health research (Health Technology Assessment); project number 11/36/29.
*MEMS® Medication Event Monitoring System

[FP 10] IT'S NOT OVER WHEN THE INFECTION'S GONE: LONG-TERM GROWTH DISTURBANCE FOLLOWING SUBACUTE OSTEOMYELITIS

Andrew Hotchen[1], Pamela Garcia-Pulido[2], Ashwin Gojanur[2], Kuldeep Stohr[3]

[1] *Addenbrookes Hospital, Cambridge University Hospital, Department of Trauma and Orthopaedics, Cambridge, United Kingdom*
[2] *Addenrbookes Hospital, Trauma and Orthopaedics, Cambridge, United Kingdom*
[3] *Cambridge University Hospital, Paediatric Orthopaedic Surgery, Cambridge, United Kingdom*

Aims: This case series aims to describe the clinical consequences of juxta-physeal sub-acute osteomyelitis in children, specifically growth and limb deformity.

Methods: All children diagnosed with osteomyelitis between 2014 and 2016 at a single University Teaching Hospital in the UK were included. Juxta-physeal sub-acute osteomyelitis was identified using magnetic resonance imaging obtained within 48-hours of presentation. These cases were followed up prospectively on a regular basis in the outpatient clinic. Any clinical evidence of limb or growth deformity was evaluated using long-leg standing radiographs.

Results: During the study period, 63 paediatric osteomyelitis cases were identified and four of these (6%) had juxta-physeal sub-acute osteomyelitis. All bone infections were located either in the distal femur or proximal tibia. All cases were treated with six weeks of intravenous ceftriaxone and three children underwent surgical procedures. All four cases developed a growth deformity in the affected limb, table 1.

Age at **presentation**	**Gender**	**Anatomical Location**	**Treatment**	**Time to note deformity**	**Deformity**	**Organism**
2 y.o.	M	Distal lateral femoral epiphysis	Drill curettage IV Antibiotics	3 years	Genu varum	None identified
1 y.o.	M	Proximal medial tibial epiphysis	Curettage IV Antibiotics	6 months	Genu valgum	*Staph. Aureus* from curettage
1 y.o.	M	Distal femur	Arthroscopic washout IV Antibiotics	20 months	Symmetrical leg length discrepancy	None identified
12 y.o.	M	Proximal medial Tibia metaphysis	IV Antibiotics only	4 months	Genu valgum	*Staph. Aureus* from blood cultures

Table 1 – summary of cases.

Conclusions: A variety of growth disturbances can occur following sub-acute osteomyelitis which could be secondary to physeal stimulation and overgrowth. In this series, overgrowth occurred in the physis immediately adjacent to the Brodie's abscess. Subsequently, the presence of a medial abscess caused a valgus deformity and a lateral abscess caused a varus deformity. This phenomenon has not been well-described in the literature. The tibial and femoral physes are amongst the most active in the body, which may explain the reason for the observed overgrowth deformity in these cases. The age of the patient and the method of treatment did not appear to influence the emergence of the growth deformity. None of our patients had recurrence or development of chronic osteomyelitis within the measured time period. In view of these findings, we recommend regular follow-up including assessment for limb deformity for a minimum of 3-years following the treatment of sub-acute osteomyelitis.

[FP 11] ROLE OF SONICATION IN REVISION FOR PRESUMED ASEPTIC LOOSENING

Boštjan Kocjancic[1], Samo Jeverica[2], Andrej Trampuz[3], Ladislav Simnic[1], Klemen Avsec[1], Drago Dolinar[1]

[1] *University Medical Center Ljubljana, Department of Orthopaedic Surgery, Ljubljana, Slovenia*
[2] *Institute of Microbiology and Immunology, Faculty of Medicine, University of Ljubljana, Slovenia, Ljubljana, Slovenia*
[3] *Charité - University Medicine Berlin, Berlin, Germany*

Aim: The aim of our study was to evaluate culture-negative prosthetic joint infections in patients who were pre-operatively evaluated as aseptic failure.

Method: For the purpose of the study we included patients planed for revision surgery for presumed aseptic failure. Intraoperatively acquired samples of periprosthetic tissue and explanted prosthesis were microbiologicaly evaluated using standard microbiologic methods and sonication. If prosthetic joint infection was discovered, additional therapy was introduced.

Results: Between October 2010 and June 2016 265 cases were operated as aseptic loosenings (66 revision knee arthroplasty, 199 revision hip arthroplasty). 69 (26,0%) cases had positive sonication and negative periprosthetic tissue sample, 24 (9,1%) cases had positive tissue samples, but negative sonication, in 27 (10,2%) cases both tests were positive and in 145 (54,7%) cases all microbiologic tests were negative.
In both groups coagulase-negative staphylococci and *P.acnes* were most common, followed by mixed flora.

Conclusions: With the increasing number of patients requiring revision arthroplasty, a clear differentiation between aseptic failure and prosthetic joint infection is crucial for the optimal treatment. Sonication of explanted material is more successful in the isolation of pathogens compared to periprosthetic tissue cultures. Sonication of explanted prosthetic material is helpful in the detection of culture-negative prosthetic joint infections.

[FP 12] IS INFECTION PREDICTABLE BEFORE REPEAT SURGERY AFTER TOTAL HIP ARTHROPLASTY? A PRELIMINARY STUDY WITH DEFINITION OF AN "INFECTION SCORE"

Jean-Yves Jenny[1], Benjamin Adamczewski[1], Emmanuel De Thomasson[2], Jeannot Gaudias[1]

[1] *University Hospital of Strasbourg, Ccom, Illkirch, France*
[2] *Institut Mutualiste Montsouris, Paris, France*

Aim: The diagnosis of peri-prosthetic infection is sometimes difficult to assess, and there is no universal diagnostic test. The recommendations currently accepted include several diagnostic criteria, and are based mainly on the results of deep bacteriological samples, which only provide the diagnosis after surgery. A predictive score of the infection might improve the peri-operative management before repeat surgery after total hip arthroplasty (THA). The goal of this study was to attempt defining a composite score using conventional clinical, radiological and biological data that can be used to predict the positive and negative diagnosis of peri-prosthetic infection before repeat surgery after THA. The tested hypothesis was that the score thus defined allowed an accurate differentiation between infected and non-infected cases in more than 75% of the cases.

Method: 104 cases of repeat surgery for any cause after THA were analyzed retrospectively: 61 cases of infection and 43 cases without infection. There were 54 men and 50 women, with a mean age of 70 ± 12 years (range, 30 to 90 years). A univariate analysis looked for individual discriminant factors between infected and uninfected case file records. A multivariate analysis integrated these factors concomitantly. A composite score was defined, and its diagnostic effectiveness was assessed by the percentage of correctly classified cases and by sensitivity and specificity.

Results: The score was defined with the following items which were individually weighted: body mass index (BMI), presence of diabetes (D, yes = 1, no = 0), mechanical complication (MC, yes = 1, no = 0), scar complication after THA implantation (SC, yes = 1, no = 0), fever (F, yes = 1, no = 0). The score was calculated as (0.09 x BMI) + (0.94 x D) – (1.34 x MC) + (17.55 x SC) + (1.22 x F) – 3.63. This composite score separated the infected (positive score) and non-infected (negative score) patients accurately in 78% of cases, with a sensitivity of 57% and a specificity of 93%.

Conclusions: Subject to prospective validation, this score could be a significant help to define the medico-surgical strategy during a reoperation of the hip prosthesis for whatever reason.

No funding from any part was received for the purpose of this study.

[FP 13] AGREEMENT BETWEEN PRE-OPERATIVE AND INTRA-OPERATIVE BACTERIOLOGICAL SAMPLES IN 85 CHRONIC PERI-PROSTHETIC HIP AND KNEE INFECTIONS

Jean-Yves Jenny[1], Valerie Matter-Parrat[1], Cecile Ronde-Oustau[1], Valérie Matter-Parrat[1]

[1] *University Hospital Strasbourg, Ccom, Illkirch, France*

Aim: Whether pre-operative microbiological sampling contributes to the management of chronic peri-prosthetic infection remains controversial. We assessed agreement between the results of pre-operative and intra-operative samples in patients undergoing single-stage prosthesis exchange to treat chronic peri-prosthetic infection. The tested hypothesis was that agreement between pre-operative and intra-operative samples exceeds 75% in patients undergoing single-stage exchange of a hip or knee prosthesis to treat chronic peri-prosthetic infection.

Method: This single-centre retrospective study included 85 single-stage prosthesis exchange procedures in 82 patients with chronic peri-prosthetic infection at the hip or knee. Agreement between pre-operative and intra-operative sample results was evaluated. Changes to the initial antibiotic regimen made based on the intra-operative sample results were recorded. Associations between sample agreement and infection-free survival were assessed.

Results: Of 149 pre-operative samples, 109 yielded positive cultures, in 75/85 cases. Of 458 intra-operative samples, 354 yielded positive cultures, in 85/85 cases. Agreement was complete in 54 (63%) cases and partial in 9 (11%) cases; there was no agreement in the remaining 22 (26%) cases. The complete agreement rate was significantly lower than 75% (p=0.01). The initial antibiotic regimen was inadequate in a single case. Agreement between pre-operative and intra-operative samples was not significantly associated with infection-free survival.

Conclusions: Pre-operative sampling may contribute to the diagnosis of peri-prosthetic infection but is neither necessary nor sufficient to confirm the diagnosis and identify the causative agent. The spectrum of the initial antibiotic regimen cannot be safely narrowed based on the pre-operative sample results. We suggest the routine prescription of a probabilistic broad-spectrum antibiotic regimen immediately after the prosthesis exchange, even when a pathogen was identified before surgery.

No funding from any part was received for the purpose of this study.

[FP 14] DETECTION OF THE ETIOLOGICAL AGENT IN PRE-SURGICAL JOINT ASPIRATION FLUID USING A COMMERCIAL MULTIPLEX PCR SYSTEM* DESIGNED FOR DIAGNOSIS OF IMPLANT AND TISSUE INFECTION

Mathilde Zeller[1], Maëlle Granier[1], Thomas Auber[2], Wilfrid Graff[2], Vincent Le Strat[2], Luc Lhotellier[2], Blandine Marion[2], Simon Marmor[2], Vanina Meyssonnier[3], Antoine Mouton[2], D. Passeron[2], Valérie Zeller[3], Elisabeth Klein[1], Beate Heym[1]

[1] Lcsh, Gh Diaconesses - la Croix Saint Simon, Paris, France
[2] Gh Diaconesses-Croix-Saint-Simon, Centre de Référence des Infections Ostéo-Articulaires Complexes, Paris, France
[3] Gh Diaconesses Croix Saint Simon, Internal Medicine, Orthopedic Surgery, Paris, France

Aim: Periprosthetic joint infection (PJI) is nowadays the most important problem leading to failure in primary and revision total knee (TKA) and total hip arthroplasty (THA), therefore accurate diagnosis of PJI is necessary. We evaluated a commercial multiplex PCR system1 for diagnosis of PJI in joint aspiration fluids prior to surgery.

Method: A total of 32 patients were included in the study. Twenty-four patients had TKA and eight had THA. Joint aspiration fluids were examined by standard bacteriological procedures. Excess material of joint aspirates was frozen at -20°C until testing by multiplex PCR1. Inclusion criteria were a minimum leucocyte count of 2.000 per ml and at least 60% of polymorphonucleaur neutrophils (PNN) in the joint aspiration fluid.

Results: For 21 patients with TKA, both standard bacteriological culture and PCR1 were negative. In these patients the mean leucocyte count in the joint fluid was 15.385/ml with 80% PNN. For three patients culture was negative, but PCR1 was positive. In one patient PCR1 detected Corynebacterium sp. which was considered as contamination as this patient had crystal arthropathy; for the second patient Propionibacterium acnes was detected by PCR1, this patient was treated as having an infection of unknown origin in another hospital. For the third patient PCR1 detected Pseudomonas aeruginosa. This patient was known as having chronic P. aeruginosa infection of his TKA and joint aspiration was done shortly after arrest of antibiotic therapy by ciprofloxacin. The mean leucocyte count in the patients with positive PCR was 61.800/ml with 89% PNN.
In three of the eight patients with THA, standard bacterial culture and PCR1 were both negative. The mean leucocyte count in joint aspirates of these patients was 10.087/ml with 77% PNN. In five patients with THA, both culture and PCR1 were positive and concordant. In one case culture and PCR1 detected Staphylococcus aureus, and in the other culture and PCR1 detected P. acnes. In two cases culture grew S. epidermidis and PCR1 detected coagulase negative Staphylococcus. In the fifth patient culture grew C. jeikeium and PCR1 detected Corynebacterium spp.

Conclusions: We found concordant results for culture and PCR1 in all eight patients with THA and in 22/24 patients (92%) with TKA. Multiplex PCR1 results are available in 4 hours whereas culture results may demand several days. The commercial multiplex PCR system1 designed for diagnosis of implant and tissue infection can be helpful for the diagnosis of PJI.

*Unyvero i60©, Curetis Strasbourg, France

[FP 15] 18F-FDG UPTAKE IN NON-INFECTED TOTAL HIP PROSTHESES

Stefan J Gelderman[1], Paul C Jutte[2], Ronald Boellaard[1], Greetje A Kampinga[3], Joris J Ploegmakers[2], Andor WJM Glaudemans[1], Marjan Wouthuyzen-Bakker[3]

[1] University Medical Center Groningen, Nuclear Medicine and Molecular Imaging, Groningen, Netherlands
[2] University Medical Center Groningen, Orthopaedic Sugergy, Groningen, Netherlands
[3] University Medical Center Groningen, Medical Microbiology and Infection Prevention, Groningen, Netherlands

Aim: Diagnosing a prosthetic joint infection (PJI) can be difficult. Several imaging modalities are available, but the choice which technique to use is often based on local expertise, availability and costs. Some centers prefer to use ^{18}F-fluorodeoxyglucose positron emission tomography (FDG-PET) as first imaging modality of choice, but due to a lack of accurate interpretation criteria, FDG-PET is currently not routinely applied for diagnosing PJI. With FDG-PET it is difficult to differentiate between FDG uptake due to reactive inflammation and uptake due to an infection. Since the physiological uptake pattern around a joint prosthesis is not fully elucidated, the aim of this study was to determine: i) the FDG uptake pattern in non-infected total hip prostheses and, ii) to evaluate whether there is a difference in uptake between cemented and non-cemented prostheses.

Method: Patients with a primary total hip arthroplasty (1995-2016) without clinical signs of an infection that underwent a FDG-PET for another indication (mainly suspicion of malignancy) were included and retrospectively analysed. Patients in whom the prosthesis was implanted < 6 months prior to FDG-PET were excluded, to avoid post-surgical effects. Scans were visually and quantitatively analysed. Quantitative analysis was performed by calculating maximum and peak standardized uptake values (SUV_{max} and SUV_{peak}) by volume of interests (VOIs) at eight different locations around the prosthesis, from which the mean SUV was calculated. SUV was standardized by the liver SUV that was taken as background.

Results: A total of 52 scans from 30 patients were analysed, with a median age of the prosthesis of 5.9 years (range 0.5-19.8). Most scans (87%) showed a diffuse uptake pattern around the prosthesis. The standardized median SUV_{max} and SUV_{peak} were 0.89 (IQR 0.78-1.16) and 0.64 (IQR=0.55-0.89), respectively. There was a difference in FDG uptake between the cemented (median SUV_{max} 0.85, IQR=0.77-1.04) and the uncemented prostheses (median SUV_{max} 1.01, IQR=0.84-2.01) (p=0.026). In uncemented prostheses, there was a positive correlation in time between the age of the prosthesis and the FDG uptake (r_s=0.66, p=0.004). This observation was not found in cemented prostheses (r_s=0.01, p=0.96).

Conclusions: Non-infected total hip prostheses mostly show a diffuse FDG pattern around the prosthesis with a higher FDG uptake in uncemented compared to cemented prostheses. In uncemented prostheses, FDG uptake increases with the age of the implant. These findings may aid in the development of accurate interpretation criteria to better differentiate between inflammation and infection in patients with a prosthetic joint.

[FP 16] PTX3 AS A NEW BIOMARKER FOR THE DIAGNOSIS OF PERIPROSTHETIC JOINT INFECTION: A SINGLE-CENTER PILOT STUDY

Mattia Loppini[1], Francesco Traverso[2], Matteo Carlo Ferrari[3], Roberta Avigni[2], Roberto Leone[2], Barbara Bottazzi[2], Alberto Mantovani[1], Guido Grappiolo[2]

[1] *Humanitas University, Humanitas Clinical and Research Center, Rozzano, Milan, Italy*
[2] *Humanitas Clinical and Research Center, Rozzano, Milan, Italy*
[3] *Humanitas Research Hospital, Rozzano, Italy*

Aim: Diagnosis of periprosthetic joint infection (PJI) is still challenging due to limitations of available diagnostic tests. Many efforts are ongoing to find out novel methods for PJI diagnosis. Recently, several studies have shown a role of the long pentraxin PTX3 as a biomarker in inflammatory diseases and infections. This pilot diagnostic study evaluated the diagnostic ability of synovial fluid and serum PTX3 for the infection of total hip arthroplasty (THA) and total knee arthroplasty (TKA).

Method: Consecutive patients undergoing revision surgery for painful THA or TKA were enrolled. Patients with antibiotic therapy suspended for less than 2 weeks prior to surgery and patients eligible for spacer removal and prosthesis re-implantation were excluded. Quantitative assessment of synovial fluid and serum PTX3 was performed with ELISA method. Musculoskeletal Infection Society (MSIS) criteria were used as reference standard for diagnosis of PJI. Continuous data values were compared for statistical significance with univariate unpaired, 2-tailed Student's t-tests. Receiver operating characteristic (ROC) curve analyses was performed to assess the ability of serum and synovial fluid PTX3 concentration to determine the presence of PJI. Youden's J statistic was used to determine optimum threshold values for the diagnosis of infection. Sensitivity (Se), specificity (Sp), positive (PPV) and negative (NPV) predictive values, positive (LR+) and negative (LR-) likelihood ratio, area under the ROC curve (AUC) were calculated.

Results: Sixty-two patients (M:F=28:34) with a mean age of 64 years (40-78) underwent revision of THA (n=52) or TKA (n=10). According with MSIS criteria, 10 cases were categorized as septic and 52 as aseptic revisions. The average synovial fluid concentration of PTX3 was significantly higher in patients with PJI compared to patients undergoing aseptic revision (23,56 ng/L vs 3,71 ng/L; P=0.0074). There was no significant difference in terms of serum concentration of PTX3 between the two groups. Synovial fluid PTX3 demonstrated an AUC of 0.93 (95%IC 0.86-0.97) with Se 100%, Sp 85%, PPV 55%, NPV 100%, LR+ 6.6 and LR- <0.01 for a threshold value of 3 ng/L. Serum PTX3 demonstrated an AUC of 0.59 (95%IC 0.38-0.8) with Se 78%, Sp 50%, PPV 25%, NPV 90%, LR+ 1.56 and LR- 0.44 for a threshold value of 3 ng/L.

Conclusions: Synovial PTX3 demonstrated a strong diagnostic ability for PJI. PTX3 could represent a useful biomarker for detection of PJI in patients undergoing revision surgery for painful THA or TKA. Larger diagnostic studies are required to confirm these preliminary data.

[FP 17] THE ALPHA DEFENSIN LATERAL FLOW TEST IN DIAGNOSING PJI OF THA AND TKA

Akos Zahar[1], Mustafa Citak[1], Christian Lausmann[1], Thorsten Gehrke[1]

[1] *Helios Endo Klinik, Hamburg, Germany*

Aim: Alpha-defensin was recently introduced as a new biomarker having a very high accuracy to rule out periprosthetic joint infection (PJI). A new rapid lateral flow version of the Alpha-defensin test was developed and introduced to detect high levels of Alpha-defensin in synovial fluid quickly and with ease. We conducted a single-centre prospective clinical study to compare the results of the Alpha-defensin rapid test* against the conventional diagnostics according to MSIS criteria.

Method: A total of 223 consecutive patients with painful total hip or knee arthroplasty were enrolled into the study. In all patients, blood C-reactive protein was measured and joint aspirations were performed. From the synovial fluid a leukocyte cell count with granulocyte percentage, microbiology cultures and Leukocyte Esterase tests were carried out according to the recommendation of MSIS for diagnosing PJI. At the same time, the Lateral Flow Test* was performed from the aspirate. 191 subjects with 195 joint aspirations (96 hips, 99 knees) were included in final clinical and statistical evaluation. We had 119 joints with an aseptic revision and 76 joints with PJI.

Results: After statistical analysis the overall sensitivity of the Lateral Flow Test* was 92.1% (95% confidence interval [CI], 83.6% to 97.1%), the specificity was 100% (95% CI, 97.0% to 100%), the positive predictive value was 100% (95% CI, 94.9% to 100%), and the negative predictive value was 95.2% (95% CI, 89.9% to 98.2%). The overall accuracy of the Lateral Flow Test* was 96.9% (189 of 195, 95% CI, 93.4% to 98.9%).

Conclusions: Our results suggest that the PJI test* has a very high accuracy in diagnosing infected THA and TKA. Though the Lateral Flow Test* does not provide information on the identity of the infectious pathogen, the test does have an important role in recognizing PJI early and enables surgeons to start proper therapy without delay.

*Synovasure®

[FP 18] COMPARISON OF QUANTITATIVE AND QUALITATIVE ALPHA-DEFENSIN TEST FOR DIAGNOSING PERIPROSTHETIC JOINT INFECTIONS

Irene Katharina Sigmund[1], Nora Renz[2], Katsiaryna Yermak[3], Andrej Trampuz[4]

[1] *Medical University of Vienna, Orthopaedics, Vienna, Austria*
[2] *Charité-Universitätsmedizin Berlin, Center for Musculoskeletal Surgery, Berlin, Germany*
[3] *Charité-Universitätsmedizin Berlin, Orthopaedics, Berlin, Germany*
[4] *Charité-Universitätsmedizin Berlin, Berlin, Germany*

Aim: Alpha-defensin is a new synovial fluid biomarker for the diagnosis of periprosthetic joint infections (PJI). We compared the performance of two different alpha-defensin assays: quantitative ELISA test and qualitative lateral flow test.

Method: In this prospective cohort study, consecutive patients with a painful prosthesis of the lower limb were eligible for inclusion. In addition to standard diagnostics of PJI, alpha-defensin was determined in the aspirated synovial fluid between October 2016 and April 2017. PJI was defined according to the modified Zimmerli criteria, the Musculoskeletal Infection Society (MSIS) criteria and the Infectious Disease Society of America (IDSA) criteria. A positive quantitative alpha-defensin test was defined at a cut-off value of 5.2 mg/L. The sensitivity, specificity, accuracy and area under the curve of each test were determined and the AUCs were compared among each other.

Results: We included 72 patients (55 knee, 27 hip prosthesis) with a median age of 70 years (range: 41 – 85 years). Based on the modified Zimmerli criteria, 23 cases (32%) were categorized as septic and 49 (68%) as aseptic prosthesis failure. The sensitivity, specificity, accuracy, and AUC of quantitative alpha-Defensin were 48%, 98%, 82%, and 0.73, respectively; for qualitative alpha-Defensin, results were 48%, 100%, 83%, and 0.74, respectively. When the IDSA criteria were applied, the sensitivity of the quantitative and qualitative alpha-defensin test was 83% and 75%, respectively; when the MSIS criteria were applied, the sensitivity of the quantitative and qualitative alpha-Defensin was 92% and 83%, respectively. The comparison between the qualitative and quantitative alpha-defensin tests showed no statistically significant difference regardless of the used infection classification (modified Zimmerli: [difference AUC -0.01; p = 0.792], IDSA: [difference AUC 0.04; p = 0.317], MSIS: [difference AUC 0.04; p = 0.264]).

Conclusions: The sensitivity of the alpha-defensin test in synovial fluid showed poor sensitivity (48%) for diagnosing PJI when modified Zimmerli criteria were used. No difference were observed between the qualitative and quantitative alpha-defensin test.

[FP 19] PERFORMANCE OF THE ALPHA DEFENSIN LATERAL FLOW TEST FOR DIAGNOSIS OF HIP AND KNEE PERIPROSTHETIC JOINT INFECTION

Nora Renz[1], Katsiaryna Yermak[2], Carsten Perka[1], Andrej Trampuz[3]

[1] *Charité-Universitätsmedizin Berlin, Center for Musculoskeletal Surgery, Berlin, Germany*
[2] *Charité-Universitätsmedizin Berlin, Orthopaedics, Germany*
[3] *Charité-Universitätsmedizin Berlin, Berlin, Germany*

Aim: The aim of the study was to assess the accuracy of the alpha defensin lateral flow test* for diagnosis of periprosthetic joint infection (PJI) using an optimized diagnostic algorithm and three classification systems. In addition, we compared the performance with synovial fluid leukocyte count, the most sensitive preoperative test.

Method: In this prospective multicenter study we included all consecutive patients with painful prosthetic hip and knee joints undergoing diagnostic joint aspiration. Alpha defensin lateral flow test * was used according to manufacturer instructions. The following diagnostic criteria were used to confirm infection: Musculoskeletal Infection Society (MSIS), Infectious Diseases Society of America (IDSA) and modified Zimmerli Criteria. In the latter, PJI was confirmed when at least one of following criteria applied: macroscopic purulence, sinus tract, positive cytology of joint aspirate (>2000 leukocytes/µl or >70% granulocytes), histological proof of acute inflammation in periprosthetic tissue, positive culture (from aspirate, tissue or sonication fluid). Infection was classified as chronic, if symptom duration was more than 3 weeks or if infection manifested after more than 1 month after surgery. The sensitivity and specificity of the alpha defensin lateral flow test* and leukocyte count in synovial fluid were calculated and compared using McNemar Chi-square test.

Results: Of 151 included patients evaluated for painful prosthetic joints (103 involved knees, 48 hips), the median patient age was 69 years (range, 41-94 years) and 75 patients were female. Systematically evaluating the included patients according to the different diagnostic criteria, MSIS and IDSA revealed both 33 patients with PJI (22%), whereas modified Zimmerli criteria disclosed 47 septic failures (31%), among them 36 chronic infections (77%). Sensitivity of the test was 79% when applying MSIS criteria, 70% with IDSA criteria and 57% with modified Zimmerli criteria. Specificity ranged from 96% (IDSA) to 98% (MSIS) and 99% (modified Zimmerli). Applying the most stringent definition criteria (modified Zimmerli), leukocyte count showed significantly higher sensitivity than the alpha defensin lateral flow test* (91% vs. 57%, p<0.001), especially in chronic infections (88% vs. 48%, p<0.001.) In acute infections, both tests detected all infection cases. Processing turnaround time was shorter in *than automated leukocyte count (10 min vs. 2-4 hours)

Conclusions: Semi-quantitative alpha defensin test was rapid and highly specific for diagnosing PJI (> 95%). However, sensitivity was limited, especially when applying definition criteria including also low grade infections (modified Zimmerli criteria). Therefore, the alpha defensin lateral flow test* does not allow a reliable exclusion of PJI, especially not in chronic infections.

*Synovasure™

[FP 20] IMPROVING THE DIAGNOSIS OF PERIPROSTHETIC JOINT INFECTION (PJI) - THE ROLE OF CIRCULATING AND SYNOVIAL FLUID BIOMARKERS

Ramsay Refaie[1], Kenneth Rankin[2], Catharien Hilkens[3], Mike Reed[1]

[1] *Newcastle University, Newcastle Upon Tyne, United Kingdom*
[2] *Newcastle University, United Kingdom*
[3] *Newcastle University, Institute of Cellular Medicine, United Kingdom*

Aim: To evaluate a panel of peripheral blood and synovial fluid biomarkers for the identification of periprosthetic joint infection PJI.

Method: Peripheral blood and synovial fluid measurements of CD64, IL-1a, IL-1b, IL-6, IL-8, IL-10, IL-17, Alpha Defensin and CRP were made on samples collected from patients with suspected PJI using a combination of flow cytometry (CD64), ELISA (Alpha Defensin) and MSD Electrochemiluminescence (IL-1a, IL-1b, IL-6, IL-8, IL-10, IL-17). Receiver operating characteristic (ROC) curves which combine sensitivity and specificity were created for each marker using GraphPad PRISM statistical software. The diagnosis of infection was based on MSIS major criteria.

Results: A total of 35 infections were identified (12 acute, 23 chronic). The best performing peripheral blood biomarker in both acute and chronic PJI was CRP with an area under the curve (AUC) of 0.88 (sensitivity 83%, specificity 94%) in acute infection and 0.82 in chronic infection (sensitivity 80%, specificity 85%). In synovial fluid the best performing acute infection marker was CRP with an AUC of 0.94 (sensitivity 87.5%, specificity 95%) and in chronic cases was Alpha defensin with an AUC of 0.98 (sensitivity 100%, specificity 85%).

Conclusions: CRP measured in peripheral blood shows excellent diagnostic characteristics in both acute and chronic cases. This is also replicated in synovial fluid from acute PJIs but not in chronic infection where Alpha defensin showed the best performance.

[RFP 21] THE NEW TREATMENT PROTOCOL AND MULTI-STAGE CLASSIFICATION OF CHRONIC OSTEOMYELITIS

Anton Semenistyy[1], Vladimir Obolenskiy[2], Alexey Semenistyy[3], Andrey Konnov[3]

[1] *Peoples' Friendship University of Russia, 13th Moscow City Clinical Hospital, Russian Federation*
[2] *City Hospital #13, Rnrmu, Moscow, Russian Federation*
[3] *13th Moscow City Clinical Hospital, Russian Federation*

Aim: Chronic osteomyelitis of long bones is one of the most severe complications in orthopedics. Different options exist for treatment of this disease, however there is still no generally accepted comprehensive protocol that could potentially guide us in each particular step. There are many classifications that were designed to help us to make clinical decision, however even the most widely used Cierny-Mader classification does not count more a half of factors, assessment of which is essential for choosing the best treatment plan. This fact may be explained by the complexity of the disease process, diversity of treatment options and multistage approach to the management of these patients. Therefore, the purpose of this study was to work out a treatment protocol and clinical classification system, which will improve final outcomes in patients with chronic osteomyelitis of long bones.

Method: Three orthopedic surgeons and one general surgeon who specialize on bone and joint infection independently of each other made a review of literature dedicated to the topic of chronic osteomyelitis. Each surgeon created a list of factors that are essential to assess for successful treatment of chronic osteomyelitis. After four lists were thoroughly matched and discussed, 10 most important factors were defined. Each surgeon proposed his own protocol of treatment, based on existent data and own experience. All four protocols were discussed and analyzed to come up with new the most comprehensive one. Therefore, the new protocol was created. After the list of factors and protocol were created, surgeons independently of each other defined the most important factors for every stage in the new protocol. Thus new multi-stage classification of chronic osteomyelitis (MSC-CO) was proposed.

Results: We have defined the most important factors influencing on the decision making process in treatment of chronic osteomyelitis of long bones. The new comprehensive protocol and multi-stage clinical classification were developed.

Conclusions: We assume, that the proposed tools may improve the results of chronic osteomyelitis treatment. However, the clinical trials should be conducted to assess the utility of new treatment protocol and MSC-CO in daily practice.

[RFP 22] FOR HOW LONG, SHOULD WE REVIEW PATIENTS AFTER TREATMENT OF CHRONIC OSTEOMYELITIS? AN ANALYSIS OF RECURRENCE PATTERNS IN 759 PATIENTS

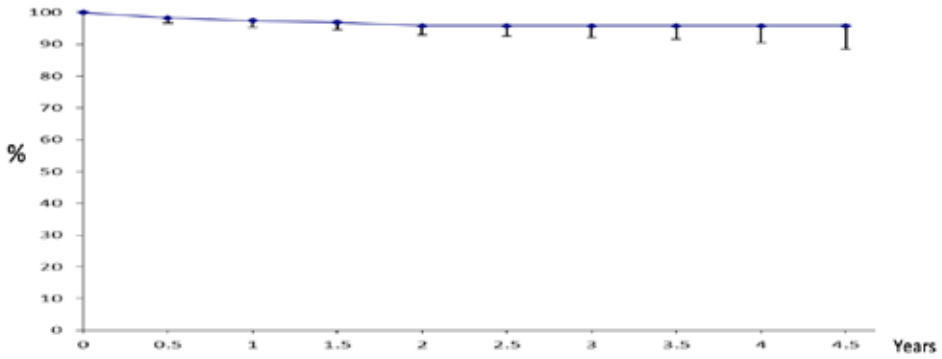
Martin McNally[1], Jamie Ferguson [1], Maria Dudareva[2], Antony Palmer[1], Deepa Bose[3], David Stubbs[1]

[1] *Nuffield Orthopaedic Centre, Oxford University Hospitals, The Bone Infection Unit, Oxford, United Kingdom*
[2] *Nuffield Department of Medicine, Oxford University Hospitals, Department of Infectious Diseases, Oxford, United Kingdom*
[3] *Queen Elizabeth Hospital, Trauma and Orthopaedics, Birmingham, United Kingdom*

Aim: Bone infection can recur months or years after initially successful treatment. It is difficult to review patients for many years to determine the true incidence of recurrence. This study determined the minimum follow-up period which gives a good indication of the recurrence rate after surgery for chronic osteomyelitis and infected non-union.

Method: We studied five cohorts of patients who had surgery for long bone infection, over a 10 year period. We investigated the efficacy of various antibiotic carriers (PMMA and Collagen; n=185, Calcium Sulphate; n=195, Calcium Sulphate/Hydroxyapatite; n=233) and management of infected non-unions (n=146)[1-4]. Patients were re-viewed and Kaplan-Meier Survivorship curves were constructed to show the incidence and timing of recurrence. The microbiology of the initial infection and the recurrent culture was also compared.

Results: 759 patients were reviewed between 12 and 131 months after surgery (mean 43.7 months). Infection recurred in 52 cases (6.9%). 34 patients recurred in the first year (65.4%), 14 in the second year (27%), 2 in the third year (3.8%) and 2 in the following 4 years (3.8%). 89% of recurrences after infected non-union occurred early after treatment. Later recurrences, after 3 years, usually followed new injuries or operations and tended to have different organisms from the original infection.



Kaplan-Meier Curve for 233 patients in the 4.5 years after surgery with the gentamicin-eluting injectable synthetic bone substitute*.
All 9 recurrences presented in the first 2 years after surgery.

Conclusions: In clinical trials of new methods of treatment of osteomyelitis, a minimum follow-up period of 2 years would reveal over 90% of the recurrences. For infected non-union surgery, one year may be adequate. Late 'recurrences' may represent new infections, rather than reactivation of previous infection.
Ferguson BJJ 2014; 96-B: 829-836
Bose BJJ 2015; 97-B: 814-896
McNally BJJ 2016; 98-B: 1289-1296
Ferguson BLRS Annual Meeting, 2017

*Cerament G™

[RFP 23] CLINICAL CHARACTERISTICS AND TREATMENT OF CLAVICULAR OSTEOMYELITIS: AN ANALYSIS OF 188 REPORTED CASES

Nan Jiang[1], Wei-ran Hu[2], Zi-long Yao[2]

[1] *Nanfang Hospital, Guangzhou, China*
[2] *Nanfang Hospital, Southern Medical University, Guangzhou, China*

Aim: The present study aimed to characterize the diagnosis and treatment of clavicular osteomyelitis on the basis of literature review.

Method: We reviewed, in PubMed database, 188 cases diagnosed as clavicular osteomyelitis found in the English literature from 1980 to 2016. Data of basic demographics, clinical and laboratory characteristics, and treatment strategy for each case were recorded and analyzed.

Results: The mean age of the cohort included in this study was 24.95 years; 57.98% of them were younger than 20 years old. Eighty-six cases (45.74%) were categorized as infectious osteomyelitis of the clavicle while 102 (54.26%) as noninfectious ones. More than half of the noninfectious cases (62.13%) were diagnosed as chronic recurrent multifocal osteomyelitis (CRMO). The male-to-female ratio in the infectious osteomyelitis cases was 1: 1.09 (41 males and 45 females) and 1: 3.43 (23 males and 79 females) in the noninfectious ones. The most common and earliest clinical presentation was pain which was observed in 86.81% of the cases. Eighty-six of the 93 patients showed an elevated erythrocyte sedimentation rate. *Staphylococcus aureus* was the microorganism involved in most of the infectious cases, accounting for 46.94% (23 cases) of the total cases with a positive bacterial culture. 42.37 % (50 of 118 cases) of the patients received surgical interventions. Cephalosporin was the antibiotics the most frequently used. The outcome was favorable in 89.91% of the 109 cases.

Conclusions: Although clavicular osteomyelitis and extremity chronic osteomyelitis shared similarities in clinical features, bacteriological diagnosis and antibiotic treatment, the former presented distinguishing characteristics of its own.

[RFP 24] PRESSURE ULCER-RELATED PELVIC OSTEOMYELITIS: EVALUATION OF A TWO-STAGE SURGICAL STRATEGY (DEBRIDEMENT, NEGATIVE PRESSURE THERAPY AND FLAP COVERAGE) WITH PROLONGED ANTIMICROBIAL THERAPY

Tristan Ferry[1], Andrianasolo Johan[2], Fabien Boucher[3], Joseph Chateau [4], Shipkov Hristo[2], Fatiha Daoud[3], Evelyne Braun[2], Claire Triffault-Fillit[2], Thomas Perpoint[3], Frédéric Laurent[1], Mojallal Alain-Ali[2], Christian Chidiac[1], Florent Valour[1]

[1] Hospices Civils de Lyon, Claude Bernard Lyon 1 University; Infectious Diseases - Inserm U1111, International Center for Research in Infectiology, Lyon, France , Lyon, France
[2] Hospices Civils de Lyon
[3] Hospices Civils de Lyon - Hôpital de la Croix-Rousse, Lyon, France
[4] Department of Burns Management, Edouard Herriot Hospital, Civil Hospices of Lyon, Lyon, France

Aim: A two-stage surgical strategy (debridement-negative pressure therapy (NPT) and flap coverage) with prolonged antimicrobial therapy is usually proposed in pressure ulcer-related pelvic osteomyelitis but has not been widely evaluated.

Method: Adult patients with pressure ulcer-related pelvic osteomyelitis treated by a two-stage surgical strategy were included in a retrospective cohort study. Determinants of superinfection (i.e., additional microbiological findings at reconstruction) and treatment failure were assessed using binary logistic regression and Kaplan-Meier curve analysis.

Results: Sixty-four pressure ulcer-related pelvic osteomyelitis in 61 patients (age, 47 (IQR, 36-63)) were included. Osteomyelitis was mostly plurimicrobial (73%), with a predominance of S. aureus (47%), Enterobacteriaceae (44%) and anaerobes (44%). Flap coverage was performed after 7 (IQR, 5-10) weeks of NPT, with 43 (68%) positive bone samples among which 39 (91%) were superinfections, associated with a high ASA score (OR, 5.8; p=0.022). An increased prevalence of coagulase negative Staphylococci (p=0.017) and Candida (p=0.003) was observed at time of flap coverage. An ESBL Enterobacteriaceae was found in 5 (12%) patients, associated with fluoroquinolone consumption (OR, 32.4; p=0.005). Treatment duration was as 20 (IQR, 14-27) weeks, including 11 (IQR, 8-15) after reconstruction. After a follow-up of 54 (IQR, 27-102) weeks, 15 (23%) failures were observed, associated with previous pressure ulcer (OR, 5.7; p=0.025) and Actinomyces infection (OR, 9.5; p=0.027).

Conclusions: Pressure ulcer-related pelvic osteomyelitis is a difficult-to-treat clinical condition, generating an important consumption of broad-spectrum antibiotics. Carbapenem should be reserved for ESBL at-risk patients only, including those with previous fluoroquinolone use. The uncorrelation between outcome and the debridement-to-reconstruction interval argue for a short sequence to limit the total duration of treatment.

[RFP 25] PROGNOSTIC FACTORS OF STREPTOCOCCAL PROSTHETIC BONE AND JOINT INFECTIONS MANAGED IN REFERENCES CENTERS

Rafael Mahieu[1], Dubee Vincent[2], Ansart Severine[3], Bernard Louis[4], Le Moal Gwenael[5], Asseray Nathalie[6], Arvieux Cedric[7], Ramanantsoa Celine[8], Legrand Erick[2], Pierre Abgueguen[1]

[1] *CHU Angers, Angers, France*
[2] *CHU D'Angers, Angers, France*
[3] *CHU de Brest , Brest, France*
[4] *CHU de Tours, Tours, France*
[5] *CHU de Poitiers, Poitiers, France*
[6] *CHU de Nantes, Nantes, France*
[7] *CHU de Rennes, Rennes, France*
[8] *CHU de Le Mans, Le Mans, France*

Aim: The optimal treatment of streptococcal prosthetic joint infections (PJIs) is unclear. Poorer outcome has been associated with *Streptococcus agalactiae* species, comorbidities and polyethylene exchange for conservative approach. Rifampicin use may be associated with higher remission rate but results are sparse.

Method: A cohort of streptococcal PJI (including total hip arthroplasty –THA- or total knee arthroplasty –TKA-) was prospectively created and retrospectively reviewed in 7 reference centers for management of complex PJI between January 1, 2010 and December 31, 2012.

Results: Seventy patients (47 infections of THA and 23 infections of total TKA) with monomicrobial infections were included. Median age was 77 (interquartile range [IQR] [69 – 83], 15.6% (n=11) had diabetes, median Charlson comorbidity score was 4 [3 – 6] and 31.4% (n=22) had chronic heart failure. *Streptococcus agalactiae* and *S. dysgalactiae* were the most commonly streptococcal species found, in 38.6% (n=27) and 17.1% (n=12) of cases respectively. Debridement, antibiotic and implant retention (DAIR) was performed after a median time of 7 days [3 – 8] with polyethylene exchange (PE) performed in 21% of these treatments. After a median follow-up of 22 month [12 – 31], 27% of patients relapsed corresponding to 51.4% of DAIR treatment and 0% of one- (n=15) or two-stage exchange strategy (n=17). Rifampicin or levofloxacin combination were not associated with a better outcome (p=0.82 and p=1, respectively). A shorter intravenous antimicrobial therapy, a *S. agalactiae* species and DAIR treatment were associated with a higher risk of failure. In multivariate analysis, only DAIR treatment and *S. agalactiae* were independent factors of relapse. PE was associated with a trend toward benefit (odds ratio 0.26 [95% CI: 0.021 – 1.98; p=0.26]) but did not reach statistical significance.

Conclusions: Streptococcal PJIs managed with DAIR have a poor prognosis and *S. agalactiae* seems to be an independent factor of failure.

[RFP 26] ENDOPROSTHESIS IMPLANTATION IS ASSOCIATED WITH INCREASED RISK FOR INFECTION DUE TO ORAL CAVITY BACTERIA

Eva Vacha[1], Deppe Herbert[2], Nina Wantia[3], Andrej Trampuz[4]

[1] *Institute of Medical Microbiology, Immunology and Hygiene, Technical University Munich, Munich, Germany*
[2] *Centre of Dentistry, Oral Medicine and Maxillofacial Surgery at the Technical University Munich*
[3] *Technische Universität München, Institute for Medical Microbiology, Immunology and Hygiene, Institute for Medical Microbiology, Immunology and Hygiene, München, Germany*
[4] *Charité-Universitätsmedizin Berlin, Berlin, Germany*

Aim: The risk of haematogenic periprosthetic joint infection (PJI) after dental procedures is discussed controversially. To our knowledge, no study has evaluated infections according to the origin of infection based on the natural habitat of the bacteria. We investigated the frequency of positive monomicrobial cultures involving bacteria from oral cavity in patients with suspected PJI compared to bone and joint infections without joint prosthesis.

Method: In this retrospective study we included all patients with suspected PJI or bone and joint infection without endoprosthesis, hospitalized at our orthopaedic clinic from January 2009 through March 2014. Excluded were patients with superficial surgical site infections or missing data. Demographic, clinical and microbiological data were collected using a standardized case report form. Groups were compared regarding infections caused by oral bacteria. $\chi 2$ test or Fisher`s exact test was employed for categorical variables and t-test for continuous variables.

Results: A total of 1673 patients were included, of whom 996 (60%) had a suspected PJI and 677 (40%) osteoarticular infection without joint endoprosthesis (control group). In patients with suspected PJI the median age (standard deviation) was 67 (14) years; 407 (41%) were males. The anatomic location of the prosthesis was hip in 522 (52%) patients, knee in 437 (44%), megaprostheses in 14 (1%), shoulder in 8 (1%) and other endoprosthesis in 15 (2%) patients. In 437 (44%) of PJI cases pathogen(s) were detected, 271 (62%) were monomicrobial and 166 (38%) polymicrobial. Of 996 patients with suspected PJI, 2.4% (n = 24) had monomicrobial infections caused by bacteria belonging to the normal oral flora, predominantly oral streptococci (n = 21). In contrast, only 0.4% (n = 3) of the control group without joint prosthesis had monomicrobial infections caused by oral bacteria. This difference was statistically significant (p = 0.002), whereas the patient age (p = 0.058) and the anatomic location of the joint prosthesis (p = 0.622) did not have any effect on the oral bacteria.

Conclusions: The incidence of infections caused by oral bacteria was significantly higher in patients with endoprosthesis than in other osteoarticular infections (2.4% versus 0.4%). This finding indicates that joint prostheses are at risk of haematogenous PJI originating from oral cavity. Future prospective studies need to determine the exact risk of haematogenic PJI caused by oral bacteria, as well as the potential of preventing these infections by antibiotic prophylaxis.

[RFP 27] HIGHER RISK OF REVISION FOR INFECTION USING SYSTEMIC CLINDAMYCIN PROPHYLAXIS COMPARED TO CLOXACILLIN IN PRIMARY KNEE ARTHROPLASTY

Anna Stefánsdóttir[1], Olof Thompson[2], Martin Sundberg[3], Annette W-Dahl[3], Lars Lidgren[3], Otto Robertsson[3]

[1] Department of Orthopaedics Skåne University Hospital, Lund, Sweden
[2] Lund University, Department of Infectious Diseases, Lund, Sweden
[3] The Swedish Knee Arthroplasty Register, Lund University, Department of Clinical Sciences Lund, Orthopaedics, Lund, Sweden

Aim: Patients reporting penicillin allergy do often receive clindamycin as systemic antibiotic prophylaxis. The effect of clindamycin has however not been compared to antibiotics with proven effect in joint arthroplasty surgery. The aim of the study was to reveal if there were differences in the rate of revision due to infection after total knee arthroplasty (TKA) depending on which antibiotic was used as systemic prophylaxis.

Method: Patients reported to the Swedish Knee Arthroplasty Register having a TKA performed due to osteoarthritis (OA) during the years 2009 – 2015 were included in the study. The type of prophylactic antibiotic is individually registered. For 80,018 operations survival statistics were used to calculate the rate of revision due to infection until the end of 2015, comparing the group of patients receiving the beta-lactam cloxacillin with those receiving clindamycin as systemic prophylaxis.

Results: Cloxacillin was used in 90% of the cases, clindamycin in 7% and cephalosporins in 2%. The risk of becoming revised due to infection was higher when using clindamycin than cloxacillin, RR 1.51 (95% CI: 1.18-1.95, p=0.001). There was no significant difference in revision rate due to other causes, (p=0.21).

Conclusions: We advise that patients reporting allergic reaction to penicillin have their allergic history explored. In the absence of clear history of type 1 allergic reaction we suggest the use of a cephalosporin instead of clindamycin as a perioperative prophylaxis when undergoing a TKR. No recommendation can be given regarding patients with type 1 allergy.

[RFP 28] PROSTHETIC JOINT INFECTIONS AND VITAMIN E PHOSPHATE COATING: PROMISING FORMULATION HAVING ANTIMICROBIAL AND ANTIBIOFILM ACTIVITY

Monica Bortolin[1], Alessandro Bidossi[1], Marco Toscano[2], Elena De Vecchi[1], Carlo Luca Romanò[3], Roberto Mattina[4], Lorenzo Drago[5]

[1] Irccs Galeazzi Orthopedic Institute, Laboratory of Clinical Chemistry and Microbiology, Milan, Italy
[2] University of Milan, Laboratory of Clinical Microbiology, Department of Biomedical Sciences for Health, Milan, Italy
[3] Centre for Reconstructive Surgery and Osteoarticular Infections, Milano Biofilm Center, Istituto Ortopedico Irccs Galeazzi, Milano, Italy
[4] University of Milan, Department of Public Health, Microbiology and Virology, Milan, Italy
[5] Laboratory of Clinical-Chemistry and Microbiology, Scienze Biomediche Per LA Salute, Irccs Galeazzi Institute, Milano, Italy

Aim: Biofilm-related infections represent a recurrent problem in the orthopaedic setting. In recent years, great interest was directed towards the identification of novel molecules capable to interfere with pathogens adhesion and biofilm formation on implant surfaces. In this study, two stable forms of α-tocopherol, the hydrophobic acetate ester and the water-soluble phosphate ester, were tested *in vitro* as coating for titanium prostheses.

Method: Antimicrobial activity against microorganisms responsible of prosthetic and joints infections was assessed by broth microdilution method. In addition, α-tocopherol esters were evaluated for both their ability to hamper bacterial adhesion and biofilm formation on sandblasted titanium surfaces.

Results: Only α-tocopheryl phosphate displayed antimicrobial activity against the tested strains. Both esters were able to significantly interfere with bacterial adhesion and to prevent biofilm formation, especially by Staphylococcus aureus and Staphylococcus epidermidis. The activity of α-tocopheryl phosphate was greater than that of α-tocopheryl acetate. Alterations at membrane levels have been reported in literature[1] and may be likely responsible for the interference on bacterial adhesion and biofilm formation shown by α-tocopherol esters.

Conclusions: Although further studies are needed to better investigate the mechanisms of action and the spectrum of activity of α-tocopherol esters, these characteristics, together with the positive effect on wound healing and immune response, make these molecules promising candidate for coating in order to prevent implant-associated infections.

References

Uberos et al., Lett Appl Microbiol. 2001; 32: 303-306

[RFP 29] IMPACT ON LENGTH OF HOSPITAL STAY FROM DEDICATED INFECTIOUS DISEASES INPUT FOR ORTHOPAEDIC INFECTION PATIENTS COMPARED TO SPORADIC INFECTION SPECIALIST INPUT

Richard Anderson[1], Jonathan Bates-Powell[1], Cameron Cole[1], Shreya Kulkarni[1], Elinor Moore[1], Alan Norrish[1], Emma Nickerson[1]

[1] *University of Cambridge School of Clinical Medicine, Addenbrooke's Hospital, Cambridge , United Kingdom*

Aim: This study aimed to evaluate the impact on length of hospital stay from dedicated infectious diseases input for orthopaedic infection patients compared to sporadic infection specialist input.

Method: We conducted an observational cohort study of 157 adults with orthopaedic infections at a teaching hospital in the UK. The orthopaedic infections included were: osteomyelitis, septic arthritis, infected metalwork and prosthetic joint infections, and adults were aged 18 years or more. Prior to August 2016, advice on orthopaedic infection patients was adhoc with input principally from the on-call infectious diseases registrar and phone calls to microbiology whereas after August 2016 these patients received regular input from dedicated infectious diseases doctor(s). The dedicated input involved bedside reviews, medical management, correct antimicrobial prescribing, managing adverse drug reactions, increased use of outpatient parenteral antimicrobial therapy (OPAT) services especially self-administration of intravenous antibiotics and shared decision-making for treatment failure, whilst remaining under orthopaedic team care. Orthopaedic patients operated on for management of their infection between 29/8/16 and 15/3/17 were prospectively identified and orthopaedic operation records were used to retrospectively identified patients between 29/8/15 and 15/3/16. The length of stay was compared between the 2 groups.

Results: There were 83 patients in the dedicated infectious diseases input group (dedicated group) and 74 patients in the sporadic infection specialist input group (sporadic group).
Baseline characteristics:

	Sporadic group (n=74) 29.8.15 – 15.3.16	**Dedicated group (n=83) 29.8.16 – 15.3.17**
Age (median, IQR)	69 years (54-78 years)	58 years (43-71 years)
Female sex	24 (32%)	33 (40%)
Osteomyelitis	16 (22%)	32 (39%)
Septic arthritis	20 (27%)	11 (13%)
Infected metalwork	11 (15%)	9 (11%)
Prosthetic joint infection	27 (36%)	31 (37%)

The median length of stay for the sporadic group was 20 days (interquartile range (IQR) 13-29 days) compared to 14 days (IQR 9-27 days) for the dedicated group. Our hospital values one day in hospital at £864, therefore over the 6.5 months trial period of the dedicated infectious diseases input there was a cost saving of £430,272 (£864 x 6 days x 83 patients).

Conclusions: Dedicated infectious diseases input would be expected to improve patient care but by additionally reducing median length of stay for orthopaedic infection patients, this encourages investment to achieve both. In this era of increased scrutiny of health budgets demonstrating value for money, not just improved quality of patient care, is essential.

[RFP 30] SONICATION: INFLUENCE ON TIME TO RESULT. A RETROSPECTIVE COHORT ANALYSIS

Tobias Kramer[1]

[1] *Ladr Mvz GmbH Neuruppin, Microbiology and Infection Prevention, Neuruppin, Germany*

Aim: Periprosthetic joint infections (PJI) are a rare, but devastating complication. Diagnostic approaches to PJI vary greatly between different centers. Most commonly tissue biopsies and synovial fluid sampling are recommended for identification pathogens causing PJI. However, sensitivity and specificity of those techniques have been shown to be highly dependent on preanalytical factors like time and conditions of transportation, location of sampling, as well as analytical approaches and prolonged incubation for up to 14days. Sonication of explanted orthopedic devices has been shown to be more than only an addition in the diagnosis of PJI. The goal of this study was to evaluate the diagnostic value of sonication in PJI.

Method: Retrospective cohort analysis of orthopedic samples sent for sonication from 29 surgical centers between 06/2014-04/2017. Until 07/2015 samples were plated on Columbia-, MacConkey-, Chocolate- and Schaedler agar each as well as brain-heart broth*) , incubated aerobically and anaerobically for up to 14days. In 07/2015 an additional enrichment of 10ml per aerobic and anaerobic blood culture bottles* was introduced. The bottles were also incubated up to 14days and plated immediately if growth was detected. The p-values were calculated in graph pad with the Fisher´s exact test

Results: We evaluated 698 orthopedic samples sent for sonication, of which resulted in growth of one (n=355) or several (n=15) relevant pathogens. Coagulase negative staphylococci were isolated in 162 cases, *Staphylococcus aureus* was isolated in 67 cases, Propionibacterium spp. In 23 cases, Streptococcus spp. in 14 cases, Gram negative in 44 cases, Enterococcus spp. also in 14 cases and Candida spp. in 3 cases. The necessary time of incubation was further decreased to 1.8 days (range: 0-5) days after introduction of additional incubation of sonicate fluid in blood-culture bottles. All positive samples showed growth before the 9th day of incubation.

Conclusions: Sonication of explanted orthopedic devices and culturing of the sonicate fluid provides a fast reliable tool for diagnosing pathogens of PJI/ODAI without the need for prolonged incubation for up to 14days. The additional incubation of the sonicate in automated blood-culturing systems further improves the limit of detection and the time to growth.

*BioMerieux, Marcy étoile

[RFP 31] CLINICAL EVALUATION OF EFFICACY USING PCR LATERAL-FLOW ASSAY FOR GRAM-POSITIVE AND GRAM-NEGATIVE BACTERIAL INFECTION DETECTION IN JOINT FLUID

Katsufumi Uchiyama[1], Hiromi Kanda[2], Tokiko Yamaguchi[3], Shiro Ibe[2], Keizou Sakurai[3], Shin Nihonyanagi[4], Yojiro Minegishi[1], Shinsuke Ikeda[1], Yusaku Kanou[3], Kensuke Fukushima[1], Naonobu Takahira[5], Masashi Takaso[1]

[1] Kitasato University, School of Medicine, Department of Orthopaedic Surgery, Sagamihara-City, Kanagawa, Japan
[2] Kitasato-Otsuka Biomedical Assay Laboratories Co, Ltd., Sagamihara-City, Kanagawa, Japan
[3] Kitasato University Hospital, Department of Clinical Laboratory, Sagamihara-City, Kanagawa, Japan
[4] Kitasato University Hospital, Department of Infection Control, Sagamihara-City, Kanagawa, Japan
[5] Kitasato University, School of Allied Health Sciences, Department of Rehabilitation, Sagamihara-City, Kanagawa, Japan

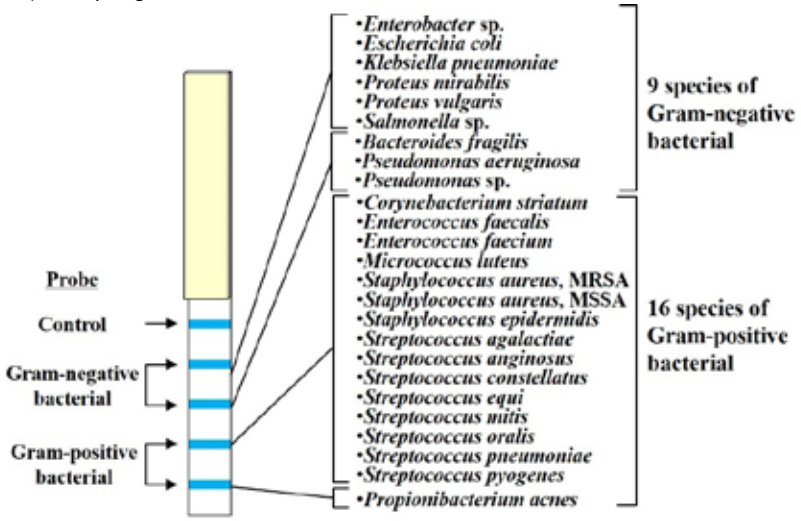
Aim: We used a polymerase chain reaction (PCR) lateral flow assay[1)] to rapidly diagnose joint infection. We evaluated the usefulness of multiplex-PCR (PCR lateral flow assay: PCR-LF) using detailed clinical data.

Method: A total of 35 synovial fluid samples were collected from 26 patients in whom bacterial infection was suspected, including 22 from knee joints, 11 from hip joints, and 2 from other joints. After purifying the DNA from the samples, multiplex PCR targeting two MRSA-associated genes (*femA* and *mecA*) and the bacterial 16S rRNA gene was performed. Amplified gene fragments were specifically detected with DNA probes immobilized on stick devices through DNA-DNA hybridization and visualization, enabling diagnosis of MRSA, MSSA, MRCNS, gram-positive, and/or gram-negative bacterial infection. Genetic identification of bacteria by determining the 16S rRNA gene sequence was also performed using multiplex PCR-positive samples. Finally, the usefulness of our PCR-LF method was evaluated using detailed clinical data.

Results: The results of PCR-LF were 9 gram-positive and 1 gram-negative bacterial infections. Eleven bacterial species were identified based on 16S rRNA gene sequences. Ten (90.9%)of the eleven samples (bacterial species) were identified using our PCR-LF. Five samples were detected in bacterial cultures; two are MSSA, one is *Streptococcus agalactiae*, one is *Escherichia coli*, one is *Prevotella oralis*. We diagnosed 6 samples as clinical infections. Therefore, the sensitivity and specificity of the culture tests were 83% and 100%, respectively, while for PCR-LF, these values were 83% and 83%.

Conclusions: PCR-LF is highly sensitive and effective for the rapid diagnosis of joint infection; however, dead bacteria may also be detected. Moreover, because the target bacterial species are limited, clinical diagnosis based on the results of multiple examinations is necessary.

References: 1) Nihonyanagi S et al.: Inflammation, 2012; 35: 927–934.



[RFP 32] PLACE OF SEROLOGY FOR THE DIAGNOSIS OF CHRONIC PROSTHETIC JOINT INFECTION

Alain Bicart See[1], Aurelie Bouige[2], Fourcade Camille[1], Guillaume Krin[3], Saltes Arnaud[4], Conte Philippe[4], Marie-Pierre Felice[2], Eric Bonnet[1], Gérard Giordano[5], Martin Rottman[6]

[1] *Hôpital Joseph Ducuing, Infectious Disease Unit, Toulouse, France*
[2] *Hôpital Joseph Ducuing, Biological Department, Toulouse, France*
[3] *Hôpital Joseph Ducuing, Orthopedy, Toulouse, France*
[4] *Clinique du Parc, Orthopedy, Toulouse, France*
[5] *Hôpital Joseph Ducuing, Traumatology and Orthopaedic Surgery Department, Toulouse, France*
[6] *Université de Versailles, Hôpital Raymond Poincaré, Aphp, Epim-Microbiology, Garches, France*

Aim: Pre-operative distinction between prosthetic joint infections (PJI) and non-infectious causes of joint failure is particularly challenging, especially in chronic situations. Guidelines propose different algorithms using numerous preoperative tests. We evaluated place of serology.

Method: During a 9 month period, we included consecutive patients undergoing arthroplasty revision for a suspected chronic hip or knee infection. Serologies were sampled at the same day than the other blood tests. Results were compared with the final diagnosis, determined with peroperative bacteriological and histological results. Serology was performed using a multiplex antibody detection*. This multiplex antibody detection assay detects antibodies against *Staphylococcus species*, *Propionibacterium acnes* and *Streptococcus agalactiae.*

Results: A total of 52 patients were enrolled. Median time from last arthroplasty was 30 months (extremes 8 months - 17 years). Median clinical signs duration was 6 months (extremes 1 - 40 months). Median CRP value was 6 mg/l (extremes 2 - 150) and sedimentation rate 12 mm (extremes 2 - 82). Diagnostic of PJI was finally retained for 17 patients and ruled out for 35. It was *Staphylococcus aureus* 3 times, coagulase negative *staphylococci* (CoNS) 5 times, *P. acnes* 4 times, *candida sp.* 2 times, *Streptococcus agalactiae* one time, *Enterobacter cloacae* one time and undetermined one time. Serology was concordant and accurate with the final diagnosis for 38 patients (27 sterile and 11 infected). For 7 of them, serology was the key parameter. In these cases, a CoNS or a *P. acnes* was isolated per-operatively on a single culture, out of 5 samples. Serology allowed confirming a contamination in 5 cases; and in 2 cases, even if not fulfilling the definition, it determined a PJI. In this study, serology had a global sensitivity of 65%, 77% specificity, 58% positive predictive value, and 82% negative predictive value. Serology reached 89% sensitivity with unchanged specificity in the subgroup of 11 patients with a CRP > 10 mg/l.

Conclusions: We evaluated place of serology in the most complex cases of suspected chronic PJIs, with finally, only 33% cases with an infection. Modest results of serology can be explained because antigens included in the assay were not those expressed in sessile bacteria. And by persistence of a humoral response, witnesses of past infections, for patients who had past surgeries on the joint. However, simple and practical, when combined with all other parameters, serology could provide a valuable support in preoperative evaluation of chronic PJIs.

* BJI Inoplex™

[RFP 33] CAN BLOOD CULTURE BE USED TO DIAGNOSE PERIPROSTHETIC JOINT INFECTION?

Ahmed Siddiqi[1], Camilo Restrepo[2], Javad Parvizi[3]

[1] *Philadelphia College of Osteopathic Medicine, Orthopedic Surgery Residency, Philadelphia*
[2] *Rothman Institute, Philadelphia, United States*
[3] *Rothman Institute, Director of Clinical Research, Philadelphia*

Aim: Diagnosis of periprosthetic joint infection (PJI) presents a real challenge in some patients. Batteries of tests are available to reach this diagnosis. It is unknown if blood cultures have any role in diagnosis of PJI. The objective of this study was to evaluate whether blood cultures, taken in a group of patients with PJI, was useful in identifying the infecting pathogen.

Methods: The institutional database was used to identify all patients treated at our institution between 2000-2015 for PJI according to the latest MSIS criteria. There were a total of 864 patients with mean age of 68 years. Synovial fluid sample and/or deep tissue samples were analyzed and cultured in all of these patients. In 371 (42.9%) patients with PJI, blood cultures were also taken. Statistical analyses were performed for correlation purposes.

Results: In 246 (66.3%) patients in whom an organism was isolated from joint fluid, blood cultures were negative. 32 (8.6%) patients had both negative blood and synovial joint tissue culture. Of the 93 (25%) patients with positive blood cultures, 77 (82.7%) patients had identical organism in the joint and 16 (17.2%) had different organisms. Interestingly one infection that was fungal in nature showed no growth on tissue/fluid culture, yet a fungal organism was isolated in blood culture. Additionally, of the 93 patients with positive blood cultures, 57 (61.2%) had signs of systemic sepsis with leukocytosis and increased PMN/left shift. Within the 57 patients, 50 (87.7%) had identical blood and joint culture and 7 (12.2%) were from different culture organisms. 36 (38.7%) patients had subclinical infection with no signs of systemic sepsis.

Discussion: Although this study does not advocate the routine use of blood culture for diagnosis of PJI, the finding that blood culture is successful in isolating the infecting organism as the joint in a handful of cases is compelling. Thus, the result of blood culture when performed should be considered as representative of the infecting organism in PJI cases.

[RFP 34] THE ACUTE PRESENTATION OF PROSTHESIS JOINT INFECTIONS CAN BE DECEIVING: WHOLE GENOME SEQUECING AS A DIAGNOSTIC TOOL

Faten El Sayed[1], Aurelia Gruber[2], Guillaume Sapriel [3], Nizar Fawal[4], Thomas Bauer[5], Beate Heym[6], Caroline Dupont [7], Simon Le Hello[4], Jean-Louis Gaillard [6], Martin Rottman[6]

[1] *Hospital Ambroise Pare, Microbiology, Boulogne Billancourt, France*
[2] *Laboratoire de Microbiologie - Hôpital Ambroise Paré, France*
[3] *Atelier de Bioinformatique (Isyeb - Umr 7205 Cnrs Mnhn Upmc Ephe, Paris) , France*
[4] *Institut Pasteur - Paris , France*
[5] *Hopital Ambroise Paré , Chirurgie Orthopédique, France*
[6] *Hopital Ambroise Paré, Microbiology, France*
[7] *Hôpital Ambroise Paré, Médecine Interne et Maladies Infectieuses, France*

Aim: According to Tsukuyama classification, late acute hematogenous prosthesis joint infections (PJI) should be treated with debridement and implant retention (DAIR). We report here a recurrent Salmonella Dublin hip prosthesis infection. Through this case, we show how a recurrence of chronic PJI may have an acute clinical presentation leading to an inadequate surgical treatment.

Method: Case report. On May 2011, a 74-year-old woman with bilateral hip prostheses (implanted in 1998 (right) and 2001 (left)), was admitted to intensive care for sepsis and pain of her left hip. Blood cultures and a joint aspiration of the left hip yielded pure cultures of S.Dublin. The patient had a recent history of febrile diarrhea after consuming dubious meat. The patient underwent DAIR followed by a six-week antibiotherapy. Three years later, she presented to the emergency room for an acute onset febrile PJI of the right hip. The patient underwent DAIR of the right hip. Blood cultures, joint aspiration fluid, and all intraoperative periprosthetic tissue samples yielded S.Dublin. Colonoscopy and abdomen ultrasound were negative. The patient received two weeks of intravenous combined antibiotherapy followed by oral antibiotics for further 10 weeks. Six weeks post operatively, the surgical wound was healed and the patient walked normally. One year later, the patient was referred by her primary care practitioner for night fevers without local signs or dysfunction of her prostheses. Radioleucoscintigraphy showed right hip inflammation. Bilateral hip biopsies were nevertheless performed, yet S. Dublin was recovered solely from the right hip biopsy. A one-stage exchange of the right hip was performed. All intraoperative periprosthetic tissue samples yielded S.Dublin. A six-week-combined antibiotherapy was undertaken. One year later, the patient appeared free of infection and walked normally.

Results: Whole-genome sequencing was carried out on the three patient's strains (2011/2014/2015). Their genomes differed by only six SNPs, suggesting that they derived from a single "infecting" strain.

Conclusions: This is the first report of recurrent S.Dublin PJI proven by whole genome sequencing. In the absence of detectable gallbladder and/or intestinal carriage, it is most likely that S. Dublin was able to persist at the surface of prosthesis, leading to a chronic disease with recurrences occurring years after the initial episode. These recurrences were associated with a clinical acute onset of the infection, inducing an inadequate surgical treatment at the first time. A better knowledge of possible acutisation of chronic PJI by orthopedic surgeons may improve surgical management of these infections.

[RFP 35] PHAGE THERAPY FOR BONE AND JOINT INFECTIONS. REPORT OF FRENCH CASES

A. Dublanchet[1], Olivier Patey[1]

[1]*Department of Infectious and Tropical Diseases, Villeneuve Saint Georges Hospital, Villeneuve Saint Georges, France*

Aim: Many bone and joint infections, in spite of appropriated antibiotics therapy and surgery, lead to a therapeutic dead end. We are then faced with a chronic infection with or without continuous antibiotic treatment, with daily local care, and an exhorbitant economic and social cost. Pami the incriminated factors: the presence of foreign implant material, the poor diffusion of antibiotics at the infectious site, the presence of biofilm.
The bacteriophages, biological drug, natural environmental viruses possess the properties to meet these difficulties: well diffusion to the infectious focus with possibilities of local use, destruction of the biofilm allowing a release of the bacteria and a synergistic effect with the antibiotics, antibiofilm effect for the restoration of osteoblastosis.

Method and results: We report a cohort of phage - treated patients with or without antibiotics in bone and joint infections in a therapeutic dead end. Without disponibility of therapeutic phages available in the European Union, commercial cocktails of phages, antistaphylococcal or polyvalent, of Russian* or Georgian** origin were used.
Ten patients have benefited since 2008 from phages, alone or in combination with an adapted antibiotic therapy. Patients were 40 to 89 years old and had chronic bone and joint infections except for one case with acute MRSA infection on femoral implant. Bacteria were *Staphylococcus aureus* 7 times, *Pseudomonas aeruginosa* 3 times, *Klebsiella* 2 times. In 4 cases implant was left in place (knee prosthesis, femoral screw plate) or introduced (1 screw in 1 case) during the procedure. In all cases except 1 patient, the phages were applied in per-operative. With a follow-up of up to 9 years for some patients, the initial bacteria were eradicated and in 2 cases replaced by another bacterium (*Pseudomonas* in place of *S. aureus* in one case and *Enterococcus* in place of *P. aeruginosa* for an elderly patient with a knee prosthesis without possible surgery.

Conclusion: The combination of surgery, phages and antibiotics appear a very efficient option, to treat patients with bone and joint infections in therapeutic dead end. The quick availability of these treatments for theses patients is a health emergency.
*Microgen® Pharma
**Eliava Institute

[RFP 36] ISOLATION OF NEW LYTIC BACTERIOPHAGES FOR TREATMENT OF PROSTHETIC JOINT INFECTION

Andrej Trampuz[1], Ann-Brit Klatt[2], Mariagrazia Di Luca[1]

[1] *Charité-Universitätsmedizin Berlin, Berlin, Germany*
[2] *Berlin-Brandenburg Centrum for Regenerative Therapies, Universitätsmedizin Chari, Berlin, Germany*

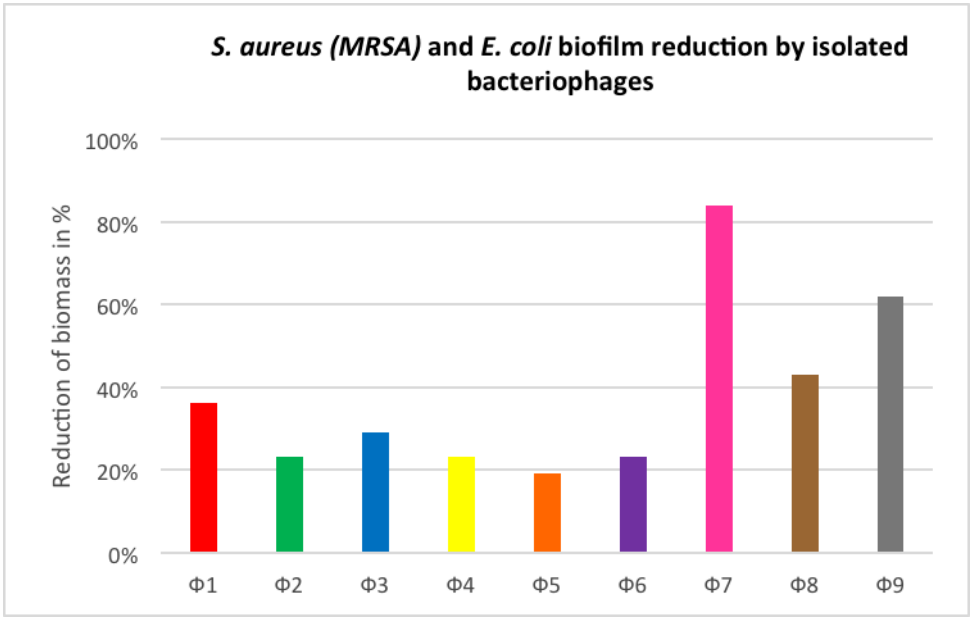
Aim: Phage therapy has attracted attention as a promising alternative treatment option for biofilm infections. To establish a successful phage therapy, a comprehensive stock of different phages covering a broad bacterial spectrum is crucial. We screened human and environmental sources for presence of lytic phages against selected bacteria.

Methods: Saliva collected from 10 volunteers and 500 ml of sewage water were screened for the presence of lytic phages active against 20 clinical strains of *Staphylococcus aureus* and 10 of *Escherichia coli*, both isolated from patients with prosthetic joint infection. Laboratory strains of methicillin-resistant *S. aureus (*MRSA)*[1] and E. *coli*[*2] were also tested. Screening was performed plaque-assay to detect phages for different strains. Isolated plaques were collected and phages were enriched to determine their activity against their bacterial host strains. The activity of bacteriophages against adherent *E. coli* and *MRSA* was evaluated by crystal violet, staining bacterial biofilms grown on glass beads.

Results: Six bacteriophages specific for MRSA were isolated from saliva. Bacteriophages for *E. coli* strains were isolated from sewage water (n=3) and saliva (n=1). All bacteriophages tested against biofilms of their bacterial host showed a reduction of the total biomass (ranging from 19% to 84%, see Figure 1).

Conclusions: Both sewage and saliva samples provided bacteriophages specific against selected bacterial strains. 24h phage treatment of *E. coli* and *S. aureus* biofilms lead to a reduction but not to a complete eradication of biofilm.

Figure 1. Reduction of total biomass of MRSA (Φ1- Φ6) and *E. coli* (Φ7- Φ9) biofilms after 24h treatment with bacteriophages isolated from human saliva and sewage water.



*ATCC 43300
* ATCC 25922

[FP 37] PROSTHETIC JOINT INFECTION IN ELDERLY PATIENTS

Camille Fourcade[1], Bouige Aurelie[2], Alain Bicart See[3], Gérard Giordano[4], Bonnet Eric[3]

[1] *Hôpital Joseph Ducuing, Infectious Disease Unit, Toulouse, France*
[2] *Hôpital Joseph Ducuing, Biological Department, Toulouse, France*
[3] *Joseph Ducuing Hospital, Orthopedic Department, Toulouse, France*
[4] *Hôpital Joseph Ducuing, Traumatology and Orthopaedic Surgery Department, Toulouse, France*

Aim: European population is ageing concurrently with an increase number of arthroplasties. Prosthetic joint infection (PJI) in the elderly is considered more severe. The aim of this study is to describe PJI's management of patients over 79 years of age.

Methods:
We conducted a retrospective study including all patients aged over 79 years old consulting for a suspected hip or knee PJI in our community hospital where a complex bone and joint unit is present.

Results: From 2007 to 2015, among the 366 patients who consulted for a PJI suspicion, 44 were older than 79. In this group, median age was 81.5 and 52% were women. A significant comorbidity was present in 24 patients among them 9 were diabetic. Location of suspected PJI was hip for 24 patients and 52% of the patients had a PJI background. Median time from the first arthroplasty was 8 years, however 17 had already an exchange. We classified the presentation as early (before 3 months after surgery, n=7), delayed (3 to 24 months, n=9) and late (more than 24 months, n=28). Pain was the first symptom, 9 presented fever and 10 had a sinus tract communication. Median C-reactive protein rate was 64 mg/l. Pre-operative synovial fluid analysis was performed in 34 patients, the concordance with intra-operative samples was 44%. A surgery was performed in 86% of the patients corresponding in five retentions, 17 one-time and 13 two-time exchange, 2 arthrodesis and one resection of arthroplasty. Coagulase-negative *Staphylococcus* (n=14), *Staphylococcus aureus* (n=10) and *Enterobacteriaceae* (n=5) were the principal microorganisms identified. Antibiotherapy median duration was 10 days for intravenous regimens and 45 days for total treatment. We noted 4 catheter-related infections and 9 side effects of antibiotics. A prolonged antibiotic suppressive therapy was performed for 8 patients (18%). With a median time of follow-up of 21.5 months, we notified 13 failures (30%) and 5 deaths (11%). After the episode, 5 patients could not stand-up, a walking stick was necessary for 11 patients, 2 for 5 patients while 13 recovered a relatively good autonomy.

Conclusion: PJI in elderly people is a severe complication with a significant morbidity but palliative treatment is not the first alternative. We showed acceptable outcomes with more invasive managements. These data need to be compared with younger population in a second analysis.

[FP 38] EPIDEMIOLOGY OF PROSTHETIC JOINT INFECTION IN THE ELDERLY: A 10 YEAR RETROSPECTIVE MULTICENTRIC STUDY

Marlene Amara[1], Thomas Bauer[2], Beatrice Bercot[3], Beate Heym[4], Herve Jacquier[5], Valentin Joste[1], Simon Marmor[6], Elsa Salomon[7], Simon Crioac Ile de France[8]

[1] *Centre Hospitalier de Versailles Hopital Andre Mignot, Le Chesnay, France*
[2] *Ambroise Paré-Garches, Aphp*
[3] *Lariboisiere, Aphp*
[4] *Lcsh, Gh Diaconesses - la Croix Saint Simon, Paris, France*
[5] *Groupe Hospitalier St Louis Lariboisière-Fernand Widal, Aphp, Service de Bactériologie-Virologie, Paris, France*
[6] *Gh Diaconesses-Croix-Saint-Simon, Centre de Référence des Infections Ostéo-Articulaires Complexes, Paris, France*
[7] *Groupe Hospitalo-Universitaire Ambroise Paré - Raymond Poincaré (Ap-Hp)*
[8] *Réseau de Prise En Charge des Infections Ostéo Articulaires (I.O.A.) D'ile-de-France*

Aim: The frequency of arthroplasty among older people is increasing. Taking care of Prosthetic Joint infection (PJI) in this specific population is a challenge. The purpose of this multicentric retrospective study was to evaluate the bacterial epidemiology of hip and knee PJI in octogenarians over ten years.

Method: Data were collected using two softwares* in each of the 4 Centers participating.
Inclusion criteria:
age ≥ 80 years
PJI (knee or hip)
between January 2007 and December 2016
microbiological data available (strains isolated from osteo-articular samples)
Bacterial identification: biochemical methods, followed by Malditof since 2009. For *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Enterobacteriaceae*, resistance profiles to antibiotics frequently used in PJI were collected. Antimicrobial susceptibility testing: disk diffusion (recommendations: French Society of Microbiology yearly updated).

Results: 381 patients were included: median age was 85 years and 239 patients were women. 129 were knee PJI and 252 hip. 129 infections occurred < 1 month after implantation, and 202 > 6 months after implantation. In 42 cases, no surgery was performed. The microorganisms isolated are detailed in table below. Combined susceptibility of *P. aeruginosa* and *Enterobacteriaceae*: piperacillin-tazobactam 81%, Cefepim 84%, carbapenem 93%, ciprofloxacin 74% and amikacin 96%. Among Enterobacteriaceae 18% of strains were producing extended spectrum beta lactamase (ESBL). Among S. aureus, susceptibility to methicillin 78 %, ofloxacin 76%, erythromycin 75% and rifampicin 93%.

Conclusions: An important proportion of the increasing infections among octogenarians with PJI are polymicrobials, and a lot of them involve gram negative rods, almost as frequently as *S. aureus*. These infections are difficult to treat, and resistance of gram negative strains is one of the obstacles to overcome among these patients where surgery is not always possible.

Year	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Gram positive Cocci										
S. aureus	8 (33%)	9 (36%)	12 (36%)	8 (38%)	14 (38%)	19 (28%)	32 (46%)	19 (31%)	29 (32%)	26 (28%)
Non aureus Staphylococci	6 (25 %)	2 (8%)	7 (21%)	4 (19%)	5 (14%)	7 (10%)	9 (13%)	6 (10%)	5 (6%)	17 (18%)
Enterococcus	1 (4%)	0	1 (3%)	0	1 (3%)	2 (3%)	2 (3%)	3 (5%)	5 (6%)	4 (4%)
Streptococcus	3 (13%)	2 (8%)	3 (9%)	0	3 (8%)	5 (7%)	3 (4%)	9 (15%)	6 (7%)	4 (4%)
Gram negative rods										
Enterobacteriaceae	3 (13%)	9 (36%)	4 (12%)	7 (33%)	10 (27%)	26 (39%)	15 (22%)	13 (21%)	30 (33%)	25 (27%)
P. aeruginosa	1 (4%)	2 (8%)	0	1 (5%)	4 (11%)	5 (7%)	3 (4 %)	3 (5%)	10 (11%)	7 (8%)
Others										
Anaerobes	1 (4%)	1 (4%)	2 (6%)	1 (5%)	0	1 (1%)	3 (4%)	2 (3%)	2 (2%)	3 (3%)
Candida	0	0	1 (3%)	0	0	1 (1%)	0	0	0	0
Other micro organism	1 (4%)	0	1 (3%)	0	0	1 (1%)	2 (3%)	6 (10%)	1 (1%)	6 (6%)
Polymicrobial	5 (25%)	4 (17%)	9 (39%)	4 (31%)	6 (19%)	16 (36%)	11 (20%)	15 (36%)	13 (19%)	19 (31%)
Total micro organisms	24	25	33	21	37	67	69	62	90	93
Number of patients	20	23	23	13	32	44	54	42	68	62

Table: Year by year repartition of microorganisms in >80 years PJI

* Sirweb (I2A) and Glims (MIPS)

[FP 39] INCREASED MORTALITY AFTER PROSTHETIC JOINT INFECTION IN PRIMARY THA

Per Hviid Gundtoft[1], Alma Becic Pedersen[2], Claus Varnum[3], Søren Overgaard[4]

[1] Kolding Sygehus, Orthopaedic, Kolding, Denmark
[2] Aarhus University Hospital, Clinical Epidemiology, Aarhus, Denmark
[3] Vejle Hospital, Orthopaedic, Vejle, Denmark
[4] Odense University Hospital, Institute of Clinical Research, University of Southern Denmark, Orthopaedic Surgery and Traumatology, Odense, Denmark

Aim: To study whether revision for prosthetic joint infection (PJI) after early PJI in primary Total Hip Arthroplasty (THA) is associated with a high mortality, when compared with:
Patients, who did not undergo revision for any reason and
Patients who underwent an aseptic revision.

Method: This population-based cohort study was based on the Danish Hip Arthroplasty Register on primary THA performed in Denmark from 2005 to 2014. Data from the Danish Hip Arthroplasty Register were linked to microbiology databases, the National Register of Patients, and the Civil Registration System to obtain data on microbiology, comorbidity, and vital status on all patients. The mortality risk for the patients who underwent revision for PJI within 1 year from implantation of primary THA was compared with (1) the mortality risk for patients who did not undergo revision for any reason within 1 year of primary THA; and (2) the mortality risk for patients who underwent an aseptic revision.

Results: A total of 68,504 primary THAs in 59,954 patients were identified, of those 445 primary THAs underwent revision for PJI, 1350 primary THAs underwent revision for other causes and the remaining 66,709 primary THAs did not undergo revision. Patients were followed from implantation of primary THA until death or 1 year of followup, or, in case of a revision, 1 year from the date of revision.
Within 1 year of primary THA, 8% (95% CI, 6%-11%) of patients who underwent revision for PJI died. The adjusted relative mortality risk for patients with revision for PJI was 2.18 (95% CI, 1.54-3.08) compared with the patients who did not undergo revision for any cause ($p < 0.001$). The adjusted relative mortality risk for patients with revisions for PJI compared with patients with aseptic revision was 1.87 (9f5% CI, 1.11-3.15; $p = 0.019$). Patients with enterococci-infected THA had a 3.10 (95% CI, 1.66-5.81) higher mortality risk than patients infected with other bacteria ($p < 0.001$).

Conclusions: Revision for PJI within 1 year after primary THA induces an increased mortality risk during the first year after the revision surgery. Especially enterococci-infected THA have a high motrtaly risk.

[FP 40] PROSTHETIC-JOINT INFECTIONS: MORTALITY RATE OVER THE LAST 10 YEARS

Arnaud Fischbacher[1], Olivier Borens[1]

[1] *University Hospital of Lausanne (Chuv), Service of Orthopedics and Traumatology, Lausanne, Switzerland*

Aim: There is a constant increase of joint arthroplasties to improve the quality of life of an aging population. Prosthetic-joint infections are rare, with an incidence of 1-2%, but they represent serious complications in terms of morbidity and mortality. The mortality was known to be approaching 8% in the elderly.[1,2] The aim of this retrospective study is to reassess the two-year mortality rate over the last ten years.

Method: Patients having a prosthetic joint infection at Lausanne University Hospital (Switzerland) between 2006 and 2016 were included. The two-year mortality rate depending on sex, age, type of infection and type of surgical therapy was measured.

Results: 444 patients (61% hips, 37% knees) were identified with a median age of 70 years. The two-year mortality rate was 5%. There was no difference between hip and knee prosthesis but the mortality was higher for men (6%) than women (4%). The rate has not changed over the last ten years. However, the mortality rate is more than doubling (12%) for patients over eighty years old. Furthermore, chronic prosthetic-joint infections seem to have a higher mortality rate (7%) than acute ones (4%). Finally, patients treated with a one-stage or two-stage exchange seem to have a lower mortality rate (<1%) than the ones treated with debridement and retention (11%).
Conclusion: The mortality seems to be less than thought before and depends on sex, age, type of infection and type of surgical therapy.

Keywords: prosthetic-joint infection, mortality, survival

References:
Rao N, Soxman GL. Prosthetic joint infections in the elderly. Oper Tech Orthop. 2002;12:131–8.
Gundtoft PH, Pedersen AB, Varnum C, Overgaard S. Increased Mortality After Prosthetic Joint Infection in Primary THA. Clin Orthop. 2017.

[FP 41] AVAPOM - COMPLETE ORAL VERSUS INTRAVENOUS ANTIBIOTIC DOCUMENTED TREATMENT IN PROSTHETIC JOINT INFECTIONS

Eric Senneville[1], Alexandre Coelho[2]

[1] *Dron Hospital, Infectious Diseases, Tourcoing, France*
[2] *Ch Dron , 59, Tourcoing, France*

Aim: Prosthetic joint infection (PJI) concerns up to 20% of all prosthesis revision procedures. The IDSA recommends at least 2 weeks of intravenous antimicrobial therapy while most of the appropriate antibiotics in these settings have very high oral bioavailability (e.g., rifampicin, cotrimoxazole, fluoroquinolone, clindamycin, fusidic acid, linezolid and doxycycline).

Method: AVAPOM is a monocentric retrospective non-inferiority study which included patients who received at least one of the highly bioavailable antibiotics listed above as a documented treatment (i.e., following the intravenous empirical post-operative antibiotic treatment) for PJIs in order to compare the remission rate of infection and the length of hospital stay (LOS). Patients were split between intravenous group (IV, from 1st January 2013 to 31st December 2014) and complete oral group (PO; since 1st January 2015) and were compared on both the PJI outcome regarding the last news available and the length of stay (LOS).

Results: Out of a total of 216 patients, our intermediary analysis included 141 patients, with 73 receiving IV treatment (IV) and 68 oral treatment (PO). Remission was recorded in 21.9% IV patients and in 25.0% PO patients after a mean follow-up of 410.4 days ± 36.3 days (p=0.26). The global mortality reached 6.41% in IV group versus 1.25% in PO group (p=0.15). The medium LOS was 16.9 and 12.5 days for respectively IV and PO groups (p=0.0001).

Conclusions: Our preliminary results suggest that complete oral and intravenous documented antibiotic treatment for patients with PJIs are comparable with regards to the patients' outcome but oral treatment is associated with a significant reduction of LOS.

[FP 42] ORAL VERSUS INTRAVENOUS ANTIBIOTICS FOR THE TREATMENT OF BONE AND JOINT INFECTION (OVIVA): A MULTI-CENTRE RANDOMISED CONTROLLED TRIAL

Matthew Scarborough[1], Ho Kwong Li[2], Ines Rombach[3], Rhea Zambellas[3], Sarah Walker[4], Michelle Kumin[5], Benjamin A. Lipsky[6], Harriet Hughes[7], Deepa Bose[8], Simon Warren[9], Claudia Geue[10], Nicola McMeekin[10], Andrew Woodhouse[11], Bridget Atkins[2], Martin McNally[1], Tony Berendt[2], Brian Angus[12], Ivor Byren[2], Guy Thwaites[13], Philip Bejon[14]

[1] *Nuffield Orthopaedic Centre, Bone Infection Unit, Oxford University Hospitals, Oxford, United Kingdom*
[2] *Nuffield Orthopaedic Centre, Oxford University Hospitals NHS Foundation Trust, United Kingdom*
[3] *Ndorms, Oxford University, Oxford, United Kingdom*
[4] *University of Oxford, Nuffield Department of Medicine, Oxford, United Kingdom*
[5] *University Of Oxford, Experimental Medicine, Oxford, United Kingdom*
[6] *University of Oxford, Medicine, Infectious Diseases, Oxford, United States*
[7] *Public Health Wales / University Hospital of Wales, Microbiology Department, Cardiff, United Kingdom*
[8] *University Hospitals Birmingham, Birmingham, United Kingdom*
[9] *Royal Free Hospital, London, UK, Royal National Orthopaedic Hospital, UK, Royal National Orthopaedic Hospital, Stanmore, London, United Kingdom*
[10] *University of Glasgow, Glasgow, United Kingdom*
[11] *Heart of England NHS Foundation Trust, Birmingham, United Kingdom*
[12] *University of Oxford, Oxford, United Kingdom*
[13] *Oxford University Clinical Research Unit, Ho Chi Minh City, Viet Nam*
[14] *Kemri Wellcome Trust Research Program, Kilifi, Kenya*

Aim: Current standard of care in the management of bone and joint infection commonly includes a 4-6 week course of intravenous (IV) antibiotics but there is little evidence to suggest that oral antibiotic therapy results in worse outcomes. The primary objective was to determine whether oral antibiotics are non-inferior to IV antibiotics in this setting.

Method: This was a parallel group, randomised (1:1), open label, non-inferiority trial across twenty-six NHS hospitals in the United Kingdom. Eligible patients were adults with a clinical diagnosis of bone, joint or orthopaedic metalware-associated infection who would ordinarily receive at least six weeks of antibiotics and who had received ≤7 days of IV therapy from the date of definitive surgery (or the start of planned curative treatment in patients managed non-operatively). Participants were randomised to receive either oral or IV antibiotics for the first 6 weeks of therapy. Follow-on oral therapy was permitted in either arm. The primary outcome was the proportion of participants experiencing definitive treatment failure within one year of randomisation. The non-inferiority margin was set at 7.5%.

Results: Of 1054 participants randomised (527 to each arm) endpoint data were available for 1015 (96.30%). Definitive treatment failure was identified in 141/1015 (13.89%) participants, 74/506 (14.62%) of those randomised to IV therapy and 67/509 (13.16%) of those randomised to oral therapy.
In the intention to treat analysis, the imputed risk difference (PO-IV) for definitive treatment failure was -1.38% (90% CI: -4.94, 2.19), thus meeting the non-inferiority criterion (i.e. the upper limit of 95%CI being <7.5%). A complete cases analysis, a per-protocol analysis and sensitivity analyses for missing data confirmed this result.
With the exception of intravenous catheter complications, there was no significant difference between the two arms in the incidence of serious adverse events (SAEs).
Health economic analysis suggests that the non-surgical treatment costs over one year for patients randomised to oral therapy were approximately £2,700 less than those of IV therapy.

Conclusions: Oral antibiotic therapy is non-inferior to IV therapy when used during the first six weeks in the treatment for bone and joint infection, as assessed by definitive treatment failure within one year of randomisation. These findings challenge the current standard of care and provide an opportunity to realise significant benefits for patients, antimicrobial stewardship and the health economy.

Funding: The OVIVA study was funded by the National Institute for Health Research Health Technology Assessment programme (Project number 11/36/29).

[FP 43] FUNCTIONAL OUTCOME OF PATIENTS WITH HIP AND KNEE INFECTIONS TREATED IN THE OVIVA (ORAL VERSUS INTRAVENOUS ANTIBIOTICS) MULTI-CENTRE RANDOMIZED CONTROLLED TRIAL (RCT)

Abtin Alvand[1], Ho Kwong Li[1], Rhea Zambellas[2], Ben Kendrick[1], Adrian Taylor[1], Bridget Atkins[1], Philip Bejon[3], Matthew Scarborough[4], Martin McNally[4]

[1] *Nuffield Orthopaedic Centre, University of Oxford, Oxford, United Kingdom*
[2] *University of Oxford*
[3] *Kemri Wellcome Trust Research Program, Kilifi, Kenya*
[4] *Nuffield Orthopaedic Centre, Bone Infection Unit, Oxford University Hospitals, Oxford, United Kingdom*

Aim: To assess the influence of route of antibiotic administration on patient-reported outcome measures (PROMS) of individuals treated for hip and knee infections in the OVIVA multi-centre randomised controlled trial.

Method: This study was designed to determine whether oral antibiotic therapy is non-inferior to intravenous (IV) therapy when given for the first six weeks of treatment for bone and joint infections. Of the 1054 participants recruited from 26 centres, 462 were treated for periprosthetic or native joint infections of the hip or knee. There were 243 participants in the IV antibiotic cohort and 225 in the oral cohort. Functional outcome was determined at baseline through to one year using the Oxford Hip/Knee Score (OHS/OKS) as joint-specific measures (0 the worse and 48 the best). An adjusted quantile regression model was used to compare functional outcome scores.

Results: Of the 214 participants in the hip sub-group, 110 were treated with IV antibiotics and 104 with oral. Of the 248 participants in the knee cohort, 133 were treated with IV antibiotics and 115 with oral. The OHS/OKS questionnaire response rate was 68%. Baseline median OHS of the hip sub-group was 14 (Interquartile range [IQR]:8-22) for the IV cohort and 12 (IQR:7-22) for the oral cohort. The one-year median OHS was 35 (IQR: 23-44) for the IV cohort and 27 (IQR:16-40) for the oral cohort with no significant difference between cohorts (p=0.181). The baseline median OKS of the knee sub-group, was 14 (IQR:8-23) for the IV cohort and 12 (IQR:8-21) for the oral cohort. The one-year median OKS was 24 (IQR: 15-35) for the IV cohort and 27 (IQR:17-38) for the oral cohort with a statistically significant difference in favour of oral therapy (p=0.036).

Conclusions: At one year, there was improvement in functional outcome of patients treated with either IV or oral antibiotics in this RCT. It suggests that joint function generally improved progressively following the start of treatment irrespective of the route of antibiotic therapy. Functional outcome of patients with hip infections was similar irrespective of the route of antibiotic therapy, whereas there was statistically greater improvement in functional outcome of patients with knee infections treated with oral antibiotics. The PROMS findings of this trial support the clinical findings (i.e. infection eradication rates) and suggest that there is no advantage of using prolonged intravenous therapy as compared to oral therapy in the early treatment of infections around the hip and knee joint.

[FP 44] SEPTIC OUTCOME AFTER MEGAPROSTHESIS RECONSTRUCTION OF A MUSCULOSKELETAL TUMOUR OF THE LOWER LIMB

Irene Katharina Sigmund[1], Jutta Gamper[2], Christine Weber[1], Johannes Holinka[1], Philipp Funovics[1], Reinhard Windhager[1]

[1] *Medical University of Vienna, Orthopaedics, Vienna, Austria*
[2] *Medical University of Vienna, Medical Statistics, Vienna, Austria*

Aim: Periprosthetic joint infections are a devastating complication after modular endoprosthetic reconstruction following resection of a musculoskeletal tumour. Due to long operating times, soft tissue dissection and immunosuppression, the infection rate after limb salvage is high and ranges between 8% and 15%. The aim of this retrospective single centre study was to assess the reinfection and re-reinfection rate after septic complications of megaprostheses.

Method: In this retrospective study, 627 patients with a primary replacement of a musculoskeletal tumour of the lower limb and reconstruction by a megaprosthesis were recorded from 1983 – 2016. 83 out of 621 patients available for follow-up experienced an infection (13.4%). Two patients were treated with debridement and removal of the mobile parts, 61 patients with a one-stage revision, 16 patients with a two-stage revision, and 4 patients with an amputation. The mean follow up was 133 months (range: 2 – 423 months).

Results: The reinfection rates after debridement, one-stage revision, two-stage revision, and amputation were 100% (CI 95%: 20 -100%), 49% (CI 95%: 36 – 62%), 38% (CI 95%: 6 – 76%), and 0%, respectively. A reinfection occurred after a mean of 38,7 months (range: 0 to 201 months). The most commonly isolated microorganisms were coagulase negative Staphylococci, followed by *Staphylococcus aureus*. A re-reinfection occurred in 100% after debridement, in 44% (CI 95%: 22 – 69%) after one-stage revision, in 55% (CI 95%: 31 – 91%) after two-stage revision, and 0% after amputation. Regarding two-stage revision, there was a statistically significant difference in infection rates between patients treated with complete removal of the megaprosthesis and patients with at least one retained component (Fisher's exact test, $p = 0.027$).

Conclusions: Septic failures after megaprosthesis reconstruction of a musculoskeletal tumour of the lower limb are difficult to treat and show high reinfection and re-reinfection rates. A two-stage revision with removal of all components showed the best results among limb salvage procedures for periprosthetic megaprosthesis infection.

[FP 45] BONE DEFECTS IN SEPTIC TWO-STAGE KNEE REVISION SURGERY - IMPLANT SURVIVAL USING METAPHYSEAL SLEEVE FIXATION

Mathias Glehr[1], Sebastian Klim[1], Patrick Sadoghi[1], Gerwin Bernhardt[1], Andreas Leithner[2], Roman Radl[1], Florian Amerstorfer[1]

[1] *Medical University of Graz, Department for Orthopaedics and Trauma, Graz, Austria*
[2] *Department of Orthopedic Surgery, Medical University of Graz, Graz, Austria*

Aim: One of the most challenging problems in total knee arthroplasty (TKA) is periprosthetic infection. A major problem that arises in septic revision TKA (RTKA) are extended bone defects. In case of extended bone defects revision prostheses with metaphyseal sleeves are used. Only a few studies have been published on the use of metaphyseal sleeves in RTKA - none were septic exclusive. The aim of our study was to determine the implant survival, achieved osseointegration as well as the radiological mid-term outcomes of metaphyseal sleeve fixation in septic two-stage knee revision surgery.

Method: Clinical and radiological follow-up examinations were performed in 49 patients (25 male and 24 female). All patients were treated with a two-stage procedure, using a temporary non-articulating bone cement spacer. The spacer was explanted after a median of 12 weeks (SD 5, min. 1 - max. 31) and reimplantation was performed, using metaphyseal sleeves in combination with stem fixation. Bone defects were classified on preoperative radiographs using the Anderson Orthopaedic Research Institute (AORI) classification. During follow-up postoperative range of motion (ROM) was measured and radiographs were performed to analyse: (i) osseointegration (radiolucent lines and spot welds), (ii) leg alignment, (iii) patella tilt and shift.

Results: All types of bone defects were found on the tibial (4x type 1, 7x type 2a, 26x type 2b, 9x type 3) as well as on the femoral side (1x type 1, 4x type 2a, 20x type 2b, 6x type 3). Mean follow-up time was 4.7 years (minimum 1 year). In total 12 knees (24.5%) had to be re-revised, all due to re-infection. We did not encounter any case of aseptic loosening. In 3 patients (6.8%) we detected an insufficient osseointegration, but no patient had to be re-revised due to only minimal or to the absence of symptoms and no clinical signs of loosening. The ROM (mean 93°, SD 20.6, min. 25° max. 125°) has shown very satisfying results at the time of follow-up. Malalignment was detected in 4 patients (10.3%), a patella tilt in 7 (19.4%) and a patella shift in 14 (48.3%).

Conclusions: Metaphyseal Sleeves have shown very promising mid-term results regarding osseointegration and aseptic implant survival in RTKA with compromised metaphyseal bone stock. Our results indicate that they are a reliable fixation option in septic RTKA patients.

[FP 46] THE USE OF TANTALUM METAPHYSEAL CONES IN THE MANAGEMENT OF SEVERE BONE DEFECTS IN SEPTIC KNEE REVISION

Giorgio Burastero[1], Luca Cavagnaro[2], Francesco Chiarlone[3], Giovanni Riccio[4], Lamberto Felli[5]

[1] Santa Maria DI Misericordia Hospital, Malattie Infiammatorie Osteo-Articolari (Mioa), Direttore DI Struttura Complessa, Loano, Italy
[2] Orthopaedic Department, Irccs Azienda Ospedaliera San Martino-Ist, Roma, Italy
[3] Orthopaedic Department - San Martino Hospital, Genoa, Italy
[4] Ospedale Santa Maria DI Misericordia, Albenga, Italy
[5] San Martino Hospital , San Michele in Escheto, Italy

Aim: Femoral or tibial massive bone defects (AORI F2B-F3 / T2B-T3) are common in septic total knee replacement. Different surgical techniques are described in literature. In our study we show clinical and radiological results associated with the use of tantalum metaphyseal cones in the management of cavitary bone defects in two-stage complex knee revision.

Method: Since 2010 we have implanted 70 tantalum metaphyseal cones associated with constrained or semiconstrained knee prostheses in 47 patients. The indication for revision was periprosthetic knee infection (43 cases, 91.5%) or septic knee arthritis (4 patients, 8.5%) with massive bone defect. All cases underwent a two-stage procedure. Patients were screened for main demographic and surgical data. Clinical and radiological analysis was performed in the preoperative and at 3,6 months, 1 years and each year thereafter in the postoperative. The mean follw-up was 31.1 months ± 18.8. No dropout was observed.

Results: Objective and subjective functional scores (KSS, OKS) showed a statistically significant improvement from the preoperative to last follow-up ($p < 0.001$). All cones but one (98.6%) showed radiological osteointegration. We did not find any cone-related intraoperative or postoperative mechanical complication with a 100% survival rate when we consider aseptic loosening as cause of revision. Six non progressive radiolucencies were observed. Two septic failures (4.3%) with implant and cone removal were reported.

Conclusions: The ideal treatment for cavitary bone defects in two-stage TKA septic revision is still unclear. The use of metaphyseal tantalum cones showed excellent clinical and radiographic results with a low rate of related complications. The main finding of our study is the cone-related infection rate (2.9%) in this particular series of patients. This data is comparable or better than other previous report about this topic with unhomogeneous cohort of patients.

[FP 47] SPINAL INSTRUMENTATION SURGERY, A WELL-KNOWN BUT NEGLECTED ORTHOPAEDIC PROCEDURE DESERVING MORE ATTENTION ON PERIOPERATIVE CARE

Koji Yamada[1], Tsuyoshi Miyazaki[2], Tomohiro Shinozaki[3], Hiroyuki Oka[4], Fumiaki Tokimura[2], Yasuhito Tajiri[5], Hiroshi Okazaki[1]

[1] Kanto Rosai Hospital, Orthopaedic Surgery, Japan
[2] Tokyo Metropolitan Geriatric Hospital and Institute of Gerontology, Orthopaedic Surgery, Japan
[3] University of Tokyo, Biostatistics, the Graduate School of Medicine, Japan
[4] University of Tokyo, Medical Research and Management for Musculoskeletal Pain, 22nd Century Medical & Research Center, Faculty of Medicine, Japan
[5] Tokyo Metropolitan Hiroo Hospital, Orthopaedic Surgery, Japan

Aim: Surgical site infection (SSI) is associated with substantial morbidity, mortality and economic burden. Management of spinal SSI is becoming more challenging especially in instrumented cases, but is not well recognized as high risk procedure. The objective of this study was to determine the impact of procedure type comparing SSI risk with arthroplasties among all orthopaedic procedures.

Method: Using prospectively collected data of consecutive samples in multi-center orthopedic SSI surveillance, we explored the differences in SSI rates within 30 days after surgery by procedure types. Patients who underwent surgery of single site between November 2013 and May 2016 were enrolled. SSI was our primary outcome. Urinary tract infection (UTI), and respiratory tract infection (RTI) were also evaluated. The definition of SSI was based on the CDC definition with slight modifications. All patients were followed for 30 days postoperatively. Multivariate logistic regression analyses were done, and variables were carefully selected for adjustments.

Results: In total 8,907 single site surgeries were analyzed. There were four major procedure types, fracture repair 31%, arthroplasty 30%, spinal surgery without instrumentation 14.7% and spinal instrumentation surgery 13%. Patient backgrounds were male 41.4%, diabetes 13.5%, rheumatoid arthritis 3.8 %, present smoker 13.4%, mean BMI 23+4, and operative time 144+92 minutes. Cefazolin was administered in more than 98% of all cases, and were administered appropriately before surgery. SSI occurred in 102 cases (1.2%), and the SSI rates were 2.5% in spinal instrumentation surgery and 0.6% in arthroplasty. After adjustment with several clinically relevant variables such as age, sex, diabetes and ASA, spinal instrumentation surgery was the only procedure which remained significant with adjusted odds ratio (aOR) of 3.3 (1.8-6.2, P<0.01) compared with arthroplasties. The risk remained stable after adding further clinically relevant variables (aOR of 2.2 to 3.3). The risk was not significant for spinal surgery without instrumentation (aOR, 1.8; 0.9-3.5, P=0.10). Moreover, the risk of spinal instrumentation surgery was highest for UTI (aOR, 4.7; 2.9-7.6), P<0.01) and RTI (aOR, 3.7; 1.6-8.9), P<0.01) among all procedures.

Conclusions: From our study, spinal instrumentation surgery was the only procedure to be significant after multivariate analysis, and the risk for SSI remained 2.2 to 3.3 fold higher compared with arthroplasties. The risk was also highest for several other major healthcare-associated infections. Considering the disastrous consequences, more interests and improvements in total perioperative care are needed for this procedure.

[FP 48] FUNCTIONAL RESULTS OF PARTIAL CALCANECTOMIES FOR THE TREATMENT OF CHRONIC OSTEOMYELITIS OF THE CALCANEUS

Demay Olivier[1], Siboni Renaud[1], Diallo Saïdou[1], Xavier Ohl[1]

[1] *Reims Teaching Hospital, Orthopaedic Department, Reims, France*

Aim: Chronic osteomyelitis of the calcaneus is a frequent problem in a population of diabetic patients, patients with neurologic disorders or bedridden patients with ulcers. Partial calcanectomy is an alternative option which avoid major amputation. The aim of this retrospective study was to determine the effectiveness of partial calcanectomy for treating chronic osteomyelitis of the calcaneux.

Method: We conducted a retrospective review of patients who underwent in our department a partial calcanectomy between 2006 and 2015. All patients with a complete set of radiographs and adequate follow-up (minimum 2 years) were included. We reviewed these cases to determine healing rate, microbiological analysis, risk factors of failure (comorbidities), limb salvage rate and survival rate. We analyzed specifically the footwear and the functional subjective evaluation according to the LEFS score (Lower Extremity Functional Scale).

Results: Twenty-four patients were included (24 foot). There were 17 men and the mean age was 65.2 years. The control of the infection and the healing was obtained in 15 cases. An additional surgery was required in 46% of the cases. A transtibial amputation has been realized in 9 cases because of uncontrolled infection. The existence of a preoperative vascular disease increased 5,9 times the risk of amputation after a partial calcanectomy (p=0,033). The type of germ was not related to the risk of recurrence. Soles were necessary for 60% of the patients with a successful partial calcanectomy (n=15). The average LEFS score was 51/80.

Conclusion: The treatment of the chronic osteomyelitis of the calcaneus was a therapeutic challenge for these patients. The partial calcanectomy is a useful procedure for limb salvage, but the selection of patients must be rigorous. In our study, arteriopathic patients had a high risk of amputation after partial calcanectomy. When the healing is acquired, the patients were satisfied and presented a good function.

[FP 49] PUBIC OSTEOMYELITIS: EPIDEMIOLOGY AND FACTORS ASSOCIATED WITH MANAGEMENT FAILURE IN TWO FRENCH REFERENCE CENTERS

Agathe Becker[1], Florent Valour[2], Thomas Perpoint[1], Loïc Boussel[1], Alain Ruffion[3], Frédéric Laurent[2], Eric Senneville[4], Christian Chidiac[2], Tristan Ferry[2]

[1] *Hospices Civils de Lyon - Hôpital de la Croix-Rousse, Lyon, France*
[2] *Hospices Civils de Lyon - Claude Bernard Lyon 1 University, Infectious Diseases - Inserm U1111, International Center for Research in Infectiology, Lyon, France*
[3] *Hospices Civils de Lyon - Centre Hospitalier Lyon Sud, Pierre Benite, France*
[4] *Centre Hospitalier Gustave Dron, Service Universitaire des Maladies Infectieuses et du Voyageur, Tourcoing, France*

Aim: Pubic osteomyelitis (PO) is one of less frequent Bone and Joint Infections forms (BJI). Its management is still poorly codified as far as nosological framework is still unclear in medical literature. We aim to describe PO epidemiology and to look for factors associated with management failure.

Method: We performed a retrospective cohort study, carried out in two Reference Centres, including patients with PO in 2010-2016. Treatment failure was defined by: (i) persistence of clinical signs despite treatment; (ii) clinical relapse with same microorganisms; (iii) infection recurrence with one or more different microorganism(s); (iv) new signs of infection (abscess, sinus tract) in same area, without recourse to get microbiological documentation. Factors associated with management failure were determined by *univariate Cox analysis (hazard ratio* [HR] and 95% confidence interval *calculation).* Kaplan-Meier curve were compared between groups by log-rank test.

Results: Twenty-five patients were included over thirteen years (median age 67 years; 19 men, median ASA score 3). Six (24 %) had a PO from haematogenous origin. Those were all monomicrobial infection, due to *S.aureus*, mostly identified in young patients without comorbidities, especially in athletes. No surgery was required if no abcess or bone sequestrum were found. Nineteen patients (76 %) had a post-operative chronic PO (developed from 1 month to 11 years after a pelvic surgery); 15 of them had history of pelvic cancer (60%); 12 received radiotherapy at the site of infection (48 %). Infection was polymicrobial in 68 % of cases, including 32 % of cases with multidrug-resistant pathogens. A clinical success was recorded in only 14 patients (56%). Treatment failure was always noticed in chronic post-operative forms. Potential risk factors associated with failure management were: pelvic cancer history (HR 3.8; p=0,089); pelvic radiotherapy history (HR 2.9; p=0.122); clinical sinus tract (HR 5.1; p=0,011); infection with multidrug-resistant bacteria (HR 2.8; p=0,116), and polymicrobial infection (HR 70.5; p=0,090).

Conclusions: Our study highlights predominant chronic complex post-operative forms of PO. They are mostly plurimicrobial, sometimes associated with multi-drug resistance, occurring in fragile patients with pelvic cancer. It frequently leads to complex antibiotherapy, with important risk of relapse. Aggressive surgical procedure with large bone resection is frequently required in patients who underwent pelvic radiotherapy.

[FP 50] EVIDENCE BASED PROTOCOL FOR MANAGEMENT OF PERSISTENT DRAINING WOUNDS AFTER TOTAL HIP AND KNEE SURGERY

Ali Oliashirazi[1], Alisina Shahi[1]

[1] *Rothman Institute, Orthopaedic Surgery, Philadelphia*

Aim: Persistent wound drainage has been recognized as one of the major risk factors of periprosthetic joint infection (PJI). Currently, there is no consensus on the management protocol for patients who develop wound drainage after total joint arthroplasty (TJA). The objective of our study was to describe a multimodal protocol for managing draining wounds after TJA and assess the outcomes.

Methods: We conducted a retrospective study of 4,873 primary TJAs performed between 2008 and 2015. Using an institutional database, patients with persistent wound drainage (>48 hours) were identified. A review of the medical records was then performed to confirm persistent drainage. Draining wounds were first managed by instituting local wound care measures. In patients that drainage persisted over 7 days, a superficial irrigation and debridement (I&D) was performed if the fascia was intact, and if the fascia was not intact modular parts were exchanged (Figure 1). TJAs that underwent subsequent I&D, revision surgery, or developed PJI within one year were identified.

Results: Draining wounds were identified in 6.2% (302/4,873) of all TJAs. Overall, 65% (196/302) of patients with draining wounds did not require any surgical procedures. Of the patients with persistent drainage, 9.8% underwent I&D, 25.0% underwent revision arthroplasty. Moreover, 15.9% of these patients developed PJI within one year. Compared to those without wound drainage, TJAs complicated by wound drainage demonstrated an odds ratio of 16.9 (95% CI: 9.1-31.6) for developing PJI, and 18.0 (95% CI: 11.3-28.7) for undergoing subsequent surgery.

Conclusions: Wound drainage after TJA is a major risk factor for subsequent PJI and its proper management has paramount importance. Our results demonstrated that drainage ceased spontaneously in 65% of the patients with local wound care measures alone. Wounds with persistent drainage were at substantially higher risk for PJI than those that healed uneventfully.

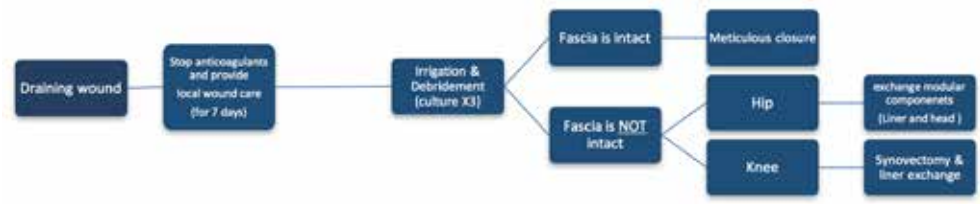


Figure 1. Management protocol for wound drainage after total joint arthroplasty.

[FP 51] COATING OF CEMENTLESS STEMS WITH COMMERCIALLY PURE ANTIBIOTIC-LOADED CALCIUM SULFATE REDUCES INFECTION RATE IN REVISION THA

Edward McPherson[1], Madhav Chowdhry[1], Matthew Dipane[1], Steven Kenney[1]

[1] *LA Orthopedic Institute, Los Angeles, United States*

Aim: Infection rates after revision THA vary widely, up to 12%. In countries that use antibiotic-loaded cemented stems in combination with perioperative IV antibiotics, infection rates in registry studies are lower. In many countries, however, cementless revision implants are preferred. Our aim was to apply an antibiotic-loaded calcium sulfate coating to cementless revision stems to reduce periprosthetic joint infection (PJI). This study sought to answer two questions: 1) Does the coating of cementless revision stems with calcium sulfate inhibit osteointegration in THA? 2) Does the antibiotic-loaded calcium sulfate coating of revision stems reduce the incidence of PJI?

Method: From Dec. 2010 to Dec. 2015, 111 consecutive revision femoral stems were coated with commercially pure calcium sulfate. 10cc of calcium sulfate was mixed with 1g of vancomycin powder and 240mg of tobramycin liquid and applied to the stem in a semi-firm liquid state immediately prior to stem insertion. The results are compared to a designated control cohort (N=104) performed across the previous 5 years. The surgical methods were comparable, but for the stem coating. All patients were staged preoperatively using the Musculoskeletal Infection Society Staging System and followed for at least 1 year.

Results: In the study group of coated stems, there were 46 A hosts, 56 B hosts, and 9 C hosts. In the control group, there were 45 A hosts, 52 B hosts, and 7 C hosts. Both cohorts had 0 cases of aseptic loosening.
The overall rate of PJI in the study cohort was 2.7%. Of the 111 revisions, 69 were aseptic (PJI=1.4%) and 42 were second stage revisions for infection (PJI=4.8%). PJI occurred in 2.2% of A hosts, 1.8% of B hosts, and 11.1% of C hosts. In the control cohort, the overall rate of PJI was 7.7%. Of the 104 revisions, 74 were aseptic (PJI=1.4%) and 30 were second stage revisions for infection (PJI=23.3%). PJI occurred in 6.7% of A hosts, 5.8% of B hosts, and 28.6% of C hosts.
The results show a reduction in PJI from 7.7% in the control group to 2.7% in the study group and were found to be statistically significant at p-value<0.1 (p=0.09).

Conclusions: The application of antibiotic-loaded calcium sulfate to cementless revision femoral stems does reduce PJI. Importantly, this coating did not inhibit osteointegration of the femoral stem. The reduced infection rate in this study supports the concept that bacteria frequently contaminate and reside within the femoral canal.

[FP 52] 99MTC-SULESOMAB AND 99MTC-NANOCOLLOID BONE MARROW IMAGING IN PROSTHETHIC JOINT INFECTION

Arnaldo Sousa[1], Patrícia Gouveia[2], Luís Coutinho[1], Cláudia Rodrigues[1], Hélder Fonte[1], Ana Cipriano[3], Ana Cláudia Santos[4], Miguel Abreu[5], Inês Amorim[2], Ricardo Sousa[6]

[1] Centro Hospitalar Do Porto, Orthopedics Department, Porto, Portugal
[2] Centro Hospitalar Do Porto, Nuclear Medicine Department, Porto, Portugal
[3] Centro Hospitalar Do Porto, Infectious Diseases Department, Porto, Portugal
[4] Centro Hospitalar Do Porto, Microbiology Department - Grip (Porto Bone and Joint Infection Unit), Porto, Portugal
[5] Centro Hospitalar Do Porto, Infectious Diseases Department - Grip (Porto Bone and Joint Infection Unit), Porto, Portugal
[6] Centro Hospitalar Do Porto – Hospital de Santo António, Hospital Privado de Alfena, Orthopedics Department - Grip (Porto Bone and Joint Infection Unit), Porto, Portugal

Aim: Autologous-labeled leukocytes combined with sulfur colloid bone marrow scan is the current imaging modality of choice for diagnosing prosthetic joint infection (PJI). Although this technique is reliable, *in-vitro* leukocyte labeling raises technical difficulties that limit its widespread use and sulfur colloid is increasingly difficult to obtain. Therefore, valid alternatives are needed. The purpose of our study was to determine the clinical value of ^{99m}Tc-sulesomab combined with ^{99m}Tc-colloidal rhenium sulphide (nanocolloid) bone marrow imaging in the diagnosis of infection in painful total joint arthroplasties.

Materials and methods: A retrospective study was conducted on a cohort of 53 patients with painful hip or knee prostheses that underwent ^{99m}Tc-sulesomab and ^{99m}Tc-nanocolloids sequentially, between January 2008 and December 2016. The combined images were interpreted as positive for infection when there was activity on the sulesomab scan without corresponding activity on the bone marrow scan. The final diagnosis was made with microbiological findings or by clinical follow up of at least 12 months.

Results: There were 49 total knee and 4 total hip replacements. Fourty of them were women, with an average age of 65 years. Infections were diagnosed in 5 of the 53 patients. An isolated 99mTc-sulesomab scan shows 100% sensitivity but only 29.4% specificity. Combining it with a 99mTc-nanocolloid bone marrow scan, the overall sensitivity, specificity, positive predictive value, negative predictive value and accuracy were 100%, 95.8%, 81.4%, 100% and 96.2% respectively.

Conclusion: ^{99m}Tc-sulesomab combined with ^{99m}Tc-nanocolloid showed to be a useful method for diagnosing prosthetic joint infections. These technically simpler and ready-to-use products may be an alternative to autologous-labeled leukocytes/sulfur colloid marrow scan, although it needs validation at a larger scale.

[FP 53] ARE DIFFICULT-TO-TREAT PERIPROSTHETIC JOINT INFECTIONS REALLY DIFFICULT-TO-TREAT? GOOD OUTCOME APPLYING A TWO-STAGE EXCHANGE WITH LONG INTERVAL

Doruk Akgün[1], Anastasia Rakow[2], Carsten Perka[2], Andrej Trampuz[2], Nora Renz[2]

[1] Charité-Universitätsmedizin Berlin, Center for Musculoskeletal Surgery, Berlin, Germany
[2] Center for Musculoskeletal Surgery, Charité – University Medicine Berlin, Berlin, Germany, Germany

Aim: Treatment outcome of difficult-to-treat (DTT) periprosthetic joint infections (PJI) caused by pathogens, for which no biofilm-active antibiotics are available, is considered to be lower than infections caused by other pathogens. We compared the outcome of DTT and non-DTT PJI managed according to a standardized treatment algorithm with individual treatment strategies for each group with a two-stage exchange arthroplasty.

Method: In a prospective cohort, all patients with hip and knee PJI treated at our institution from 2013 to 2015 were included. The treatment outcome was compared between DTT and non-DTT PJI group using the modified Delphi consensus definition. A DTT PJI was defined when microorganisms with resistance against biofilm-active antibiotics were isolated, including rifampin-resistant staphylococci, enterococci, fluoroquinolone-resistant gram-negative bacteria or fungi. The logistic regression analysis was performed to determine the predictors of a DTT PJI. The Kaplan-Meier survival method was used to compare the probability of infection-free survival between groups.

Results: Among 182 patients with hip (n=93) and knee (n=89) PJI, 35 (19%) were classified as DTT and 147 (81%) as non-DTT. Presence of a sinus tract was an independent risk factor predictive for DTT PJI (odds ratio 1.6; 95% confidence interval 1.0-2.4; p = 0.04). The overall treatment success was 85.2% with a median follow-up of 27 months (range, 14-42 months). The treatment success was similar for DTT (82.9%) and non-DTT PJI (85.7%) (p = 0.65). The number of revision surgeries in prosthesis-free interval was higher in DTT than in non-DTT PJI (1.9 vs. 1.1, respectively; p=0.04). Also, the duration of hospital stay (mean, 43.1 vs. 28.4 days, respectively; p=0.015) and the total duration of antimicrobial treatment (137 vs. 113 days; p=0.017) were longer in the DTT PJI group.

Conclusions: More revision surgeries and a longer prosthesis-free interval in DTT PJI were necessary to achieve similar eradication rates as in non-DTT PJI. If biofilm-active antibiotics are available, a shorter prosthesis-free interval can be applied.

[FP 54] DOES STAPHYLOCOCCUS NASAL DECONTAMINATION AFFECTS THE RATE OF EARLY SURGICAL SITE INFECTIONS IN ADOLESCENT IDIOPATHIC SCOLIOSIS SURGERY?

Mallet Cindy[1], Marion Caseris[2], Doit Catherine[3], Maesani Matthieu[4], Mazda Kevan[1], Stephane Bonacorsi[3], Ilharreborde Brice[1]

[1] Hôpital Robert Debré, Orthopedic Surgery, Paris, France
[2] Hôpital Robert Debré, Infectious Disease, Paris, France
[3] Hôpital Robert Debré, Microbiology, Paris, France
[4] Hôpital Robert Debré, Anesthesist, Paris, France

Aim: Nasal colonization with *S.aureus* (SA) is a risk factor for developing nosocomial infections in cardiac surgery. However, the risk in orthopedic surgery remains unclear, especially in adolescent idiopathic scoliosis (AIS) surgery were data are missing. This study aims to evaluate the efficacy of a preoperative nasal decontamination program in SA healthy carriers on early surgical site infections (SSI) after AIS posterior surgery in a pediatric universitary Parisian hospital.

Method: Between 01-01-2014 and 03-31-2017, all AIS patients were screened preoperatively with nasal swabs and decontaminated with mupirocine if positive during the 5 days before surgery. Early SSI were prospectively identified and microorganisms' findings were compared to a previous serie published before the beginning of the decontamination program (2007-2011).

Results: Among the 316 AIS posterior procedures performed during the study period, nasal swabs were performed at the average of 100 ± 92 days before surgery. Incidence of positive nasal swab was 22 % (n=71) and all were preoperatively decontaminated. Compared to the series (n=496) published before the decontamination program, the early SSI rate remains stable (8.2% versus 8.5%). But incidence of *S.aureus* early SSI decreased to 1% (n=4), while it represented 5% (n=25) in the previous study. In our study, none of the *S. aureus* decontaminated patients had an early *S.aureus* SSI. For the 4 *S.aureus* early SSI, preoperative nasal swab was negative, but done with a mean delay of 328 days before surgery, suggesting a possible *S.aureus* intermittent carriage and the need of shorter delays between nasal swab and surgery to improve the screening. Moreover, the stable rate of early SSI between the 2 periods is due to an increase rate of *Propionibacterium acnes,* which incidence grown from 0.08% to 6% in our actual series.

Conclusions: To conclude, in our study, nasal decontamination divided by 5 the incidence of *S.aureus* SSI. It seems that nasal swabs should be performed as close as possible to the surgery to optimise the *S.aureus* screening. In addition, the SSI rate remains very high with the emergence of *Propionibacterium acnes* and is currently addressed by a multifactorial approach.

[FP 55] B.A.C.H. - A NEW CLASSIFICATION SYSTEM FOR LONG-BONE OSTEOMYELITIS

Andrew Hotchen[1], Parham Sendi[2], Martin McNally[3]

[1] *Addenbrookes Hospital, Cambridge University Hospital, Department of Trauma and Orthopaedics, Cambridge, United Kingdom*
[2] *University Hospital of Bern, Department of Infectious Diseases, Bern, Switzerland*
[3] *Nuffield Orthopaedic Centre, Oxford University Hospitals, The Bone Infection Unit, Oxford, United Kingdom*

Aims: We have reviewed the published classifications of long-bone osteomyelitis.[1] This review demonstrated the limitations and poor recognition of existing classifications. We have designed a new system which includes four easily identifiable variables (table 1). In this study, we aim to retrospectively validate this classification in a cohort of osteomyelitis cases.

	Bone involvement (B):	Antimicrobials (A):	Coverage by soft tissue (C):	Host status (H):
Uncomplicated	B1: Cavitary defect without joint involvement	A1: treatment options available OR Ax: unknown / no positive growth	C1: Direct closure possible	H1: fit for definitive surgery without specialist intervention
Complex: Specialist intervention needed	B2: Segmental defect without joint involvement	A2: limited treatment options (MDR) or resistance to anti-biofilm antibiotics in presence of an implant	C2: Direct closure not possible; plastic surgery expertise required	H2: fit for definitive surgery with specialist intervention
	B3: Any osteomyelitis with associated joint involvement	A3: no treatment options (XDR / PDR)		
Palliative: Not for definitive surgery				H3: unfit for definitive surgery after specialist intervention / patient refusal for surgery

Table 1 – The BACH classification system for osteomyelitis.

Methods: We identified 100 patients who had received surgery for osteomyelitis between 2013-2015 in our single specialist centre for osteomyelitis. Each patient was classified retrospectively by two assessors who were not involved in the initial patient care. Osteomyelitis was confirmed in each patient by a validated composite protocol.[2]

Results: All patients in this series could be classified using each of the B.A.C.H. variables. Seventy-four patients were categorised as B1, 13 as B2 and 13 as B3. Thirty-four patients revealed no growth of microorganisms (Ax). Fifty-four were A1, 11 A2 and one patient was classified as A3. For rare organisms (e.g. *Corynebacterium* spp.), categorisation required specialised infectious disease knowledge. Twenty-four patients needed soft tissue procedures (C2) and 76 had their wound closed primarily (C1). Twenty patients did not need optimisation prior to surgery and were deemed as H1. The remaining 80 patients needed optimisation prior to surgery and were deemed as H2.

Conclusions: All patients were classifiable according to the B.A.C.H. system. This system offers a simple method of stratifying long-bone osteomyelitis and may give an indication of severity and the need for specialist intervention. However, there were difficulties in classification of rare causative organisms. This validation has been performed in a single specialist centre for osteomyelitis and requires both internal prospective and external validation to evaluate its reproducibility.

[1]Hotchen AJ, Sendi P, McNally MA. Poster 61, EBJIS 2016
[2]McNally MA *et al*. *Bone Joint J* 2016; 98-B:1289-1296.

[FP 56] ANTIBACTERIALBIOGLASS FOR THE TREATMENT OF SEPTIC BONE DEFECTS IN OSTEOMYELITIS: EXPERIENCEIN A CONSECUTIVE SERIES OF 104 CASES

Carlo Luca Romanò[1], Delia Romanò[2], Sara Scarponi[3], Nicola Logoluso[4]

[1] Centre for Reconstructive Surgery and Osteoarticular Infections, Milano Biofilm Center, Istituto Ortopedico Irccs Galeazzi, Milano, Italy
[2] Istituto Ortopedico Galeazzi DI Milano, Centro DI Chirurgia Ricostruttiva e Delle Infezioni Ortopediche, Dirigente Medico, Milano, Italy
[3] Centre for Reconstructive Surgery and Osteoarticular Infections, Orthopaedic Research Institute Galeazzi, Milano, Italy
[4] Centre for Reconstructive Surgery and Osteoarticular Infections, Centre for Reconstructive Surgery and Osteoarticular Infections, Orthopaedic Research Institute R.Galeazzi, Corinaldo, Italy

Aim: The treatment of osteomyelitis often requires extensive surgical debridement and removal of all infected tissues and foreign bodies. Resulting bone loss can then eventually be managed with antibacterial bone substitutes, that may also serve as a regenerative scaffold. Aim of the present study is to report the clinical results of a continuous series of patients, treated at our centre with an antibacterial bioglass*.

Method: From November 2010 to May 2016, a total of 106 patients, affected by osteomyelitis, were included in this prospective, single centre, observational study. Inclusion criteria were the presence of osteomyelitis with a contained bone defect or segmental defects < 10 mm, with adequate soft tissue coverage. All patients underwent a one-stage procedure, including surgical debridement and bone void filling with the bioactive glass*, with systemic antibiotic therapy and no local antibiotics. Clinical, radiographic and laboratory examinations were performed at 3, 6 and 12 months and yearly thereafter.

Results: Two patients were lost to follow-up, hence a total of 104 patients (65 males, 39 females; mean age: 46 ± 17 years, min 6 – max 81) were available at an average follow-up of 38 ± 26 months (range: 12 -68); forty-eight patients (46.1%) were classified as Type A, 48 (46.1%) as Type B and 8 (7.7%) as Type C hosts, according to McPherson classification. Tibia (N=61) and femur (N=33) were the most common involved bones. On average patients had undergone 2.1 ± 1.3 (min 0 – max 7) previous surgical operations, with a mean infection duration of 18.7 ± 16.6 months (min 2 – max 120). Infection recurrence was observed in 10 patients (9.6%), most often within one year from surgery (8/10). Negative prognostic factors included infection duration > 2 years, Gram negative or mixed flora or negative cultural examination, Type B or C hosts and soft tissue defect. No side effects or complications related to bioglass were noted.

Conclusions: This is to our knowledge the longest and the largest single centre consecutive series of patients, affected by bone infections of the long bones, treated according to a one-stage procedure using bioactive glass. Our results confirm, on a larger population and at a longer follow-up, previous reports. Early treatment, pathogen identification and adequate management of soft tissues should be considered to further reduce infection recurrence rate.

* BonAlive®

[FP 57] COMBINED DEAD SPACE MANAGEMENT AND PREVENTION OF INFECTION IN OPEN FRACTURES USING INTRAMEDULLARY NAIL IN ASSOCIATION WITH AN INJECTABLE ANTIBIOTIC ELUTING COMPOSITE BONE SUBSTITUTE: A PRELIMINARY CASE SERIES

Damiano Papadia[1], Luciano Bertoldi[2]

[1] *Apss Trento, Ortopedia, Dirigente Medico, Trento, Italy*
[2] *Apss Trento, Ortopedia e Traumatologia, Trento, Italy*

Aim: Open fractures with bone defects and skin lesions carry a high risk of infection potentially leading to prolonged hospitalization and complication requiring revision procedures. Treatment options for diaphyseal fractures with soft tissue lesions are one- or two-stage approaches using external fixation or intramedullary nailing. We describe a surgical technique combining intramedullary nailing with an antibiotic-eluting biphasic bone substitute (BBS) applied both at the fracture site, for dead-space management and infection prevention, and on the nail surface for the prophylaxis of implant-related infection.

Method: Adult patients with an increased risk of bony infection (severe soft tissue damage and open fractures of Gustilo-Anderson grades I and II) were treated with debridement followed by application on the intramedullary nail surface, in the canal and at the fracture site of a BBS with prolonged elution (to 28 days) of either gentamicin or vancomycin. All patients also received systemic antibiotic prophylaxis following surgery. Data on infections and other adverse events were collected throughout the follow-up period. Bone union was determined by radiographic assessment of 4 cortices in radiographs obtained 1 year after surgery.

Results: In this prospective, non-randomized case series a total of 6 patients were treated: 4 tibia (2 male, 2 female), 1 femur (female) and 1 humerus (male). The mean age of the patients was 28 years (range 18–51 years). Two patients had a history of smoking and 1 patient had a history of diabetes. Minimal Follow up was 12 months (range: 12 – 30 months). One to two weeks postoperatively, partial load bearing (20 kg) was allowed with free mobility of joints. Bone samples from the fracture site following debridement showed the presence of bacteria in 2 cases. No infections were observed during follow-up. Radiographs showed that the bone substitute was resorbed and also a gradual bony union of the fractures. All patients had good clinical outcomes.

Conclusions: The addition of a BBS which elutes antibiotic locally in the dead-space of exposed fractures and at the implant surface prevents bacterial colonization and biofilm formation. The injectable composite we used enhances safety in higher risk patients, is easy to use in combination with intramedullary nailing and offers the opportunity for a one-stage procedure. Local administration of antibiotics at the fracture site provides an additional tool to manage difficult-to-treat complex fractures and implant-related infections. Larger studies are needed to confirm these results.

*CERAMENT G or V, BONESUPPORT AB

[FP 58] ESTABLISHMENT OF AN IMPLANT-ASSOCIATED OSTEOMYELITIS RAT MODEL TO TEST MICRO-STRUCTURED ANTIBACTERIAL IMPLANT SURFACES

Marie-Luise Schröder[1], Henning Windhagen[2], Tilman Calließ[2], Nina Angrisani[1], Janin Reifenrath[1]

[1] Hannover Medical School, Nife - Lower Saxony Centre for Biomedical Engineering, Implant Research and Development, Clinic for Orthopaedic Surgery (in the Annastift Hospital), Hannover, Germany
[2] Hannover Medical School, Clinic for Orthopaedic Surgery (in the Annastift Hospital), Hannover, Germany

Aim: The aim of this study was to establish an implant-associated osteomyelitis model in rats with the ability to quantify biofilm formation on implants for prospective evaluation of antibacterial effects on micro-structured implant surfaces.

Method: *Staphylococcus aureus* (strain 36/07) suspension with infection concentrations of 10^6, 10^5, 10^4 and 10^3 CFU/10µl, respectively was injected in the tibia of 32 rats (n=8 per group). Afterwards a titanium implant (0.8x0.8x12 mm) was inserted. 8 rats were implanted with a preincubated implant (10^7 CFU/ml, 12 h) and 8 rats served as a control (injection of 0.9% NaCl). During the follow up, clinical, radiographic and µ-CT examinations were conducted. On day 21 post op, all rats were sacrificed. Implant and tibia were explanted under sterile conditions. The implant was stained with green and red fluorescent nucleic acid dye (live/ dead) and analyzed by confocal microscopy. The amount of vivid and dead biomass as well as vivid bacteria on the implant surface was calculated with an image software*.

Results: In all groups with artificial infection, local bacterial colonization could be detected without systemic infection. While clinical signs of infections (lameness, subcutaneous abscesses) decreased, the volume of bacterial colonization increased on the implant surface with decreasing initial infection CFU (figure 1). Preincubated implants showed a similar bacterial colonialization of the surface as implants which were infected with 10^6 CFU as well as a similar bone disintegration due to ongoing osteomyelitis.

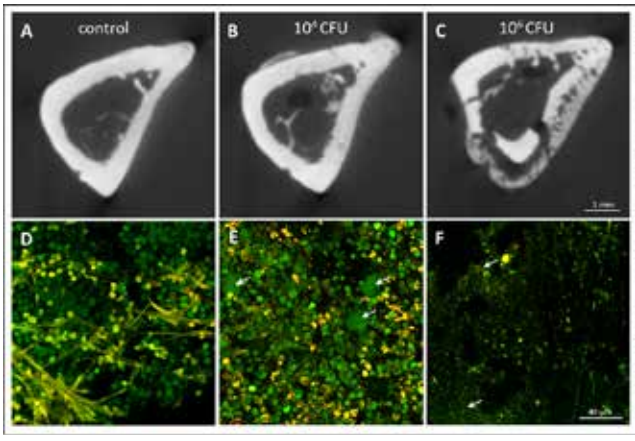


Figure 1: Exemplary µCT and confocal microscopic figures of tibiae and implants of the control group (A,D) and artificial infected groups with 10^6 CFU (B,E) and 10^5 CFU (C,F). µCT images display CFU dependent increased osteolysis and periosteal reactions, whereas confocal images show decreased bacterial (⟶) colonialization.

Conclusions: Establishment of the implant-associated infection model in rats with subsequent quantification of the vivid bacterial volume via confocal microscopy was successful and is now applicable for the evaluation of micro-structured antibacterial implant surfaces. Pre incubation of implants with initiating biofilm formation was established as alternative onset of infection.

This work was part of BIOFABRICATION for NIFE and funded by Volkswagen Foundation and MWK.

* Imaris® x64 6.2.1

[FP 59] ANTIBIOFILM EFFICACY OF ANTIBIOTIC-LOADED SYNTHETIC CALCIUM SULPHATE BEADS IN A P. AERUGINOSA/S. AUREUS CO-CULTURE MODEL FOR PROSTHETIC INFECTIONS

Connor Frapwell[1], Caroline Duignan[1], Jeremy Webb[1], Sean Aiken[2], John Cooper[2], Paul Stoodley[3], Robert Howlin[1]

[1] *University of Southampton, United Kingdom*
[2] *Biocomposites Ltd*
[3] *The Ohio State University, United States*

Aim: Bacterial biofilms play a key role in prosthetic infection (PI) pathogenesis. Establishment of the biofilm phenotype confers the bacteria with significant tolerance to systemic antibiotics and the host immune system meaning thorough debridement and prosthesis removal often remain the only possible course of treatment. Protection of the prosthesis and dead-space management may be achieved through the use of antibiotic loaded cements and beads to release high concentrations of antibiotics at the surgical site. The antibacterial and antibiofilm efficacy of these materials is poorly understood in the context of mixed species models, such as are often encountered clinically.

Methods: A *P. aeruginosa* and *S. aureus in vitro* co-culture biofilm model was grown using 1/5th BHI supplemented with 20 µM hemin. The ability of beads made from a synthetic calcium sulfate ($CaSO_4$)* loaded with vancomycin, tobramycin and vancomycin & tobramycin in combination to prevent biofilm formation and kill established co-culture biofilms were assessed using viable cell counts and confocal scanning laser microscopy (CSLM) over a 7 day time course. To assay for genetic changes to the individual species as a result of their presence together within a biofilm, mutation rates were measured using fluctuation analysis following growth as planktonic and biofilm cultures, alone or in co-culture. Mutants were determined based on their ability to grow on agar plates containing an inhibitory concentration of rifampicin. Mutation rates were calculated using the Ma-Sandri-Sarkar Maximum Likelihood Estimator and 94% confidence intervals compared for significance.

Results: Mixed species biofilms displayed differential sensitivity to vancomycin alone and tobramycin alone $CaSO_4$-loaded beads relative to single species biofilms. Preliminary data suggests 10- and 100-fold increase in mutation rates of *P. aeruginosa* and *S. aureus*, respectively, when in a co-culture relative to monospecies biofilm which, while further work is needed, may directly or indirectly contribute to the differing antibiotic sensitivities observed. A broad-spectrum intervention of $CaSO_4$-loaded vancomycin & tobramycin beads was able to prevent bacterial colonisation and attenuate *P. aeruginosa* and *S. aureus mixed species* biofilm formation for multiple days.

Conclusions: Synthetic antibiotic-loaded CS beads, with a broad-spectrum antibiotic combination, have potential to reduce or eliminate mixed species biofilm formation on implant material by providing locally high concentrations over sufficient time periods to aid in the management of PIs.

* Stimulan, Biocomposites Ltd

[FP 60] HISTOPATHOLOGICAL DIAGNOSIS OF BIOFILM

Louise Kruse Jensen[1], Nicole Lind Henriksen [1], Henrik Elvang Jensen[1]

[1] *University of Copenhagen, Department of Veterinary Disease Biology, Frederiksberg C , Denmark*

Aim: Despite the expanding research focusing on bacterial biofilm formation, specific histochemical biofilm stains have not been developed for light microscopy. Therefore, pathologists are often not aware of the presence of biofilm formation when examining slides for diagnosing bacterial infections, including orthopaedic infections. The aim of the present study was to develop a combined histochemical and immunohistochemical biofilm stain for simultaneous visualization of *Staphylococcus aureus* bacteria and extracellular matrix in different colours using light microscopy.

Methods: Infected bone tissue was collected from two different porcine models of osteomyelitis inoculated with the biofilm forming *S. aureus* strain S54F9. The infection time was 5 and 15 days, respectively. First, 25 common histochemical protocols were used in order to find stains that could identify extracellular biofilm matrix. Hereafter, the histochemical protocols for Alcian Blue pH3, Luna and Methyl-pyronin green were combined with an immunohistochemical protocol based on a specific antibody against *S. aureus.* Finally, the three new combined protocols were applied to infected bone tissue from a child suffering from chronic staphylococcal osteomyelitis for more than a year. For all combined protocols applied on all types of tissue (porcine and human) the number of double stained bacterial aggregates were counted. On the same sections the percentage of extracellular matrix of representative bacterial aggregates was calculated by image analysis.

Results: Simultaneous visualization of bacterial cells and extracellular matrix in different colours was detected in both porcine and human tissue sections with all three combined protocols. The bacterial cells were red to light brown and the extracellular matrix either light blue, blue or orange depending on the histochemical stain *i.e.* if it was Alcian blue pH3 (colouring polysaccharides), Luna or Methyl green-pyronin (both colouring extracellular DNA), respectively. In the porcine models, 10 percent of the bacterial aggregates in a 10x magnification field revealed both the extracellular matrix and bacteria simultaneously in two different colours. For the human case, this was seen in 90 percent of the bacterial aggregates. The percentage of extracellular matrix of representative bacterial aggregates was 60 and 20 percent in the human and porcine tissues, respectively.

Conclusions: The amount of *S. aureus* biofilm extracellular matrix increased with infection time. A combination of histochemical and immunohistochemical staining is a practical method for identification and evaluation of *S. aureus* biofilm in orthopaedic infections.

[FP 61] THE EFFECTS OF A NOVEL DECONTAMINATION-RECIRCULATING SYSTEM IN REDUCING AIRBORNE PARTICULATE: A LABORATORY BASED STUDY

Gareth Davies[1], Nathaniel Bradford[2], Rema Oliver[2], Richard Verheul[3], Warwick Bruce[4], William Walsh[2]

[1] *Unsw, Prince of Wales Hospital, Surgical & Orthopaedic Research Laboratories, Randwick, Australia*
[2] *Unsw, Surgical and Orthopaedic Research Laboratories, Prince of Wales Hospital, Randwick, Australia*
[3] *Lake Macquarie Private Hospital, Orthopaedics, Gateshead, Australia*
[4] *Concord Hospital, Orthopaedics, Sydney Olympic, Australia*

Aim: The prevention of surgical-site infection (SSI) is of great importance. Airborne particulate correlates with microbial load and SSI. There are many potential sources of airborne particulates in theatre and from an experimental point of view impossible to control. We evaluated the effectiveness of a novel air decontamination-recirculation system (ADRS) in reducing airborne particles in a laboratory environment and controlled the introduction of particulate using diathermy.

Methods: Airborne particles were measured with and without activation of the ADRS in PC2 laboratory to provide a baseline. Particles were generated in a controlled manner utilising electrocautery ablation of porcine skin tissue. Ablation was performed at 50W power (Cut) for 60 seconds at a constant rate with and without the ADRS operating in the PC2 laboratory. Particles were measured continuously in 30s intervals at two sites 0.5m and 3m from the site of diathermy. Adequate time was allowed for return to baseline between each repetition. Each experiment was repeated 10 times.

Results: The ADRS significantly reduced baseline airborne particles in the empty PC2 laboratory. When using electrocauterization (as a source of particle generation), peak particles were significantly higher at 0.5m compared to 3m. Small particles (0.3-0.5 microns) were reduced at 0.5m with ADRS whilst larger particles were not. The ADRS significantly reduced all particles of 0.3-10.0 microns at 3m. Particles also returned to a lower baseline and at a faster rate with the ADRS.

Conclusion: Airborne particle counts are a surrogate measure of microbial load. As likelihood of SSI is assumed to increase with the quantity of airborne pathogens present, there is a great deal of interest in methods of reducing airborne particle count in the operating theatre. Distance from the source of particle generation influences particle load and has potential clinical relevance for the operating theatre layout and staff. The ADRS effectively reduced the peaks and baseline of airborne particles and hastened the clearance of generated particles. The use of this technology in the operating theatre is of great interest for further research as suppression of airborne particulate may play a role in reducing SSIs. Diathermy provides a simple means to introduce particles in a controlled manner for such experiments.

[FP 62] PHARMACOKINETICS OF SINGLE-DOSE CEFUROXIME IN PORCINE INTERVERTEBRAL DISC AND VERTEBRAL CANCELLOUS BONE DETERMINED BY MICRODIALYSIS

Pelle Emil Hanberg[1], Mats Bue[2], Hanne Birke Sørensen[3], Kjeld Søballe[4], Mikkel Tøttrup[5]

[1] Aarhus University Hospital, Regional Hospital Horsens, Orthopaedic Research In Aarhus, Aarhus C, Denmark
[2] Regional Hospital Horsens
[3] Orthopaedic Research In Aarhus
[4] Aarhus University Hospital, Orthopaedic Research In Aarhus, Orthopaedic Department, Aarhus C, Denmark
[5] Aarhus University Hospital, Denmark

Aim: Pyogenic spondylodiscitis is associated with prolonged antimicrobial therapy and high relapse rates. Nevertheless, tissue pharmacokinetic studies of relevant antimicrobials in both prophylactic and therapeutic situations are still sparse. Previous approaches based on bone biopsy and discectomy exhibit important methodological limitations. The objective of this study was therefore to assess the concentration of cefuroxime in intervertebral disc (IVD), vertebral body cancellous bone, subcutaneous adipose tissue (SCT) and plasma pharmacokinetics after single dose administration by use of microdialysis (MD) in a large animal model.

Method: Ten female pigs were assigned to receive 1,500 mg of cefuroxime intravenously over 15 min. Measurements of cefuroxime were obtained from plasma, SCT, the vertebral cancellous bone and the IVD for 8 hours thereafter. MD was applied for sampling in solid tissues. The cefuroxime concentration in both the MD and plasma samples was determined using ultra-high performance liquid chromatography.

Results: For both the IVD and the vertebral cancellous bone, the area under the concentration-curve from zero to the last measured value was significantly lower than that of free plasma. Tissue penetration of cefuroxime was incomplete for the IVD, whereas for vertebral cancellous bone and SCT it was not. Furthermore, the penetration of cefuroxime from plasma to IVD was delayed. Additionally, a noticeable prolonged elimination rate of cefuroxime in the IVD was found. The maximal concentration and the elimination of cefuroxime were reduced in IVD compared to both SCT and vertebral cancellous bone. Due to this delay in elimination of cefuroxime, the time with concentrations above the minimal inhibitory concentration (T>MIC) was significantly higher in IVD than in SCT, vertebral cancellous bone and free plasma for MICs up to 6 µg/ml.

Conclusions: MD was successfully applied for serial assessment of the concentration of cefuroxime in the IVD and the vertebral cancellous bone. Penetration of cefuroxime from plasma to IVD was found to be incomplete and delayed, but due to a prolonged elimination, the best results regarding T>MIC was found in IVD.

[FP 63] DURATION OF ANTIBIOTIC PROPHYLAXIS WITH INTRAVENOUS CEFUROXIME AFFECTS INFECTION RATE WITH STAPHYLOCOCCUS AUREUS IN AN OPEN FRACTURE MODEL IN RABBITS

Jan Pützler[1], Daniel Arens[1], Willem-Jan Metsemakers[2], Stephan Zeiter[1], Kühl Richard[3], Geoff Richards[1], Michael Raschke[4], Fintan Moriarty[1]

[1] Ao Research Institute Davos, Switzerland
[2] University Hospitals Leuven, Leuven, Belgium
[3] University Hospital Basel, Division of Infectious Diseases and Hospital Epidemiology; Infectious Diseases & Hospital Epidemiology, Basel, Switzerland
[4] University Hospital Muenster, Department of Trauma-, Hand- and Reconstructive Surgery, Germany

Aim: Open fractures still have a high risk for fracture-related Infection (FRI).[1] The optimal duration of perioperative antibiotic prophylaxis (PAP) for open fractures remains controversial due to heterogeneous guidelines and highly variable prophylactic regimens in clinical practice.[2,3] In order to provide further evidence with which to support the selection of antibiotic duration for open fracture care, we performed a preclinical evaluation in a contaminated rabbit fracture model.

Method: A complete humeral osteotomy in 18 rabbits was fixed with a 7-hole-LCP and inoculated with *Staphylococcus aureus* ($2x10^6$ colony forming units, CFU per inoculum). This inoculum was previously shown to result in a 100% infection rate in the absence of any antibiotic prophylaxis.[4] Cefuroxime was administered intravenously in a weight adjusted dosage equivalent to human medicine (18.75 mg/kg) as a single shot only, for 24 hours (every 8 hours) and for 72 hours (every 8 hours) in separate groups of rabbits (n=6 per group). Infection rate per group was assessed after two weeks by quantitative bacteriological evaluation of soft tissue, bone and implants. Blood samples were taken from rabbits preoperatively and on days 3, 7 and 14 after surgery to measure white blood cell count (WBC) and C-reactive protein (CRP) levels.

Results: Duration of PAP had a significant impact on the success of antibiotic prophylaxis. The single shot regimen completely failed to prevent infection. All samples (soft tissue, implant and bone) from this group displayed high numbers of bacteria. Additionally, abscesses were present in two of six rabbits. The 24-hour regimen showed a reduced infection rate (1 out of 6 rabbits infected), but only the 72-hour course was able to prevent FRI in all animals in our model. After an initial postoperative peak on day three, CRP levels then decreased to baseline (approx. 30 µg/ml) in the 24h-group and 72h-group, but remained significantly higher in the single shot group at day 7 and 14 ($p<0.05$).

Conclusions: When contamination with high bacterial loads is likely (e.g. in an open fracture situation), a 72-hour course of intravenous cefuroxime appears to be superior in preventing FRI compared to a single shot or 24-hour antibiotic regimen.

Acknowledgements: This work was funded by AOTrauma

References:
Tschudin-Sutter S et al. *Clinical microbiology and infection* 2016;22:457.e451-459.
Ryan SP et al. *Scand J Surg*. 2014;103:132-137
Halawi MJ et al. *Orthopedics*. 2015;38:e1025-1033
Arens D et al. *Eur Cell Mater*. 2015;30:148-161

[FP 64] MICROCALORIMETRIC DETECTION OF STAPHYLOCOCCAL BIOFILM GROWTH ON VARIOUS PROSTHETIC BIOMATERIALS AFTER EXPOSURE TO DAPTOMYCIN

Christen Ravn[1], Inês Santos Ferreira[2], Elena Maiolo[3], Søren Overgaard[1], Andrej Trampuz[4]

[1] *Odense University Hospital, University of Southern Denmark, Orthopaedic Research Unit, Odense, Denmark*
[2] *Research Institute for Medicines, Faculty of Pharmacy, University of Lisbon, Lisbon, Portugal*
[3] *Center for Musculoskeletal Surgery, Charité - University Medicine Berlin, Berlin, Germany*
[4] *Charité-Universitätsmedizin Berlin, Berlin, Germany*

Aim: The primary aim of this in vitro study was to test the efficacy of daptomycin to eradicate staphylococcal biofilms on various orthopedic implant surfaces and materials. The secondary aim was to quantitatively estimate the formation of staphylococcal biofilm on various implant materials with different surface properties.

Method: We tested six clinically important biomaterials: cobalt chrome alloy, pure titanium, grid-blasted titanium, porous plasma-coated titanium with/without hydroxyapatite, and polyethylene. Two laboratory strains of bacteria commonly causing PJI were used, namely *Staphylococcus aureus* * and *Staphylococcus epidermidis**. After overnight incubation with biofilm formation, the test samples were washed and individually exposed to increasing daptomycin concentrations (4-256 mg/l) during 24-hours. Samples were subsequently sonicated in order to detect dislodged biofilm bacteria on blood agar plates by viable growth and transferred to a microcalorimeter*** for real-time measurement of growth related heat flow during 24-h incubation. Minimal biofilm eradication concentration (MBEC) was determined as the lowest concentration of antibiotic required to eradicate the biofilm bacteria on the sample.
The time to detection expressed as the heat flow >50 µW (TTD-50) indirectly quantifies the initial amount of biofilm bacteria, with a shorter TTD-50 representing a larger amount of bacteria.

Results: MBEC of S. aureus biofilm on smooth metallic surfaces (median 6 mg/l, range 4-8 mg/l) was significantly lower than the rough/porous metallic surfaces (median 128 mg/l, range 32-256 mg/l; $p<0.001$). Variations of MBEC in experiments with S. epidermidis biofilms on test samples with smooth or rough/porous surface was found non-significant ($p=0.25$).
Mean TTD-50 (±SD) of S. aureus biofilms on rough/porous metallic samples (2.3 ±1.1 hours) was significantly lower than smooth metallic samples (6.7 ±0.4 hours, $p<0.001$) and polyethylene (5.3 ±0.5 hours, $p<0.001$). Mean TTD-50 with S. epidermidis biofilm on smooth metals (3.9 ± 1.0 hours) was also significantly higher than their rough/porous counterparts (2.0 ± 1.0 hours, $p=0.010$).

Conclusions: Growth of biofilm bacteria on orthopedic materials are variably influenced by exposure to the potent antimicrobial effect of high-dose daptomycin. In this study, the main factor decisively influencing biofilm quantity and daptomycin susceptibility of staphylococcal biofilms was the irregular surface topography.

* ATCC® 29213
** ATCC® 35984
*** TAM III

[FP 65] PHENOTYPIC AND GENOTYPIC CHARACTERIZATION OF STAPHYLOCOCCUS EPIDERMIDIS FROM ORTHOPEDIC DEVICE-RELATED INFECTIONS CORRELATED WITH PATIENT OUTCOME

Virginia Post[1], Mario Morgenstern[2], Llinos Harris[3], Leonardos Mageiros[3], Matthew D. Hitchings[3], Guillaume Méric[4], Ben Pascoe[4], Samuel K. Sheppard[4], Geoff Richards[1], Fintan Moriarty[1]

[1] *Ao Research Institute Davos, Davos, Switzerland*
[2] *University Hospital Basel, Basel, Switzerland*
[3] *Swansea University, Microbiology and Infectious Diseases, Swansea, United Kingdom*
[4] *University of Bath, The Milner Centre for Evolution, Bath, United Kingdom*

Aim: *Staphylococcus epidermidis* has emerged as an important opportunistic pathogen causing orthopedic device-related infections (ODRIs). In this prospective clinical and laboratory study, we have investigated the association of genome variation and phenotypic features of the infecting *S. epidermidis* isolate with the clinical outcome of the infected patient.

Method: One hundred and four invasive *S. epidermidis* isolates were prospectively collected from patients with ODRI. Upon patient entry into the study, surgical parameters such as type of implant; open or closed fracture were documented. Personal characteristics were also documented and included: gender; age; body mass index (BMI); smoker/non-smoker; overall medical condition (Charlson comorbidity index); and chronic immunosuppressive conditions. Any revision surgeries involving the site of interest and all isolated pathogens were recorded throughout the course of treatment and follow-up. The clinical outcome after treatment was measured with a mean follow-up period (FUP) of 26 months, and each patient was then considered to have been "cured" or "not cured". The isolates were tested for their antibiotic susceptibility and ability to form biofilm. Whole genome sequencing was performed on all isolates and genomic variation was related to features associated with "cured" and "not cured".

Results: Strong biofilm formation and resistance to aminoglycoside antibiotics were associated with a "not cured" treatment outcome ($p = 0.031$ and $p < 0.001$, respectively). Isolates within the "not cured" group were more prevalent in the phylogenetic clade B compared to the predominant clade A ($p = 0.08$). Based on a gene-by-gene analysis, some accessory genes were more prevalent in isolates from patients that were "not cured". These included: the biofilm-associated *bhp* gene; the antiseptic resistance *qacA* gene, the cassette chromosome recombinase encoding genes *ccrA* and *ccrB* and IS*256*-like transposase.

Conclusions: The novelty of this study was that all *S. epidermidis* isolates were whole genome sequenced in order to screen for features associated with poor clinical outcome. Multiple factors were found to have an influence on poorer patient clinical outcome, such as multiple revisions surgeries, biofilm formation and antibiotic resistance to aminoglycosides emphasizing the multifactorial pathogenesis of ODRI. Furthermore, poor treatment outcome was associated with a small number of mobile elements that could potentially be used as prognostic markers for ODRI treatment outcome.

[FP 66] ONE-STAGE EXCHANGE PROCEDURE IN THE MANAGEMENT OF INFECTED SHOULDER PROSTHESIS: A RETROSPECTIVE STUDY OF 16 CASES

Laëla El Amiri[1], Maxime Antoni[1], Gaudias Jeannot[1], Benjamin Adamczewski[1], Jean-François Kempf[1], Philippe Clavert[1]

[1] *University Hospital of Strasbourg, Ccom, Illkirch, France*

Aim: Shoulder prosthesis chronic infection is a rare but serious complication, likely to lead to re-interventions and poor functional outcome. Two-stage exchange surgery is considered the standard procedure by most authors. Our hypothesis was that one-stage revision procedure is a valid therapeutic option in the management of chronic infections of shoulder arthroplasty.

Method: This was a mono-center retrospective cohort study. All patients who underwent, during the inclusion period, a one-stage revision procedure for a chronic infection of shoulder arthroplasty were included. All patients underwent clinical evaluation (Constant-Murray score), radiological examination (standard X-rays) and a blood test (Complete Blood Count and C-reactive protein), at a minimal one-year follow-up. Primary endpoint of this study was the infectious outcome and secondary endpoints were the functional and radiographic outcomes.

Results: 16 shoulder prosthesis in 14 patients (5 females, 9 males) were included. Mean time between primary prosthesis implantation and exchange surgery was 40 months (1-145). Mean follow up was 30,5 months. The principal micro-organism involved was *Propionibacterium acnes* (9/16) and multiple organisms were found in 6 patients. In 14/16 (87,5%) shoulders, we found no sign of persistent infection at last follow-up. 2/16 (12,5%) shoulders were considered as still infected. On these 2 patients still infected, one refused further revision and the other was not in a good enough medical condition to undergo another procedure. 2 patients required an additional one-stage procedure for a new infection (new pathogen) after a period of two years, both free of infection at last follow-up. At last follow-up, mean Constant score was 54,8 (23-82). 7/14 (50%) patients were satisfied or very satisfied with the global fonctionnal result.

Conclusions: One-stage revision procedure seems to be a valid therapeutic option in the management of infected shoulder prosthesis, as it allowed us to eradicate the infection in 87,5% patients in our serie, with a fair clinical result.

[FP 67] PREOPERATIVE TOPICAL BENZOYL PEROXIDE REDUCES THE PRESENCE OF P. ACNES ON THE SKIN AND PREVENTS RECOLONIZATION AFTER OPERATING ROOM SKIN PREPARATION OF THE SHOULDER

Vendela Scheer[1], Malin Bergman Jungeström[1], Maria Lerm[1], Lena Serrander[1], Anders Kalén[1]

[1] *Linköpings University Hospital, Linköping, Sweden*

Aim: The purpose of this study was to compare the presence of *P.acnes* on the skin after topical pre-operative application with benzoyl peroxide (BPO) to chlorhexidine soap (CHS) and whether this also affected skin recolonization after surgical preparation and draping.

Method: Forty volunteers – twenty-four men and sixteen women were randomized to pre-operative topical treatment at home with either CHS or BPO in the area of a delto-pectoral approach of their left shoulder. The right served as a control. Five skin swabs were taken in a standardized manner on different occasions: before and after topical treatment, after surgical skin preparation and sterile draping and 120 minutes after draping. A fifth sample was taken on the contralateral untreated side as a control when the patient was draped. The draping took place in an operating room with laminar air flow and skin preparation was performed for 2 minutes with 0.5% chlorhexidine solution in 70% ethanol according to the recommendations of the Swedish National Board of Health and Welfare.

Bacterial colonies were then analyzed on agar plates by colony forming units (CFU) and surface characteristics. *P.acnes* were identified with matrix-assisted laser desorption/ionization time-of-flight (MALDI-ToF) mass spectrometry.

Results: Treatment with BPO significantly reduced the presence of *P.acnes* on the skin after topical treatment at home. After skin preparation and sterile draping *P.acnes* was found in 8/40 subjects, and 7 of those were found in the CHS-group ($p<0.044$), and the results remained after two hours ($p<0.048$). Topical treatment with BPO before surgical skin preparation significantly decreased the presence of CFU (p-value 0.035).

Conclusions: Topical treatment with BPO before shoulder surgery may be effective in reducing *P.acnes* on the skin and prevent recolonization. Further studies in vitro are needed to detect if *P.acnes* is reduced in dermis and surgical field as well.

[FP 68] PROPIONIBACTERIUM ACNES RELATED SHOULDER PROSTHETIC JOINT INFECTIONS: EFFECTIVENESS DIFFERENCES DEPENDING ON THE MEDICAL OR SURGICAL TREATMENT

Maxime Pradier[1], Florence Suy[2], Bertrand Issartel[2], Caroline Dehecq[3], Caroline Loiez[4], Michel Valette[5], Eric Senneville[1]

[1] *Dron Hospital, Tourcoing, France*
[2] *Villeurbane, France*
[3] *Dunkerque, France*
[4] *Chru Lille, France*
[5] *Dron Hospital, Tourcoing, France*

Aim: *Propionibacterium acnes* (PA) is an important cause of shoulder prosthetic joint infections (SPJIs) for which the optimal treatment has not yet been determined. Rifampicin and Levofloxacin both showed not benefit in recent experimental models of PA-SPJIs. We describe herein the experience of five different medical French centers in order to assess factors associated with patient's outcome with special emphasize on antibiotic regimens.

Method: A multicentric retrospective study was performed, on consecutive patients with PA – related SPJIs diagnosed on the basis of at least 2 or more positive cultures of either per-operative or joint aspiration and clinical history compatible with a PJI according to the current guidelines. All patients had surgical management, followed by systemic antibiotic therapy. Remission was defined as an asymptomatic patient with functioning prosthesis at the last contact.

Results: Fifty-nine patients of mean age 66.2 ± 10.5 years were included. Most patients were at least ASA 2 (66%), 8 (14%) diabetes mellitus, 3 (5%) had neoplasia. Fourteen patients (24%) had acute, 34 (58%) subacute, and 11 late infections (19%). The mean delay from symptoms of infection to surgery was 89 ± 141 days (1-660). Surgical management consisted in implant exchange in 40 (68%) patients. Antibiotic treatment included mainly clindamycin (49%), levofloxacin (44%) and rifampin (17%), with a mean duration of 52.3 ± 31.9 days. The mean follow-up duration was 540 days ± 488 (range 12 – 1925). Forty-five patients were in remission (76%) in this study, 8 patients had a relapsing infection (14%), 1 a recurrence (2%) and 5 a superinfection – i.e, due to a different pathogen - (8%). In monovariate analysis, rifampicin/levofloxacin treatment was significantly associated with failure (p=0.038). In multivariate analysis, levofloxacin use and implants retention were significantly related to failure (p=0.02 and p=0.003, respectively).

Conclusions: Our results suggest that implant retention and levofloxacin use are two independents factors of failure in patients treated for PA – related SPJIs.

[FP 69] INFECTED TOTAL ELBOW ARTHROPLASTY: MANAGEMENT AND RESULTS. ABOUT 11 CASES

Mathieu Girard[1], Marine Arboucalot[1], Amélie Faraud[1], Stéphanie Delclaux[1], Nicolas Bonnevialle[1], Pierre Delobel[2], Pierre Mansat[1]

[1] University Hospital of Toulouse, Pierre Paul Riquet Hospital, Orthopedic and Traumatology Department, Toulouse, France
[2] University Hospital of Toulouse, Purpan Medicine Hospital, Infectious Diseases Department, Toulouse, France

Aim: Infections after total elbow arthroplasty are more frequent than after other joint arthroplasties. Therapeutic management varies depending of the patient status, the time of diagnosis of the infection, the status of the implant as well as the remaining bone stock around the implants.

Method: Between 1997 and 2017, 180 total elbow arthroplasties were performed in our department. Eleven (6%) sustained a deep infection and were revised. Infection occurred after prosthesis of first intention in 4 and after a revision procedure in 7. Etiologies were: rheumatoid arthritis in 6, trauma sequela in 4 and osteosarcoma in 1. There were 7 women and 4 men of 59 years on average (22-87). Delay between the prosthesis and the diagnosis of infection was 66 months (0.5-300). The infection was stated as acute (<3week) in one, subacute (between 3 week and 3 months) in 1, and chronic (>3 months) in 9. Isolated bacteria were: Staphylococcus (10), Streptococcus (1), *P. acnes* (1), and *Proteus mirabilis* (1). Infection were poly microbial in 2 cases. A simple lavage with debridement was performed in 3 cases (Group 1), a 2-stage revision in 4 (Group 2), and a definitive removal of the prosthesis in 4 (Group 3). Adapted antibiotics were prescribed for all patients during at least 6 weeks.

Results: All patients were reviewed with 59 months average follow-up. Eight patients were cured of their infection thanks to the initial therapeutic strategy. For 2 patients of Group 2, infection reccurrency required a new surgical procedure with one simple lavage/debridement for one, and 3 lavage/debridement for the other making it possible to cure the infection. For one patient of Group 1, a failure of lavage/debridement required removal of the implants. The MEPS reached 72 points: 67 points for patients of Group 1, 76 points for patients of Group 2, and 74 points for patients of Group 3. Complication rate was 36% (4): 2 ulnar nerve impairment with dysesthesia, one radial nerve palsy, and one humeral stem loosening.

Conclusions: An adapted therapeutic strategy can allow suppression of the responsible bacteria after infection of total elbow arthroplasty. Sometimes, several procedures are necessary to obtain the cure. Better functional results were obtained when the prosthesis could be retained or replaced, but satisfactory results could also be obtained after resection arthroplasty when the humeral columns have been preserved to stabilize the joint.

[FP 70] CHRONIC EMPYEMA OF THE ELBOW JOINT- TREATMENT AND OUTCOME

Ulf-Joachim Gerlach[1]

[1] *Abteilung für Septische Unfallchirurgie und Orthopädie, Bg-Klnikum Hamburg, Hamburg, Germany*

Aim: The chronic empyema of the elbow joint is a severe but rare disorder and leads to the destruction of the joint without correct treatment. The primary goal is the stop of the infection, a good range of motion and stability. We perform a bilateral arthrotomy, a radical debridement with synovialectomy and if necessary with debridement of the bone. A local antibiotic carrier is always implanted. We never choose the arthroscopic approach. A short term systematic antibiotic therapy is following the operation. In this retrospective study we examined the result of our treatment.

Method: From 17.12.2008 to 31.12.2014 we treated 30 patients, 23 (76,7%) male and 7 (23,3%) female patients. The average age was 50,6 (14-88) years. In 19 cases the empyema developed as a complication of an operation, in 11 cases due to infections, chronic bursitis or hematogen. The group of patients was analyzed concerning the comorbidities, the number of operations and duration of the before admitted to our hospital, the identified bacteria, length of the stay at our hospital and the range of motion.

Results: The duration of the treatment before admission to our hospital was in average of 26,4 days (5-180 d) with 1,4 operations (0-4). 7 of the 30 patients suffered from severe comorbidities. The examination of the tissue extracted in our surgery lead to an identification of bacteria in 17 cases, mostly Staphylococcus(52,9 %). In all 30 cases a stop of the infection was achieved, in 24 with just one single operation. Due to a persisting infection 6 patients had to undergo a second surgery. The patients stayed in hospital for an average of 19,9 days (3-86). At the end of the therapy the average range of motion was 0-23,5-110°. Due to a complete destruction of the elbow joint and instability we had to perform an arthrodesis of the humero-ulnar joint in 3 cases.

Conclusions: The chronic empyema of the elbow joint, mostly a complication after surgical treatment of a fracture is not very often but needs a radical and consequent therapy in order to be successful. It is necessary to perform a radical debridement using a bilateral arthrotomy, the implementation of local antibiotic carriers and a short term antibiotic therapy according to the resistogram. The results of our group of patients show that if done correctly the treatment leads to a stop of the infection with a satisfying range of motion.

[FP 71] COMPARISON OF LEUKOCYTE ESTERASE STRIP WITH SONICATION FLUID CULTURES AND FROZEN SECTIONS FOR DIAGNOSIS OF PERIPROSTHETIC JOINT INFECTIONS

Paolo Di Benedetto[1], Vanni Cainero[1], Renato Gisonni[1], Alessandro Beltrame[1], Araldo Causero[1]

[1] *Clinica Ortopedica, Azienda Sanitaria Universitaria Integrata DI Udine, Lestizza, Italy*

Aim: The aim of the study is to evaluate the specificity and sensibility of leukocyte esterase for the diagnosis of periposthetic joint infection (PJI).

Method: Between October 2016 and April 2017 we enrolled 65 patients underwent to hip and knee revision arthroplasty due to uncertain joint infection. Synovial fluid was obtained from 64 joints that underwent revision arthroplasty.
Each patient was evaluated in the preoperative time with CRP, ESR and leukoscan, in the intraoperative time with frozen section and leukocyte esterase strip and post-operative with sonication fluid culture, periprosthetic tissues cultures and histological examination. Results of all of these exams were compared to assess the specificity, the sensibility, the positive and negative predicting values of leukocyte esterase for the diagnosis of PJI.

Results: The leukocyte esterase test with a threshold of +/++ had a sensitivity of 80.2%, a specificity of 82.8%, a positive predictive value of 63.8%, and negative predictive value of 92.1%. Using the threshold of ++ as a positive leukocyte esterase result, the specificity reached 97.8%, the positive predictive value 90.8%, and the negative predictive value 89.0%.

Conclusions: These results demonstrate that leukocyte esterase is a quite accurate, effective marker of periprosthetic joint infection and that it is a valuable tool that can be used in conjunction with the the other tests for diagnosis of PJI.

[FP 72] EFFICACY OF BIO-ACTIVE GLASS BAG-S53P4 FOR THE RECONSTRUCTION OF SEGMENTAL BONE DEFECTS OF SEPTIC ORIGIN. A COMPARATIVE STUDY

Thierry Begue[1], Gregoire Rougereau[2], Jean-Charles Aurégan[2]

[1] Antoine Beclere Hospital, University Paris-Sud, Department of Orthopaedic Surgery, Clamart, France
[2] Antoine Beclere Hospital, Clamart, France

Aim: Infections in long bones can be divided in osteitis, osteomyelitis and septic non-unions. All are challenging situations for the orthopaedic surgeon. Treatment is a mix with debridement, radical resection of infected tissue, void filling with different types of products, and antibiotic therapy of different kinds. In cavitary bone defects, bioglasses such as BAG-S53P4 have given good results in early or mid-term follow-up. Results of such treatment in segmental bone defects remain unknown. The goal of our study was to evaluate efficacity of active bioglass BAG-S53P4 in septic segmental bone defects.

Method: A retrospective cohort study has been done in a single specific orthopaedic center devoted to treatment of infected bony situations. All cases were a severe septic bone defect. We have compared the segmental bone defects to the cavitary ones. Results were analyzed on recurrence of infection, bone healing, functional result and complication rate.

Results: 14 patients were included with a minimum follow-up of 1 year after treatment. 8 were in the group "cavitary", 6 in the group "segmental". The mean age was 54 years-old (30-76). Sex-ratio was 2.5. All patients have been treated with bone resection and debridement of infected bone and tissue, even if more than 1 surgery was necessary in some cases. After cleaning, 7 patients have needed a local flap, and 1 a free flap. Then, all bone defects were filled up by bioglass BAG-S53P4*. Additional antibiotherapy with specific molecules based of the results of bacterial analysis, was given for a minimum time-period of 6 weeks. In the "cavitary" group, the mean volume of BAG-S53P4 was de 21.25 ml (10-60). In the "segmental" group, it was of 12.5 ml (10-20). The healing rate was of 80% in the "cavitary" group and of 100% in the "segmental" one. No complication related to the bioglass insertion was noted.

Conclusions: Different publications have been made using bioglass in the treatment of infected bone with a continuous bone such as osteitis or osteomyelitis. Our study is the first one to compare specifically the results obtained in a cavitary defect where the bone is still in continuity, and in a segmental defect. Active bioglass such as the BAG-S53P4 seems to be a good option in the treatment of segmental septic bone defects in the limb.

*BonAlive Biomaterials Ltd, Turku, Finland

[FP 73] ADVERSE EVENTS (AE) DURING PROSTHETIC JOINT INFECTION (PJI) EMPIRICAL ANTIMICROBIAL THERAPY: A FIVE YEARS PROSPECTIVE COHORT STUDY

Claire Triffault-Fillit[1], Florent Valour[2], Tod Michel[1], Sylvain Goutelle[1], Ronan Guillo[1], Sébastien Lustig[1], Michel Fessy[1], Frédéric Laurent[2], Mabrut Eugenie[1], Christian Chidiac[2], Tristan Ferry[2]

[1] *Hospices Civils de Lyon, Claude Bernard Lyon 1 University, Lyon, France*
[2] *Hospices Civils de Lyon - Claude Bernard Lyon 1 University, Infectious Diseases - Inserm U1111, International Center for Research in Infectiology, Lyon, France*

Aim: Current guidelines recommend the combination of vancomycin with either piperacillin-tazobactam (PT) or a third generation cephalosporin (3GC) as empirical antimicrobial therapy of PJI, immediately after surgery. However, clinical and biological safeties of such high dose-combinations are poorly known.

Method: All patients managed in a reference center in France between 2011 and 2016 receiving an empirical antimicrobial therapy for PJI were included in a prospective cohort study. Antimicrobial-related AE upcoming during the empirical treatment phase were describe according to the Common Terminology Criteria for Adverse Events (CTCEA), and severe ones (grade ≥ 3) were reported to pharmacovigilance. AE determinants were assessed using univariate logistic regression.

Results: Three hundred and thirty-one patients (166 males, 50.2%; median age, 70.1 (IQR, 59.4-79.1) years) with empirically-treated PJI were included. Vancomycin (n=228; 68.9%), teicoplanin (n=33; 10.0%), antistaphylococcal penicillin (n=29; 8.8%) and daptomycin (n=4; 1.2%) were the most commonly used anti-Gram positive antimicrobials. Most common combinations were vancomycin-PT (n=122;36.9%) and vancomycin-3GC (n=33; 10.0%). Forty-two (12.7%) patients experienced 49 AE in a median delay of 8 (IQR, 5-13) days. They included 25 acute kidney injuries (AKI; 7.6% of patients) including 16 (4.8%) without vancomycin overdose, 4 drug reactions with eosinophilia and systemic symptoms, isolated fevers, rashes or pruritus (1.2% each), 3 eosinophilia (0.9%), 2 hepatitis (0.6%), and one febrile neutropenia, injection site reaction or vomiting (0.3% each). Ten AE were considered as severe (3.0% of patients). Treatment has to be stopped in most cases (n=38; 95.0%). All AE had a favorable outcome. In univariate analysis, the use of vancomycin (OR 6.878; p=0.026) and/or PT (OR 3.667; $p<10^{-3}$), and consequently the vancomycin-PT combination (OR 4.149; $p<10^{-3}$) were found to be determinants of empirical antimicrobial therapy-related AE. Moreover, vancomycin-PT combination was found as an AKI risk-factor (OR 8.000; $p<10^{-3}$).

Conclusions: Empirical antimicrobial therapy of PJI is associated with a high rate of AE. These results reinforce recent data suggesting an increased risk of AKI when using vancomycin in combination with PT and encouraging the preferential use of 3GC or cefepim in this indication.

[FP 74] USE OF RIFAMPICIN FOR THE TREATMENT OF TWO TIME SURGERY FOR PROSTHETIC JOINT INFECTIONS: MULTICENTER RETROSPECTIVE STUDY

Fanny Pierret[1], Henri Migaud[2], Caroline Loiez[3], Michel Valette[4], Beltrand Eric[5], Jean-Cyr Yombi[6], Olivier Cornu[1], Eric Senneville[4], Maite Van Cauter [1]

[1] *Orthopaedic and Trauma Department, Cliniques Universitaires Saint-Luc Ucl, Brussels, Belgium*
[2] *Centre Regional Hospitalier Universitaire Roger Salengro , Lille Cedex, France*
[3] *Faculty Hospital of Lille, Microbiology, Lille, France*
[4] *Dron Hospital, Infectious Diseases, Tourcoing, France*
[5] *Orthopedic Surgery, Tourcoing Hospital, Tourcoing, France*
[6] *Cliniques Universitaires Saint-Luc, Brussels, Belgium*

Aim: The treatment of a chronic prosthetic joint infection (PJI) is a combination of the bacteria´s identification, a « carcinological » surgery and an appropriate antibiotherapy. In case of gram positive cocci infection, rifampicin is often used.
The aim of this study is to determine which factors are responsible for the development of resistance to rifampicine.

Method: All patients had a total hip (THA) or knee (TKA) arthroplasty with a chronic infection. They were treated with a two-time surgery. All of them received a bi-antibiotic treatment. In case of gram positive cocci infection, and according to the susceptibility test, they received rifampicin. The 221 patients were operated from july 1997 to november 2013 in 3 university centers (one belgian and two french) and were retrospectively analysed. The demographical, clinical and bacterial datas as well as the antibiotic treatment were collected. The healing was defined as the absence of recurrence during the 2 years following surgery.

Results: Among the 221 patients (from 22 to 91 years old, median age: 67), 133 (60%) had a THA infection. 22% of the peroperative samples collected during the first time surgery were sterile. 64% were mono-microbial and 14% were poly-microbial. For 69% of them, gentamycin-impregnated spacers were used and for 26% of them vancomycin and gentamycin-impregnated spacers were used. The median delay for the second time surgery was 52 days (15 to 221 days). The healing was higher for the patients treated by an antibiotic combination with rifampicin than the others (86 vs 72%; p=0.02). In the same way, the healing rate was higher in patients where the delay between the two surgeries was less than one month (91 vs 77%; p=0.09). There were more recurrence in TKA than in THA (30% vs 13%, p=0.006). 12 % of the patients showed a persistence of the germ or the emergence of a new microorganism with a comparable antibiogram. A resistance to rifampicin during the second surgery appears in 9 % of cases.

Conclusions: Theses study results suggest the benefit of the use of rifampicin for the treatment of gram positive cocci prosthetic joint infections treated by a two time surgery. In all cases, intravenous antibiotic therapy was maintained until the wound was closed to decrease the emergence of resistance.

[FP 75] BONE AND SUBCUTANEOUS TISSUE PHARMACOKINETICS OF VANCOMYCIN IN TOTAL KNEE REPLACEMENT PATIENTS

Mats Bue[1], Mikkel Tøttrup[2], Pelle Hanberg[1], Otto Langhoff[3], Hanne Birke Sorensen[4], Theis Muncholm Thillemann[5], Torben Lüth Andersson[6], Kjeld Søballe[7]

[1] Horsens Regional Hospital, Orthopaedic Research Unit, Aarhus University, Department of Orthopaedic Surgery, Horsens, Denmark
[2] Aarhus University Hospital, Randers Regional Hospital, Department of Orthopaedic Surgery, Aarhus C, Denmark
[3] Horsens Regional Hospital, Department of Orthopaedic Surgery, Horsens, Denmark
[4] Orthopaedic Research Unit, Aarhus University, Aarhus C, Denmark
[5] Aarhus University Hospital, Department of Orthopaedic Surgery, Aarhus C, Denmark
[6] Aarhus University Hospital, Department of Clinical Biochemistry, Aarhus N, Denmark
[7] Aarhus University Hospital, Orthopaedic Research Unit, Aarhus University, Department of Orthopaedic Surgery, Aarhus C, Denmark

Aim: The incidence of orthopaedic methicillin-resistant *staphylococcus aureus* infections is increasing. Vancomycin may therefore play an increasingly important role in orthopaedic perioperative antimicrobial prophylaxis. Adequate antimicrobial concentrations at target site is essential for prevention of orthopaedic infections. Current studies investigating perioperative bone and soft tissue concentrations of vancomycin are sparse and challenged by a lack of appropriate methods. The aim of this study was therefore to assess the concentration of vancomycin in plasma, subcutaneous tissue and bone after single dose administration using microdialysis (MD) in patients undergoing total knee replacement.

Method: 1,000 mg of vancomycin was postoperatively administered intravenously over 100 minutes to 10 male patients undergoing primary total knee replacement. Vancomycin concentrations in plasma, subcutaneous tissue (SCT), cancellous and cortical bone were measured the following 8 hours. MD was applied for sampling in solid tissues. The vancomycin concentration in MD-samples was determined using ultra-high performance liquid chromatography, whilst the free plasma concentration was determined using a chemistry analyzer*.

Results: For all extravascular tissue, an impaired penetration was demonstrated, with lower area under the concentration-time curve (AUC) compared to free plasma. The lowest AUC was found in cortical bone. For all tissues, tissue penetration expressed as the ratio of the area under the concentration–time curve from 0 to the last measured value ($AUC_{0\text{-last tissue}}/AUC_{0\text{-last plasma}}$) were below 0.5. The time to a mean clinically relevant minimal inhibitory concentration (MIC) of 2 mg/L were 3, 36, 27 and 110 min for plasma, SCT, cancellous and cortical bone, respectively. As opposed to the other compartments, a mean MIC of 4 mg/L was not reached in cortical bone. The $AUC_{0\text{-last}}$ and peak drug concentrations (C_{max}) for SCT, cancellous and cortical bone were lower than those of free plasma. The time to C_{max} was higher for all tissues compared with free plasma.

Conclusions: Penetration of vancomycin to bone and SCT was found to be impaired and delayed in male patients undergoing total knee replacement surgery. Adequate perioperative vancomycin concentrations may not be reached at target site using standard prophylactic dosage.
*Cobas c501

[FP 76] CORYNEBACTERIUM BONE AND JOINT INFECTION (BJI): A RETROSPECTIVE COHORT STUDY IN A REFERENCE CENTER FOR BJI MANAGEMENT

Pierre Chauvelot[1], Tristan Ferry[2], Claire Triffault-Fillit[3], Evelyne Braun[3], Thomas Perpoint[4], Frédéric Laurent[2], Fessy Michel-Henry[3], Sébastien Lustig[3], Christian Chidiac[2], Florent Valour[2]

[1] *Crioac, Hcl, Lyon, France*
[2] *Hospices Civils de Lyon, Claude Bernard Lyon 1 University; Infectious Diseases - Inserm U1111, International Center for Research in Infectiology, Lyon, France , Lyon, France*
[3] *Hospices Civils de Lyon, Claude Bernard Lyon 1 University, Lyon, France*
[4] *Hospices Civils de Lyon - Hôpital de la Croix-Rousse, Lyon, France*

Aim: *Corynebacterium* is a rare etiologic agent of BJI. We aimed to describe this rare clinical condition and to assess treatment failure determinants.

Method: All adult patients with proven *Corynebacterium* BJI (i.e. consistent clinical/radiological signs, AND ≥2 reliable positive bacteriological samples, AND treated as such) were included in a retrospective cohort study. After cohort description, determinants of treatment failure (i.e, infection persistence, relapse, requirement of additional surgical procedure, and BJI-related death) were determined using stepwise logistic regression and Kaplan Meier curve analysis.

Results: The 51 included BJI were more frequently chronic (88.2%), orthopaedic device-related (ODI, 74.5%) and polymicrobial (78.4%). Surgery was performed in 92.2% of cases, and considered as appropriate in 76.5% of them. The main first-line antimicrobials were glycopeptides (68.6%), betalactams (50%) and/or clindamycin (10.0%). Three (5.9%) patients received daptomycin as part of first-line regimen, and 8 (15.7%) at any point of treatment. After a follow-up of 60.7 (IQR, 30.1-115.1) weeks, 20 (39.2%) treatment failures were observed, including 4 (20%) *Corynebacterium*-documented relapse. Independent risk factors were initial biological inflammatory syndrome (OR 16.1; p=0,030) and inappropriate surgical management (OR 7.481; p=0.036). Interestingly, all patients receiving daptomycin as part of first-line regimen failed (p<0.001), including one patient with a *Corynebacterium*-documented relapse with a daptomycin increased MIC. Among patients with ODI, survival curve analysis disclosed a worst prognosis in case of prosthetic joint infection (p=0.030), unappropriate surgical management (p=0.029) and daptomycin use as first-line regimen (p<0.001).

Conclusions: *Corynebacterium* BJI is a poorly known condition, frequently chronic and polymicrobial. An important rate of failure was observed, associated with inappropriate surgical management and daptomycin use as part of first-line regimen. As described for other clinical conditions such as infective endocarditis, daptomycin should be avoid or used in combination therapy to prevent resistance selection and treatment failure.

[FP 77] ORTHOPAEDIC IMPLANT-ASSOCIATED INFECTIONS (OIAI) CAUSED BY PROPIONIBACTERIUM SPP.: DIFFICULT TO DETECT, EASY TO TREAT?

Nora Renz[1], Stasa Mudrovcic[2], Carsten Perka[1], Andrej Trampuz[2]

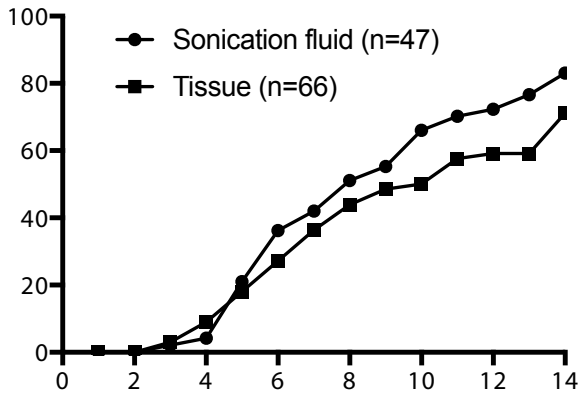
[1] *Charité-Universitätsmedizin Berlin, Center for Musculoskeletal Surgery, Berlin, Germany*
[2] *Charité-Universitätsmedizin Berlin, Germany*

Aim: To assess the clinical characteristics, diagnostic tests and treatment strategies in orthopedic implant-associated infections (OIAI) caused by *Propionibacterium* spp.

Method: We retrospectively included consecutive patients with OIAI caused by *Propionibacterium* spp. treated at our institution from January 2012 to January 2017. OIAI was diagnosed when: (i) macroscopic purulence, sinus tract or exposed implant was present; (ii) acute inflammation in peri-implant-tissue was documented; (iii) *Propionibacterium* spp. grew in joint aspirate, ≥2 intraoperative peri-implant tissue samples or in sonication fluid of the removed implant (>50 CFU/ml).

Results: Of 67 patients with *Propionibacterium* OIAI, 42 (63%) had an infected joint prosthesis (21 hip, 12 shoulder, 9 knee) and 25 (37%) an infected fixation device (10 spinal hardware, 11 osteosynthesis, 2 anchorages after rotator cuff reparation, 2 cruciate ligament grafts). 53 (84%) presented with a delayed (3-24 months) or late (>24months) infection. 62 infections were caused by *P. acnes* and 5 by *P. avidum*, all being susceptible to levofloxacin and rifampin. Among non-culture-based diagnostic tests, tissue histology had the highest sensitivity (68%), followed by increased synovial fluid leukocyte count/differential (59%). Of culture-based tests, sonication fluid culture showed the highest sensitivity (83%), followed by tissue culture (71%) and synovial fluid culture (61%). Time to culture positivity is shown in the figure below. Most patients were treated with one-stage (24%) or two-stage (55%) implant exchange. The majority of patients received oral levofloxacin and rifampin for 6-12 weeks.

Conclusions: *Propionibacterium* spp. affected various types of orthopaedic implants in different anatomic locations (lower and upper limbs and spine). Conventional diagnostic tests showed limited sensitivity of *Propionibacterium* OIAI and can be easily missed when cultures are incubated less than 10-14 days. All *Propionibacterium* isolates were susceptible to levofloxacin and rifampin.



[FP 78] CLONAL RELATIONSHIP OF PROPIONIBACTERIUM ACNES ISOLATES RECOVERED FROM BONE AND JOINT INFECTIONS: DO MICROBIOLOGICAL DEFINITION OF PROSTHESIS JOINT INFECTIONS APPLY TO THIS MICROORGANISM?

Faten El Sayed[1], Anne-Laure Roux[1], Jean-Pierre Rabès[2], Philippe De Mazancourt[2], Thomas Bauer[3], Jean-Louis Gaillard[4], Martin Rottman[5]

[1] *Hospital Ambroise Pare, Microbiology, Boulogne Billancourt, France*
[2] *Hôpital Ambroisé Paré, Biologie Moléculaire-Biochimie, France*
[3] *Hospital Ambroise Paré, Orthopedic Surgery , Boulogne Billancourt, France*
[4] *Laboratoire de Microbiologie, Hopital Ambroise Paré, Boulogne-Billancourt, France*
[5] *Hospital Raymond Poincaré, Microbiology, Garches, France*

Aim: *Propionibacterium acnes* is a skin commensal colonizing the deeper structures of the pilous bulb. It is responsible for 5-10% of lower limb prosthetic joint infections (PJI) but accounts for as many as 50% of shoulder arthroplasty infections. *P. acnes* PJIs characteristically feature limited systemic inflammation, limited polymorphonuclear infiltration and clinical signs compatible with aseptic loosening. All current microbiological definitions of PJI require two or more identical commensal isolates to be recovered from the same procedure to diagnose PJI to increase specificity and rule out contamination. Whereas the antimicrobial susceptibility patterns of coagulase negative staphylococci are highly polymorphic and commonly allow the ready distinction of unrelated strains, *P. acnes* shows a highly stereotypical susceptibility profile and it is impossible to phenotypically assess the clonal relationship of isolates. In order to determine the clonal relationship of multiple *P. acnes* isolates recovered from arthroplasty revisions, we analyzed by multi-locus sequence typing (MLST*) P. acnes* isolates grown from PJI in a reference center for bone and joint infection.

Method: We retrospectively selected all cases of microbiologically documented monomicrobial PJI caused by *P. acnes* diagnosed in our center from January 2009 to January 2014. Microorganisms were identified by MALDI-TOF mass spectrometry (Bruker Daltonics). All corresponding *P.acnes* isolates biobanked in cryovials frozen at -80°C were subcultured on anaerobic blood agar, DNA extracted by freeze-thawing and bead-milling, and typed according to the 9 gene MLST scheme proposed by Lomholt HB. and *al*.

Results: Over the 5-year period, 39 cases of PJI positive with *P. acnes* were diagnosed in our center. Three to ten intraoperative samples were sent for microbiological analysis per surgery. Overall, 113 *P. acnes* isolates were grown from 210 samples. On average, four samples were positive out of six. In 34/39 cases, all isolates belonged to the same ST. In 5 cases, multiples STs were found among the *P.acnes* isolates. In 3/39 cases (7.7%), a single ST was found to be microbiologically significant, with a single isolate of the alternate ST. In 2/39 cases (5.1%), we found that each isolate belonged to a different ST.

Conclusions: *P. acnes* PJI were found to be polyclonal by MLST in 12.8% of cases in our experience, with more than 5% of cases not fulfilling the requirements for microbiological significance. The criteria for microbiological significance do not necessarily apply to commensal agents with no antimicrobial susceptibility pattern variation such as *P. acnes*.

[FP 79] PROPIONIBACTERIUM ACNES CAN INCREASE ITS ARSENAL OF RESISTANCE: IN VITRO EMERGENCE OF FLUOROQUINOLONE RESISTANCE AND MOLECULAR CHARACTERIZATION OF THE GYRA GENE MUTATIONS INVOLVED

Takoudju Eve-Marie[1], Aurélie Guillouzouic[1], Kambarev Stanimir[2], Pecorari Frédéric[2], Stephane Corvec[3]

[1] *Nantes University Hospital, Nantes, France*
[2] *Inserm U 1232, Nantes, France*
[3] *Nantes University Hospital, Department of Bacteriology, Nantes, France*

Aim: Although there are no treatment guidelines for *Propionibacterium acnes* (PA) bone and joint infections (Corvec et al Acta Orthopedica 2016), these infections can be treated with a combination of fluoroquinolones and rifampicin. Rifampicin resistance have already been reported either in *in vitro* selected mutants or clinical isolates (Furustrand et al JAC 2013, Anaerobe 2015). Minimal inhibitory concentrations of levofloxacin (LVX) ranging from 0,12 to 0.5mg/L are regularly observed but resistance has not yet been investigated. We investigated the *in vitro* emergence of LVX resistance and characterized the mutations involved in *gyrA* gene.

Method: The strain of PA ATCC11827 (MIC LVF = 0.25 mg/L) was used. The frequency of mutation was determined after inoculation of 10^8 PA on blood agar containing concentrations of 2 to 128 times the MIC incubated for 7 days in anaerobiosis at 35 ° C. The emergence of high-level of resistance was also studied from the low-level mutants after a second exposure. For the resistant mutants, the *gyrA* and *parC* genes were sequenced and compared to the PA reference sequences.

Results: The mutation frequency was 3.8 cfu × 10^{-8} (8×MIC) and 1.6 cfu × 10^{-7} (4×MIC), respectively. A low or high-level resistance to LVX was observed. MICs varied between 0.75 and> 32 mg/L and were stable after three subcultures. 87 mutants were studied including 40 with a mutation in *gyrA* gene. 10 different genotypes could be demonstrated with either high-level resistance: G99 (n = 4), G99 D (n = 3), D100N (n = 1), S101 L (n = 14), S101W N = 5) or low-level resistance D100H (n=1), D100G (n=1), A102P (n=5), D105 H (n = 4), D105 G (n = 2). Substitution 101 always leads to a high level of resistance. No mutation was found in *parC* gene.

Conclusions: To our knowledge, this is the first description of the emergence of LVX resistance in PA. The MIC increases from sensitivity to low or high-level resistance. This resistance is stable and associated exclusively with mutations in the *gyrA* gene. Six different positions give rise to ten different genotypes. The passage from a low to a high-level resistance is done mainly by the selection of the mutation at position 101. Finally, some mutants do not exhibit mutations in QRDRs, suggesting the existence of an efflux system.

[FP 80] INNOVATIVE TREATMENT OF ACUTE AND CHRONIC OSTEITIS OF THE LOWER EXTREMITY: CASE-SERIES OF 15 PATIENTS

Stephan Huber-Wagner[1], Sebastian Pesch[1], Chlodwig Kirchhoff[1], Martijn van Griensven[2], Peter Biberthaler[3], Marc Hanschen[4]

[1] *Klinikum Rechts der Isar, Klinik und Poliklinik für Unfallchirurgie, München, Germany*
[2] *Klinikum Rechts der Isar, Experimental Trauma Surgery, Munich, Germany*
[3] *Technische Universität München, Klinikum Rechts der Isar, Klinik und Poliklinik für Unfallchirurgie, München, Germany*
[4] *Klinikum Rechts der Isar, Department of Trauma Surgery, Munich, Germany*

Aim: The current treatment concepts of acute and chronic osteitis are associated with unsolved challenges and problems, underlining the need for ongoing medical research. The invention and prevalence of an absorbable, gentamicin-loaded ceramic bone graft, that is well injectable for orthopedic trauma and bone infections, enlarges the treatment scope regarding the rise of posttraumatic deep bone infections. This substance can be used either for infection, dead-space, or reconstruction management. The bone cement, eluting antibiotics continuously to the surrounding tissue, outperforms the intravenous antibiotic therapy and enhances the local concentration levels efficiently. This study aims to evaluate the power and practicability of bone cement in several locations of bone infections.

Method: The occurrence of posttraumatic infections with acute or chronic osteitis increases in trauma surgery along with progression of high impact injuries and consecutively high incidence of e.g. open fractures. We present a case-series of 10 patients with posttraumatic osteitis at different anatomic sites, who were treated in our level I trauma center. All of these patients received antibiotic eluting bone cement* for infection and reconstruction management.

Results: With admission to our trauma-center all patients with obvious or suspected osteitis undergo an interdisciplinary pre-work up, including thorough clinical examination and different measures of diagnostic imaging, ultimately leading to the definition of an individual treatment plan. We diagnosed 10 bone infections anatomically allocated to the proximal (2x) and distal femur (3x), distal tibia (3x), tibial diaphysis (1x) and the ankle joint (1x). These ten patients were treated (1) with surgical debridement, (2) with an antibiotic eluting bone cement*, (3) bone stabilisation (including nail osteosynthesis, arthrodesis nails, plates, or external ring fixation), (4) optionally VAC-conditioning, and (5) optionally soft tissue closure with local or free flaps.
We observed very good clinical, functional and radiological results by using bone cement augmented with gentamicin. The overall treatment failure rate is low, throughout, all patients showed no signs of acute recurrence of infection. Pain and immobility decreased continuously with time. “White fluid” secretion was observed in one case.

Conclusion: Current concepts for treatment of osteitis include radical surgical debridement and additional antibiotic therapy. It could be demonstrated that the usage of an antibiotic biocement with osteoconductive characteristics enlarges the success rate in septic bone surgery. The treatment concepts, however, remain complex, time consuming, require a high patient compliance, and are highly individually.

*Cerement® G

[FP 81] INFECTIOUS SPONDYLITIS AFTER VERTEBROPLASTY: 18 CASES IN 5749 PATIENTS, AND COMPARISONS BETWEEN PYOGENIC AND TUBERCULOSIS

Jen-Chung Liao[1]

[1] *Chang Gung Memorial Hospital, Chang Gung University, Orthopedics, Bone and Joint Research Center, Taoyuan, Taiwan*

Aim: Infection after vertebroplasty (VP) is a rare but serious complication. Previous literatures showed most pathogens for infection after VP were bacteria; tuberculosis (TB) induced infection after VP was extremely rare. In this study, we reported our treatment experiences of 18 cases with infectious spondylitis after VP, and compared the differences between developed pyogenic and TB spondylitis.

Method: From January 2001 to December 2015, 5749 patients underwent VP at our department were reviewed retrospectively. The causative organisms were obtained from tissue culture of revision surgery. Parameters including type of surgery, the interval between VP and revision surgery, neurologic status, and visual analog scale of back pain were recorded. Laboratory data at the time of VP and revision surgery were collected. Risk factors including the Charlson comorbidity index (CCI), preoperative bacteremia, urinary tract infection (UTI), pulmonary TB history were also analyzed.

Results: 18 patients developed infectious spondylitis after VP (0.32%, 18/5749). Two were male and 16 were female. The median age at the time of VP was 73.4 years. The mean CCI score was 1.7. The causative organisms were TB in nine patients (Fig. 1), and bacteria in nine patients (Fig. 2). The interval between VP and revision surgery ranged from 7 to 1140 days (mean 123.2 days). C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR) were elevated in most patients especially at readmission. The most common type of revision surgery was anterior combined posterior surgery. Seven patients developed neurologic deficit before revision surgery. Three patients died within 6 months after revision surgery, with a mortality of 16.7%. Finally, VAS of back pain was improved from 7.4 to 3.1. 7 patients could walk normally, 5 patients needed walker support, 3 patients depended on wheelchair for ambulation (Table 1). Both pyogenic and TB group had similar age, sex, and CCI distribution. The interval between VP and revision surgery was shorter in the patients with pyogenic organisms (75.9 vs 170.6 days). At revision surgery, WBC and CRP were prominently elevated in the pyogenic group. Five in the pyogenic group had UTI or bacteremia; five in TB group had a history of lung TB (Table 2).

Conclusions: VP is a minimal procedure but sustains possibility of postoperative infection, which required major surgery for salvage with a relevant part of residual disability. Before surgery, any bacteremia/ UTI or history of pulmonary TB should be reviewed rigorously; any elevation of infection parameters should be scrutinized strictly.

[FP 82] CLINICAL EPERIENCE OF TREATING FUNGAL PERIPROSTHETIC JOINT INFECTION IN A SPECIALIST ORTHOPAEDIC HOSPITAL

Tariq Azamgarhi[1], Ashik Shah[2], Sharoni Palanivel[3], Damien Mack[4], Leanne Cleaver[5], Simon Warren[6]

[1] Royal National Orthopaedic Hospital , Stanmore, United Kingdom
[2] Royal National Orthopaedic Hospital, London, United Kingdom
[3] Royal Free Hospital, London, Royal National Orthopaedic Hospital Trust, Medical Microbiology, London, United Kingdom
[4] Royal Free London NHS Foundation Trust, Royal National Orthopaedic Hospital, Stanmore, London, United Kingdom
[5] Royal Free London NHS Foundation Trust, Microbiology Department, London, United Kingdom
[6] Royal Free Hospital, London, UK, Royal National Orthopaedic Hospital, UK, Royal National Orthopaedic Hospital, Stanmore, London, United Kingdom

Aim: The aim is to describe our experience of treating late-onset fungal periprosthetic joint infection (PJI) within the Bone Infection Unit at the Royal National Orthopaedic Hospital in Stanmore since 2011.

Methods: Retrospective observational study, including all patients who had received systemic or local antifungal treatment for prosthetic Joint Infection. Data was collected from electronic patient notes and databases.

Results: We identified 10 patients who were treated for late-onset fungal between May 2011 and March 2017.
Demographics: Of the 10 patients, 7 were female and 3 were male. The mean age was 68 with a range of 19 to 87. The types of prosthesis infected included Knees (n=5), Hips (n=3) and Shoulders (n=2). The organisms requiring treatment included *C.albicans* (n=3), *C.parapsilosis* (n=3), *C.dublinensis* (n=2), *C.orthopsilosis* (n=1) and *C.glabrata* (n=1).
Treatment**:** Of the 10 cases, 9 had a 2-stage revision surgery and 1 had a single stage revision. Voriconazole 300mg per 40g of PMMA loaded bone cement was used in 8 of the 10 patients. Initial intravenous antifungal treatment continued for a mean duration of 61 days (range 43 to 94), and included Caspofungin (n=5), Fluconazole (n=4) and Voriconazole (n=1).
Clinical outcomes: Patients were categorised based on a Microbiologist or Surgical team's assessment at a mean duration of 12 months (range 3 to 44 months). Of the 10 patients, 6 had a successful outcome, 2 waiting final outcome, 1 had an amputation and 1 patient deceased (due to pulmonary embolism).
Of the 10 cases, 2 patients required a change of antifungal treatment due to raised liver function tests (1 due to Fluconazole and 1 due to Voriconazole).

Conclusion: Our case series supports current evidence supporting a two-stage revision strategy for fungal PJI [1]. Caspofungin seems to be better tolerated than azole antifungals.

References

[1] J. W. Kuiper, "2-stage revision recommended for treatment of fungal hip and knee prosthetic joint infections," *Acta Orthopaedica,* vol. 84, no. 6, 2013.

[FP 83] CHARACTERISTICS OF PROSTHETIC JOINT INFECTION (PJI) DUE TO ENTEROBACTER CLOACAE: A SERIE OF 20 CASES

Bouige Aurelie[1], Fourcade Camille[2], Alain Bicart See[2], Marie-Pierre Felice[1], Gautie Laurence[3], Guillaume Krin[4], Julie Lourtet Hascoet[5], Pascale Marlin[4], Gérard Giordano[4], Eric Bonnet[2]

[1] *Hôpital Joseph Ducuing, Biological Department, Toulouse, France*
[2] *Hôpital Joseph Ducuing, Infectious Disease Unit, Toulouse, France*
[3] *Hôpital Joseph Ducuing, Pharmacy, Toulouse, France*
[4] *Hôpital Joseph Ducuing, Orthopedy, Toulouse, France*
[5] *Saint Joseph Hospital, Microbiology Laboratory, Paris, France*

Aim: Prosthetic joint infections (PJI) due to *Enterobacter cloacae* are rare and often severe. The aim of this study is to describe cases with *E. cloacae* PJI.

Method: We conducted a retrospective and a monocentric study in an orthopedic unit where complex bone and joint infections are managed. From 2012 to 2016, we included patients with PJI which perioperative samples were positive with *E. cloacae*. We collected background, clinical, biological and microbiological data of the current infection, surgical and medical treatment, and the outcome of these patients.

Results: A total of twenty patients were included which 8 were male. Location was hip in 14 cases, knee in 5 cases and ankle in one case. The median time between arthroplasty and revision for infection was 3 years. Fourteen patients had at least two surgeries for previous PJI. The median time between the last surgery and the revision for *E. cloacae* infection was 31 days. Eleven patients were infected by extended-spectrum beta-lactamases (ESBL) strains. Most frequently, the antibiotics used were carbapenem in 9 cases, cefepim in 7 cases, a quinolone in 7 cases and fosfomycin in 4 cases. Infection was cured in 10 cases (50%) with a median time of follow-up of 24 months. Five patients had a recurrent infection, three due to *Staphylococcus epidermidis*, one to *Staphylococcus epidermidis* and *Propionibacterium acnes* and one to *Escherichia coli*. Four patients had a relapse of *E. cloacae* infection. One patient died from non-infectious cause (stroke).

Conclusions: PJI infections due to *E.cloacae* usually occur early after the last prosthetic surgery, typically in patients with complex surgical history. A poor outcome, observed in nearly half of the patients could be explained in part by an association of factors: multiple risks factors, complex infectious history, a high rate of multiple resistance to antibiotics, unfavorable skin conditions.

[FP 84] MINOCYCLINE: A COMPETITIVE AGENT TO TREAT METHICILLIN-RESISTANT STAPHYLOCOCCAL PROSTHETIC JOINT INFECTIONS

Géraldine Bart[1], Vanina Meyssonnier[2], Y. Kerroumi[3], Luc Lhotellier[4], Wilfrid Graff[4], D. Passeron[4], Antoine Mouton[4], Jean Marc Ziza[3], Nicole Desplaces[5], Simon Marmor[4], Valérie Zeller[2]

[1] Nantes University Hospital, Rheumatologie, Nantes, France
[2] Gh Diaconesses Croix Saint Simon, Internal Medicine, Orthopedic Surgery, Paris, France
[3] Gh Diaconesses Croix Saint Simon, Osteoarticular Infections Reference Center, Paris, France
[4] Gh Diaconesses-Croix-Saint-Simon, Centre de Référence des Infections Ostéo-Articulaires Complexes, Paris, France
[5] Groupe Hospitalier Diaconesses Croix Saint Simon, Paris, France

Aim: Treatment of chronic prosthetic joint infection (PJI) combines exchange arthroplasty and effective antibiotic therapy. *Staphylococci* are the most frequent microorganism isolated in PJIs, with resistance to methicillin found in 15-50% of the cases. Data from randomized trials on treatment of methicillin-resistant staphylococci are lacking and the choice of antibiotic(s) and recommendations vary according to authors. To date, combination therapy including vancomycin is the treatment of choice.
Minocycline, a cyclin antibiotic, is naturally effective against methicillin-resistant staphylococci. We use this antibiotic since many years in combination with vancomycin for the treatment of multi-drug resistant staphylococcal bone and joint infections.
The aim of this study is to analyze the outcome of patients treated with combination antibiotic therapy including minocycline for the treatment of chronic methicillin-resistant staphylococcal PJI.

Method: We conducted a cohort study between 2004 and 2014 in our referral center for bone and joint infections. Data were extracted from the prospective database. All the patients receiving an initial combination therapy including at least 4 weeks of minocycline, given orally, and another IV antibiotic, usually high-dose continuous IV vancomycin, for chronic MR staphylococcal PJI and who underwent one or two stage exchange arthroplasty, were included. They were followed prospectively for at least 2 years.

Results: We included 42 patients: 26 patients (62%) had one-stage, 16 patients (38%) had two stage exchange arthroplasty .Median duration of IV and total antibiotic therapy was 42 [40-44] days and 84 [84-88] days, respectively. 41 patients (98%) received vancomycin as associated initial therapy. Thirty-six patients received 100mgx3 per day of minocycline. Six received >300mg per day because of low serum concentrations. Median follow-up was 48 months (IQR 27-58).
Survival rate without infection was 84,5% at 2 years, 70.2% at 6 years.
Four patients reported adverse events due to minocycline: one had grade 4 thrombopenia leading to minocycline withdrawal, two had grade 2 liver toxicity. One patient had grade 1 nauseas.
Two patients with MR *Staphylococcus epidermidis* knee arthroplasty experienced relapse. Three patients with hip arthroplasty infection developed a new infection within 2 year due to MSSA, *Pseudomonas aeruginosa*, and plurimicrobial for the last one.
Three further patients developed a new infection 3 (n=2) and 4 years later. They were all acute haematogenous infections.

Conclusions: Our data support the use of minocycline combination therapy with high-dose IV vancomycin for the treatment of chronic PJI due to methicillin-resistant *Staphylococci*.

[FP 85] PRIMARY FOCI OF HEMATOGENOUS PERIPROSTHETIC JOINT INFECTIONS: AN ANALYSIS OF 70 CONSECUTIVE EPISODES

Anastasia Rakow[1], Doruk Akgün[1], Michael A. Schütz[1], Carsten F. Perka[1], Andrej Trampuz[2], Nora Renz[2]

[1] Charité - Universitätsmedizin Berlin, Center for Musculoskeletal Surgery , Orthopaedic Surgery & Traumatology, Berlin, Germany
[2] Charité - Universitätsmedizin Berlin, Center for Musculoskeletal Surgery , Septic Surgery / Orthopaedic Surgery & Traumatology, Berlin, Germany

Aim: The incidence of hematogenous periprosthetic joint infections (hPJI) is unknown and the cases probably largely underreported. Unrecognized and untreated primary infectious foci may cause continuous bacteremia, further spread of microorganisms and thus treatment failure or relapse of infection. This study aimed at improving knowledge about primary foci and microbiological characteristics of this entity to establish preventive measures and improve diagnostic and therapeutic strategies to counteract hPJI.

Method: We retrospectively analysed all consecutive patients with hPJI, who were treated at our institution from January 2010 until December 2016. Diagnosis of PJI was established if ³1 of the following criteria applied:(i) macroscopic purulence, (ii) presence of sinus tract, (iii) positive cytology of joint aspirate (>2000 leukocytes/µl or >70% granulocytes), (iv) significant microbial growth in synovial fluid, periprosthetic tissue or sonication culture of retrieved prosthesis components, (v) positive histopathology. PJI was classified as hematogenous if the following criteria were fulfilled additionally: (1) onset of symptoms more than 1 month after arthroplasty AND (2) i) isolation of the same organism in blood cultures OR ii) evidence of a distant infectious focus consistent with the pathogen.

Results: A total of 70 episodes of hPJI were included. Median age was 74 years (32–89 years), 36 were women and 29 men. Sites of PJI included 39 knees, 29 hips, one shoulder and one elbow joint. The pathogen was identified in 99% (n=69), the majority of episodes was monomicrobial (n=64, 91%). Blood cultures were collected in 39 cases (56%) and identified the pathogen in 67% (n=26). Isolated pathogens were *Staphylococcus aureus* (n=29), *Streptococcus* spp. (n=20) and *Enterococcus faecalis* (n=12), coagulase-negative staphylococci (n=6) and gram-negative bacilli (n=5). In 55% the primary focus was identified and included an intravascular (endocarditis, endoplastitis, thrombophlebitis; n=15), urogenitary (n=8), dental (n=6), gastrointestinal, (n=5) and osteoarticular (n=2) origin and skin and soft tissue (n=1). The primary focus could not be identified in 29 cases (41%), primarily due to underuse of diagnostic workup.

Conclusions: Causative agents were identified in the vast majority of hPJI with a predominance (75%) of high virulent microorganisms such as staphylococci, streptococci and gram-negative bacilli. Our results highlight the importance of a meticulous diagnostic workup including collection of blood cultures and performance of echocardiography in hematogenous PJI in order to cure the infection and prevent relapse. Awareness must be raised with regard to every prosthesis being endangered by hematogenous seeding from a distant infectious focus during the entire indwelling time.

[FP 86] INPUT OF A PHARMACIST IN A REGIONAL REFERRAL CENTER FOR BONE AND JOINT INFECTIONS

Frédérique Bouchand[1], Christophe Nich[1], Gautier Petroni[1], Samuel Privé[1], Eleonore Truchard[1], Benjamin Davido[1], Philippe Hardy[2], Maryvonne Villart[1], Aurélien Dinh[1]

[1] Raymond Poincaré University Hospital, Pharmacy, Garches, France
[2] Hôpitaux Universitaires Paris Ile de France Ouest

Aim: Our hospital is a referral center for Bone and Joint Infection (BJI) with a 15-bed orthopedic unit. Patients benefit from a multidisciplinary team management (surgeons, anesthetists, infectious disease physicians, microbiologists, dietician etc.). Computerized drug prescriptions are performed by anesthetists, surgical residents, surgeons and infectious disease physicians. Since 2015, a pharmacist has been included in ward rounds and in weekly multidisciplinary consultative meetings, where antibiotic treatment strategies are decided for hospitalized patients. This work aimed to assess the impact of a pharmacist in this unit to limit prescription errors.

Method: Prospective monocentric study of all pharmacist's advice or interventions during 15 weeks in 2016 and 2017. A complete pharmaceutical analysis of prescriptions is performed twice a week at least. This analysis is based on doses control and drug interactions, but also takes into account biological and clinical data of patients (patient history, renal function, symptoms, adverse effects…). In case of a prescription error, a computerized message and/or a phone call is sent to the prescriber. Each pharmacist's intervention is recorded and classified according to the French Society of Clinical Pharmacy. The pharmacist collected the number of pharmaceutical advice (when spontaneously solicited by any member of the multidisciplinary team), the different types of prescription errors, the pharmacological class associated to these errors, the types of pharmacist's interventions and their impact on prescriptions.

Results: During ward rounds, 24 pharmaceutical advices were asked spontaneously by physicians about drug treatment optimization, predominantly about preparation and administration of injectable antibiotics or about doses adaptation. Regarding medication problems detected by the pharmacist, there were 145 prescription errors: inappropriate dose (38/145), too long-duration treatment (24/145), drug omission (18/145), drug overlap (13/145), inappropriate route (13/145), drug interaction (10/145), non-adherence to guidelines (15/145), omission of specific monitoring (4/145), other (10/145). The main pharmacist's interventions were drug discontinuations (53/145, 37%) and dose adjustments (37/145, 26%). In this specific BJI unit, 67/145 (46%) pharmacist's interventions were related to antibiotic drugs, 29/145 (20%) to drugs for digestive disorders and 16/145 (11%) to cardiovascular drugs. Most of pharmacist's interventions were accepted by prescribers (123/145, 85%), with immediate correction of prescriptions.

Conclusions: Most prescription errors concerned doses and durations of treatments. Antibiotic prescriptions were often susceptible to errors. The involvement of a pharmacist in this bone and joint infection unit allows a better medication safety.

[FP 87] AN EXAMPLE OF INFECTIOUS DISEASE ADVICE IN PRIVATE HEALTH CARE FACILITIES

Camille Fourcade[1], Bouige Aurelie[2], Eric Labau[3], Gérard Giordano[4], Alain Bicart See[5], Bonnet Eric[5]

[1] *Hôpital Joseph Ducuing, Infectious Disease Unit, Toulouse, France*
[2] *Hôpital Joseph Ducuing, Biological Department, Toulouse, France*
[3] *Centre de Biologie Médicale, Toulouse, France*
[4] *Hôpital Joseph Ducuing, Traumatology and Orthopaedic Surgery Department, Toulouse, France*
[5] *Joseph Ducuing Hospital, Orthopedic Department, Toulouse, France*

Aim: In private healthcare facilities, the access to a specialized infectious disease (ID) advice is difficult. More, the lack of traceability is problematic and harmful for treatment and follow-up. We have tested an information technology (IT) application to improve medical transmission and evaluate an interdisciplinary ID activity.

Methods: In November 2015, three ID physicians (IDP) created an interdisciplinary activity, visiting patients and giving phone advices among ten private healthcare facilities. They are members of the complex bone and joint infection unit of the community hospital where they are attached. Since September 2016, each advice was prospectively recorded on a protected online information system. These data are available for consultation and modification by the three IDP. It is the first descriptive analysis of this database.

Results: From September 2016 to February 2017, 887 advices from 573 inpatients were collected. Median age was 69 years old and 56% of patients were male (n=320). Comorbidity was notified in 329 patients (57%): presence of a medical device (n=154), active neoplasia (n=76), mellitus diabetes (n=38) and renal failure (n=38) were the most common. Patients were hospitalized in a surgery unit in 49% of cases and of which 69% was the orthopaedic unit. By frequency, type of infection was prosthetic joint (n=111) and osteosynthesis device infection (n=67), urinary tract infection (n=57), skin infection (n=44), and catheter device infection (n=43). The presence of multidrug resistant bacteria was notified in 63 patients. Antibiotics were already administered before the first advice in 62% of patients. Advices were given after a medical consultation in the clinic in 353 cases (40%) and after a phone call with the physician in charge of the patient in 523 cases (60%). Antibiotics were disrupted or not introduced for 126 advices (14%), introduced for 133 advices (15%), modified in 337 advices (38%) and maintained unchanged in 291 advices (33%). New evaluation was effective for 171 patients (30%). Multidisciplinary meeting was requested for 54 patients.

Conclusion: Use of an information system for interdisciplinary and multisite ID activity has permitted with a better traceability to improve management of these septic patients, facilitate storage and transmission of medical information. It is a first overview of ID activity in private healthcare facilities and these tools appear essential in the development of such activity and for public health policy.

[FP 88] THE IMPORTANCE OF CLEANLINESS: A SINGLE CENTER STUDY OF I & D-PROCEDURES

Jeroen Neyt[1], Jan Verhaegen[2]

[1] *Ku Leuven - University of Leuven, Department of Orthopedics, Faculty of Medicine, University Hospitals Leuven, Leuven, Belgium*
[2] *Uh Gasthuisberg, Microbiology, Leuven, Belgium*

Aim: The purpose of this single center study was to analyze the robustness and thoroughness of debridement and irrigation in first stage procedures for periprosthetic joint infections in which the latter had been confirmed by fulfilling the PJI criteria produced by the musculo-skeletal infection society.

Method: After introduction of ' a clean phase ' concept in our center , we developed a method of using new instrumentation sets and waterproof cover sheets as well as sets of gloves and aprons after thorough debridement followed by copious irrigation under a splash sheet , once the prosthetic components were removed during which several (6 to 8) tissue biopsies and cultures were harvested. 'Clean phase' tissue specimens ad random were again obtained and cultured and compared with 'dirty phase' cultures and sonication results. Our zero hypothesis was that we were not able to entirely eradicate bacterial colonization. We tested this hypothesis during a period of 18 months in a consecutive series of first stage revisions for PJI at our center after introduction of the clean phase concept.

Results: We were able to reject our zero hypothesis in that 'clean phase' tissue cultures were either negative or they did not match 'dirty phase' tissue cultures suggestive of bacterial contamination.
We present our preliminary results.

Conclusion: Our findings suggest that our procedures and methods of debridement and irrigation in first stage PJI revision procedures are robust and thorough. Further investigation is required to determine whether 'clean phase' culture negativity is matching with a successful outcome in the run up and after the second stage revision procedure.

[FP 89] SUCCESSFUL TREATMENT OF SIX WEEKS OF ANTIBIOTICS IN HIP AND KNEE PERIPROSTHETIC JOINT INFECTION AFTER ONE-STAGE REPLACEMENT ARTHROPLASTY: A FRENCH COHORT STUDY

Gabriella Chieffo[1], Denis Archambeau[2], Luc-Jean Eyrolle[2], Philippe Morand[3], Julien Loubinoux[3], Solen Kerneis[4], Remy Gauzit[5], Philippe Leclerc[6], Philippe Anract[2], Dominique Salmon-Ceron[7]

[1] *San Matteo Hospital, Infectious Disesase, Pavia, Italy*
[2] *Cochin Hospital Aphp, Paris, France*
[3] *Assistance Publique Hôpitaux de Paris, Université Paris Descartes, Hupc Cochin, Bacteriology, Paris, France*
[4] *Assistance Publique Hôpitaux de Paris, Université Paris Descartes, Cic Cochin Pasteur, Paris Cedex 14, France*
[5] *Chu Cochin, Paris, France*
[6] *Cochin Hospital Aphp, Orthopedie, Paris, France*
[7] *Assistance Publique des Hôpitaux de Paris - Hôpital Cochin, Université Paris Descartes, Paris, France*

Aim: Periprosthetic joint infection (PJI) is a major complication of prosthetic implantation and needs a combined surgical and antimicrobial treatment. One-stage revision results usually in similar cure rate than two-stage (around 85-92%), but antibiotic therapy duration is not well established. The aim of study was to evaluate the efficacy of a short six-weeks antibiotic course in hip and knee PJIs after one-stage replacement arthroplasty (RA).

Method: This was a retrospective, observational study conducted at Orthopaedic Department of Cochin Hospital, Paris, between 1st January 2010 and 31 December 2015. Inclusion criteria were: age>18 years; clinical/microbiological diagnosis of PJI; one-stage RA; 6-weeks course of antibiotics; follow-up of at least one year. PJIs were classified depending on the delay of infection from implantation as: early(<3 months), delayed(3-24 months), late(>24 months). Pearson's-χ^2 and *t*-tests were used to compare categorical and continuous variables.

Results: Fifty patients with PJIs treated with one-stage hip/knee replacement arthroplasty (HRA/KRA) were included, 42 HRA, 8KRA. Median age was 69.3 years (IQR 24.5-97.4), 31 were males. Comorbidities included tumours(18%), polyarthritis(12%), chronic kidney disease (CKD), HIV infection. ASA score was≥3 in 15(30%) cases. PJIs occurred after a mean of 36 months:9 early, 9 delayed, 32 late. Bone biopsy and synovial fluid cultures were positive for methicillin-susceptible *coagulase-negative Staphylococci* (MSCNS) in 19(65%) cases, methicillin-resistant CNS (MRCNS) in 5(17%), methicillin-susceptible *S. aureus* (MSSA) in 5(17%), *P. acnes* in 20(40%), Enterobacteriacae in 6(12%), *Streptococcus* spp. in 4(8%), *E. faecium* and *Listeria* spp.(2%). Twelve PJIs (24%) were polymicrobial. Intravenous antibiotics were administered for 11 days (IQR 4-45). Daptomycin was used in 22(44%) cases. Forty-six 46(92%) patients were switched to oral antibiotics: fluoroquinolones in 25(54%) cases, clindamycin in 19(41%), beta-lactams in 17(37%), rifampicin in 12(26%). One patient died due to a carcinoma, while others reached at least one year evaluation (IQR 12-60). Overall, the remission rate was 90%(HRA=90%, KRA=88%). Failures included 4 relapses and one reinfection: HRA in 80%, ASA score ≥3 in 40%. Infections recurred after 6 months (IQR 4-12); bacteria involved were: MSCNS(n=2), MSSA, *P. acnes* and ESBL-producing *K. pneumoniae*. Univariate analysis, performed for demographical and PJI parameters, showed no differences between success and failures, except for radiotherapy, HIV infection and CKD associated to worst prognosis (p=0.05,OR=10.7; remission rate=50%). The lowest rate of failures was observed with rifampicin use, but it was not significant(p=0.14).

Conclusions: six-weeks course of antibiotics in knee and hip PJIs treated with one stage revision, seems sufficient with a satisfactory remission rate.

[FP 90] CEMENTLESS ONE-STAGE REVISION OF CHRONIC INFECTIONS IN HIP ARTHROPLASTIES (CORIHA); CLINICAL OUTCOME OF THE CORIHA PROTOCOL IN 56 PATIENTS AFTER A MEAN 4-YEAR FOLLOW-UP PERIOD

Jeppe Lange[1], Anders Troelsen[2], Søren Solgaard[3], Thue Ørsnes[2], Kristian Otte[2], Poul Torben Nielsen[4], Martin Lamm[5], Niels Krarup[6], Søren Mikkelsen[7], Andre Zawadski[8], Kjeld Søballe[5], On behalf of the CORIHA research group[9]

[1] Orthopeadic Research - Department of Orthopaedic Surgery, Aarhus University Hospital, Aarhus C, Denmark
[2] Copenhagen University Hospital – Hvidovre, Hvidovre, Denmark
[3] Gentofte Hospital, Gentofte, Denmark
[4] Aalborg University Hospital, Aalborg, Denmark
[5] Aarhus University Hospital, Aarhus, Denmark
[6] Regional Hospital Viborg, Viborg, Denmark
[7] Regional Hospital Silkeborg, Silkeborg, Denmark
[8] Esbjerg Hospital, Esbjerg, Denmark
[9] Lundbeck Foundation Center for Fast-Track Hip and Knee Surgery, Denmark

Aim: Our aim was to evaluate cementless one-stage revision in chronic periprosthetic hip joint infection.

Method and patients: The study was performed as a multicentre, *proof-of-concept*, observational study with prospective data collection. Inclusion of patients with a chronic periprosthetic hip joint infection (PJI) were followed by protocolled surgical treatment (cementless one-stage revision - the CORIHA protocol) at one of 8 participating departments of orthopaedic surgery between 2009 -2014, and the patients enrolled in a 2-year follow-up program. A PJI were diagnosed based on adopted criteria from McPherson and Zimmerli. At the time of initiation of the study in 2009, the collaborating departments performed approximately one-fourth of all nationwide primary HJR and more than one-third of all revisions.
In total 56 PJI patients with a median age of 72 years and a median pre-operative ASA score of 2 met the established eligibility criteria and accepted to participate; 31 (55%) were males.
The cohort had a mean follow-up time of 4.0 years, with all patients followed for minimum 2 years.
The primary outcome were relapse described as re-revision due to infection (regardless of considered as a relapse or new infection). This was evaluated by competing risk analysis (competing risks: aseptic revisions and death). Secondary, all-cause mortality was evaluated by survival analysis.
The study was approved by the local Committees on Biomedical Research Ethics.

Results: Five patients were revised due to relapse of infection. The cumulative incidence of re-revision due to infection was 8.9% (95% Confidence Interval 3.2-18.1). Seven patients had died in the follow-up period. None of these were believed to have been re-infected. The 1 and 5 year survival incidence was 96 (95% Confidence Interval 86-99) and 89 (95% Confidence Interval 75-95).
Several complications were registered in the follow-up period: Three patients sustained periprosthetic fractures. Five patients had closed reduction due to dislocation - none have been open revised. Five patients sustained acute renal failure without long-term complications. One patient suffered an acute non-stemi myocardial infarction 8 days post-operatively, but with no major sequelae. One patient had soft-tissue revision of the wound following the CORIHA surgery, but is believed free of infection; One patient has severe irritation by the cables left from the extended osteotomy, but no further surgery is planned.

Conclusions: We found that cementless one-stage revision in chronic hip PJI is a valuable treatment. This method has gained nationwide acceptance as first-line treatment strategy following this study.

[FP 91] IMPORTANCE OF MAZEF TOXIN-ANTITOXIN SYSTEM FOR INTRACELLULAR DEVELOPMENT OF STAPHYLOCOCCUS AUREUS IN OSTEOBLASTS

Camille Kolenda[1], Jérôme Josse[1], Roberto Sierra[2], Adriana Renzoni[3], Frederic Laurent[4]

[1] International Centre for Infectiology Research Inserm U1111 - Cnrs Umr5308 - Ens Lyon - Lyon 1 University, Hospices Civils de Lyon, Staphylococcal Pathogenesis Team, Lyon, France
[2] Medical Faculty, University of Geneva, Department of Microbiology and Molecular Medicine, Geneva, Switzerland
[3] Hug, Service of Infectious Diseases , Department of Medical Specialties, Geneva, Switzerland
[4] Centre International de Recherche En Infectiologie - Hospices Civils de Lyon, Inserm U1111, Lyon, France

Aim: Toxin-antitoxin (TA) systems are small genetics elements found in the majority of bacteria which encode a toxin causing bacterial growth arrest and an antitoxin counteracting the toxic effect. In *Salmonella* and *E. coli*, TA systems were shown to be involved in the formation of persisters. Persisters are a bacterial subpopulation with low growth rate and high tolerance to antibiotics. They could be responsible for antibiotic treatment failure in chronic infections and relapses, notably in bone and joint infections (BJI) caused by *Staphylococcus aureus*. Currently, two type II TA system families were described in *S. aureus*, *mazEF* and *axe/txe,* but their physiological roles are not well described. In this work, we studied the importance of *mazEF* in the intracellular survival of *S. aureus* inside osteoblasts, one of the mechanisms considered in the chronicity of *S. aureus* BJI.

Methods: Using an *ex vivo* model of intracellular infection of human osteoblast-like cells (MG-63), two strains of *S. aureus* HG003 wild type and its isogenic mutant HG003 Δ*mazEF* were compared in terms of : i) internalization and intracellular survival by lysostaphin protective assay and ii) cytotoxicity by quantifying LDH in the culture supernatant, 24h and 48h after infection.

Results: The comparison of the two strains revealed that HG003 Δ*mazEF* had a lower capacity to be internalized by osteoblasts compared to the wild type (p=0.02). However, intracellular survival was greater for HG003 Δ*mazEF* compared to the wild type 24h and 48h post-infection (p=0.02 and 0.001 respectively). Concerning the bacteria-induced cell death, HG003 Δ*mazEF* appeared to be less cytotoxic than the wild type strain at 24h post infection (p=0.007) whereas no more differences could be observed after 48h. This delayed cytotoxicity with HG003 Δ*mazEF* was also observed after incubation of culture supernatants with osteoblasts during 8 hours, suggesting that the differences observed could be caused by a secreted molecule.

Conclusions: Our results suggest that the *mazEF* system could be involved in *S. aureus* BJI physiopathology regulating cytotoxicity and persistence in osteoblasts. Our prospect is to identify the target of the mazF toxin which could be a therapeutic target.

[FP 92] TWO-STAGE REVISION FOR PERIPROSTHETIC JOINT INFECTION OF THE HIP: CULTURE-NEGATIVE VERSUS CULTURE-POSITIVE INFECTION

Asep Santoso[1], Kyung-Soon Park[2], Taek-Rim Yoon[2], Shin Youngrok[2]

[1] Department of Orthopaedic and Traumatology, Prof. Dr. R. Soeharso Orthopaedic Hospital, Sebelas Maret University, Solo, Indonesia, Indonesia
[2] Center for Joint Disease, Chonnam National University Hwasun Hospital, Jeonnam, Korea, Rep. of South

Aim: Identification of the causal pathogen is crucial in the management of periprosthetic joint infection (PJI) of the hip. Unfortunately, it was often difficult and negative culture could be a common findings. This situation made the treatment of PJI of the hip became more challenging. The negative culture finding resulted in a doubtful diagnosis of infection, and poses difficulty in choosing the appropriate antibiotics. Here we compared the treatment outcome of two-stage revision arthroplasty for culture-negative versus culture-positive PJI of the hip.

Method: We retrospectively reviewed patients who received two-stage revision for PJI of the hip between January 2010 to June 2015. All patients was planned to received articulated antibiotic cement-spacer as the first stage and revision total hip arthroplasty (THA) as the second stage of the procedure. Out of total 94 patients, 10 patients was loss to follow-up and excluded from the study. We devided the rest of 84 patients into two groups: culture-negative group (n: 27) and culture-positive group (n: 57). We compared all relevant medical records and the treatment outcome between the two groups.

Results: The mean of follow-up was 29.5 months (range, 12-78) in culture-negative group and 30.9 months (range, 12-71) in culture-positive group (p = 0.74). The overall negative culture finding rate was 30.8%. There was no significant difference on baseline data between the two groups including: age, gender, body mass index, preoperative C-reactive protein (CRP), preoperative erythrocyte sedimentation rate and preoperative white blood count, type of hip arthroplasty, previous history of irrigation and debridement (I &D), and preoperative Harris hip score (HHS). However, culture-negative group has significantly higher number on history of preoperative antibiotic use (p = 0.003). The reimplantation rate was 96.3% and 91.2% in culture-negative and culture-positive group, respectively (p= 0.39). The infection recurrency rate after reimplantation was 7.7% and 15.4% in culture-negative and culture-positive group, respectively (p= 0.33). The overall infection control rate was 92.6% (25/27) and 82.4% (47/57) in culture-negative and culture-positive group, respectively (p = 0.21). We also observed no significant difference on the time interval between stage, time to normal CRP, time to recurrency and complications rate between the two groups. A higher postoperative HHS was obtained in culture-negative group (p = 0.04).

Conclusions: Negative culture finding was not resulted in an inferior treatment outcome compared to culture-positive group in periprosthetic joint infection of the hip which treated with two-stage revision arthroplasty.

[FP 93] INFECTION AFTER SPINAL SURGERY. A PROSPECTIVE CASE-SERIES INCLUDING 2706 PATIENTS

Charles Peltier[1], Vendeuvre Tanguy[1], Rigoard Philippe[1]

[1] *Chu Poitiers , Unité Rachis et Neurostimulation , Poitiers, France*

Aim: Spinal infection is the most frequent complication of spine surgery. Its incidence varies between 1% and 14% in the literature, depending on various studied populations and surgical procedures. The aim of this study was to describe a consecutive 2706 case series.

Method: We analyzed a prospective cohort of 2706 patients operated for spine disease between 2013 and 2016 in a University Hospital. The infection rates, germs, time between surgery and infection and outcomes after surgical revision were assessed with a minimum follow-up of 7 months. We developed a mathematical model to analyze risk factors in this difficult-to-treat population.

Results: Among 2706 patient who underwent spinal surgery during the three-year study period, 106 developed a postoperative spine infection. Clinical indicators for infection were the sudden onset of local pain and swelling without fever after an initial pain-free interval. We observed a masculine predominance (68%); the median age was 56 years. The rate of infection was comprised between 0,3% (discal herniation surgery) to over 20% in posterior cervical instrumented surgery (acute cervical fractures), with a global rate of 4%. Polymicrobial infections with more than 3 germs were found in only 2 case, with 3 germs in 8 cases, 2 germs in 27 cases and 1 germ in 69 cases. Staphylococcus aureus, Propionibacterium acnes and Staphylococcus epidermidis were the three main germs identified (53, 36 and 22% respectively). Propionibacterium acnes was involved with a higher rate in instrumented surgery but also in 8% of conventional non-instrumented surgery, with a median relapse time of 24 days (12 days to 4 years). Staphylococcus aureus was involved at a higher rate in posterior non-instrumented surgery with a median relapse time of 18 days (8-66 days). The rate of infection per month was globally stable along the year except an increased rate in February-March. All patients with a suspicion of post-op infection were initially treated with wound/deep tissues revision within the first month after surgery and associated with implant removal after one-month post-op. Pejorative outcomes were associated with incomplete revision surgery, several surgeries and polymicrobial infection.

Conclusions: In this study, the rate of postoperative infection is comparable to the literature. In contrast, Propionibacterium incidence is high, especially for acute infections. This unexpected rate can be linked to technical improvements in culture detection but this should also lead us to further discuss the natural process of spine/disk colonization of this germ.

[FP 94] CSA-90 REDUCES IMPLANT-ASSOCIATED STAPHYLOCOCCUS AUREUS INFECTION IN A NOVEL RAT MODEL

Rebecca Mills[1], Aaron Schindeler[1], David Little[1]

[1] *Kids Research Institute, University of Oxford, Orthopaedic Research & Biotechnology, Sydney, Australia*

Aim: Implant-associated infection remains one of the biggest challenges facing orthopaedics and there is an urgent clinical need to develop new prophylactic strategies. We have previously shown that CSA-90, a broad-spectrum antimicrobial, prevented infection in an infected open fracture model. In this study we developed a novel model of implant-associated infection, in which to further test the potential of CSA-90 as a prophylactic agent.

Method: All studies were approved by the local animal ethics committee. 3D-printed porous titanium implants were implanted into the distal femora of 18 week-old male Wistar rats under general anaesthesia. The treatment groups' (n=10) implants were pre-coated with 500µg CSA-90 in saline. *Staphylococcus aureus** was inoculated either directly around the implant (1×10^4 CFU) or injected intravenously immediately post-operatively (1×10^5 CFU). No systemic antibiotic prophylaxis was used. The study ran for six weeks and animals were reviewed daily for signs of infection. An independent, blinded veterinarian reviewed twice-weekly radiographs, and rats demonstrating osteolysis and/or declining overall health were culled early at their instruction. The primary outcome was implant infection, incorporating survival, microbiological, radiological, and histological measures.

Results: All untreated animals inoculated with *S. aureus* developed clinical and radiographic evidence of implant infection and were culled within 14 days of surgery (Figure 1A). CSA-90 treatment significantly increased median survival in groups inoculated with *S. aureus* ($p<0.001$). Swab culture demonstrated that CSA-90 treated implants had a significantly reduced rate of infection compared to untreated implants in both the local ($p< 0.01$) and systemic ($p<0.001$) groups (Figure 1B).

Conclusions: This study demonstrates clinical potential for CSA-90 as a novel prophylactic antimicrobial for orthopaedics. Further *in vivo* evaluation is required in conjunction with existing systemic antibiotic prophylaxis.

Acknowledgements: This work was funded by NHMRC grant 1106982. Implants and CSA-90 were donated in kind support from Stryker and N8 Medical respectively.

[FP 95] RESULTS OF THE APPLICATION OF M. VASTUS LATERALIS FLAP PLASTY IN TREATMENT OF CHRONIC RECURRENT PERIPROSTHETIC HIP JOINT INFECTION

Vasilii Artyukh[1], Vitaly Liventsov[1], Svetlana Bozhkova[1]

[1] *Vreden Russian Research Institute of Traumatology and Orthopaedics, Saint-Petersburg, Russian Federation*

Aim: To evaluate the efficacy of infection elimination and functional outcomes of the resection hip arthroplasty (RHA) with m. vastus lateralis flap plasty in patients with chronic recurrent periprosthetic joint infection (PJI) one year or later after the surgery.

Method: We retrospectively studied the outcomes of 61 cases with recurrent PJI (more than 3 relapses). All patients underwent RHA with m. vastus lateralis flap plasty from the year 2005 to 2016. There were 35 males (63.6%) and 20 females (36.4%) with the mean age of 54 years. At least in one year after the surgery, the cases were analyzed for the absence of inflammation during the physical exam, functional result with the Harris hip score (HSS), quality of life with the Instrument for measurement of health-related quality of life scale and level of pain with the visual analogue scale (VAS). The results are presented as means with CI95%.

Results: The mean follow-up period was 40.8 months. The overall mortality rate was 12.2% (n = 6). Of all patients, 3 (5.5%) had severe concomitant pathology and died due to systemic infection within 90 days after the surgery. Two more patients died during the period of 1-3 years. Prolonged remission of PJI was achieved in 91% (n = 50) patients. In 9% of cases (n = 5) the relapse of infection was achieved.
The HHS corresponded to an unsatisfactory outcome with the mean value of 49.3 (45.4-53.3). Most of the patients (56%, n = 31) used 2 crutches while walking, 23% (n = 13) - a cane or a crutch, and 11% (n = 6) – a walker. In 73% of cases (n = 40), the load-bearing capacity of the operated limb was preserved. In 27% of cases (n = 15) the limb was non-supporting, including 10 patients with severe pain syndrome under the load. At the same time, the pain syndrome was absent in the rest of the patients. The mean VAS score was 2.77 (2.3-3.12). Despite the insufficient function of the operated limb, 83.6% of patients noted a satisfactory result with the mean Instrument for measurement of health-related quality of life* score of 57.8 (52.1-63.4).

Conclusions: RHA with m. vastus lateralis flap plasty is a technically complex operation that in most cases leads to the elimination of chronic recurrent PJI. Apparently, the improvement of functional capabilities can be ensured by the use of revision arthroplasty or external fixation in order to form a supporting «new joint» (neoarthrosis).

* EQ5D

[FP 96] CAN LEUCOCYTE/BONE MARROW SPECT CT DIAGNOSE DEEP INFECTION OF SHOULDER ARTHROPLASTIES?

Thomas Falstie-Jensen[1], Henrik Daugaard[2], Jeppe Lange[1], Janne Ovesen[1], Kjeld Søballe[1]

[1] Aarhus University Hospital, Orthopaedic Department, Section for Shoulder and Elbow Surgery, Aarhus C, Denmark
[2] Herlev-Genofte Hospital, Orthopaedic Department, Denmark

Background: Periprostetic joint infections (PJI) are often difficult to diagnose, to treat and often leave the patient with severe impaired function. The presence of low virulent bacteria is frequently discovered in apparent aseptic revisions of shoulder arthroplasties and pose a challenge to diagnose preoperatively.
Dual Isotope In^{111} Leucocyte/ Tc^{99} Bone Marrow SPECT CT scan (L/BMS) is considered the radionuclide gold standard in preoperative diagnosing PJI with reported high specificity and sensitivity in hip and knee arthroplasties. Unfortunately, it is labour-intensive and expensive to perform and documentation using L/BMS on shoulder arthroplasties lack.

Aim: To investigate if L/BMS succeeds in detecting shoulder PJI compared to tissue cultures obtained perioperatively.

Method: All patients referred to a highly-specialised shoulder department with a painful or stiff shoulder-arthroplasty were included in the cohort. To diagnose infection as a possible cause of arthroplasty failure a L/BMS was planned for all patients.
If the arthroplasty was revised, 5 tissue biopsies were obtained from the most infection-suspicious site during revision. Biopsies were cultured in broth and on plates for 14 days due to the high frequency of low virulent infection in shoulder revisions. Infection was defined as growth of the same bacteria in 3 or more of 5 the biopsies.

Results: During the observation period 71 patients were referred. Revision surgery was performed in 62% of the patients (44/71) of which 29 also had been examined by L/BMS. A microbiological diagnose was available for all. The most predominant organism isolated was P. Acnes.
Two patients both had a positive L/BMS and positive cultures. Negative L/BMS and negative cultures were found in 20 patients. The remaining 7 patients had negative L/BMS, but positive cultures. The two patients with a positive L/BMS both showed overt clinical signs of infection.
L/BMS show a sensitivity 0.22 95%CI(0-0.49) and specificity 1.00 95%CI(1.00-1.00) in detecting shoulder PJI. The Positive Predictive Value is 1.00 95%CI(1.00-1.00) and Negative Predictive Value 0.74 95%CI(0.57-0.90).
No patients infected with P. Acnes resulted in a positive scintigraphy nor had they preoperative or perioperative signs of infection.

Conclusion: Only patients with severe infectious symptoms of shoulder PJI resulted in positive L/BMS. Hence, the scan added nothing to the preoperative clinical diagnose.
In^{111} Leucocyte/ Tc^{99} Bone Marrow SPECT CT scan cannot be recommended as a standard screening procedure when evaluating failed shoulder arthroplasties for possible infection.

[FP 97] CYCLOOXYGENASE-2 POLYMORPHISM RS689466 MAY CONTRIBUTE TO THE INCREASED SUSCEPTIBILITY TO POST-TRAUMATIC OSTEOMYELITIS IN CHINESE POPULATION

Nan Jiang[1], Lei Wang[1], Bin Yu[1]

[1] *Nanfang Hospital, Guangzhou, China*

Aim: Cyclooxygenase-2 (COX-2) enzyme is one of the major mediators during inflammation reactions, and COX-2 gene polymorphisms of rs20417 and rs689466 have been reported to be associated with several inflammatory diseases. However, potential links between the two polymorphisms and risk of developing post-traumatic osteomyelitis remain unclear. The present study aimed to investigate associations between the rs20417 and rs689466 polymorphisms and susceptibility to post-traumatic osteomyelitis in Chinese population.

Method: A total of 189 patients with definite diagnosis of post-traumatic osteomyelitis and 220 healthy controls were genotyped for rs20417 and rs689466 using a genotyping method*. Chi-square test was used to compare differences of genotype distributions as well as outcomes of five different genetic models between the two groups.

Results: Significant association was found between rs689466 and post-traumatic osteomyelitis by recessive model (GG vs AA + AG) (OR = 1.74, 95% CI 1.098 – 2.755, P = 0.018). Although no statistical differences were identified of rs689466 between the two groups by allele model (P = 0.098) or homozygous model (P = 0.084), outcomes revealed a tendency that allele G may be a risk factor and people of GG genotype may be in a higher risk to develop post-traumatic osteomyelitis in Chinese population. However, no significant link was found between rs20417 and susceptibility to post-traumatic osteomyelitis in this Chinese cohort.

Conclusions: To our knowledge, we reported for the first time that COX-2 gene polymorphism rs689466 may contribute to the increased susceptibility to post-traumatic osteomyelitis in Chinese population.

*SNaPshot®

[FP 98] EVALUATION OF THE DOUBLE-LAYERED ANTIBIOTIC-LOADED CEMENT SPACER

Shinsuke Ikeda[1], Katsufumi Uchiyama[1], Yojiro Minegishi[1], Masaki Nakamura[2], Ken Sugo[3], Kensuke Fukushima[1], Naonobu Takahira[4], Satoshi Kishino[5], Hidero Kitasato[2], Masashi Takaso[1]

[1] Kitasato University, School of Medicine, Department of Orthopaedic Surgery, Sagamihara-City, Kanagawa, Japan
[2] Kitasato University, School of Allied Health Sciences, Department of Microbiology
[3] Hoya Corporation
[4] Kitasato University, School of Allied Health Sciences, Department of Rehabilitation, Sagamihara-City, Kanagawa, Japan
[5] Meiji Pharmaceutical Univesity, Department of Medication Use Analysis and Clinical Research

Aim: The preparation of antibiotic-containing polymethyl methacrylate (PMMA), as spacers generates a high polymerization heat, which may affect their antibiotic activity; it is desirable to use bone cement with a low polymerization heat. Calcium phosphate cement (CPC) does not generate heat on polymerization, and comparative elution testings are reported that vancomycin (VCM)-containing CPC (VCM-CPC) exceeded the antibiotic elution volume and period of PMMA (VCM-PMMA). Although CPC alone is a weak of mechanical property spacer, the double-layered, PMMA-covered CPC spacer has been created and clinically used in our hospital. In this study, we prepared the double-layered spacers: CPC covered with PMMA and we evaluated its elution concentration, antimicrobial activity and antibacterial capability.

Method: We prepared spherical, double-layered, PMMA-coated (CPC+PMMA; 24 g CPC coated with 16 g PMMA and 2 g VCM) and PMMA alone (40 g PMMA with 2 g VCM) spacers (5 each). In order to facilitate VCM elution from the central CPC, we drilled multiple holes into the CPC from the spacer surface. Each spacer was immersed in phosphate buffer (1.5 mL/g of the spacer), and the solvent was changed daily. VCM concentrations were measured on days 1, 3, 7, 14, 28, 56, and 84. Antimicrobial activity against MRSA and MSSA was evaluated by the broth microdilution method. After measuring all the concentration, the spacers were compressed at 5 mm/min and the maximum compressive load up to destruction was measured.

Results: The VCM concentration of the CPC+PMMA spacer exceeded that of the PMMA spacer at all-time points; in particular, it was approximately 7.3 times (109.30 vs. 15.03 µg/mL) and approximately 9.1 times (54.47 vs. 6.50 µg/mL) greater on days 14 and 28, respectively. Using the broth microdilution method, we found that the CPC+PMMA spacer had higher antimicrobial activity than the PMMA model. On day 56, the PMMA spacer lost the capability to inhibit bacterial growth, but the CPC+PMMA spacer maintained this ability. The average maximum compressive load for the CPC+PMMA was 7.28 kN, and that of PMMA was 16.21 kN.

Conclusions: The CPC+PMMA spacer was superior to PMMA alone in VCM elution volume and duration, so CPC+PMMA may be effective for the treatment of MRSA and MSSA infection. The double-layered, antibiotic-loaded cement spacer may maintain antibacterial capability and sufficient strength.

[FP 99] RADIOGRAPHIC, MCT AND HISTOLOGICAL REMODELING PATTERN OF A GENTAMICIN-ELUTING HYDROXYAPATITE / CALCIUM SULPHATE BIOCOMOPSITE. ONE YEAR RESULTS FROM A LARGE ANIMAL MODEL

Michael Diefenbeck[1], Sabine Bischoff[2], Eva Lidén[3], Werner Hettwer[4]

[1] *Scientific Consulting in Orthopaedic Surgery, Hamburg, Germany*
[2] *Institute of Experimental Animal Science and Animal Protection, University of Jena, Germany*
[3] *Bonesupport Ab, Lund, Sweden*
[4] *Musculoskeletal Tumour Section, National University Hospital, Copenhagen, Denmark*

Aim: A gentamicin-eluting biocomposite consisting of hydroxyapatite (HA) and calcium sulphate (CaS)*[1] can provide effective dead space management and bone formation in chronic osteomyelitis. However, radiographic follow-up after implantation of this biomaterial has shown imaging features previously not described with other comparable bone graft substitutes. Last year we presented preliminary results with a follow-up of 6 months. Now we present the radiographic, µCT and histological one-year follow-up of the critical-size bone defect model in sheep. The aim of this study was to simulate the clinical situation in a large animal model to correlate different imaging techniques used in the clinic (Radiography, CT and MRI scans) with histological finding.

Methods: Standardised bone defects were created in ten Merino-wool sheep (age two to four years). Large drill holes (diameter 2.5cm, depth 2cm, volume approx. 10ml) were placed in the medial femoral condyles of both hind legs and filled with gentamicin-eluting biocomposite. Initially surgery was carried out on the right hind leg. Three months later, an identical intervention was performed on the contralateral side. Animals were sacrificed at three and six weeks and 4.5, six and twelve months. Radiographs and MRI scans were taken immediately after sacrifice. Filled bone voids were harvested en-block and analysed using µCT, and histology.

Results: We present our radiographic, µCT and histological results after a follow-up of twelve months. The bio-composite was clearly visible on all post-operative radiographs and resorbed over the next four months following the before described pattern of “halo sign” and “marble sign”. µCT images of the “halo sign” show degradation of the biocomposite starting at its surface, with the degradation products CaS and HA carried into the periphery of the bone void. µCT images of the “marble sign” showed the further degradation of the biocomposite from the surface to its core, leaving a “marble shaped” remnant of the biocomposite behind. These remnants are completely resorbed at 4.5 months. µCT scans at twelve and six months’ reveal progression of trabecula bone formation. The histological results confirm the µCT findings.

Conclusion: We have established a large animal model, which mimics the clinical situation and reproduces comparable radiographic post implantation features previously observed in clinical cases (including the “halo” and the “marble” sign). Using µCT imaging and histology we can describe and understand the biodegradation process and the bone formation capacity of the biocomposite in detail.

*[1] CERAMENT™|G, BONESUPPORT, Lund, Sweden
*[2] CERAMENT™|G

[FP 100] LOCAL GENTAMICIN DELIVERY FROM A THERMORESPONSIVE HYALURONAN HYDROGEL SUCCESSFULLY TREATS A CHRONIC IMPLANT-RELATED INFECTION IN A SINGLE STAGE REVISION IN SHEEP

Willemijn Boot[1], Matteo D'este[1], Tanja Schmid[1], Stephan Zeiter[1], Geoff Richards[1], David Eglin[1], Fintan Moriarty[1]

[1] *Ao Research Institute, Davos, Switzerland*

Aim: The treatment of chronic orthopedic device-related infection (ODRI) often requires multiple surgeries and prolonged antibiotic therapy. In a two-stage exchange procedure, the treatment protocol includes device removal and placement of an antibiotic-loaded bone cement spacer to achieve high local antibiotic concentrations. At the second stage, further surgery is required to remove the spacer and replace it with the definitive device. We have recently developed a thermo-responsive hyaluronan hydrogel (THH) that may be loaded with antibiotics and used as delivery system. Since the material is bio-resorbable, it does not require surgical removal and may therefore be suitable for use as treatment strategy in a single-stage exchange.
This aim of this study was to evaluate gentamicin sulphate (Genta)-loaded THH (THH-Genta) for treating a chronic *Staphylococcus aureus* ODRI in sheep using a single-stage procedure.

Methods: Twelve Swiss-alpine sheep received an IM tibia nail and an inoculation of a gentamicin-sensitive clinical strain of *Staphylococcus aureus*. After letting a chronic infection develop for 8 weeks, a revision procedure was performed: the implant was removed, the IM canal debrided and biopsies were taken for culture. The IM canal was then filled with 25ml THH-Genta (1% Genta) or left empty (control group) prior to the implantation of a sterile nail. An ultrafiltration probe was placed within the IM cavity to collect extracellular fluid and determine local antibiotic levels for 10 days. Both groups received systemic amoxicillin and clavulanic acid for 2 weeks, followed by 2 weeks without treatment for antibiotic washout. At euthanasia, IM nail, bone marrow, bone and tissue samples were harvested for quantitative bacteriology.

Results: All sheep were infected at revision surgery as confirmed by cultures of biopsies and sonication of the IM nail. Local Genta concentrations ranged on average from 830µg/ml postoperatively to below 5µg/ml after 8 days. At euthanasia, *S. aureus* was detected in 5/5 IM nails, 5/5 bone marrow samples, and 8/25 superficial soft tissue samples in the control group (one control sheep was excluded for having a superinfection). In the THH-Genta group, *S. aureus* was cultured from 0/6 IM nails, 1/6 bone marrow samples, and 1/30 superficial soft tissue samples.

Conclusions: The THH showed a Genta release pattern that started with high local concentrations and decreased to low concentrations within 10 days. Local Genta delivery by THH combined with systemic antibiotics significantly reduced infection rates whereas systemic therapy alone was unable to eradicate infection in any animal.

[FP 101] SYNOVIAL FLUID D-LACTATE FOR THE DIAGNOSIS OF PJI AND EVALUATION OF TREATMENT SUCCESS

Svetlana Karbysheva[1], Katsiaryna Yermak[2], Lyudmila Grigoricheva[1], Andrej Trampuz[3]

[1] *Federal Center of Traumatology, Orthopaedics and Arthroplasty, Barnaul, Russian Federation*
[2] *Charité-Universitätsmedizin Berlin, Orthopaedics, Berlin, Germany*
[3] *Charité-Universitätsmedizin Berlin, Berlin, Germany*

The diagnosis of prosthetic-joint infection (PJI) is challenging, as bacteria adhere on implant and form biofilm. Therefore, current diagnostic methods, such as preoperative culture of joint aspirate have limited sensitivity with false-negative results.

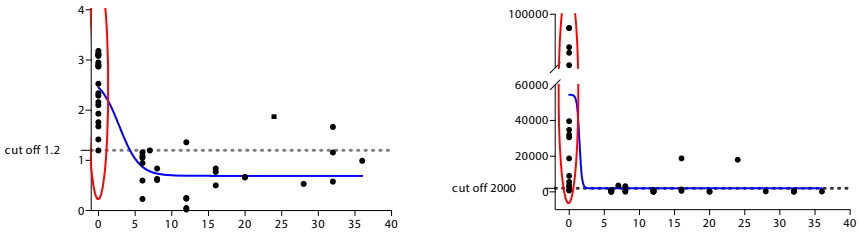
Aim: To evaluate the performance of measurement synovial fluid (SF) D-lactate (as a pathogen-specific marker) for the diagnosis of PJI and estimate of treatment success.

Method: 224 patients undergoing removal knee or hip prosthesis were included in the study between January 2015 and March 2017. 173 patients of this group had aseptic loosening of prosthesis and 87 were diagnosed with PJI. Prior to surgery, synovial fluid routine culture, D-lactate test, leukocyte count and neutrophils (%) were performed for each patient. In order to evaluate a treatment success, the measurement of SF D-lactate before second two-stage exchange procedure (after treatment) was implemented in 30 patients. Diagnosis of PJI was established according to modified Zimmerli criteria[1].

Results: Of 87 patients with infection of prosthetic joints, 61 (70%) had positive synovial fluid cultures, including *Staphylococcus spp. (70%), Streptococcus spp. (10%), Enterococcus spp. (6%), Anaerobes (6%), Enterobacteriacae (4%), P. aeruginosa (2%), C. parapsilosis (2%).* There was no significant difference in SF D-lactate levels due to different bacterial strains. The optimal D-lactate cut off was 1,2 mmol/l (sensitivity = 98%, specificity = 84%, PPV = 79%, NPV = 98%, AUC 0,99). Concentration of **SF D-lactate was significantly higher in patients with PJI compared to aseptic loosening of prosthesis** (median (range)) 2.33 (0.99-3.36) vs 0.77 (0.01-2.4), p<0.0001.D-lactate has better sensitivity for diagnosis of PJI (98%), compared to leukocytes (80%) and neutrophils % (89%), p<0.0001). The concentration of D-lactate decreased below cut off within four weeks after revision surgery (after treatment) in all patients except of three, showing relapse of infection (p<0.0001). Figure 1.

Conclusions: The measurement of synovial fluid D-lactate demonstrated high analytical performance in the diagnosis of PJI, it is a reliable pathogen specific marker. D-lactate has the best sensitivity as independent diagnostic method and could be implemented for the evaluation of treatment success.

Figure 1. Evaluation of treatment success. Significant reduction in the concentration of D-lactate and leucocytes count after treatment.



References: 1) Zimmerli W, Trampuz A, Ochsner PE. 2004 N Engl J Med 351:1645-1654.

[FP 102] METAGENOMIC SEQUENCING FOR ORTHOPAEDIC DEVICE-RELATED INFECTION

Teresa Street[1], Nicholas Sanderson[1], Bridget Atkins[2], Andrew Brent[3], Kevin Cole[4], Dona Foster[1], Martin McNally[5], Sarah Oakley[6], Leon Peto[3], Adrian Taylor[2], Tim Peto[1], Derrick Crook[1], David Eyre[7]

[1] *University of Oxford, Nuffield Department of Clinical Medicine, Oxford, United Kingdom*
[2] *Nuffield Orthopaedic Centre, Oxford University Hospitals, Oxford, United Kingdom*
[3] *Oxford University Hospitals, Oxford, United Kingdom*
[4] *Public Health England, Brighton, United Kingdom*
[5] *Nuffield Orthopaedic Centre, Oxford University Hospitals, The Bone Infection Unit, Oxford, United Kingdom*
[6] *Oxford University Hospital NHS Trust, Microbiology Laboratory, Oxford, United Kingdom*
[7] *University of Oxford, Nuffield Department of Medicine, Oxford, United Kingdom*

Aim: Culture of multiple periprosthetic tissue samples is the current gold-standard for microbiological diagnosis of prosthetic joint infections (PJI). Additional diagnostic information may be obtained through sonication fluid culture of explants. These current techniques can have relatively low sensitivity, with prior antimicrobial therapy or infection by fastidious organisms particularly influencing culture results. Metagenomic sequencing has demonstrated potential as a tool for diagnosis of bacterial, viral and parasitic infections directly from clinical samples, without the need for an initial culture step. We assessed whether metagenomic sequencing of DNA extracts from sonication fluid can provide a sensitive tool for diagnosis of PJI compared to sonication fluid culture.

Method: We compared metagenomic sequencing with standard aerobic and anaerobic culture in 97 sonication fluid samples from prosthetic joint and other orthopaedic device-related infections. Sonication fluids were filtered to remove whole human cells and tissue debris; then bacterial cells were mechanically lysed before DNA extraction. DNA was sequenced on a sequencing reagent*[1] using a sample pret kit protocol*[2] and sequencing reads were taxonomically classified using Kraken. Using 50 derivation samples, we determined optimal thresholds for the number and proportion of bacterial reads required to identify an infection and confirmed our findings in 47 independent validation samples.

Results: A total of 131 sonication fluids were aerobically and anaerobically cultured and underwent metagenomic sequencing. From the first 72 sonication fluid samples sequenced 22 samples from six batches were excluded, as these samples and negative controls from the same batches showed similar contamination. The remaining 50 samples, the derivation set, were used to determine optimal sequence thresholds for identifying true infection. Of 59 subsequently sequenced validation samples, 12 from a single batch were excluded as the negative control was contaminated with *Propionibacterium acnes*, leaving 47 validation samples.
Compared to sonication fluid culture, the species-level sensitivity of metagenomic sequencing was 61/69(88%,95%CI 77-94%) (derivation samples 35/38[92%,79-98%]; validation samples 26/31[84%,66-95%]), and genus-level sensitivity was 64/69(93%,84-98%). Species-level specificity, adjusting for plausible fastidious causes of infection, species found in concurrently obtained tissue samples, and prior antibiotics, was 85/97(88%,79-93%) (derivation 43/50[86%,73-94%], validation 42/47[89%,77-96%]). High levels of human DNA contamination were seen despite use of laboratory methods to remove it.

Conclusions: We demonstrate as a proof of principle that metagenomic sequencing can provide accurate diagnostic information in PJI. Further depletion of human DNA will lead to improved genomic information on the cause of infection, strengthening the case for metagenomic sequencing as a diagnostic tool in PJI.
*[1] Illumina MiSeq sequencer
*[2] Nextera XT protocol

[FP 103] EARLY AND DELAYED FRACTURE-RELATED INFECTIONS ARE TREATED SUCCESSFULLY WITH IMPLANT RETENTION IN A RABBIT MODEL OF STAPHYLOCOCCUS AUREUS INFECTION

Jan Pützler[1], Stephan Zeiter[1], Alejandro Vallejo[1], Dominic Gehweiler[1], Michael Raschke[2], Geoff Richards[1], Fintan Moriarty[1]

[1] *Ao Research Institute Davos, Davos, Switzerland*
[2] *University Hospital Muenster, Department of Trauma-, Hand- and Reconstructive Surgery, Germany*

Aim: Treatment regimens for fracture-related infection (FRI) often refer to the classification of Willenegger and Roth, which stratifies FRIs based on time of onset of symptoms. The classification includes early (<2 weeks), delayed (2-10 weeks) and late (>10 weeks) infections.[1] Early infections are generally treated with debridement and systemic antibiotics but may not require implant removal. Delayed and late infections, in contrast, are believed to have a mature biofilm on the implant, and therefore, treatment often involves implant removal. This distinction between early and delayed infections has never been established in a controlled clinical or preclinical study.[2, 3] This study tested the hypothesis that early and delayed FRIs respond differently to treatment comprising implant retention.

Method: A complete humeral osteotomy in 16 rabbits was fixed with a 7-hole-LCP and inoculated with *Staphylococcus aureus*. The inoculum size ($2x10^6$ colony forming units per inoculum) was previously tested without antibiotic intervention to result in infection of all animals persisting for at least 12 weeks.[4] The infection was allowed to develop for either 1 (early group) or 4 (delayed group) weeks (n= 8 per group) after bacterial inoculation. At these time points, treatment involved debridement and irrigation of the wound (no implant removal) and quantitative bacteriological evaluation of the removed materials. Systemic antibiotics were administered according to a common clinical regimen (2 weeks: rifampin + nafcillin, followed by 4 weeks: rifampin + levofloxacin). After an additional one-week antibiotic washout period, animals were euthanized and a quantitative bacteriology of soft tissue, implant (after sonication) and bone was performed.

Results: Greater numbers of bacteria were recovered by debridement and irrigation in the early group compared with the delayed group, which may indicate retraction of the infection in the delayed stage. Treatment was successful in both the early and delayed group: all animals in both groups were infection free at euthanasia. Furthermore, all osteotomies had healed, although animals in the delayed group displayed irregular callus formation
Conclusions: In both groups, treatment successfully eradicated the infection, suggesting that, at least in this model, the maturity of the infection does not impact upon treatment success within the first four weeks.

Acknowledgements: This work was funded by AOTrauma

References:
Willenegger H, Roth B (1986). Unfallchirurgie; 12 (5):241-246
Trampuz A, Zimmerli W (2006) Injury. May;37 Suppl 2:S59-66 3
Metsemakers WJ, et al., (2016) Injury
Arens D, et al. (2015) European Cells and Materials Vol. 30 p148-162

Poster Overview

Poster Overview

No.	Category	Title	Authors
P1	Prevention	INTERNATIONAL SURVEY OF CLINICAL PRACTICE REGARDING PERIOPERATIVE ANTIBIOTIC PROPHYLAXIS IN ORTHOPAEDIC SURGERY	Christof Berberich · Elke Lieb · Alessandra-Catalina Bardelli · Nora Renz · Andrej Trampuz
P2	Prevention	PERIOPERATIVE CONTAMINATION OF KNITTED COTTON OUTER GLOVES IN HIP AND KNEE ARTHROPLASTY SURGERY: AN INFECTION RISK?	Thorsten Wichmann · Fintan Moriarty · Iris Keller · Stefan Pfister · Vanessa Deggim-Messmer · Emanuel Gautier · Fabian Kalberer · Peter Koch · Peter Wahl
P3	Prevention	PRE-OPERATIVE ASYMPTOMATIC BACTERIURIA: A RISK FACTOR FOR PROSTHETIC JOINT INFECTION?	Ross Weale · Fatima El-Bakri
P4	Prevention	THE EFFECT OF A NOVEL AIR DECONTAMINATION-RECIRCULATION SYSTEM ON VIABLE AND TOTAL AIRBORNE PARTICULATES DURING SURGERY	William Walsh · Nathaniel Bradford · Gareth Davies · Rema Oliver · Richard Verheul · Warwick Bruce
P5	Prevention	IMPACT OF NURSING CARE INTERVIEW ON THE REPRÉSENTATIONS AND RESILIENCE OF THE AMPUTEE: ANALYSIS OF A PILOT STUDY	Happi Line · François Gouin · Bornand Elvire · Line Happi
P6	Prevention	CLOTHING PROTECTION AND BEHAVIOR IN OPERATING ROOM: EVALUATION OF THE ORGANISATION AND THE PRACTICES IN ORTHOPEDIC AND SPINE SURGERIES	Sophie Obéléréo · Béatrice Bibes · Didier Lepelletier
P7	Prevention	PREOPERATIVE BACTERIURIA DOES NOT AFFECT THE RISK OF PERIPROSTHETIC JOINT INFECTION FOLLOWING PRIMARY KNEE OR HIP REPLACEMENT	Meeri Honkanen · Esa Jämsen · Matti Karppelin · Reetta Huttunen · Heini Huhtala · Antti Eskelinen · Jaana Syrjänen
P8	Prevention	INFLUENCE OF ANTIMICROBIAL PROPHYLAXIS DURATION ON FRACTURE-RELATED INFECTION: PRELIMINARY DATA OF A SINGLE CENTRE EXPERIENCE	Peter Declercq · Jorien Quintens · Thomas De Ridder · André Nijssen · Stefaan Nijs · Willem-Jan Metsemakers
P9	Prevention	A PROSPECTIVE STUDY OF SKIN AND URINE COLONIZATION IN THE ELDERLY WITH A PROXIMAL FEMORAL FRACTURE: PRELIMINARY RESULTS	Daniel Haro Fernández · Eva Cuchi Burgos · Lucia Gomez Garcia · Pablo Castillon Bernal · Alfredo Matamala Pérez · Elena Jimenez · Francesc Anglès Crespo · Josefa Pérez Jove
P10	Prevention	ANTIBIOTIC PROPHYLAXIS FULFILLMENT IN TOTAL KNEE AND HIP REPLACEMENT AFTER AN INTERVENTION PROGRAM	David Campillo Recio · Marta Comas Aguilar · Olga Portolà Castillón · Pilar de la Cruz Solé · Nuria Farrero · Ana Méndez Gil
P11	Prevention	STAPHYLOCOCCUS EPIDERMIDIS ISOLATED FROM NARES AND PROSTHETIC JOINT INFECTIONS ARE MUPIROCIN SUSCEPTIBLE	Bo Söderquist · Salih Lavin · Tevell Staffan · Månsson Emeli · Nilsdotter Åsa · Hellmark Bengt
P12	Prevention	THE EFFECTIVENESS OF PREVENTING HOSPITAL-ACQUIRED TRANSMISSION OF MULTI-DRUG RESISTANT BACTERIA BY ISOLATION ON A SPECIAL WARD	Julia Greipel · Hackl Simon · von Rüden Christian · Werle Regina · Bühren Volker · Militz Matthias
P13	Prevention	USE OF MODEL PLASTIC ARM AND TEACHING VIDEOS TO INCREASE SELF-ADMINISTRATION OF INTRAVENOUS ANTIBIOTICS IN ORTHOPAEDIC INFECTIONS	Richard Anderson · Tanya Porter · Lina Bakaite · Anna Mayhew · Emma Nash · Filipa Mendes · Ilias Mariolis · Elinor Moore · Sian Coggle · Emma Nickerson

Poster Overview

No.	Category	Title	Authors
P14	Diagnosis	BONE AND JOINT INFECTION DIFFICULT TO DIAGNOSE: INTEREST OF AUTOMATED MULTIPLEX PCR CURETIS SYSTEM	Damasie Malandain · Pascale Bemer · Leroy Anne-gaëlle · LEGER Julie · Plouzeau Chloé · VALENTIN Anne-Sophie · Anne Jolivet-Gougeon · Didier Tandé · LEMARIE Carole · KEMPF Marie · Christophe Burucoa · Stephane Corvec
P15	Diagnosis	FEMORAL BONE DEFECT CHARACTERIZATION IN HIP PERIPROSTHETIC JOINT INFECTION	Andrew Kochish · Svetlana Bozhkova · Vasilii Artyukh · Vitaliy Liventsov
P16	Diagnosis	PYODERMA GANGRENOSUM MIMICKING POSTOPERATIVE INFECTION AFTER TOTAL HIP ARTHROPLASTY: A CASE REPORT	Masaki Mizushima
P17	Diagnosis	IMPLEMENTATION OF THE SONICATION METHOD ON EXPLANTED MATERIALS OF INTERNAL FIXATIONS AND COMPARISON WITH THE RESPECTIVE TISSUE CULTURES FOR THE DIAGNOSIS OF ORTHOPAEDIC IMPLANT ASSOCIATED INFECTIONS. A PROSPECTIVE STUDY	Antonios Stylianakis · Gerasimos Socrates Christodoulatos · Panagiotis Lepetsos · Spyros Kamariotis · Athanasios Adamopoulos · Sofia Katara · Nikolaos Zalavras · Moyssis Lelekis
P18	Diagnosis	THE EFFECT OF PREOPERATIVE ANTIMICROBIAL PROPHYLAXIS ON INTRAOPERATIVE CULTURE RESULTS IN REVISION ARTHROPLASTY. A SYSTEMATIC REVIEW	Marjan Wouthuyzen-Bakker · Natividad Benito · Alex Soriano
P19	Diagnosis	INTERPRETATION OF RESULTS OF ALPHA-DEFENSIN LEVEL IN THE DIAGNOSIS OF THE JOINT FLUID	Pavel Melichercik · David Jahoda · Ivan Landor · Eva Klapková · Tobias Judl · Rastislav Ballay · Václav Čeřovský
P20	Diagnosis	BIOFILM IN SYNOVIAL FLUID: BIOFILM DISLODGING TREATMENT IMPROVES CULTURE SENSITIVITY	Elena De Vecchi · Carlo Luca Romanò · Lorenzo Drago
P21	Diagnosis	USE OF CHROMAGARTM STAPHYLOCOCCUS WITH ADDITION OF CEFOXITIN FOR EARLY DETECTION OF METHICILLIN-RESISTANT STAPHYLOCOCCUS, IMPORTANT PATHOGENS IN THE IMPLANT-ASSOCIATED INFECTION (IAI) OF IN TRAUMATOLOGY - ORTHOPEDICS	Oksana Kimaikina · Lyudmila Grigoricheva
P22	Diagnosis	MICROBIOLOGICAL EPIDEMIOLOGY IN PATIENTS EXPERIENCING MICROBIOLOGICAL OR CLINICAL FAILURE FOLLOWING REIMPLANTATION AFTER A 2-STAGE EXCHANGE STRATEGY FOR HIP OR KNEE PROSTHETIC JOINT INFECTION	Tristan Ferry · Hassan Serrier · Frédéric Laurent · mabrut eugenie · Michel Fessy · Christian Chidiac · Laure Huot · Sébastien Lustig · Florent Valour
P23	Diagnosis	MULTICENTER PROSPECTIVE EVALUATION OF BJI INOPLEX TEST FOR THE DIFFERENTIAL DIAGNOSIS OF PROSTHETIC JOINT INFECTION	Pascale Bemer · Anne Jolivet-Gougeon · Plouzeau Chloé · Anne-Sophie Valentin · Carole Lemarié · Christophe Burucoa · Marie Kempf · Line Happi · Anne Meheut · Céline Bourigault · Stephane Corvec

Poster Overview

No.	Category	Title	Authors
P24	Diagnosis	PERFORMANCE OF A RAPID TEST TO RULE OUT PERSISTENT INFECTION DURING TWO STEPS EXCHANGE MANAGEMENT FOR PJI	Morgan Matt · Nich Christophe · Davido Benjamin · Deconninck Laurène · Frédérique Bouchand · Geffrier Antoine · Senart Olivia · Clara Duran · Ruxandra-Oana Calin · Martin Rottman · Aurélien Dinh
P25	Diagnosis	USEFULNESS OF SCD14-ST IN SYNOVIAL FLUID FOR EARLY DIAGNOSIS OF PYOGENIC ARTHRITIS	Takashi Imagama · Atsunori Tokushige · Kazushige Seki · Toshihiro Seki · Toshihiko Taguchi
P26	Diagnosis	THE EFFECTIVE EVALUATION OF MEASUREMENT OF A-DEFENSIN DERIVED FROM SYNOVIAL FLUIDS IN ORTHOPEDIC AREA INFECTION	Yojiro Minegishi · Katsufumi Uchiyama · Shinsuke Ikeda · Masaki Nakamura · Hidero Kitasato · Masashi Takaso · Lene Kaspersen
P27	Diagnosis	THE VALUE OF SONICATION IN THE MICROBIOLOGICAL DIAGNOSIS OF PERI-IMPLANT INFECTION	Vladimir Obolenskiy · Anton Semenistyy · Svetlana Stepanenko · Zoya Bursyuk
P29	Diagnosis	MICRORNA21 AS A NOVEL MOLECULAR MARKER OF INFLAMMATION IN PATIENTS WITH PERIPROSTHETIC JOINT INFECTIONS	Ioanna Papathanasiou · Evanthia Mourmoura · Eleni Ntoumou · Konstantinos N. Malizos · Nikolaos Stephanou · Lydia Anastasopoulou · Aspasia Tsezou
P30	Diagnosis	CAN THE CRP VALUES, NUMBER OF LEUKOCYTES AND PERCENTAGE OF POLYMORPHONUCLEARS, HELP US TO ASSESS THE AGENT CAUSING THE INFECTION?	Massimiliano Conte · Xaver-Andoni Tibau Alberdi · Rafael Tibau Olivan
P31	Diagnosis	SYNOVIAL FLUID GLUCOSE AND LEUKOCYTE ESTERASE IN DIFFERENTIATING SEPTIC KNEE ARTHRITIS	Daisuke Nakashima · Takashi Imagama · Toshihiko Taguchi
P32	Diagnosis	THE ROLE OF FDG PET/TC IN TWO STEPS IMPLAQNTATION OF MEGAPROSTHESES IN POST TRAUMATIC AND PERIPROSTHETIC SEPTIC BONE DEFECTS	Patrizia Gandolfo · Riccardo Armonino · Giorgio Maria Calori · Massimiliano Colombo · Emilio Mazza · Silvio Mazzola · Alessandra Colombo · Sergio Papa
P33	Diagnosis	PRE - OPERATIVE MICROBIOLOGICAL CULTURE OF SYNOVIAL FLUID FOR THE DIAGNOSIS OF PERIPROSTHETIC JOINT INFECTION	Oksana Kimaikina · Lyudmila Grigoricheva
P34	Diagnosis	PERFORMANCE OF MULTIPLEX PCR OF VARIOUS BIOLOGICAL SPECIMENS FOR THE DIAGNOSIS OF LOW-GRADE PJI	Svetlana Karbysheva · Mariagrazia Di Luca · Lyudmila Grigoricheva · Anna Popovtseva · Lidiya Voevodskaya · Andrej Trampuz
P35	Diagnosis	EVALUATION OF PRE-OPERATIVE RADIOLOGICAL SAMPLING IN MULTI-DISCIPLINARY MANAGEMENT OF SUSPECTED JOINT INFECTION	Leanne Cleaver · Rikin Hargunani · Sharoni Palanivel
P36	Diagnosis	PERFORMANCE OF AUTOMATED MULTIPLEX PCR OF SONICATION FLUID FOR THE DIAGNOSIS OF PERIPROSTHETIC JOINT INFECTION	Nora Renz · Susanne Feihl · Sabrina Cabric · Andrej Trampuz

Poster Overview

No.	Category	Title	Authors
P37	Diagnosis	IS THE SONICATION USEFUL FOR THE DIAGNOSIS OF KNEE AND HIP PROSTHETIC JOINT INFECTION?	Marta Sabater Martos · Juan Antonio Calle Garcia · Sonia Molinos · Valentina Isernia · Ester Garcia Oltra · Juan Carlos Martínez-Pastor · Jose Antonio Hernández Hermoso
P38	Diagnosis	SONICATION OF ORTHOPAEDIC IMPLANTS FOR DETECTION OF PJI	Boštjan Kocjancic · Samo Jeverica · Andrej Trampuz · Ladislav Simnic · Klemen Avsec · Drago Dolinar
P39	Diagnosis	PUNCTURE PROTOCOL IN THE DIAGNOSIS OF SUSPECTED CHRONIC PROSTHETIC JOINT INFECTION	Karsten Ottink · Marjan Wouthuyzen-Bakker · Paul Jutte · Joris Ploegmakers
P40	Diagnosis	ALPHA-DEFENSIN AS BIOMARKER IN PERIPROSTHETIC JOINT INFECTION: OUR EXPERIENCE	Giovanni Riccio · Luca Cavagnaro · Francesco Chiarlone · Giorgio Burastero · Lamberto Felli
P41	Diagnosis	MUST BONE AND LABELED LEUKOCYTE SCINTIGRAPHY BE COMPLETELY EXCLUDED IN THE DIAGNOSIS OF PERIPROSTHETIC JOINT INFECTION?	Margarita Veloso · Raul Figa · Lluis Font · Montserrat Ysamat · Jose Manuel Gonzalez · Alfredo Matamala · Francesc Angles
P42	Diagnosis	DOES CULTURE OF THE CEMENT SPACER SONICATION FLUID IN SHOULDER PROSTHETIC INFECTION IMPROVES BACTERIA DETECTION WHEN COMPARED TO PERIPROSTHETIC TISSUE CULTURES?	Albert Alier · Lluís Puig Verdié · Nuria Prim · Maria Luisa Sorli · Carlos Torrens
P43	Diagnosis	EVALUATION OF A MULTIPLEXED PCR-BASED METHOD FOR DETECTION OF BACTERIA AND FUNGI IN OSTEOARTICULAR INFECTIONS USING SYNOVIAL FLUIDS	Monteix Alice · Céline Dupieux · Abad Lelia · Patrice Gracieux · Corinne Jay · Stéphane Magro · Thibault Martin · Touchard Maryse · Frederic Laurent
P44	Diagnosis	ASEPTIC LOOSENING REVISION OF HIP AND KNEE ARTHROPLASTY - INFECTION SHOULD ALWAYS BE RULED OUT	Cláudia Rodrigues · Arnaldo Sousa · Hélder Fonte · Luís Coutinho · Ana Cipriano · Ana Cláudia Santos · Miguel Abreu · Ricardo Sousa

Poster Overview

No.	Category	Title	Authors
P45	Treatment	OUTCOME OF REVISION TOTAL KNEE ARTHROPLASTY: DOES CAUSE OF REVISION MATTER?	Yu-Chih Lin · Yuhan Chang
P46	Treatment	TREATMENT OF CHRONIC SEPSIS IN TOTAL KNEE ARTHROPLASTY BY ATHRODESIS WITH JUVARA'S NAIL	Jérémy Plassard · Ludovic Labattut · Philibert Alixant · Brice Viard · Pierre Martz · Emmanuel Baulot
P47	Treatment	TWO-STAGE REVISION OF INFECTED HIP ARTHROPLASTY	Georgii Gayko · Mikola Grytsay · Gennadii Kolov · Roman Kozak
P48	Treatment	FUNCTIONAL RECOVERY AFTER REVISION OF PERIPROSTHETIC KNEE JOINT INFECTION	Tomislav Madjarevic · Darinka Vuckovic · Antea Buterin · Ida Matic · Anton Tudor · Ivan Rakovac · Branko Sestan
P49	Treatment	PROSTHETIC SEPTIC LARGE REVISION	Giorgio Maria Calori · Massimiliano Colombo · Simone Mazzola · Emilio Luigi Mazza · Alessandra Ines Maria Colombo · Fabio Giardina · Fabio Romanò
P50	Treatment	PATIENT'S DIAGNOSTIC AND TREATMENT PLAN FOR INFECTION IN ORTHOPAEDICS AND TRAUMATOLOGY	Giorgio Maria Calori · Massimiliano Colombo · Emilio Luigi Mazza · Simone Mazzola · Alessandra Ines Maria Colombo · Paola Navone · Marta Nobile
P51	Treatment	MANAGING PERSISTENT WOUND LEAKAGE AFTER TOTAL HIP AND KNEE ARTHROPLASTY. RESULTS OF A NATIONWIDE SURVEY AMONG DUTCH ORTHOPAEDIC SURGEONS	Claudia Löwik · Frank-Christiaan Wagenaar · Sjoerd Bulstra · Yvette Pronk · Inge van den Akker-Scheek · Marjan Wouthuyzen-Bakker · Rob Nelissen · Rudolf Poolman · Martin Stevens · Walter van der Weegen · Paul Jutte
P52	Treatment	LEAK-STUDY: FINDING THE BEST WAY TO TREAT WOUND LEAKAGE AFTER PRIMARY HIP AND KNEE ARTHROPLASTY. DESIGN OF A PROSPECTIVE NATIONWIDE MULTICENTER RANDOMIZED CONTROLLED TRIAL	Claudia Löwik · Frank-Christiaan Wagenaar · Sjoerd Bulstra · Walter van der Weegen · Yvette Pronk · Inge van den Akker-Scheek · Marjan Wouthuyzen-Bakker · Rob Nelissen · Rudolf Poolman · Karin Vermeulen · Martin Stevens · Paul Jutte
P53	Treatment	PROSTHETIC JOINT INFECTIONS IN ELDERLY PATIENTS: OUR TWO YEARS EXPERIENCE	Matteo Carlo Ferrari · ALESSANDRO EUSEBIO · Mattia Loppini · Guido Grappiolo
P54	Treatment	WHAT ARE THE RISK FACTORS OF PERSISTENT WOUND DRAINAGE AFTER TOTAL HIP AND KNEE ARTHROPLASTY?	Alisina Shahi · Ali Oliashirazi
P55	Treatment	PELVIC SUPPORT OSTEOTOMY FOR HIP DISORDERS IN ADOLESCENTS: INDICATIONS, TECHNIQUE, LONG TERM RESULTS	Antonio Loro
P56	Treatment	QUALITY OF LIFE AFTER SEPTIC TWO-STAGE REVISION SURGERY USING METAPHYSEAL SLEEVE FIXATION	Sebastian Klim · Florian Amerstorfer · Renate Krassnig · Gerwin Bernhardt · Andreas Leithner · Norbert Kastner · Mathias Glehr
P57	Treatment	KNEE ARTHRODESIS BY A MODULAR NAIL TO TREAT COMPLEX PERIPROSTHETIC INFECTIONS: A SOLUTION TO LIMIT AMPUTATION?	Gérard Giordano · Timothée mesnier · Krin Guillaume · Camille Fourcade · Bouige Aurelie · Alain Bicart See · Bonnet Eric

Poster Overview

No.	Category	Title	Authors
P58	Treatment	PERIPROSTHETIC HIP INFECTION: ANALYSIS OF SURGICAL TREATMENT OPTIONS OF 96 PATIENTS IN A TERTIARY REFERRAL HOSPITAL	Alfredo Figueiredo · Jose Lito Monico · Rui Ferreira · Carlos Alegre · Fernando Fonseca
P59	Treatment	PROSTHESIS RETENTION AFTER AN INFECTED HIP PROSTHESIS: HIP FRACTURES VERSUS ELECTIVE HIP PROSTHESIS: DATA FROM 1998 - 2014	Lieke De Vries · William Neve · Jeroen Steens
P60	Treatment	THE USE OF CUSTOM-MADE POROUS TITANIUM CUP IN COMPLEX TWO-STAGE HIP REVISION SURGERY: PRELIMINARY RESULTS	Giorgio Burastero · Luca Cavagnaro · Francesco Chiarlone · Giovanni Riccio · Lamberto Felli
P61	Treatment	CLINICAL RESULTS OF A MODULAR KNEE ARTHRODESIS AS A SALVAGE PROCEDURE AFTER FAILED KNEE ARTHROPLASTY OR INFECT ASSOCIATED PSEUDARTHROSIS WITH MASSIVE BONE LOSS	Stefan Weber · Axel Ekkernkamp · Dirk Stengel · Nikolai Spranger
P62	Treatment	EXTERNAL VALIDATION OF THE KLIC-SCORE FOR PREDICTING FAILURE IN EARLY PROSTHETIC JOINT INFECTIONS TREATED WITH DEBRIDEMENT, IMPLANT RETENTION AND ANTIBIOTICS	Laura Velasco · Eduard Tornero · Xavier Crusi · Natividad Benito
P63	Treatment	TRANSFEMORAL AMPUTATIONS: FAILURE OPTION OR ESCAPE ROUTE IN PJI	Jeroen Neyt · Carlotte Kiekens · Hilde Vandenneucker
P64	Treatment	TOTAL HIP ARTHROPLASTY REVISION SURGERY AND PERIPROSTHETIC JOINT INFECTIONS: BEFORE, DURING AND AFTER SURGERY	Marije Benedictus · Rianne Huis in 't Veld · Dean Pakvis
P65	Treatment	RESULTS IN 16 PERIPROSTHETIC KNEE AND HIP FRACTURES COMPLICATED WITH INFECTION	Ireneusz Babiak · Piotr Pędzisz
P66	Treatment	ECONOMIC IMPACT OF PROSTHETIC JOINT INFECTION IN PORTUGUESE NATIONAL HEALTH SYSTEM	Arnaldo Sousa · Cláudia Rodrigues · Hélder Fonte · Luís Coutinho · Cláudia Pereira · Ana Cipriano · Ana Cláudia Santos · miguel abreu · Ricardo Sousa
P67	Treatment	REVISION OF HIP ARTHROPLASTY CAUSED BY CHRONIC PERIPROTHETIC INFECTION: OUTCOME AND FOLLOW-UP	Simon Hackl · Julia Greipel · Mario Morgenstern · Volker Bühren · Sven Hungerer · Matthias Militz
P68	Treatment	FAILURE OF ONE-STAGED KNEE ARTHRODESIS BY NON-CEMENTED MODULAR NAIL IN THE TREATEMENT OF CHRONIC INFECTED TOTAL KNEE ARTHROPLASTY	Abdollah Moufid · dejean charles · rigoard philippe · le-moal gwenael · Gayet Louis-Etienne · Vendeuvre tanguy · Charles Peltiers
P69	Treatment	CUTANEOUS COVERAGE WITHOUT REMOVING METALWARE IN INFECTED WOUNDS	Oscar Izquierdo · Pilar Aparicio · Enric Domínguez · Raquel Gómez · Vicens Diaz-Brito Fernandez · Eduard Tornero · Juan Castellanos

Poster Overview

No.	Category	Title	Authors
P70	Treatment - Non Union / Osteomyelitis	PRIMARY TOTAL KNEE ARTHROPLASTY AFTER SIX-WEEK TREATMENT OF CHRONIC OSTEOMYELITIS	Adriana Dell'Aquila · Eloy De Avila Fernandes · Carolina da Silva Andriotti · Antonio Altenor Bessa de Queiroz
P71	Treatment - Non Union / Osteomyelitis	COMPARISON OF BONE REPLACEMENT TECHNIQUES FOR TREATMENT OF CHRONIC CAVITARY OSTEOMYELITIS OF THE TIBIA	Alexander Afanasyev · Svetlana Bozhkova · Vasiliy Artyukh · Nazim Mirzoev · Dmitry Labutin
P72	Treatment - Non Union / Osteomyelitis	INFECTED NON-UNION AND CRITICAL BONE DEFECTS OF THE FOREARM	Giorgio Maria Calori · Massimiliano Colombo · Emilio Luigi Mazza · Simone Mazzola · Alessandra Ines Maria Colombo · Fabio Giardina · Fabio Romanò
P73	Treatment - Non Union / Osteomyelitis	THE STRATEGY IN THE TREATMENT ON HUMERAL SEPTIC NON-UNIONS AND CRITICAL BONE SIZE DEFECT	Giorgio Maria Calori · Massimiliano Colombo · Simone Mazzola · Emilio Luigi Mazza · Alessandra Ines Maria Colombo · Fabio Romanò · Fabio Giardina
P74	Treatment - Non Union / Osteomyelitis	THE ROLE OF MEGAPROSTHESIS IN THE TREATMENT OF SEPTIC NON-UNIONS AND CRITICAL SIZE BONE DEFECTS	Giorgio Maria Calori · Emilio Luigi Mazza · Simone Mazzola · Massimiliano Colombo · Alessandra Ines Maria Colombo · Fabio Giardina · Fabio Romanò
P75	Treatment - Non Union / Osteomyelitis	TREATMENT OF SEPTIC NONUNION LEGS WITH INDUCED MEMBRANE TECHNIQUE: ABOUT 19 CASES	Siboni Renaud · Demay Olivier · Diallo Saïdou · Xavier Ohl
P76	Treatment - Non Union / Osteomyelitis	SERUM TNF-A, IL-6 AND ESR ARE MORE VALUABLE BIOMARKERS FOR ASSISTED DIAGNOSIS OF EXTREMITY CHRONIC OSTEOMYELITIS	Nan Jiang · Yi-long Hou · Bin Yu
P77	Treatment - Non Union / Osteomyelitis	DIFFICULTY IN DIAGNOSING AN UNUSUAL PRESENTATION OF OSTEOMYELITIS	Mohamed Ali Rebai · Ameur Abid · Wajdi Bouaziz · Ahmed Racem Guidara · Mohamed Ben Jemaa · Zribi Wassim · Moez Trigui · Kamel Ayedi · Keskes Hassib
P78	Treatment - Non Union / Osteomyelitis	TIBIOCALCANEAL ARTHRODESIS AS A SURGICAL OPTION FOR CHARCOT ANKLE DEFORMITY	Vladimir Obolenskiy · Viktor Protsko
P79	Treatment - Non Union / Osteomyelitis	SINGLE STAGE LOCAL ANTIBIOTIC AUGMENTED DEBRIDEMENT FOR IMPLANT OSTEOMYELITIS	Efstathios Drampalos · Hasan Mohammad · Usmaan Halim · Moez Ballal · Jason Wang · Anand Pillai
P80	Treatment - Non Union / Osteomyelitis	SMALL SEGMENTAL DEFECT INFECTED NON-UNION, TREATED WITH EXCISION, STABILIZATION AND A BIOABSORBABLE ANTIBIOTIC CARRIER; TECHNIQUE AND OUTCOME AT A MINIMUM OF 13 MONTHS	Martin McNally · Jamie Ferguson · David Stubbs · Matthew Scarborough · Alex Ramsden · Bridget Atkins

Poster Overview

No.	Category	Title	Authors
P82	Treatment - Non Union / Osteomyelitis	ACUTE OSTEOMYELITIS CAUSED BY COMMUNITY-ACQUIRED METICILLIN-RESISTANT STAPHYLOCOCCUS IN CHILDREN: ABOUT 15 CASES	Oussema abdelhedi · Mohamed Ben Jemaa · Zribi Wassim · Mohamed Ali Rebai · Ameur Abid · Wajdi Bouaziz · Zoubaier Ellouz · Kamel Ayedi · Mohamed Zribi · Keskes Hassib
P83	Treatment - Non Union / Osteomyelitis	MANAGEMENT OF INFECTED OPEN ELBOW JOINT DISLOCATION - A CASE REPORT	Martins Malzubris · Luize Raga · Igors Terjajevs · Inese Breide
P84	Treatment - Non Union / Osteomyelitis	RECONSTRUCTION OPTIONS FOR WRIST BONE CHRONIC OSTEOMYELITIS - A CASE REPORT	Martins Malzubris · Luize Raga · Kalvis Krastins · Igors Terjajevs
P85	Treatment - Non Union / Osteomyelitis	A CASE-SERIES OF PAEDIATRIC HIP SEPTIC ARTHRITIS TREATED IN 10 YEARS OF A TERTIARY REFERRAL CENTER	Alfredo Figueiredo · Cristina Alves · Ines Balacó · Gabriel Matos
P86	Treatment - Non Union / Osteomyelitis	REMOVAL OF IM NAIL AND RIA DEBRIDEMENT VERSUS REAMED EXCHANGE ANTIBIOTIC NAILING FOR THE TREATMENT OF POST TRAUMATIC LONG BONE OSTEOMYELITIS: A RANDOMIZED CONTROL TRIAL	Carlos Augusto Finelli · Mauro Jose Costa Salles · Adriana Dell'Aquila · Cyril Mauffrey · Natalia Miki-Rosario · Fernando Baldy · Cely Barreto da Silva · Hélio Fernandes · Sheila Ingham · Rene Abdalla
P87	Treatment - Non Union / Osteomyelitis	THE SEPTIC DISLOCATION OF THE HIP: SHORT AND MEDIUM-TERM THERAPEUTIC OUTCOMES ABOUT 6 CASES	Ayadi Wassim · Jmal Mokhtar · Rekik Mohamed Ali · Bouaziz Wajdi · Trigui Moez · Ayadi Kamel · Keskes Hassib
P88	Treatment - Non Union / Osteomyelitis	SEPTIC COMPLICATIONS AND OSTEOMYELITIS AFTER OSTEOSYNTHESIS OF TIBIA FRACTURES: WHY IS DIFFICULT TO TREAT	Vasyl Tsokalo · Mykola Grytsai · Gennadii Kolov · Mykhailo Arschulik
P89	Treatment - Non Union / Osteomyelitis	FEMORAL HEAD OSTEOMYELITIS TREATMENT OUTCOMES - IS A "TWO STAGE" STRATEGY A SUITABLE ALTERNATIVE?	Hélder Fonte · Arnaldo Sousa · Luís Lopes Coutinho · Cláudia Rodrigues · Ana Cipriano · Ana Cláudia Santos · Miguel Abreu · Ricardo Sousa
P90	Treatment - Non Union / Osteomyelitis	OSTEOMYELITIS OF THE CALCANEUS - DIAGNOSTICS AND INTERDISCIPLINARY TREATMENT	Matthias Militz · Oehlbauer Markus
P91	Treatment - Antibiotics	COST OF OFF-LABEL ANTIBIOTIC THERAPY IN BONE AND JOINT INFECTION (BJI): PROSPECTIVE 2-YEAR STUDY IN A COMPLEX BJI REFERENCE CENTER	Mabrut Eugenie · Cochard Philippe · Chardon Paul · Hassan Serrier · Huot Laurence · Tod Michel · Florent Valour · Leboucher Gilles · Christian Chidiac · Tristan Ferry

Poster Overview

No.	Category	Title	Authors
P92	Treatment - Antibiotics	INFECTION OF TOTAL KNEE ARTHROPLASTY WITH ONE-STAGE SURGERY AND LINEZOLID	Adriana Dell'Aquila · Cesar Janovsky · Moisés Cohen
P93	Treatment - Antibiotics	SUBCUTANEOUS SUPPRESSIVE ANTIBIOTIC THERAPY FOR BONE AND JOINTS INFECTIONS: SAFETY AND OUTCOME IN A COHORT OF 10 PATIENTS	Cecile Pouderoux · Sylvain Goutelle · Sébastien Lustig · Claire Triffault-Fillit · Fatiha Daoud · Michel Fessy · Sabine Cohen · Frédéric Laurent · Christian Chidiac · Florent Valour · Tristan Ferry
P94	Treatment - Antibiotics	MICROBIOLOGICAL EPIDEMIOLOGY DEPENDING ON TIME TO OCCURRENCE OF PROSTHETIC JOINT INFECTION (PJI): IMPACT ON THE EMPIRICAL ANTIMICROBIAL STRATEGIES	Claire Triffault-Fillit · Tristan Ferry · Frédéric Laurent · Céline Dupieux · Sébastien Lustig · Michel Fessy · Christian Chidiac · Florent Valour
P95	Treatment - Antibiotics	SELECTION AND LOCAL APPLICATION OF A COCKTAIL OF BACTERIOPHAGES IN ADDITION WITH LOCAL COLISTIN THERAPY AND OFF-LABEL USE OF CEFTOLOZANE/TAZOBACTAM FOR THE TREATMENT OF A COMPLEX BONE AND JOINT INFECTION DUE TO MULTIDRUG-RESISTANT P. AERUGINOSA	Tristan Ferry · Cindy Fevre · Joseph CHATEAU · Stéphanie Bauler · Thomas Perpoint · Christian Chidiac · Guillaume L'Hostis · Maurice Perol · Charlotte Petitjean · Leboucher Gilles · Fabien Boucher · Frédéric Laurent
P96	Treatment - Antibiotics	RATE AND RISK FACTORS FOR DISCONTINUATION OF RIFAMPICIN DURING ANTIBIOTIC TREATMENT OF ORTHOPAEDIC DEVICE-RELATED INFECTIONS	Natasa Faganeli · Rihard Trebse · Helena Poniz
P97	Treatment - Antibiotics	EVALUATION OF THE USE OF INTRAVENOUS CEFTRIAXONE FOR INFECTIONS WITH METHICILLIN-SENSITIVE STAPHYLOCOCCUS AUREUS	Tse Hua Nicholas Wong · Katie Appleyard · Emily Attrill · Colette Gilmore · Bridget Atkins · Martin McNally · Matthew Scarborough
P98	Treatment - Antibiotics	CLINDAMYCIN EFFICACY IN BONE AND JOINT INFECTION ASSOCIATED WITH ERYTHROMYCIN-RESISTANT STAPHYLOCOCCUS SP: A RETROSPECTIVE SURVEY	Maud Debuse · Olivier Robineau · Sophie Putman · Eric Beltrand · Philippe Choisy · Marc Digumber · Blondiaux Nicolas · Eric Senneville
P99	Treatment - Antibiotics	SURGICAL ANTIBIOTIC PROPHYLAXIS GUIDELINES ADHERENCE BY ORTHOPEDIC SURGEONS: IN PAPER OR PRACTICE?	Sureshkumar D · Paul Dilip · Kalyani R · Deepa Kala · Suajanya Saravanakumar
P100	Spine	OPTIMAL DURATION OF PARENTERAL ANTIBIOTIC TREATMENT IN PATIENT WITH PYOGENIC SPONDYLODISCITIS AFTER SURGICAL INTERVENTION AT LOW RISK AND HIGH RISK OF RECURRENCE	Yun-da Li · Tsai-Sheng Fu · Chak-Bor Wong · Lih-Huei Chen · Wen-Jer Chen

Poster Overview

No.	Category	Title	Authors
P101	Spine	OUTCOMES OF PERCUTANEOUS ENDOSCOPIC SURGERY IN TREATING SPINAL INFECTION WITH OR WITHOUT PREOPERATIVE EMPIRICAL ANTIBIOTICS	Ying-Chih Wang · Tsai-Sheng Fu
P102	Spine	COMPARISON OF PERCUTANEOUS ENDOSCOPIC SURGERY AND ANTERIOR OPEN SURGERY FOR LUMBAR SPINAL INFECTION	Tsai-Sheng Fu · Ying-Chih Wang
P103	Spine	CLINICAL FEATURES, COMPLICATIONS AND OUTCOME OF STAPHYLOCOCCAL SPONDYLODISCITIS	Stanka Lotrič Furlan · Petra Bogovič · Tatjana Lejko-Zupanc
P104	Spine	SPINAL IMPLANT INFECTIONS TREATED WITH RETENTION OR ONE-STAGE REPLACEMENT OF THE HARDWARE: OUTCOME AND RISK FACTORS OF FAILURE	Romain Lamberet · Pascale Bemer · Pierre-Marie Longis · Stephane Corvec · Yoann Varenne · David Boutoille · Sophie Touchais · Olivier Grossi
P105	Spine	WOUND INFECTIONS AFTER PEDIATRIC SPINE DEFORMITY SURGERY	Marco Crostelli · Andrezej Krzysztofiak · Osvaldo Mazza
P106	Spine	SPINE IMMOBILISATION IN VERTEBRAL OSTEOMYELITIS: STILL A CHALLENGE IN DAILY PRACTICE	Géraldine Bart · Turdy Zubaida · Ageneau Peggy · Olivier Hamel · David Boutoille · Benoit Le Goff
P107	Spine	A NOVEL CARE BUNDLE TO PREVENT SURGICAL SITE INFECTION IN SPINAL INSTRUMENTATION SURGERY	Koji Yamada · Hiroaki Abe · Akiro Higashikawa · Juichi Tonosu · Koji Nakajima · Takashi Kuniya · Tomohiro Shinozaki · Hiroyuki Oka · Kenichi Watanabe
P108	Spine	STERILE SPONDYLODISCITIS IN A PATIENT WITH RECURRENT ORAL ULCERS	Han Joo Baek · Hee Jung Ryu · Mi Ryoung Seo · Hyo Jin Choi
P109	Germes	FULMINANT FEMORAL OSTEOMYELITIS CAUSED BY STREPTOCOCCUS CONSTELLATUS IN A HEALTHY 21 YEAR OLD	Renate Krassnig · Gloria Hohenberger · Uldis Berzins · Patrick Holweg · Nikolas Eibinger · Amerstorfer Florian · Seibert Franz Josef · Paul Puchwein

Poster Overview

No.	Category	Title	Authors
P110	Germes	A RARE CASE OF ACUTE INFECTION IN A TOTAL HIP ARTHROPLASTY	Jessica Stephens Hemingway · Puthur Damodaran · Nirav Shah
P111	Germes	ROLE OF THE ENTEROBACTERIACEAE FAMILY IN THE AETIOLOGY OF PERI-PROSTHETIC INFECTION	Svetlana Bozhkova · Ekaterina Polyakova · Anna Rukina · Dmitry Labutin · Vasilii Artiukh
P112	Germes	MULTIDRUG-RESISTANT GRAM-NEGATIVE BACILLI PROSTHETIC JOINT INFECTION: A WORRISOME SCENARIO	Taiana Ribeiro · Giselle Klautau · Stanley Nigro · Cely Barreto da Silva · Cida Murça · Emerson Honda · Giancarlo Polesello · Ricardo Cury · Mauro Jose Costa Salles
P113	Germes	SALMONELLA TYPHI SEPTIC ARTHRITIS IN AN IMMUNOCOMPETENT INFANT: 2 CASE REPORTS	Mohamed Ali Rebai · Wajdi Bouaziz · Zribi Wassim · Fedi Dehech · Mohamed Ben Jemaa · Zoubaier Ellouz · Hassib Keskes
P114	Germes	GARDENERELLA VAGINALIS, FROM THE VAGINAL MICROBIOTA TO PROSTHETIC JOINT INFECTION	Valérie Zeller · Marion Thomas · Beate Heym · Vanina Meyssonnier · Jean Marc Ziza · Vincent Lestrat · Simon Marmor
P115	Germes	FUNGAL INFECTION AFTER WIDE RESECTION OF THE FEMUR FOLLOWED BY ALLO- AND AUTOGRAFT IMPLANTATION DUE TO OSTEOSARCOMA	Florian Amerstorfer · Urban Slokar · Lukas Leitner · Marko Bergovec · Mathias Glehr · Joerg Friesenbichler · Andreas Leithner
P116	Germes	FINEGOLDIA MAGNA ISOLATED FROM ORTHOPEDIC JOINT IMPLANT-ASSOCIATED INFECTIONS	Bo Söderquist · Björklund Sanna · Brüggemann Holger · Jensen Anders · Hellmark Bengt
P117	Germes	THE OSTEOARTICULAR" BCGITIS" ABOUT 2 CASES AND REVIEW OF LITERATURE	Mohamed Ben Jemaa · Zribi Wassim · Mohamed Ali Rebai · Oussema Abdelhedi · Fedi Dehech · Emna Elleuch · Chakib Marrakchi · Yosr Hentati · Mounir Ben Jmeaa · Mohamed Zribi · Keskes Hassib
P118	Germes	TUBERCULOUS SACROILITIS: ABOUT 5 CASES	Fedi Dehech · Zribi Wassim · Mohamed Ben Jemaa · Mohamed Ali Rebai · Emna Elleuch · Mounir Ben Jmeaa · Mohamed Zribi · Keskes Hassib
P119	Germes	TUBERCULOSIS OSTEOMYELITIS OF THE UPPER EXTREMITY OF THE TIBIA: CASE REPORT	Mohamed Mokhtar Jmal · Zribi Wassim · Mohamed Ben Jemaa · Ahmed Racem Guidara · Mohamed Ali Rebai · Ameur Abid · Emna Elleuch · Mounir Ben Jmeaa · Mohamed Zribi · Keskes Hassib
P120	Germes	A RARE CASE OF CHRONIC HIP OSTEOMYELITIS BY ECHINOCOCCUS GRANULOSUS	Nikolaos Antonakos · George Siakalis · Alice Dourou · Olympia Papakonstantinou · Dimitrios Filippiadis · Andreas Mavrogenis · Antonios Papadopoulos · Efthymia Giannitsioti
P121	Germes	PERIPROSTHETIC JOINT INFECTIONS CAUSED BY GRAM-NEGATIVE BACTERIA. A MULTICENTRIC RETROSPECTIVE COHORT STUDY	Tobias Kramer

Poster Overview

No.	Category	Title	Authors
P122	Germes	APIM-PEPTIDES INHIBIT STAPHYLOCOCCUS EPIDERMIDIS GROWTH AND ABILITY TO DEVELOP RESISTANCE AGAINST GENTAMICIN	Synnøve Ræder · Erik Thorvaldsen Sandbakken · Kirsti Løseth · Kåre Bergh · Eivind Witsø · Marit Otterlei
P123	Germes	OBTURATOR PYOMYOSITIS RELATED TO STAPHOLOCOCCOUS AUERUS BACTEREIMIA: CAN MIMIC OR BE COMPLICATED BY IPSILATERAL SEPTIC COXITIS	Rasmus Cleemann · Mathias Bünger · Klaus Kjær
P124	Germes	HIGH FAILURE RATE OF STREPTOCOCCAL PERIPROSTHETIC JOINT INFECTION: RESULTS FROM A 7-YEAR COHORT STUDY	Nora Renz · Susanne Feihl · Doruk Akgün · Carsten Perka · Andrej Trampuz
P125	Germes	TUBERCULAR STERNITIS: A CASE REPORT	Mohamed Ali Rebai · Oussema Abdelhedi · Zribi Wassim · Mohamed Ben Jemaa · Mohamed Zribi · Keskes Hassib
P126	Germes	PSEUDOMONAS ARYZIHABITANS INFECTED TOTAL HIP ARTHROPLASTY	Georgios N. Panagopoulos · Panayiotis D. Megaloikonomos · Vasileios A. Kontogeorgakos · Miranda Drogari-Apiranthitou · Efthymia Giannitsioti · Antonios Papadopoulos · Andreas F. Mavrogenis
P127	Germes	STREPTOCOCCUS GALLOLYTICUS KNEE PROSTHETIC JOINT INFECTION	Marta Sabater Martos · Maria Dolores Quesad · Valentina Isernia · Ester Garcia Oltra · Juan Carlos Martínez-Pastor · Jose Antonio Hernández Hermoso
P128	Cement	ELUTION AND MECHANICAL STRENGTH OF VANCOMYCIN-LOADED BONE CEMENT: IN VITRO STUDY OF THE INFLUENCE OF BRAND COMBINATION	Sheng-Hsun Lee

Poster Overview

No.	Category	Title	Authors
P129	Cement	CASE REPORT: USE OF ANTIBIOTIC CEMENTED COATED NAIL FOR THE MANAGEMENT OF A POST TRAUMATIC ANKLE JOINT INFECTION IN A DIABETIC PATIENT	Fabrizio Cortese · Domenico Mercurio
P130	Cement	SEGMENTAL DIAPHYSEAL CEMENT EXTRACTION IN SEPTIC HIP AND KNEE REVISION SURGERY	Aritz Ortega Centol · Xavier Cabo · Salvador Pedrero · Victor Casals · Guillermo Cortés · Jose Luis Agulló
P131	Cement	QUANTITATIVE STUDY ON VANCOMYCIN RELEASE FROM CEMENT IN 3 DIFFERENT FORMULATIONS:RESULTS AND ANTIMICROBIAL ACTIVITY	Domenico Fenga · David Joaquín Ortolà Morales · Massimiliano Rosi · Antonino Cantivalli · Michele Attilio Rosa
P132	Cement	TWO-STAGE EXCHANGE ARTHROPLASTY OF CHRONIC PERIPROSTHETIC JOINT INFECTION OF THE HIP AND KNEE WITH A PRE-FORMED ANTIBIOTIC-LOADED ACRYLIC CEMENT SPACER	Sladjan Timotijevic · Dejan Ristic · Tomislav Kasum · Zeljko Bokun
P133	Cement	AMPHOTERICIN B-LOADED PMMA CEMENT INHIBITS CANDIDA BIOFILMS	Magdalena Czuban · Mariagrazia Di Luca · Andrej Trampuz
P134	Cement	INFECTED PMMA CEMENT REMOVAL WITH ULTRASOUND IN BONE TUMOR PATIENTS	Panayiotis D. Megaloikonomos · Georgios N. Panagopoulos · Christos T. Vottis · Vasilios G. Igoumenou · Efthymia Giannitsioti · Antonios Panagopoulos · Andreas F. Mavrogenis
P135	Cement	PMMA CEMENT ALLERGY IN A PATIENT WITH INFECTED TOTAL KNEE ARTHROPLASTY	Panayiotis D. Megaloikonomos · Evanthia Mitsiokapa · Dimitrios A. Flevas · Panayiotis Koulouvaris · Efthymia Giannitsioti · Antonios Papadopoulos · Andreas F. Mavrogenis
P136	Cement	THE USE OF CUSTOM-MADE ANTIBIOTIC CEMENT NAILS FOR THE TREATMENT OF ACUTE INFECTIONS OF FRACTURE TREATED WITH NAILS	Lluis Font · Margarita Veloso · Lucia Gomez · Sandra Huguet · Alfredo Matamala · Francesc Angles
P137	Cement	INSERTION OF LOCAL ANTIBIOTICS USING CEREMENT G, AN ABSORBABLE COMPOSITE, IN THE TREATMENT OF OPEN FRACTURES GRADE II AND III B	Asan Rafee · Matthew Gray · Abdul Madni
P138	Bone substitutes / Innovation	LIPID NANOPARTICLES FOR REVIVING ANTIBIOTICS: THE EXAMPLE OF A GEL OF DAPTOMYCIN IN A MRSA RABBIT OSTEOMYELITIS MODEL	Amokrane Reghal · Cédric Jacqueline · Jocelyne Caillon · Gilles Potel · Karim Asehnoune · Eric Dailly

Poster Overview

No.	Category	Title	Authors
P139	Bone substitutes / Innovation	ENHANCED BONE HEALING OF GUSTILO III SEVERE OPEN TIBIA FRACTURES TREATED BY IMMEDIATE IMPLANTATION OF ANTIBIOTIC-FORMULATED BONE GRAFTING	Noam Emanuel · Doron norman · Ruperto Estrada · Moshe Salai · David Segal
P140	Bone substitutes / Innovation	POROUS ALUMINA CERAMIC AS SCAFFOLD FOR BONE DEFECT AND VECTOR FOR LOCAL ANTIBIOTIC DELIVERY	Eric Denes · Francois Bertin · Guislaine Barrière · Evelyne Poli · Christian Woloch · Guillaume Leveque
P141	Bone substitutes / Innovation	ECONOMIC EVALUATION OF ANTIBACTERIAL COATINGS ONHEALTHCARE COSTS FOLLOWING TOTAL JOINT ARTHROPLASTY	Maria Teresa Trentinaglia · Catherine Van Der Straeten · Ilaria Morelli · Nicola Logoluso · Lorenzo Drago · Carlo Luca Romanò
P142	Bone substitutes / Innovation	THE CHAMBER INDUCTION TECHNIQUE (CIT) IN THE USE OF BONE TRANSPORT TO IMPROVE THE RIGENERATE QUALITY AND TO HEAL THE SEPTIC CONDITION	Giorgio Maria Calori · Emilio Luigi Mazza · Massimiliano Colombo · Fabio Romanò · Simone Mazzola · Alessandra Ines Maria Colombo · Fabio Giardina
P143	Bone substitutes / Innovation	ACTIVITY OF NOVEL ANTI-STAPHYLOCOCCAL PERSISTERS IN SYNOVIAL FLUID AND IN INTRA-OSTEOBLAST INFECTION MODELS	Sylvie Lefort · Jean-Francois Sabuco
P144	Bone substitutes / Innovation	SPECTRUM OF ACTIVITY OF NOVEL ANTI-PERSISTERS COMPOUNDS AGAINST PJI PATHOGENS	Sylvie Lefort · Jean-Francois Sabuco
P145	Bone substitutes / Innovation	IN-VITRO DISSOLUTION OF A NEW ABSORBABLE DEVICE FOR IMPLANTATION INTO INFECTED BONE VOIDS MINIMISING PRESSURISATION	Leanne Davis · Gemma Marshall · Philip Laycock
P146	Bone substitutes / Innovation	IN-VITRO ABILITY OF ANTIBIOTIC LOADED CALCIUM SULFATE BEADS TO INHIBIT GROWTH OF VANCOMYCIN-RESISTANT ENTEROCOCCI	Leanne Davis · Gemma Marshall · Philip Laycock
P147	Bone substitutes / Innovation	BONALIVE - A NEW HOPE ?	Ulf-Joachim Gerlach · Grimme Cornelius · Schoop Rita · Borree Marcel
P148	Bone substitutes / Innovation	ANTIBIOTIC LOADED CALCIUM SULFATE MEDIATED KILLING OF PSEUDOMONAS AERUGINOSA BIOFILMS GROWN ON ORTHOPAEDIC IMPLANT MATERIALS	Cory Knecht · James Moley · Jeffrey Granger · Paul Stoodley · Devendra Dusane · Robert Howlin
P149	Bone substitutes / Innovation	STUDY TO EVALUATE THE BIOFILM PREVENTION CAPABILITY OF THREE BONE VOID FILLERS COMBINED WITH ANTIBIOTICS	Robert Howlin · Paul Stoodley · Sean Aiken · John Cooper
P150	Bone substitutes / Innovation	INNOVATIVE DRUG VECTORIZATION FOR BREAKTHROUGH BONE TARGETING ANTIMICROBIAL THERAPY	Sebastien Cagnol · Le Bot Ronan · David Emmanuelle
P151	Bone substitutes / Innovation	BONY INTEGRATION OF POROUS TANTALUM DESPITE ONGOING INFECTION: HISTOLOGIC WORKUP OF AN EXPLANTED SHOULDER PROSTHESIS	Peter Wahl · Christoph M Sprecher · Christian Brüning · Christoph Meier · Emanuel Gautier · Fintan Moriarty

Poster Overview

No.	Category	Title	Authors
P152	Bone substitutes / Innovation	CALCIUM-BASED ANTIBIOTIC-LOADED BONE SUBSTITUTE IN JOINT REVISION SURGERY: A PROSPECTIVE,COHORT STUDY	Sara Scarponi · Nicola Logoluso · Susanna Maraldi · Delia Romanò · Carlo Luca Romanò
P153	Bone substitutes / Innovation	STRUCTURAL FRESH FROZEN ALLOGENEOUS BONE GRAFT IN TWO-STAGE EXCHANGE ARTHROPLASTY OF KNEE PERIPROSTHETIC JOINT INFECTION	Yuhan Chang · Yu-Chih Lin
P154	Bone substitutes / Innovation	THE EFFICACY OF INJECTABLE BIPHASIC CALCIUM SULPHATE/HYDROXYAPATITE BONE SUBSTITUTE CERAMENT G IN THE TREATMENT OF POLYTRAUMATIZED PATIENT WITH SEVERE BONE INFECTION AND VASCULAR INJURY	Ciro Pempinello · Salvatore Pagliuca
P155	Bone substitutes / Innovation	EVOLUTION OF THE MASQUELET TECHNIQUE IN A ONE-STEP SURGICAL PROCEDURE FOR LARGE BONE DEFECTS USING A BIPHASIC BONE SUBSTITUTE ELUTING ANTIBIOTIC	Damiano Papadia · Luciano Bertoldi
P156	Bone substitutes / Innovation	THE ROLE OF AN ANTIBIOTIC-CONTAINING REGENERATING BONE GRAFT SUBSTITUTE IN COMPLEX TRAUMA CASES OF THE LOWER LIMB	Guido Wanner · Neuhaus Valentin · Baumeister Steffen · Simon Max · Kaiser Bertin
P157	Bone substitutes / Innovation	SHOULD SYSTEMIC ABSORPTION BE A CONCERN WHEN USING ANTIBIOTIC LOADED CALCIUM SULPHATE IN THE TREATMENT OF OSTEOMYELITIS AND SOFT TISSUE INFECTION	Mazen Soufi · Suganth Jayaraman · Syed Haque · Barzo Faris · Amer Shoaib
P158	Bone substitutes / Innovation	ANTIBIOTIC-LOADED RESORBABLE BONE-GRAFT SUBSTITUTE TO CURE OSTEOMYELITIS OF A LONG BONE	Bernd Gächter · Stephan Schlunke
P159	Bone substitutes / Innovation	ACTIVITY AGAINST PLANKTONIC AND BIOFILM NUTRITIONALLY VARIANT STREPTOCOCCI (NVS)	Mercedes Gonzalez-Moreno · Mariagrazia Di Luca · Andrej Trampuz
P160	Bone substitutes / Innovation	ANTIBIOTIC ELUTING BONE GRAFT SUBSTITUTE USED IN REVISION OF EARLY IMPLANT RELATED INFECTION OF OPEN ELBOW FRACTURE	Simon Vikstrom
P161	Bone substitutes / Innovation	DECRA PROCEDURE IN ACUTE PJI OF KNEE: IMPROVED EFFICACY WITH DISSOLVABLE COMMERCIALLY PURE ANTIBIOTIC LOADED CALCIUM SULFATE BEADS.	Madhav Chowdhry · Matthew Dipane · Edward McPherson
P162	Bone substitutes / Innovation	ANTIBIOTIC IMPREGNATED CALCIUM PHOSPHATE APPEARS TO PREVENT POST–OPERATIVE INFECTIONS WHEN USED AS BONE VOID FILLER	Felix Cheung · Ammar Qureshi · Travis Parkulo

What you get

- Current
- Clinical
- Definitive

Where you get it

THE JOURNAL

To subscribe: visit jrheum.org online or send in your completed coupon below

Rates for 2017 calendar year
USA/INTERNATIONAL

	Print + Online	Online Only
INDIVIDUALS:	$350 US	$285 US
INSTITUTIONAL:		
- Multisite #	On request	On request
- Multiuser (IP ranges)	$1025 US	$975 US
- Basic-Plus (IP ranges)	$750 US	$700 US
- Basic (up to 4 users)	$550 US	$500 US
TRAINEES+	$215 US	$150 US+
AIRMAIL (ADD)	$120 US	

For terms of access visit jrheum.org
+Supervisor certification required below.

NAME OF SUPERVISOR: _____

SUPERVISOR SIGNATURE: _____

SUPERVISOR TELEPHONE: _____

Mail completed form to: The Journal of Rheumatology
365 Bloor Street East, Suite 901
Toronto, Ontario Canada M4W 3L4

Phone: (416) 967-5155
Fax: (416) 967-7556
E-mail: subscriptions@jrheum.com

Please enter my 2017 subscription to **The Journal of Rheumatology**

Name (please print) _____

Address _____

City _____ State/Province _____

Country _____ Zip/Postal Code _____

Contact E-mail _____

Amount Enclosed $ _____ Bill Me _____

Telephone Number _____ Fax Number _____

VISA/MasterCard Number _____ Expiration Date _____

Signature _____ CVV _____

All subscriptions are for the calendar year. Renewals for print subscriptions received after May 31, 2017 will be charged an additional $10 per back issue. Back issues: 2 years including current year are available if in stock. Single copies are available at $30 each. Claims: US 2 months, elsewhere 4 months from issue date, e.g., March 1 and May 1, respectively, for the January Issue. PRIVACY POLICY: For details of our privacy policy, visit our website at www.jrheum.org.

Author Index

Author first name	Author last name	Abstract no.
Alessandra-Catalina	Bardelli	P1
Cely	Barreto da Silvia	P86, P112
Guislaine	Barrière	P140
Géraldine	Bart	FP 84, P106
Jonathan	Bates-Powell	RFP 29
Thomas	Bauer	RFP 34, FP 38, FP 78
Stéphanie	Bauler	P95
Emmanuel	Baulot	P46
Agathe	Becker	FP 49
Thierry	Begue	FP 72
Philip	Bejon	FP 42, FP 43
Alessandro	Beltrame	FP 71
Eric	Beltran	FP 1, P98
Pascale	Bemer	P14, P23, P104
Mohamed	Ben Jemaa	P82, P77, P113, P117, P118, P119, P125
Mounir	Ben Jmeaa	P117, P118, P119
Marije	Benedictus	P64
Hellmark	Bengt	P11, P116
Natividad	Benito	P18, P62
Davido	Benjamin	P24
Christof	Berberich	P1
Beatrice	Bercot	FP 38
Tony	Berendt	FP 42
Kåre	Bergh	P122
Malin	Bergman Jungeström	FP 67
Marko	Bergovec	P115
Gerwin	Bernhardt	FP 45, P56
Francois	Bertin	P140
Kaiser	Bertin	P156
Luciano	Bertoldi	FP 57, P155
Uldis	Berzins	P109
Peter	Biberthaler	FP 80
Béatrice	Bibes	P6
Alain	Bicart See	FP 6, RFP 32, FP 37, FP 83, FP 87, P57
Alessandro	Bidossi	RFP 28
Hanne	Birke Sørensen	FP 62, FP 75
Sabine	Bischoff	FP 99
Marion	Blandine	FP 14
Ronald	Boellaard	FP 15
Petra	Bogovič	P103
Zeljko	Bokun	P132
Stephane	Bonacorsi	FP 54
Eric	Bonnet	FP 6, RFP 32, FP 37, FP 83, FP 87, P57
Nicolas	Bonnevialle	FP 69
Willemijn	Boot	FP 100
Olivier	Borens	FP 40
Monica	Bortolin	RFP 28
Deepa	Bose	RFP 22, FP 42
Barbara	Bottazzi	FP 16
Wajdi	Bouaziz	P77, P82, P113
Frédérique	Bouchand	FP 86, P24
Fabien	Boucher	RFP 24, P95
Aurelie	Bouige	FP 6, RFP 32
Céline	Bourigault	P23
Loïc	Boussel	FP 49
David	Boutoille	P104, P106
Svetlana	Bozhkova	FP 95, P15, P71, P111
Nathaniel	Bradford	FP 61, P4
Evelyne	Braun	RFP 24, FP 76
Inese	Breide	P83
Andrew	Brent	FP 102
Ilharreborde	Brice	FP 54
Warwick	Bruce	FP 61, P4
Christian	Brüning	P151
Mats	Bue	FP 62, FP 75
Sjoerd	Bulstra	P51, P52
Giorgio	Burastero	FP 46, P40, P60

Author first name	Author last name	Abstract no.
Zoya	Bursyuk	P27
Christophe	Burucoa	P14, P23
Antea	Buterin	P48
Volker	Bühren	P67
Mathias	Bünger	P123
Ivor	Byren	FP 42
Xavier	Cabo	P130
Sabrina	Cabric	P36
Sebastien	Cagnol	P150
Jocelyne	Caillon	P138
Vanni	Cainero	FP 71
Ruxandra-Oana	Calin	P24
Juan Antonio	Calle Garcia	P37
Tilman	Calließ	FP 58
David	Campillo Recio	P10
Antonino	Cantivalli	P131
Matteo	Carlo Ferrari	FP 16, P53
LEMARIE	Carole	P14
Victor	Casals	P130
Marion	Caseris	FP 54
Juan	Castellanos	P69
Pablo	Castillon Bernal	P9
Araldo	Causero	FP 71
Luca	Cavagnaro	FP 46, P40, P60
Arvieux	Cedric	RFP 25
Ramanantsoa	Celine	RFP 25
Václav	Čeřovský	P19
James	Chan	FP 3
Yuhan	Chang	P45, P153
Joseph	Chateau	RFP 24, P95
Pierre	Chauvelot	FP 76
Lih-Huei	Chen	P100
Wen-Jer	Chen	P100
Felix	Cheung	P162
Francesco	Chiarlone	FP 46, P40, P60
Christian	Chidiac	RFP 24, FP 49, FP 73, FP 76, P22, P91, P93, P94, P95
Gabriella	Chieffo	FP 89
Plouzeau	Chloé	P14, P23
Philippe	Choisy	P98
Madhav	Chowdhry	FP 51, P161
Nich	Christophe	P24
Ana	Cipriano	FP 52, P44, P66, P89
Mustafa	Citak	FP 17
Philippe	Clavert	FP 66
Leanne	Cleaver	FP 82, P35
Rasmus	Cleemann	P123
Philippe	Cochard	P91
Alexandrre	Coelho	FP 41
Sian	Coggle	P13
Moisés	Cohen	P92
Sabine	Cohen	P93
Kevin	Cole	FP 102
Cameron	Cole	RFP 29
Alessandra	Colombo	P32
Massimiliano	Colombo	P32, P49, P50, P72, P73, P74, P142
Marta	Comas Aguilar	P10
Massimiliano	Conte	P30
Philippe	Conte	RFP 32
John	Cooper	FP 59, P149
Grimme	Cornelius	P147
Olivier	Cornu	FP 74
Guillermo	Cortés	P130
Fabrizio	Cortese	P129
Stephane	Corvec	FP 79, P14, P23, P104
Luís	Coutinho	FP 52, P44, P66
Simon	Crioac	FP 38
Derrick	Crook	FP 102

Author first name	Author last name	Abstract no.
Marco	Crostelli	P105
Xavier	Crusi	P62
Eva	Cuchi Burgos	P9
Ricardo	Cury	P112
Magdalena	Czuban	P133
Sureshkumar	D	P99
Carolina	da Silva Andriotti	P70
Eric	Dailly	P138
Puthur	Damodaran	P110
Fatiha	Daoud	RFP 24, P93
Henrik	Daugaard	FP 96
Benjamin	Davido	FP 86
Gareth	Davies	FP 61, P4
Leanne	Davis	P145, P146
Eloy	De Avila Fernandes	P70
Pilar	de la Cruz Solé	P10
Philippe	De Mazancourt	FP 78
Thomas	De Ridder	P8
Emmanuel	De Thomasson	FP 12
Elena	De Vecchi	RFP 28, P20
Lieke	De Vries	P59
Maud	Debuse	P98
Peter	Declercq	P8
Vanessa	Deggim-Messmer	P2
Fedi	Dehech	P113, P117, P118
Caroline	Dehecq	FP 68
Charles	Dejean	P68
Stéphanie	Delclaux	FP 69
Adriana	Dell'Aquila	P70, P86, P92
Pierre	Delobel	FP 69
Olivier	Demay	FP 48, P75
Eric	Denes	P140
Nicole	Desplaces	FP 84
Matteo	D'este	FP 100
Paolo	Di Benedetto	FP 71
Mariagrazia	Di Luca	FP 8, RFP 36, P34, P133, P159
Vicens	Diaz-Brito Fernandez	P69
Michael	Diefenbeck	FP 99
Marc	Digumber	P98
Paul	Dilip	P99
Aurélien	Dinh	FP 86, P24
Matthew	Dipane	FP 51, P161
Catherine	Doit	FP 54
Drago	Dolinar	FP 11, P38
Maria	Dolores Quesad	P127
Enric	Domínguez	P69
Alice	Dourou	P120
Lorenzo	Drago	RFP 28, P20, P141
Efstathios	Drampalos	P79
Miranda	Drogari-Apiranthitou	P126
A	Dublanchet	RFP 35
Maria	Dudareva	RFP 22
Caroline	Duignan	FP 59
Céline	Dupieux	P43, P94
Caroline	Dupont	RFP 34
Clara	Duran	P24
Devendra	Dusane	P148
David	Eglin	FP 100
Nikolas	Eibinger	P109
Axel	Ekkernkamp	P61
Laëla	El Amiri	FP 66
Faten	El Sayed	RFP 34, FP 78
Fatima	El-Bakri	P3
Emna	Elleuch	P117, P118, P119
Zoubaier	Ellouz	P82, P113
Henrik	Elvang Jensen	FP 60
Bornand	Elvire	P5

Author first name	Author last name	Abstract no.
Noam	Emanuel	P139
Månsson	Emeli	P11
David	Emmanuelle	P150
Beltrand	Eric	FP 74
Legrand	Erick	RFP 25
Antti	Eskelinen	P7
Ruperto	Estrada	P139
Mabrut	Eugenie	FP 73, P22, P91
Alessandro	Eusebio	P53
David	Eyre	FP 102
Luc-Jean	Eyrolle	FP 89
Natasa	Faganeli	P96
Thomas	Falstie-Jensen	FP 96
Amélie	Faraud	FP 69
Barzo	Faris	P157
Nuria	Farrero	P10
Nizar	Fawal	RFP 34
Susanne	Feihl	P36, P124
Marie-Pierre	Felice	RFP 32, FP 83
Lamberto	Felli	FP 46, P40, P60
Domenico	Fenga	P131
Jamie	Ferguson	FP 4, RFP 22, P80
Hélio	Fernandes	P86
Rui	Ferreira	P58
Tristan	Ferry	RFP 24, FP 49, FP 73, FP 76, P22, P91, P93, P94, P95
Michel	Fessy	FP 73, P22, P93, P94
Cindy	Fevre	P95
Raul	Figa	P41
Alfredo	Figueiredo	P58, P85
Dimitrios	Filippiadis	P120
Thomas	Fintan Moriarty	FP 7
Arnaud	Fischbacher	FP 40
Dimitrios	Flevas	P135
Amerstorfer	Florian	P109
Fernando	Fonseca	P58
Lluis	Font	P41, P136
Hélder	Fonte	FP 52, P44, P66, P89
Dona	Foster	FP 102
Camille	Fourcade	FP 6, RFP 32, FP 37, FP 83, FP 87, P57
Connor	Frapwell	FP 59
PECORARI	Frédéric	FP 79
Joerg	Friesenbichler	P115
Tsai-Sheng	Fu	P100, P101, P102
Kensuke	Fukushima	RFP 31, FP 98
Philipp	Funovics	FP 44
Jean-Louis	Gaillard	RFP 34, FP 78
George	Galiwango	FP 2
Jutta	Gamper	FP 44
Patrizia	Gandolfo	P32
Ester	Garcia Oltra	P37, P127
Pamela	Garcia-Pulido	FP 10
Jeannot	Gaudias	FP 12, FP 66
Laurence	Gautie	FP 6
Emanuel	Gautier	P2, P151
Remy	Gauzit	FP 89
Georgii	Gayko	P47
Thorsten	Gehrke	FP 17
Dominic	Gehweiler	FP 103
Stefan	Gelderman	FP 15
Ulf-Joachim	Gerlach	FP 70, P147
Claudia	Geue	FP 42
Efthymia	Giannitsioti	P120, P126, P134, P135
Fabio	Giardina	P49, P72, P73, P74, P142
Leboucher	Gilles	P91, P95
Colette	Gilmore	P97
Gérard	Giordano	FP 6, RFP 32, FP 37, FP 83, FP 87, P57
Mathieu	Girard	FP 69

Author first name	Author last name	Abstract no.
Renato	Gisonni	FP 71
Andor	Glaudemans	FP 15
Mathias	Glehr	FP 45, P56, P115
Ashwin	Gojanur	FP 10
Raquel	Gómez	P69
Lucia	Gomez Garcia	P9, P136
Jose Manuel	Gonzalez	P41
Mercedes	Gonzalez-Moreno	P159
François	Gouin	P5
Sylvain	Goutelle	FP 73, P93
Patrícia	Gouveia	FP 52
Patrice	Gracieux	P43
Wilfrid	Graff	FP 14, FP 84
Jeffrey	Granger	P148
Maëlle	Granier	FP 14
Guido	Grappiolo	FP 16, P53
Matthew	Gray	P137
Julia	Greipel	P12, P67
Lyudmila	Grigoricheva	FP 101, P21, P33, P34
Olivier	Grossi	P104
Aurelia	Gruber	RFP 34
Mykola	Grytsai	P88
Mikola	Grytsay	P47
Krin	Guillaume	P57
Ronan	Guillo	FP 73
Aurélie	Guillouzouic	FP 79
Per Hviid	Gundtoft	FP 39
Bernd	Gächter	P158
Simon	Hackl	P67
Usmaan	Halim	P79
Olivier	Hamel	P106
Pelle Emil	Hanberg	FP 62, FP 75
Marc	Hanschen	FP 80
Line	Happi	P5, P23
Syed	Haque	P157
Philippe	Hardy	FP 86
Rikin	Hargunani	P35
Daniel	Haro Fernández	P9
Llinos	Harris	FP 65
Keskes	Hassib	P77, P82, P87, P117, P118, P119, P125
Carolyn	Hemsley	FP 9
Yosr	Hentati	P117
Deppe	Herbert	RFP 26
Jose Antonio	Hernández Hermoso	P37
Werner	Hettwer	FP 99
Beate	Heym	FP 14, RFP 34, FP 38, P114
Akiro	Higashikawa	P107
Catharien	Hilkens	FP 20
Matthew	Hitchings	FP 65
Andrew	Hodges	FP 2
Gloria	Hohenberger	P109
Brüggemann	Holger	P116
Johannes	Holinka	FP 44
Patrick	Holweg	P109
Emerson	Honda	P112
Meeri	Honkanen	P7
Susan	Hopkins	FP 9
Andrew	Hotchen	FP 10, FP 55
Yi-long	Hou	P76
Robert	Howlin	FP 59, P148, P149
Shipkov	Hristo	RFP 24
Wei-ran	Hu	RFP 23
Tse	Hua Nicholas Wong	P97
Stephan	Huber-Wagner	FP 80
Harriet	Hughes	FP 42
Sandra	Huguet	P136
Heini	Huhtala	P7

Author first name	Author last name	Abstract no.
Rianne	Huis in 't Veld	P64
Sven	Hungerer	P67
Laure	Huot	P22
Reetta	Huttunen	P7
Shiro	Ibe	RFP 31
Vasilios	Igoumenou	P134
Shinsuke	Ikeda	P26, RFP 31, FP 98
Takashi	Imagama	P25, P30
Alessandra	Ines Maria Colombo	P49, P50, P72, P73, P74, P142
Sheila	Ingham	P86
Valentina	Isernia	P37, P127
Bertrand	Issartel	FP 68
Oscar	Izquierdo	P69
Cédric	Jacqueline	P138
Herve	Jacquier	FP 38
David	Jahoda	P19
Cesar	Janovsky	P92
Corinne	Jay	P43
Suganth	Jayaraman	P157
Jean-Yves	Jenny	FP 12, FP 13
Samo	Jeverica	FP 11, P38
Nan	Jiang	FP 5, RFP 23, P76, FP 97
Elena	Jimenez	P9
Hyo	Jin Choi	P108
Andrianasolo	Johan	RFP 24
Anne	Jolivet-Gougeon	P14, P23
Han	Joo Baek	P108
Mauro	Jose Costa Salles	P86, P112
Jérôme	Josse	FP 91
Valentin	Joste	FP 38
Tobias	Judl	P19
Hee	Jung Ryu	P108
Paul	Jutte	FP 15, P39, P51, P52
Esa	Jämsen	P7
Deepa	Kala	P99
Fabian	Kalberer	P2
Anders	Kalén	FP 67
Spyros	Kamariotis	P17
Ayadi	Kamel	P87
Greetje	Kampinga	FP 15
Hiromi	Kanda	RFP 31
Yusaku	Kanou	RFP 31
Svetlana	Karbysheva	P34, FP 101
Matti	Karppelin	P7
Norbert	Kastner	P56
Tomislav	Kasum	P132
Sofia	Katara	P17
Iris	Keller	P2
Jean-François	Kempf	FP 66
Marie	Kempf	P23
Ben	Kendrick	FP 43
Steven	Kenney	FP 51
Solen	Kerneis	FP 89
Y.	Kerroumi	FP 84
Hassib	Keskes	P113
Mazda	Kevan	FP 54
Carlotte	Kiekens	P63
Oksana	Kimaikina	P21, P33
Chlodwig	Kirchhoff	FP 80
Satoshi	Kishino	FP 98
Hidero	Kitasato	P26, FP 98
Klaus	Kjær	P123
Eva	Klapková	P19
Ann-Brit	Klatt	RFP 36
Giselle	Klautau	P112
Elisabeth	Klein	FP 14
Sebastian	Klim	FP 45, P56

Author first name	Author last name	Abstract no.
Cory	Knecht	P148
Peter	Koch	P2
Andrew	Kochish	P15
Boštjan	Kocjancic	FP 11, P38
Camille	Kolenda	FP 91
Gennadii	Kolov	P47, P88
Andrey	Konnov	RFP 21
Vasileios	Kontogeorgakos	P126
Panayiotis	Koulouvaris	P135
Roman	Kozak	P47
Tobias	Kramer	RFP 30, P121
Niels	Krarup	FP 90
Renate	Krassnig	P56, P109
Kalvis	Krastins	P84
Guillaume	Krin	FP 6, RFP 32, FP 83
Louise	Kruse Jensen	FP 60
Andrezej	Krzysztofiak	P105
Raj	Kugan	FP 4
Shreya	Kulkarni	RFP 29
Michelle	Kumin	FP 42
Takashi	Kuniya	P107
Ho	Kwong Li	FP 9
Richard	Kühl	FP 63
Vytautas	Kymantas	FP 1
Ludovic	Labattut	P46
eric	labau	FP 87
Dmitry	Labutin	P71, P111
Romain	Lamberet	P104
Martin	Lamm	FP 90
Ivan	Landor	P19
Jeppe	Lange	FP 90, FP 96
Otto	Langhoff	FP 75
Gautie	Laurence	FP 83
Huot	Laurence	P91
Deconninck	Laurène	P24
Frédéric	Laurent	P22, RFP 24, P43, FP 49, FP 73, FP 76, FP 91, P93, P94, P95
Christian	Lausmann	FP 17
Salih	Lavin	P11
Philip	Laycock	P145, P146
Ronan	Le Bot	P150
Benoit	Le Goff	P106
Simon	Le Hello	RFP 34
Gwenael	Le Moal	RFP 25
Vincent	Le Strat	FP 14
Philippe	Leclerc	FP 89
Sheng-Hsun	Lee	P128
Sylvie	Lefort	P143, P144
Julie	Leger	P14
Andreas	Leithner	FP 45, P56, P115
Lukas	Leitner	P115
Tatjana	Lejko-Zupanc	P103
Moyssis	Lelekis	P17
Abad	Lelia	P43
Carole	Lemarié	P23
Gwenael	Le-moal	P68
Roberto	Leone	FP 16
Didier	Lepelletier	P6
Panagiotis	Lepetsos	P17
Maria	Lerm	FP 67
Vincent	Lestrat	P114
Guillaume	Leveque	P140
Guillaume	L'Hostis	P95
Luc	Lhotellier	FP 14, FP 84
Ho Kwong	Li	FP 42, FP 43
Yun-da	Li	P100
Jen-Chung	Liao	FP 81
Eva	Lidén	FP 99

Author first name	Author last name	Abstract no.
Lars	Lidgren	RFP 27
Elke	Lieb	P1
Yu-Chih	Lin	P45, P153
Nicole	Lind Henriksen	FP 60
Happi	Line	P5
Benjamin	Lipsky	FP 42
Jose	Lito Monico	P58
David	Little	FP 94
Vitaliy	Liventsov	P15, FP 95
Nicola	Logoluso	FP 56, P141, P152
caroline	loiez	FP 68, FP 74
Pierre-Marie	Longis	P104
Luís	Lopes Coutinho	P89
Mattia	Loppini	FP 16, P53
Antonio	Loro	FP 2, P55
Stanka	Lotrič Furlan	P103
Julien	Loubinoux	FP 89
Bernard	Louis	RFP 25
Gayet	Louis-Etienne	P68
Julie	Lourtet Hascoet	FP 83
Emilio	Luigi Mazza	P49, P50, P72, P73, P74, P142
Jose	Luis Agulló	P130
Sébastien	Lustig	P22, FP 73, FP 76, P93, P94
Torben	Lüth Andersson	FP 75
Kirsti	Løseth	P122
Claudia	Löwik	P51, P52
Damian	Mack	FP 9, FP 82
Tomislav	Madjarevic	P48
Abdul	Madni	P137
Leonardos	Mageiros	FP 65
Stéphane	Magro	P43
Rafael	Mahieu	RFP 25
Elena	Maiolo	FP 64
Damasie	Malandain	P14
Konstantinos	Malizos	P29
Cindy	Mallet	FP 54
Martins	Malzubris	P83, P84
Pierre	Mansat	FP 69
Alberto	Mantovani	FP 16
Susanna	Maraldi	P152
Jean	Marc Ziza	P114
Borree	Marcel	P147
Giorgio	Maria Calori	P32, P49, P50, P72, P73, P74, P142
KEMPF	Marie	P14
Felice	Marie-Pierre	FP 6
Ilias	Mariolis	P13
Oehlbauer	Markus	P90
Pascale	Marlin	FP 6, FP 83
Simon	Marmor	FP 14, FP 38, FP 84, P114
Chakib	Marrakchi	P117
Gemma	Marshall	P145, P146
Thibault	Martin	P43
Juan Carlos	Martínez-Pastor	P37, P127
Pierre	Martz	P46
Touchard	Maryse	P43
Alfredo	Matamala Pérez	P9, P41, P136
Ida	Matic	P48
Gabriel	Matos	P85
Morgan	Matt	P24
Valerie	Matter-Parrat	FP 13
Militz	Matthias	P12
Maesani	Matthieu	FP 54
Roberto	Mattina	RFP 28
Cyril	Mauffrey	P86
Andreas	Mavrogenis	P120, P126, P134, P135
Simon	Max	P156
Anna	Mayhew	P13

Author first name	Author last name	Abstract no.
Osvaldo	Mazza	P105
Emilio	Mazza	P32
Silvio	Mazzola	P32
Simone	Mazzola	P49, P50, P72, P73, P74, P142
Nicola	McMeekin	FP 42
Martin	McNally	FP 3, FP 4, FP 9, RFP 22, FP 42, FP 43, FP 55, P80, P97, FP 102
Edward	McPherson	FP 51, P161
Panayiotis	Megaloikonomos	P126, P134, P135
Anne	Meheut	P23
Christoph	Meier	P151
Pavel	Melichercik	P19
Filipa	Mendes	P13
Ana	Méndez Gil	P10
Domenico	Mercurio	P129
Guillaume	Méric	FP 65
Timothée	Mesnier	P57
Willem-Jan	Metsemakers	P8, FP 63, FP 103
Vanina	Meyssonnier	FP 14, FP 84, P114
Tod	Michel	FP 73, P91
Fessy	Michel-Henry	FP 76
Aukse	Mickiene	FP 1
Henri	Migaud	FP 74
Natalia	Miki-Rosario	P86
Søren	Mikkelsen	FP 90
Matthias	Militz	P67, P90
Robert	Millar	FP 3
Rebecca	Mills	FP 94
Yojiro	Minegishi	P26, RFP 31, FP 98
Nazim	Mirzoev	P71
Evanthia	Mitsiokapa	P135
Tsuyoshi	Miyazaki	FP 47
Masaki	Mizushima	P16
Trigui	Moez	P87
Rekik	Mohamed Ali	P87
Hasan	Mohammad	P79
Jmal	Mokhtar	P87, P119
James	Moley	P148
Sonia	Molinos	P37
Elinor	Moore	P13, RFP 29
Philippe	Morand	FP 89
Ilaria	Morelli	P141
Mario	Morgenstern	FP 7, FP 65, P67
Fintan	Moriarty	FP 63, FP 65, FP 100, FP 103, P2, P151
Abdollah	Moufid	P68
Evanthia	Mourmoura	P29
Antoine	Mouton	FP 14, FP 84
Stasa	Mudrovcic	FP 77
Theis	Muncholm Thillemann	FP 75
Cida	Murça	P112
Paul	Muwa	FP 2
Koji	Nakajima	P107
Masaki	Nakamura	P26, FP 98
Daisuke	Nakashima	P30
Emma	Nash	P13
Asseray	Nathalie	RFP 22
Paola	Navone	P50
Rob	Nelissen	P51, P52
William	Neve	P59
Jeroen	Neyt	P63, FP 88
Christophe	Nich	FP 86
Emma	Nickerson	P13, RFP 29
Blondiaux	Nicolas	P98
Poul Torben	Nielsen	FP 90
Stanley	Nigro	P112
Shin	Nihonyanagi	RFP 31
Stefaan	Nijs	P8

Author first name	Author last name	Abstract no.
André	Nijssen	P8
Marta	Nobile	P50
Doron	Norman	P139
Alan	Norrish	RFP 29
Eleni	Ntoumou	P29
Sarah	Oakley	FP 102
Sophie	Obéléréo	P6
Vladimir	Obolenskiy	P27, P78
Xavier	Ohl	FP 48, P75
Hiroyuki	Oka	FP 47, P107
Hiroshi	Okazaki	FP 47
Ali	Oliashirazi	P54
Rema	Oliver	FP 61, P4
Aritz	Ortega Centol	P130
David Joaquín	Ortolà Morales	P131
Kristian	Otte	FP 90
Marit	Otterlei	P122
Karsten	Ottink	P39
Søren	Overgaard	FP 39, FP 64
Janne	Ovesen	FP 96
Salvatore	Pagliuca	P154
Dean	Pakvis	P64
Sharoni	Palanivel	P35, FP 82
Antony	Palmer	RFP 22
Georgios	Panagopoulos	P126, P134
Antonios	Panagopoulos	P134
Sergio	Papa	P32
Damiano	Papadia	FP 57, P155
Antonios	Papadopoulos	P120, P126, P135
Olympia	Papakonstantinou	P120
Ioanna	Papathanasiou	P29
Kyung-Soon	Park	FP 92
Travis	Parkulo	P162
Javad	Parvizi	RFP 33
Ben	Pascoe	FP 65
D.	Passeron	FP 14, FP 84
Olivier	Patey	RFP 35
Chardon	Paul	P91
Alma Becic	Pedersen	FP 39
Salvador	Pedrero	P130
Piotr	Pędzisz	P65
Ageneau	Peggy	P106
Charles	Peltiers	P68, FP 93
Ciro	Pempinello	P154
Cláudia	Pereira	P66
Josefa	Pérez Jove	P9
Carsten	Perka	FP 19, FP 53, FP 77, FP 85, P124
Maurice	Perol	P95
Thomas	Perpoint	RFP 24, FP 49, FP 76, P95
Sebastian	Pesch	FP 80
Charlotte	Petitjean	P95
Leon	Peto	FP 102
Tim	Peto	FP 102
Gautier	Petroni	FP 86
Stefan	Pfister	P2
Fanny	Pierret	FP 74
Anand	Pillai	P79
Jérémy	Plassard	P46
Joris	Ploegmakers	FP 15, P39
Giancarlo	Polesello	P112
Evelyne	Poli	P140
Ekaterina	Polyakova	P111
Helena	Poniz	P96
Rudolf	Poolman	P51, P52
Anna	Popovtseva	P34
Tanya	Porter	P13
Olga	Portolà Castillón	P10

Author first name	Author last name	Abstract no.
Virginia	Post	FP 65
Gilles	Potel	P138
Cecile	Pouderoux	P93
Maxime	Pradier	FP 68
Nuria	Prim	P42
Samuel	Privé	FP 86
Yvette	Pronk	P51, P52
Viktor	Protsko	P78
Paul	Puchwein	P109
Jan	Puetzler	FP 7
Lluís	Puig Verdié	P42
Sophie	Putman	P98
Jan	Pützler	FP 63, FP 103
Jorien	Quintens	P8
Ammar	Qureshi	P162
Kalyani	R	P99
Jean-Pierre	Rabès	FP 78
Ahmed	Racem Guidara	P77, P119
Roman	Radl	FP 45
Asan	Rafee	P137
Luize	Raga	P83, P84
Ivan	Rakovac	P48
Anastasia	Rakow	FP 53, FP 85
Alex	Ramsden	FP 3, P80
Kenneth	Rankin	FP 20
Michael	Raschke	FP 63, FP 103
Christen	Ravn	FP 64
Mike	Reed	FP 20
Ramsay	Refaie	FP 20
Amokrane	Reghal	P138
Werle	Regina	P12
Janin	Reifenrath	FP 58
Anatolijus	Reingardas	FP 1
Siboni	Renaud	FP 48, P75
Nora	Renz	FP 18, FP 19, FP 53, FP 77, FP 85, P36, P124
Adriana	Renzoni	FP 91
Camilo	Restrepo	RFP 33
Taiana	Ribeiro	P112
Giovanni	Riccio	FP 46, P40, P60
Geoff	Richards	FP 7, FP 63, FP 65, FP 100, FP 103
Philippe	Rigoard	P68, FP 93
Dejan	Ristic	P132
Schoop	Rita	P147
Otto	Robertsson	RFP 27
Olivier	Robineau	P98
Cláudia	Rodrigues	FP 52, P44, P66, P89
Mark	Rogers	FP 9
Delia	Romanò	FP 56, P152
Carlo Luca	Romanò	RFP 28, FP 56, P20, P141, P152
Fabio	Romanò	P49, P72, P73, P74, P142
Ines	Rombach	FP 9, FP 42
Cecile	Ronde-Oustau	FP 13
Massimiliano	Rosi	P131
Martin	Rottman	RFP 32, RFP 34, FP 78, P24
Gregoire	Rougereau	FP 72
Anne-Laure	Roux	FP 78
Alain	Ruffion	FP 49
Anna	Rukina	P111
Mi	Ryoung Seo	P108
Synnøve	Ræder	P122
Marta	Sabater Martos	P37, P127
Jean-Francois	Sabuco	P143, P144
Patrick	Sadoghi	FP 45
Diallo	Saïdou	FP 48, P75
Keizou	Sakurai	RFP 31
Moshe	Salai	P139
Dominique	Salmon-Ceron	FP 89

Author first name	Author last name	Abstract no.
Elsa	Salomon	FP 38
Nicholas	Sanderson	FP 102
Björklund	Sanna	P116
Ana Cláudia	Santos	FP 52, P44, P66, P89
Inês	Santos Ferreira	FP 64
Asep	Santoso	FP 92
Guillaume	Sapriel	RFP 34
Suajanya	Saravanakumar	P99
Matthew	Scarborough	FP 9, FP 42, FP 43, P80, P97
Sara	Scarponi	FP 56, P152
Vendela	Scheer	FP 67
Aaron	Schindeler	FP 94
Stephan	Schlunke	P158
Tanja	Schmid	FP 100
Marie-Luise	Schröder	FP 58
Michael	Schütz	FP 85
David	Segal	P139
Franz Josef	Seibert	P109
Kazushige	Seki	P25
Toshihiro	Seki	P25
Alexey	Semenistyy	RFP 21
Anton	Semenistyy	RFP 21, P27
Olivia	Senart	P24
Parham	Sendi	FP 55
Eric	Senneville	FP 1, FP 41, FP 49, FP 68, FP 74, P98
Lena	Serrander	FP 67
Hassan	Serrier	P22, P91
Branko	Sestan	P48
Ansart	Severine	RFP 25
Ashik	Shah	FP 82
Nirav	Shah	P110
Alisina	Shahi	FP 50, P54
Samuel	Sheppard	FP 65
Tomohiro	Shinozaki	FP 47, P107
Amer	Shoaib	P157
George	Siakalis	P120
Ahmed	Siddiqi	RFP 33
Roberto	Sierra	FP 91
Irene Katharina	Sigmund	FP 18, FP 44
Ladislav	Simnic	FP 11, P38
Hackl	Simon	P12
Urban	Slokar	P115
Gerasimos	Socrates Christodoulatos	P17
Søren	Solgaard	FP 90
Alex	Soriano	P18
Maria Luisa	Sorli	P42
Mazen	Soufi	P157
Arnaldo	Sousa	FP 52, P44, P66, P89
Ricardo	Sousa	FP 52, P44, P66, P89
Nikolai	Spranger	P61
Christoph	Sprecher	P151
Arturas	Spucis	FP 1
Tevell	Staffan	P11
KAMBAREV	Stanimir	FP 79
Jeroen	Steens	P59
Anna	Stefánsdóttir	RFP 27
Baumeister	Steffen	P156
Dirk	Stengel	P61
Svetlana	Stepanenko	P27
Nikolaos	Stephanou	P29
Jessica	Stephens Hemingway	P110
Martin	Stevens	P51, P52
Kuldeep	Stohr	FP 10
Paul	Stoodley	FP 59, P148, P149
Teresa	Street	FP 102
David	Stubbs	FP 4, RFP 22, P80
Antonios	Stylianakis	P17

Author first name	Author last name	Abstract no.
Ken	Sugo	FP 98
Rita	Sulcaite	FP 1
Martin	Sundberg	RFP 27
Florence	Suy	FP 68
Jaana	Syrjänen	P7
Kjeld	Søballe	FP 62, FP 75, FP 90, FP 96
Bo	Söderquist	P11, P116
Toshihiko	Taguchi	P25, P30
Yasuhito	Tajiri	FP 47
Naonobu	Takahira	RFP 31, FP 98
Masashi	Takaso	RFP 31, FP 98, P26
Eve-Marie	Takoudju	FP 79
Didier	Tandé	P14
Vendeuvre	Tanguy	FP 93, P68
Adrian	Taylor	FP 43, FP 102
Igors	Terjajevs	P83, P84
Marion	Thomas	P114
Olof	Thompson	RFP 27
Erik	Thorvaldsen Sandbakken	P122
Guy	Thwaites	FP 42
Xaver-Andoni	Tibau Alberdi	P30
Rafael	Tibau Olivan	P30
Sladjan	Timotijevic	P132
Tamta	Tkhilaishvili	FP 8
Fumiaki	Tokimura	FP 47
Atsunori	Tokushige	P25
Juichi	Tonosu	P107
Eduard	Tornero	P62, P69
Carlos	Torrens	P42
Marco	Toscano	RFP 28
Sophie	Touchais	P104
Andrej	Trampuz	FP 8, FP 11, FP 18, FP 19, RFP 26, RFP 36, FP 53, FP 64, FP 77, FP 85, FP 101, P1, P34, P36, P38, P124, P133, P159
Francesco	Traverso	FP 16
Rihard	Trebse	P96
Maria Teresa	Trentinaglia	P141
Claire	Triffault-Fillit	RFP 24, FP 73, FP 76, P93, P94
Moez	Trigui	P77
Anders	Troelsen	FP 90
Eleonore	Truchard	FP 86
Aspasia	Tsezou	P29
Vasyl	Tsokalo	P88
Anton	Tudor	P48
Mikkel	Tøttrup	FP 62, FP 75
Katsufumi	Uchiyama	RFP 31, FP 98, P26
Eva	Vacha	RFP 26
Anne-Sophie	Valentin	P14
Neuhaus	Valentin	P156
Anne-Sophie	Valentin	P23
Michel	valette	FP 68, FP 74
Alejandro	Vallejo	FP 7, FP 103
Florent	Valour	RFP 24, FP 49, FP 73, FP 76, P22, P91, P93, P94
Maite	Van Cauter	FP 74
Inge	van den Akker-Scheek	P51, P52
Catherine	Van Der Straeten	P141
Walter	van der Weegen	P51, P52
Martijn	van Griensven	FP 80
Hilde	Vandenneucker	P63
Yoann	Varenne	P104
Claus	Varnum	FP 39
Danguole	Vaznaisiene	FP 1
Laura	Velasco	P62
Margarita	Veloso	P41, P136
Jan	Verhaegen	FP 88
Richard	Verheul	P4, FP 61
Karin	Vermeulen	P52
Brice	Viard	P46

Author first name	Author last name	Abstract no.
Simon	Vikstrom	P160
Maryvonne	Villart	FP 86
Dubee	Vincent	RFP 25
Astra	Vitkauskiene	FP 1
Lidiya	Voevodskaya	P34
Bühren	Volker	P12
Christian	von Rüden	P12
Christos	Vottis	P134
Darinka	Vuckovic	P48
Frank-Christiaan	Wagenaar	P51, P52
Peter	Wahl	P2, P151
Bouaziz	Wajdi	P87
Sarah	Walker	FP 42
William	Walsh	P4, FP 61
Lei	Wang	FP 97
Ying-Chih	Wang	P101, P102
Jason	Wang	P79
Guido	Wanner	P156
Nina	Wantia	RFP 26
Simon	Warren	FP 9, FP 42, FP 82
Zribi	Wassim	P77, P82, P113, P117, P118, P119, P125
Ayadi	Wassim	P87
Kenichi	Watanabe	P107
Annette	W-Dah	RFP 27
Ross	Weale	P3
Jeremy	Webb	FP 59
Christine	Weber	FP 44
Stefan	Weber	P61
Thorsten	Wichmann	P2
Henning	Windhagen	FP 58
Reinhard	Windhager	FP 44
Eivind	Witsø	P122
Christian	Woloch	P140
Chak-Bor	Wong	P100
Andrew	Woodhouse	FP 42
Marjan	Wouthuyzen-Bakker	FP 15, P18, P39, P51, P52
Koji	Yamada	FP 47, P107
Tokiko	Yamaguchi	RFP 31
Zi-long	Yao	RFP 23
Katsiaryna	Yermak	FP 18, FP 19, FP 101
Jean-Cyr	Yombi	FP 74
Taek-Rim	Yoon	FP 92
Shin	Youngrok	FP 92
Montserrat	Ysamat	P41
Bin	Yu	FP 5, P76, FP 97
Akos	Zahar	FP 17
Nikolaos	Zalavras	P17
Rhea	Zambellas	FP 9, FP 42, FP 43
Andre	Zawadsk	FP 90
Stephan	Zeiter	FP 63, FP 100, FP 103
Mathilde	Zeller	FP 14
Valérie	Zeller	FP 14, FP 84, P114
Xing-qi	Zhao	FP 5
Jean Marc	Ziza	FP 84
Mohamed	Zribi	P82, P117, P118, P119, P125
Turdy	Zubaida	P106
Thue	Ørsnes	FP 90
Nilsdotter	Åsa	P11

Notes

Notes

Platinum partners

Biocomposites

BONESUPPORT™

Heraeus

Gold partner

ZIMMER BIOMET
Your progress. Our promise.®

Silver partners

Exactech®
Surgeon focused. Patient driven.™

Exhibitors

aap

ADLER ORTHO

AEROBIOTIX
BETTER AIR FOR HEALTHCARE.

BonAlive®
BIOMATERIALS LTD

ceramisys

curetis

implantcast

LINK

merete®

NORAKER
INNOVATIVE BIOMATERIALS

PRO-IMPLANT FOUNDATION

smith&nephew

stryker

Synimed

TECRES®
Advancing High Technology