Révision pour infection

Les « nouveaux » modes d'administration d'antibiothérapie locorégionale

Pr. Tristan Ferry
tristan.ferry@univ-lyon1.fr

Service de Maladies Infectieuses et Tropicales
Hôpital de la Croix-Rousse, Hospices Civils de Lyon
Université Claude Bernard Lyon1, Lyon

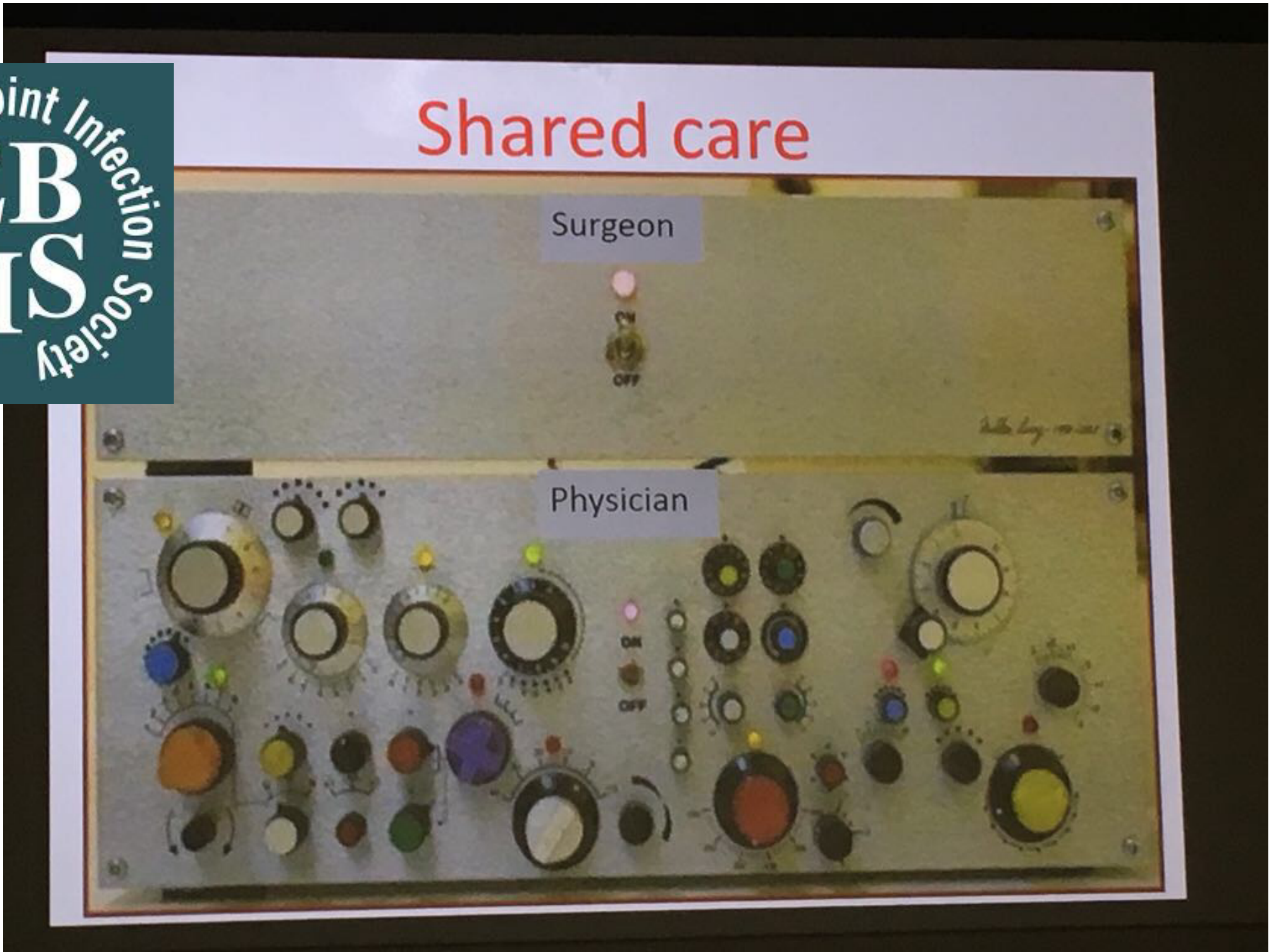
Centre International de Recherche en Infectiologie, CIRI, Inserm U1111, CNRS UMR5308, ENS de Lyon, UCBL1, Lyon, France

Centre Interrégional Rhône-Alpes Auvergne
de Référence des IOA complexes

Antibiotiques locaux

Quand le chirurgien orthopédiste « joue » à l'infectiologue

EBJIS
European Bone & Joint Infection Society



Shared care

Surgeon

Physician

Antibiotiques locaux

IOA = infection locale

Légitime de vouloir agir localement

Infectiologue

[redacted]

- Billes de gentamicine
- Chirurgie non optimal
- Faible relargage local
- Sans antibiothérapie systémique

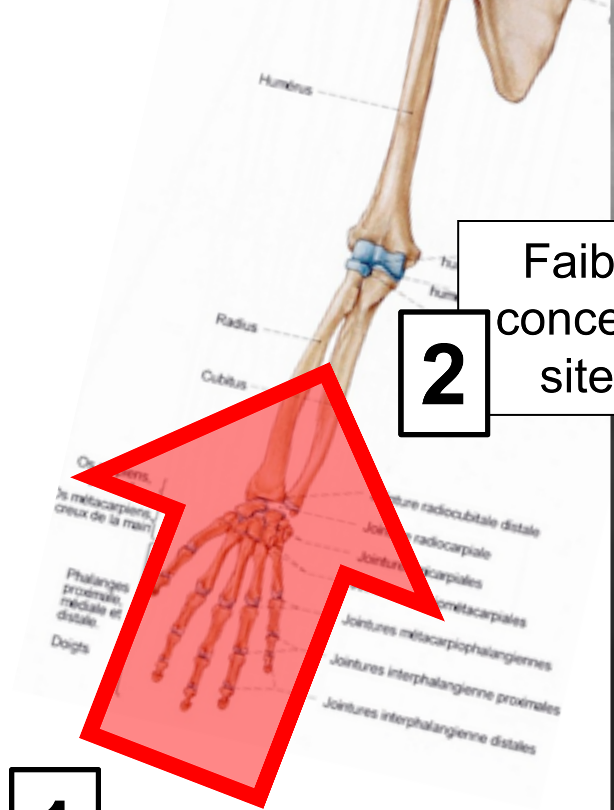
⇓

Echec

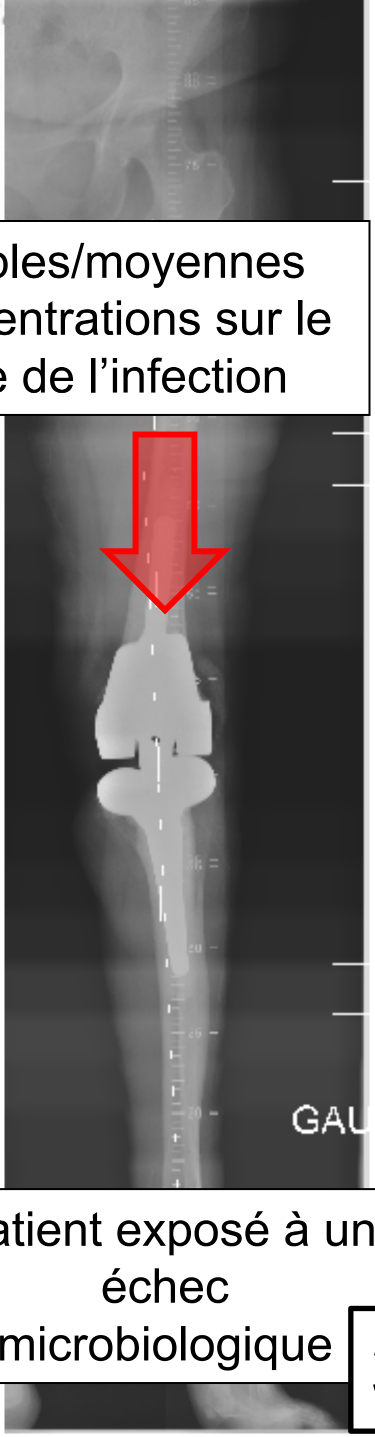
⇓

Acquisition de résistance

Rationnel pour l’utilisation d’antibiotique(s) locaux

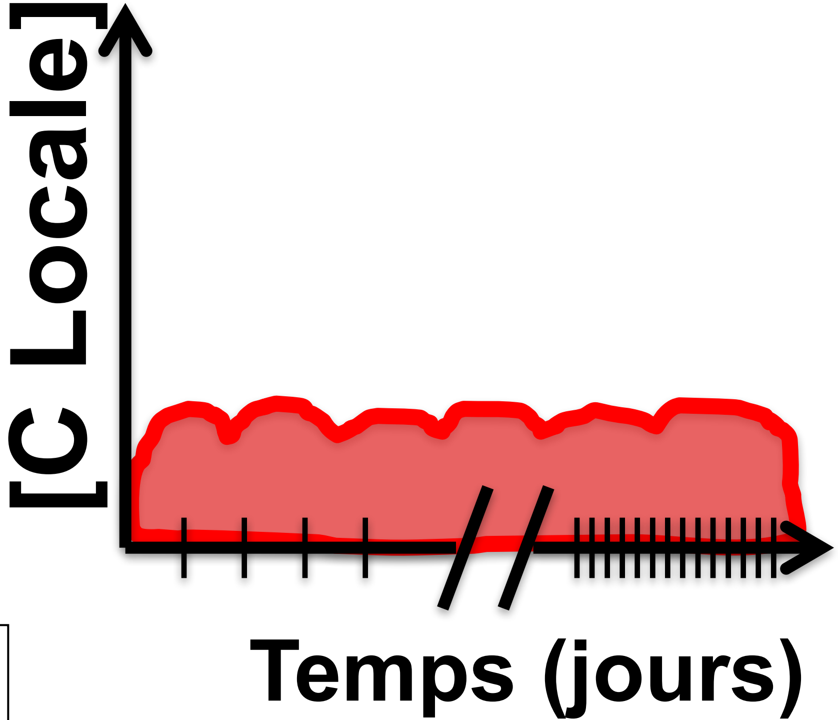

Humérus
Radius
Cubitus
Phalanges proximale, médiale et distale
Doigts
Jointures métacarpophalangiennes
Jointures interphalangienne proximales
Jointures interphalangienne distales

1 Fortes doses d’antibiotique IV ou oral pour traiter une infection locale



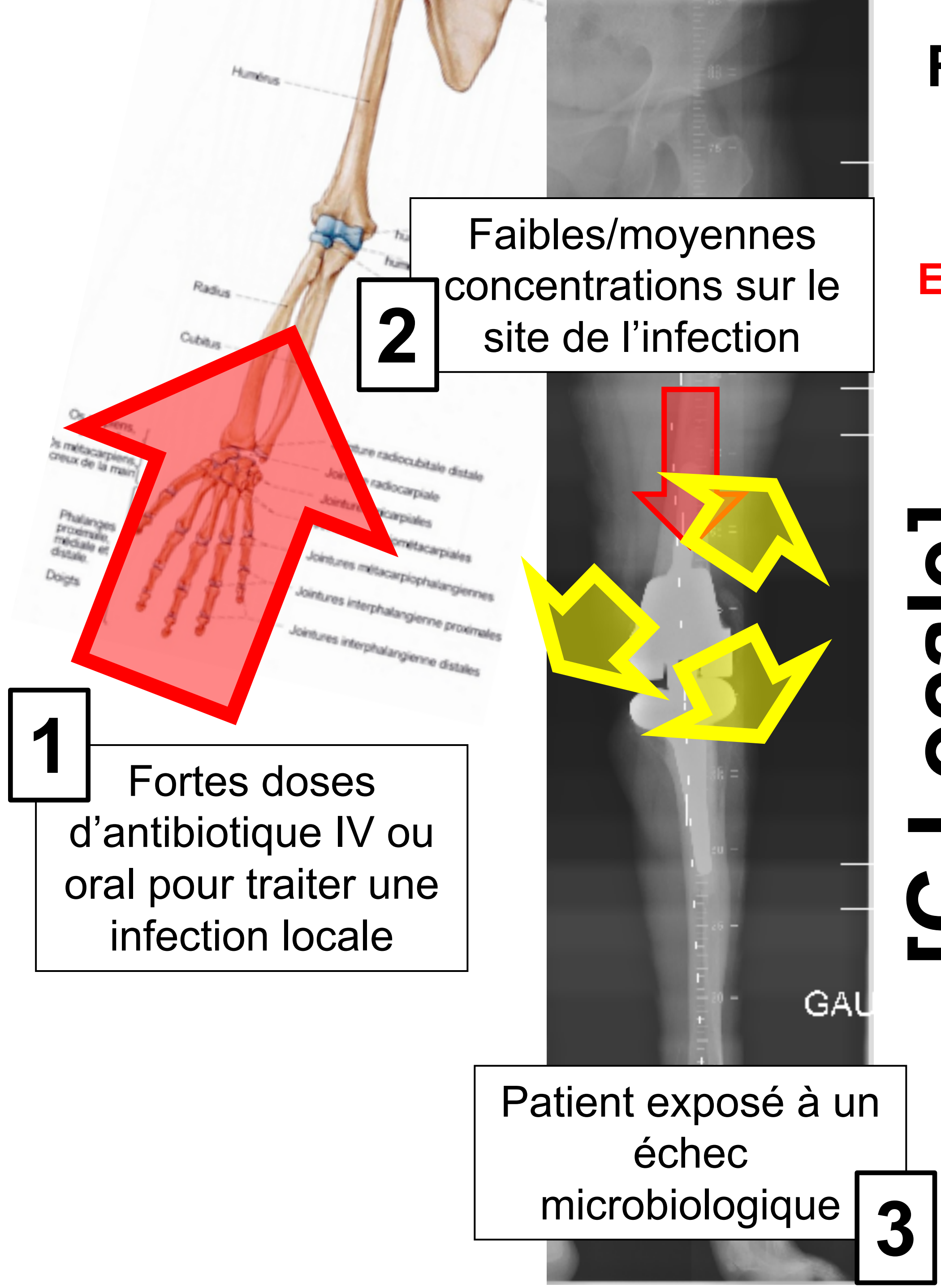
2 Faibles/moyennes concentrations sur le site de l’infection

3 Patient exposé à un échec microbiologique



Rationnel pour l’utilisation d’antibiotique(s) locaux

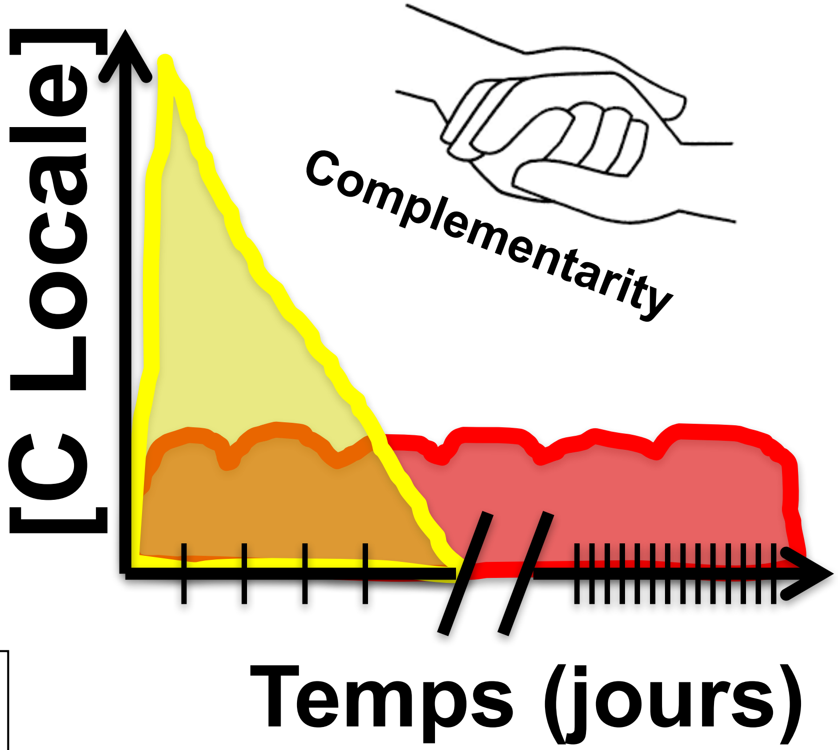
En plus des antibiotiques systémiques
Pour obtenir de fortes [C] locales


Humérus
Radius
Cubitus
Os métacarpiens, creux de la main
Phalanges proximale, médiale et distale
Doigts
Jointure radiocubitale distale
Jointures métacarpophalangiennes
Jointures interphalangienne proximales
Jointures interphalangienne distales
GAU

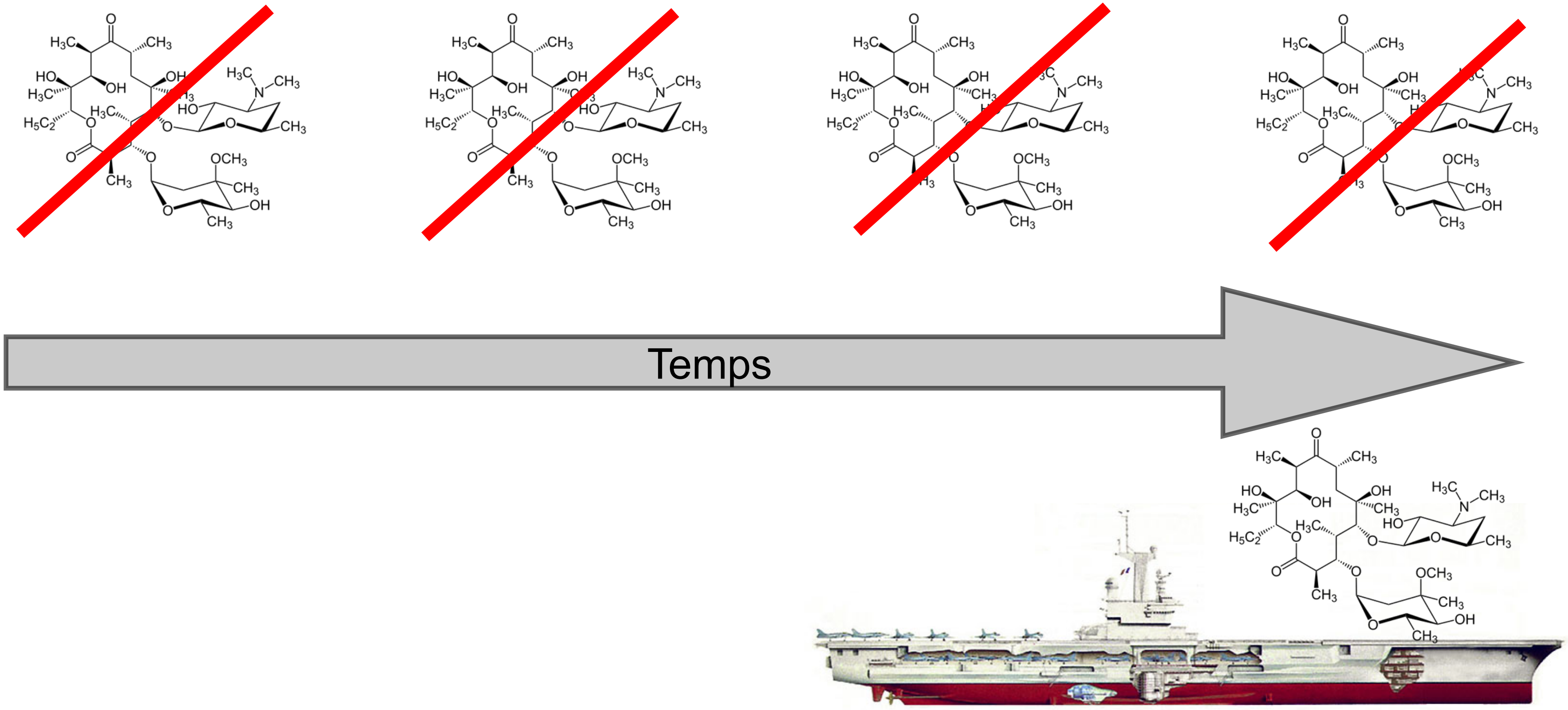
2 Faibles/moyennes concentrations sur le site de l’infection

1 Fortes doses d’antibiotique IV ou oral pour traiter une infection locale

Patient exposé à un échec microbiologique **3**

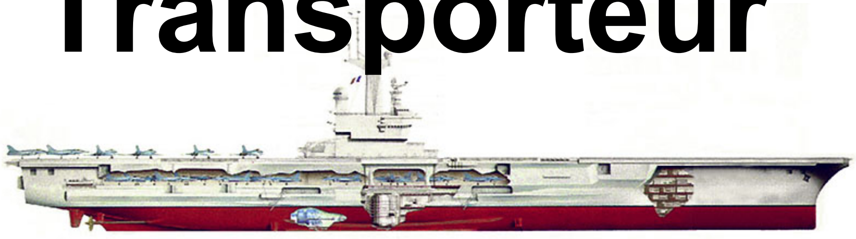


Durée de vie des antibiotiques

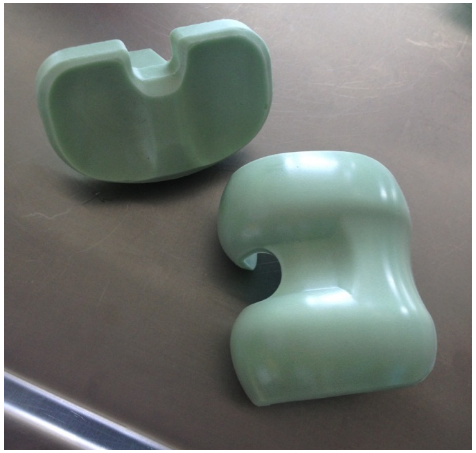


Temps

Transporteur

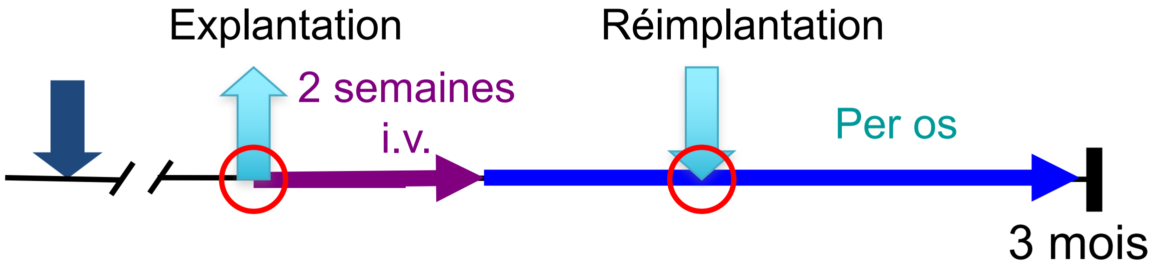


Transporteur



Ciment
PMMA

Stratégie médico-chirurgicale au cours des infections de PTG



Explantation

2 semaines i.v.

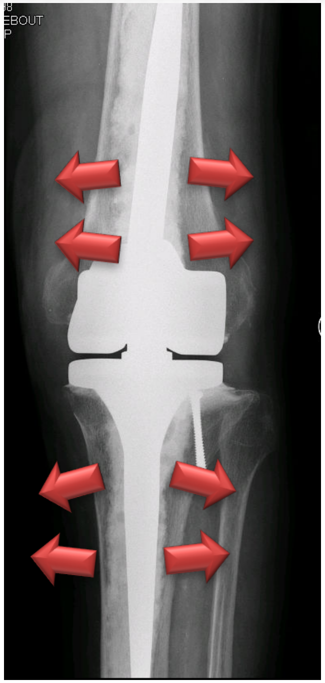
Réimplantation

Per os

3 mois

Changement Classique en 2 temps

Ciments aux antibiotiques

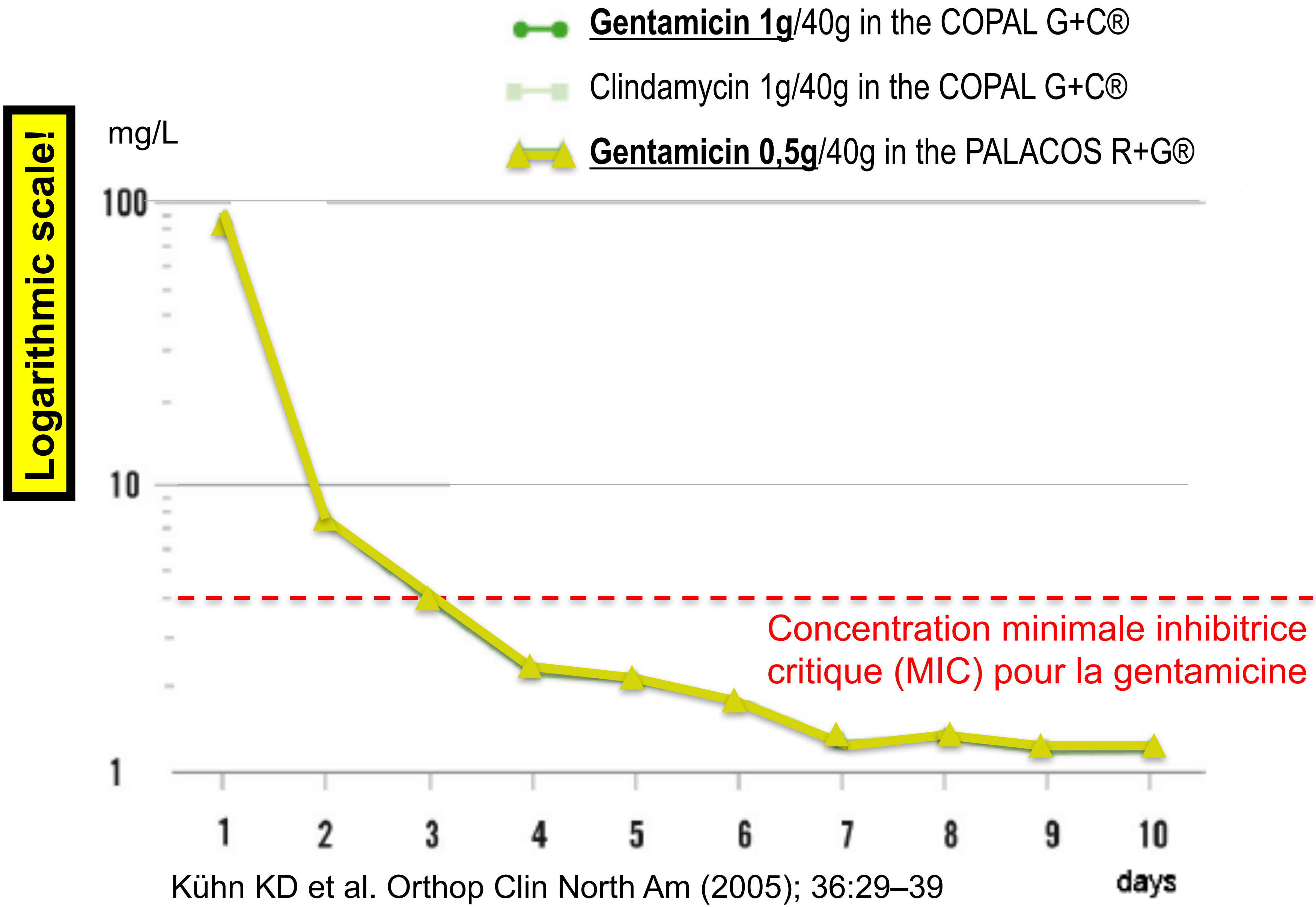


Plusieurs objectifs

Spacer articulé
Pour traiter l'infection
Pour prévenir la surinfection
Pour faciliter la rééducation

Ciment utilisé pour la réimplantation
Pour traiter l'infection
Pour prévenir la surinfection
Pour fixer la prothèse

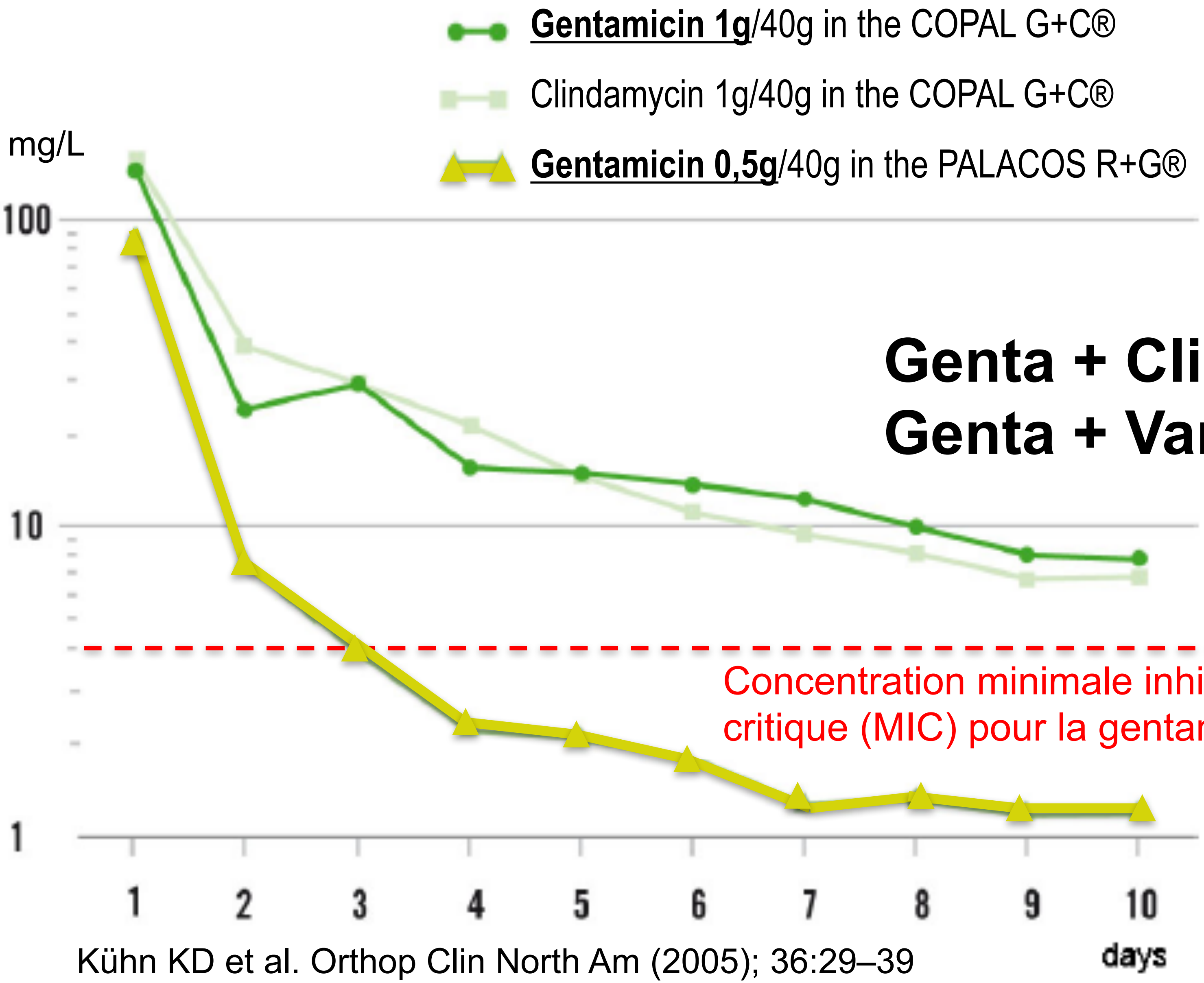
Concentrations locales



Kühn KD et al. Orthop Clin North Am (2005); 36:29–39

Concentrations locales

Echelle logarithmique !



Concentration minimale inhibitrice critique (MIC) pour la gentamicine

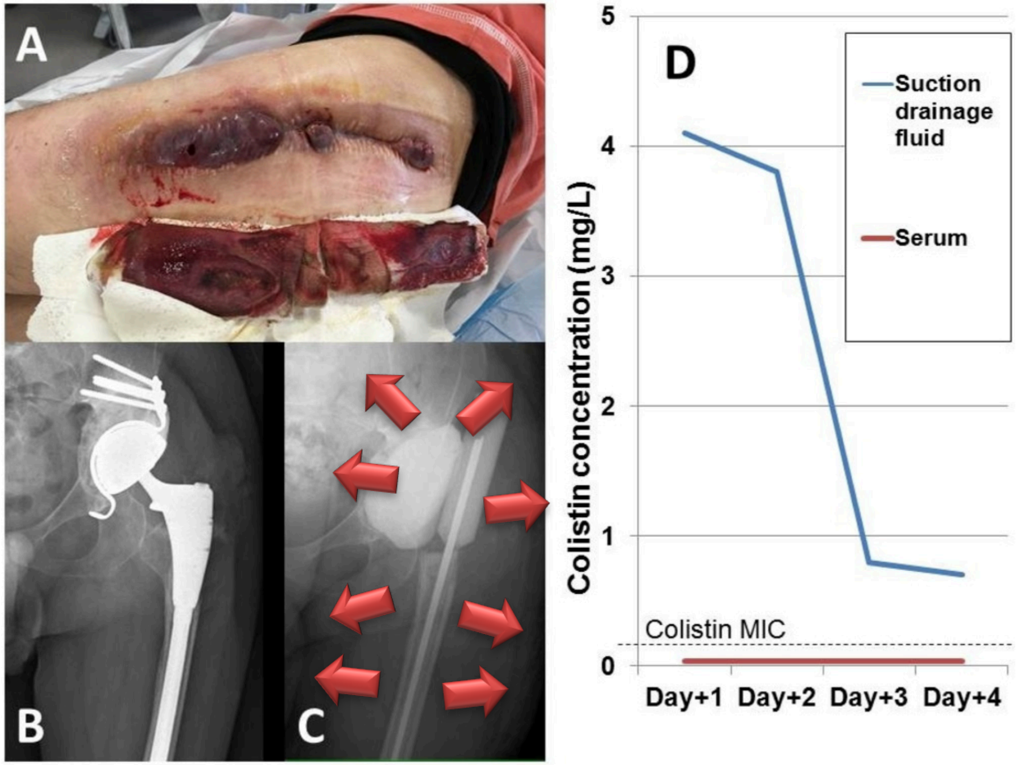
Genta + Clinda
Genta + Vanco

Kühn KD et al. Orthop Clin North Am (2005); 36:29–39

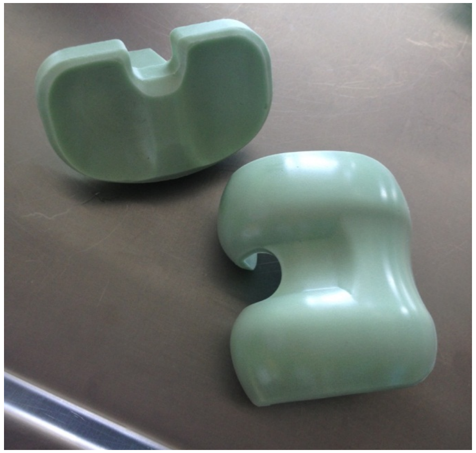
Images in...

Gentamicin–vancomycin–colistin local antibiotherapy in a cement spacer in a 54-year-old haemophilic patient with relapsing plurimicrobial severe prosthetic joint infection

Tristan Ferry,[1,2,3,4] Romain Desmarchelier,[5] Sophie Magréault,[6,7] Florent Valour,[1,2,3,4] on behalf of the Lyon BJI Study group


A
B
C
D
Colistin concentration (mg/L)
5
4
3
2
1
0
Suction drainage fluid
Serum
Colistin MIC
Day+1
Day+2
Day+3
Day+4

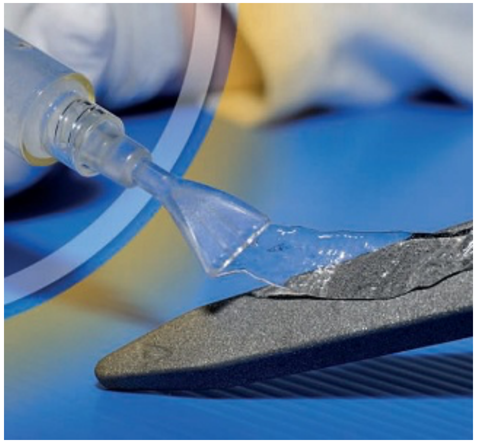
Transporteur



Ciment
PMMA

Transporteur

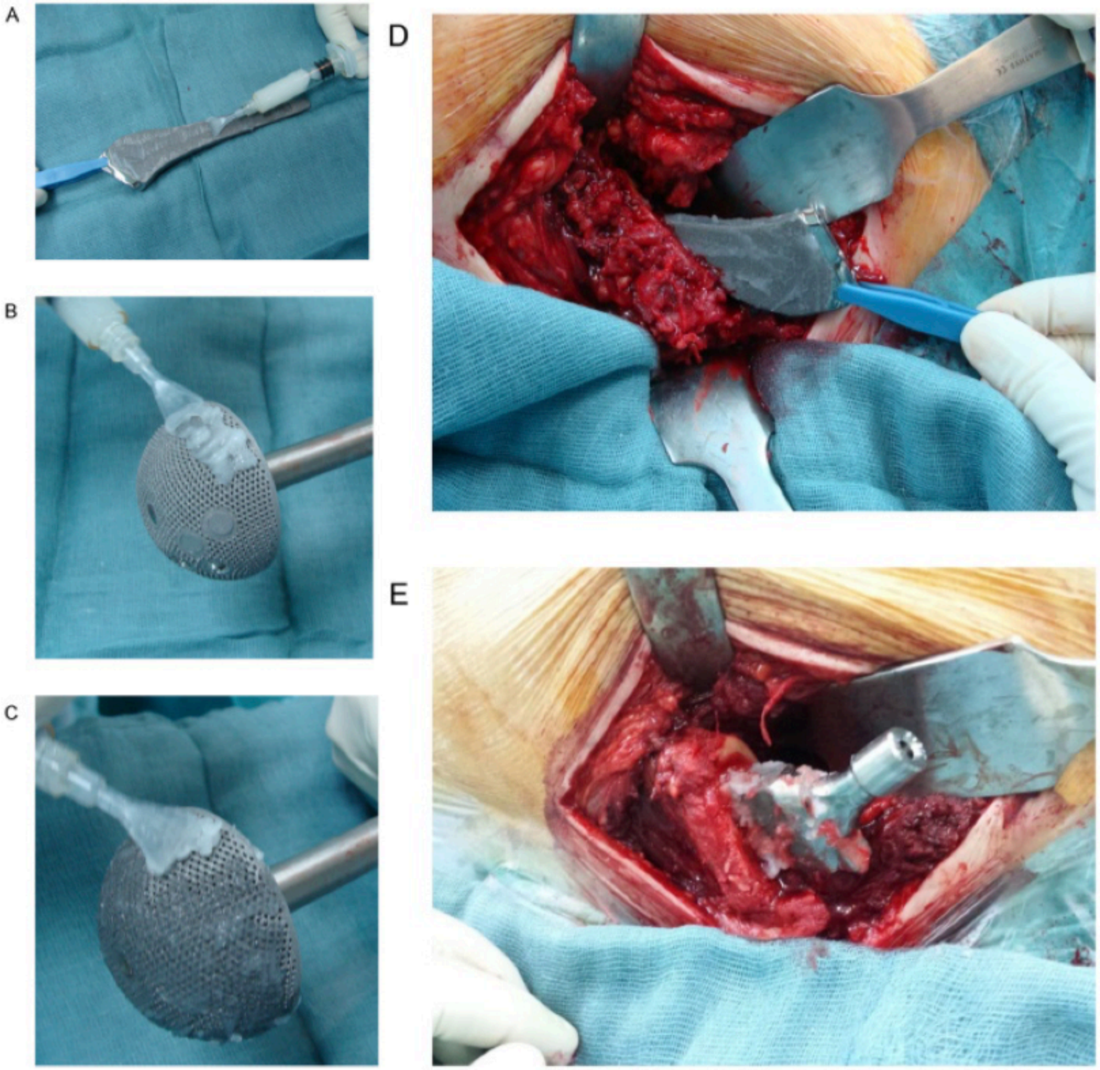
Ciment
PMMA



Hydrogel

Does an Antibiotic-Loaded Hydrogel Coating Reduce Early Post-Surgical Infection After Joint Arthroplasty?

Carlo Luca Romanò[1]✉, Kostantinos Malizos[2], Nicola Capuano[3], Riccardo Mezzoprete[4], Michele D'Arienzo[5], Catherine Van Der Straeten[6, 7], Sara Scarponi[1] and Lorenzo Drago[8, 9]

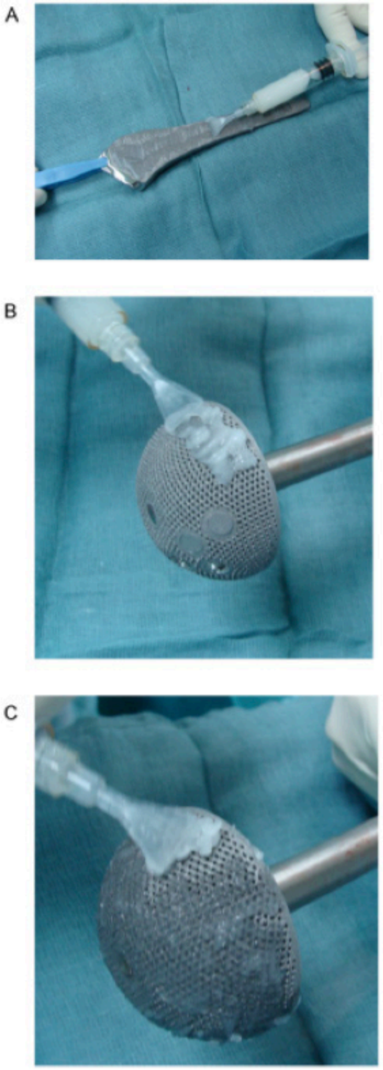


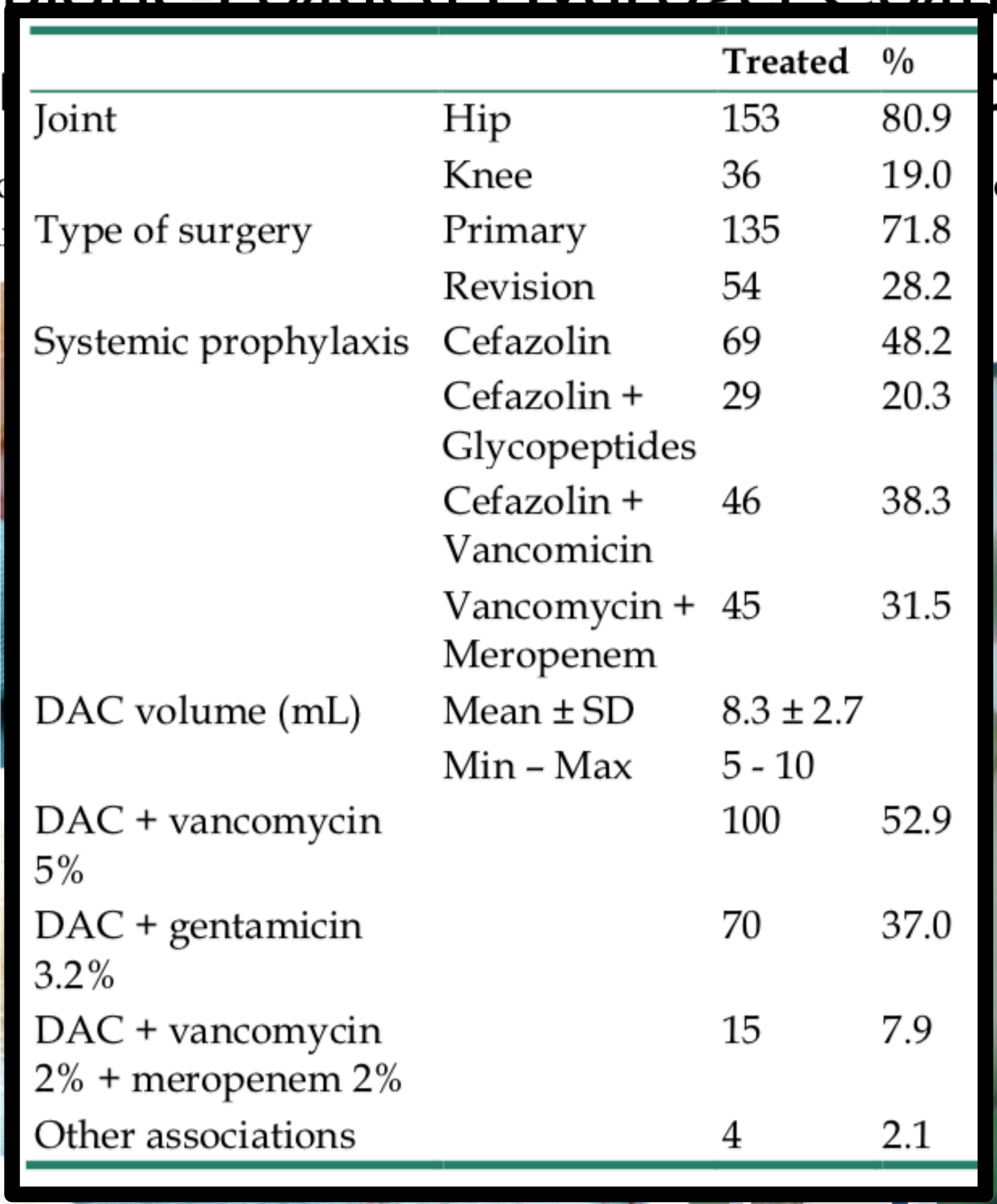
LATEX FR
DAC
THE HYDROGEL BARRIER TO INFECTION
DAC
NOVAGENIT

J. Bone Joint Infect. 2016

Does an Antibiotic-Loaded Hydrogel Coating Reduce Early Post-Su hroplasty?

Carlo Luca Romanò[1]✉, Ko ete[4], Michele D'Arienzo[5], Catherine Va





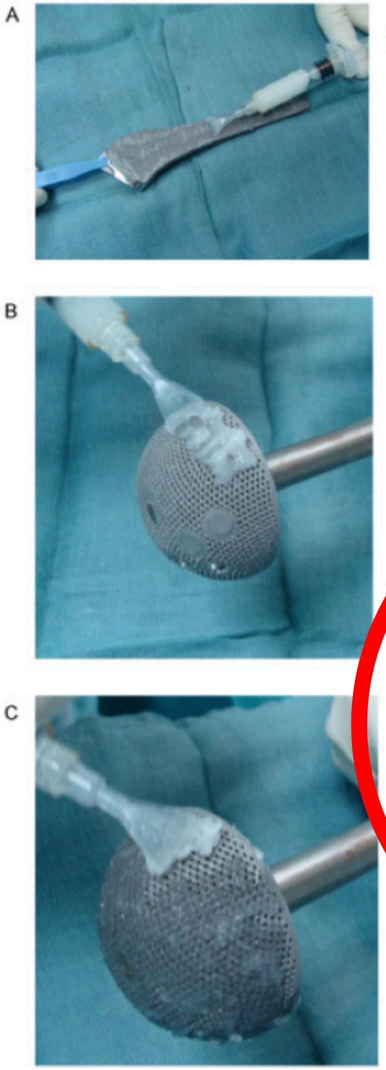
		Treated	%
Joint	Hip	153	80.9
	Knee	36	19.0
Type of surgery	Primary	135	71.8
	Revision	54	28.2
Systemic prophylaxis	Cefazolin	69	48.2
	Cefazolin + Glycopeptides	29	20.3
	Cefazolin + Vancomicin	46	38.3
	Vancomycin + Meropenem	45	31.5
DAC volume (mL)	Mean ± SD	8.3 ± 2.7	
	Min – Max	5 - 10	
DAC + vancomycin 5%		100	52.9
DAC + gentamicin 3.2%		70	37.0
DAC + vancomycin 2% + meropenem 2%		15	7.9
Other associations		4	2.1

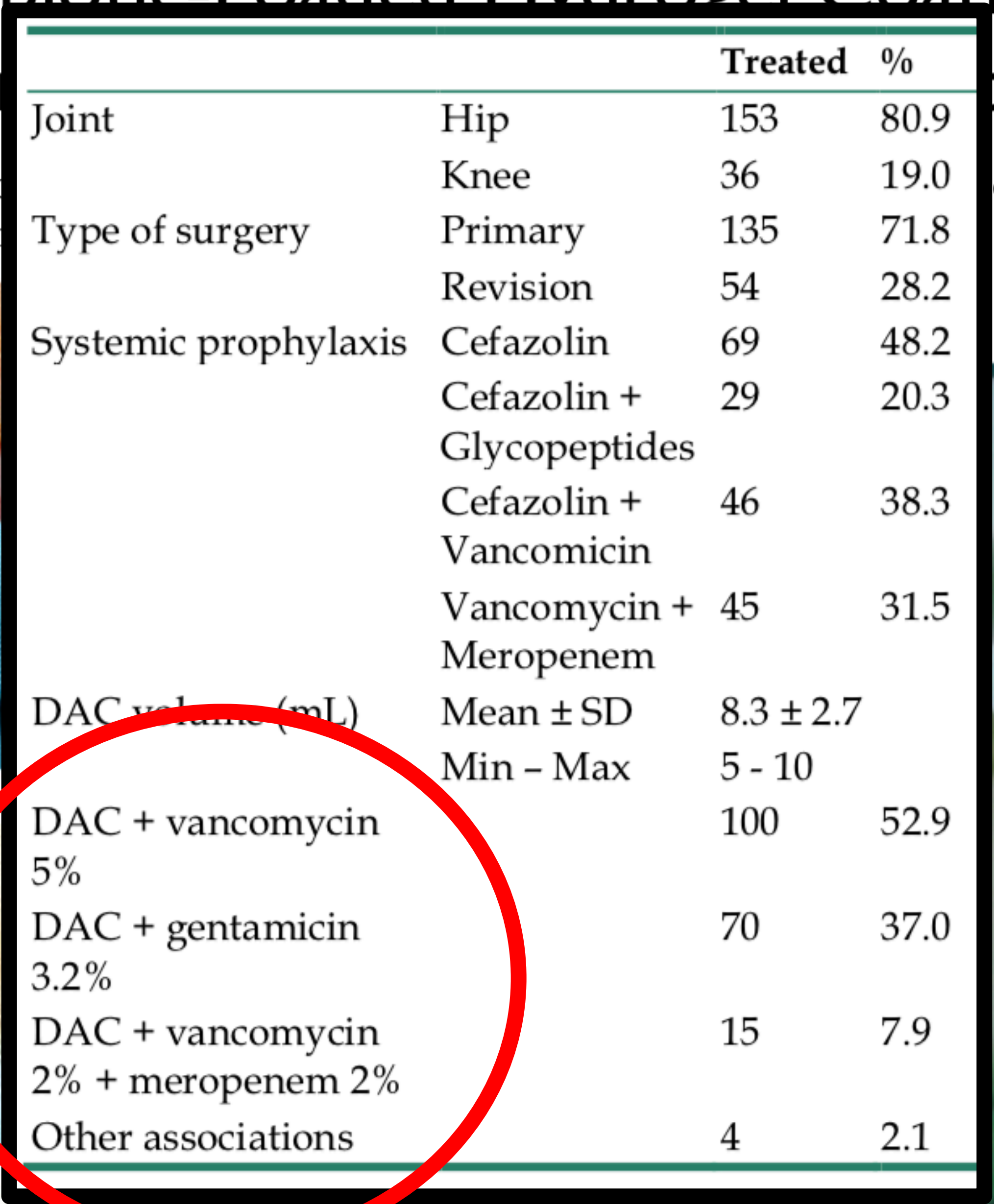
DAC
NOVAGENIT

J. Bone Joint Infect. 2016

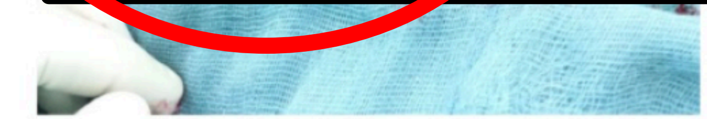
Does an Antibiotic-Loaded Hydrogel Coating Reduce Early Post-Su throplasty?

Carlo Luca Romanò[1✉], Ko ete[4], Michele D'Arienzo[5], Catherine Va





		Treated	%
Joint	Hip	153	80.9
	Knee	36	19.0
Type of surgery	Primary	135	71.8
	Revision	54	28.2
Systemic prophylaxis	Cefazolin	69	48.2
	Cefazolin + Glycopeptides	29	20.3
	Cefazolin + Vancomicin	46	38.3
	Vancomycin + Meropenem	45	31.5
DAC volume (mL)	Mean ± SD	8.3 ± 2.7	
	Min – Max	5 - 10	
DAC + vancomycin 5%		100	52.9
DAC + gentamicin 3.2%		70	37.0
DAC + vancomycin 2% + meropenem 2%		15	7.9
Other associations		4	2.1

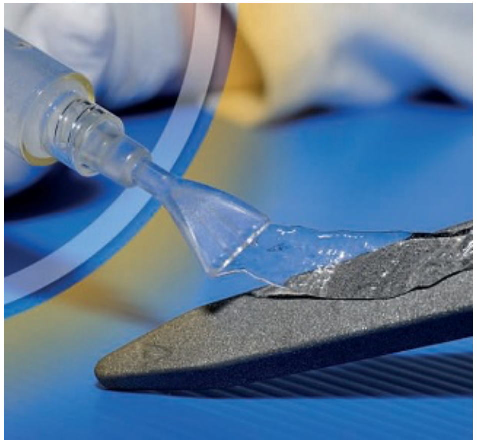


DAC
NOVAGENIT

J. Bone Joint Infect. 2016

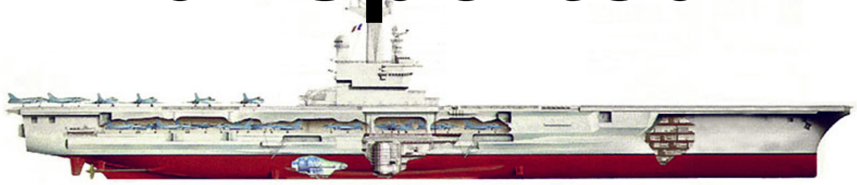
Transporteur

Ciment
PMMA

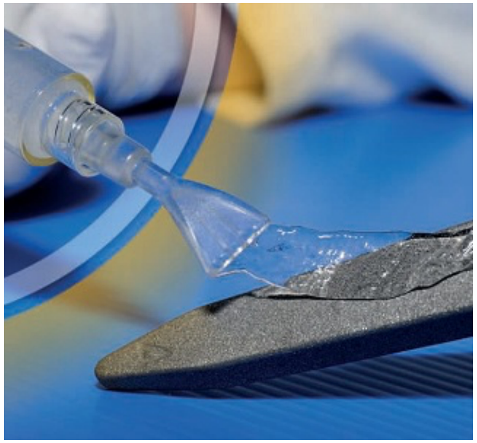


Hydrogel

Transporteur



Ciment
PMMA



Hydrogel

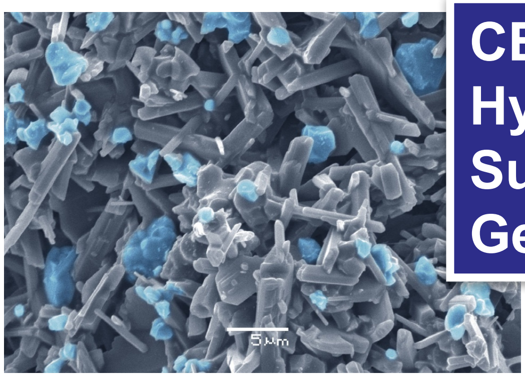
Pâte

M. Stravinskas et al. **Bone Joint res** 2016;5:427–435

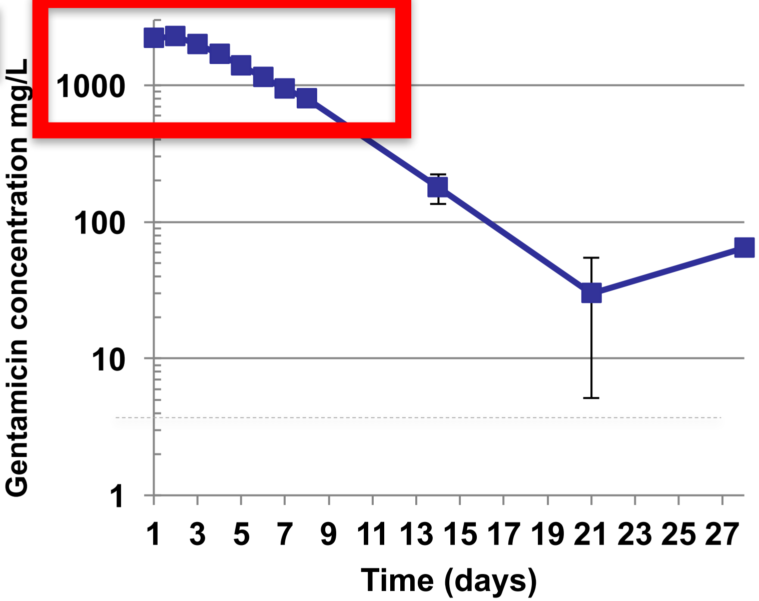
BJR

Pharmacokinetics of gentamicin eluted from a regenerating bone graft substitute

IN VITRO AND CLINICAL RELEASE STUDIES



CERAMENT G™
Hydroxyapatite
Sulfate de calcium
Gentamicine

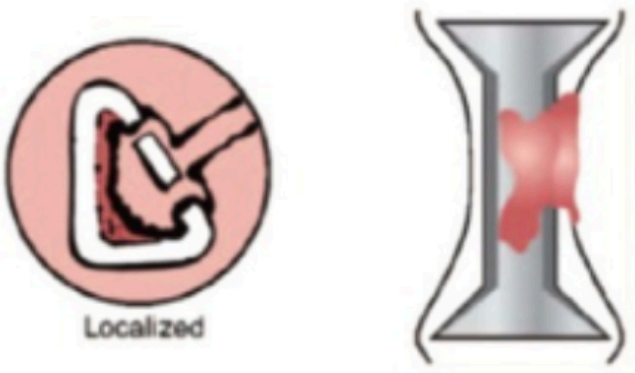


Régénération osseuse, **Résorbable**, sous forme de **pâte**

■ GENERAL ORTHOPAEDICS

Single-stage treatment of chronic osteomyelitis with a new absorbable, gentamicin-loaded, calcium sulphate/hydroxyapatite biocomposite

A PROSPECTIVE SERIES OF 100 CASES



Mac Nally M. et al.
Oxford Bone infection unit

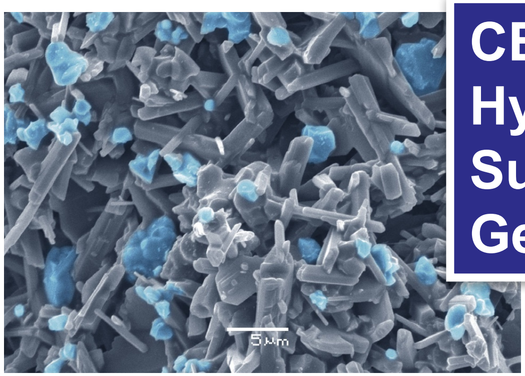
Bone Joint J 2016;98-B:1289–96.

M. Stravinskas et al. **Bone Joint res** 2016;5:427–435

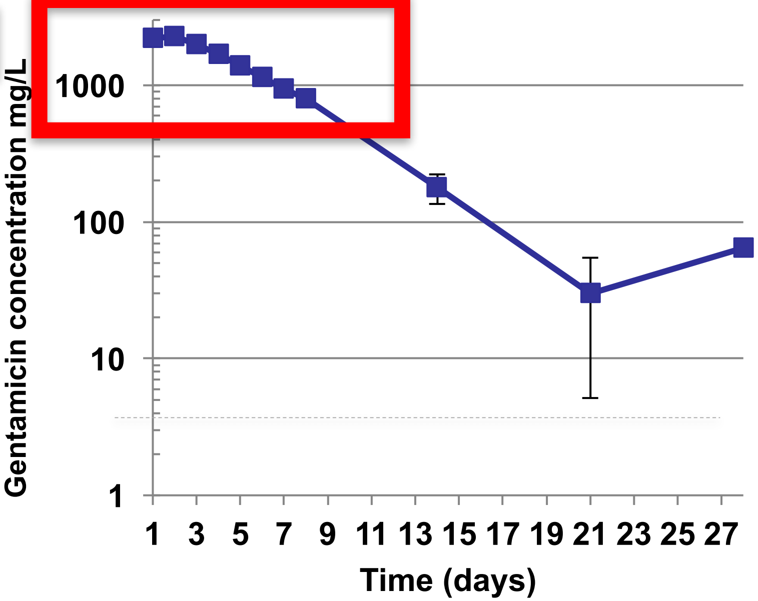
BJR

Pharmacokinetics of gentamicin eluted from a regenerating bone graft substitute

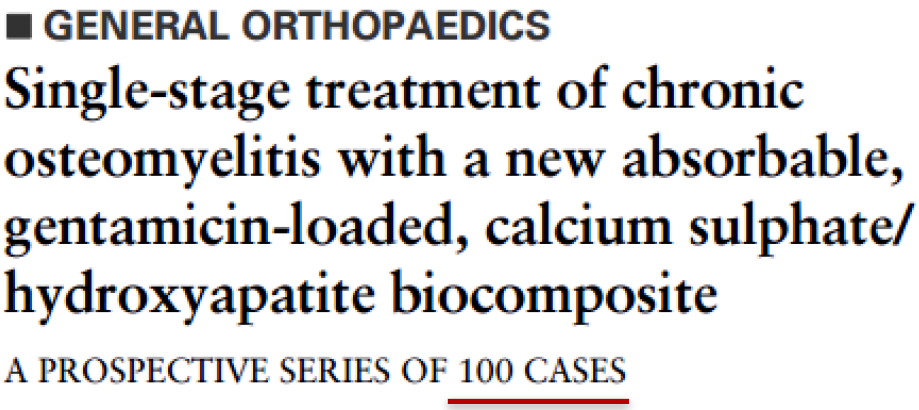
IN VITRO AND CLINICAL RELEASE STUDIES



CERAMENT G™
Hydroxyapatite
Sulfate de calcium
Gentamicine



Régénération osseuse, **Résorbable**, sous forme de **pâte**



■ GENERAL ORTHOPAEDICS

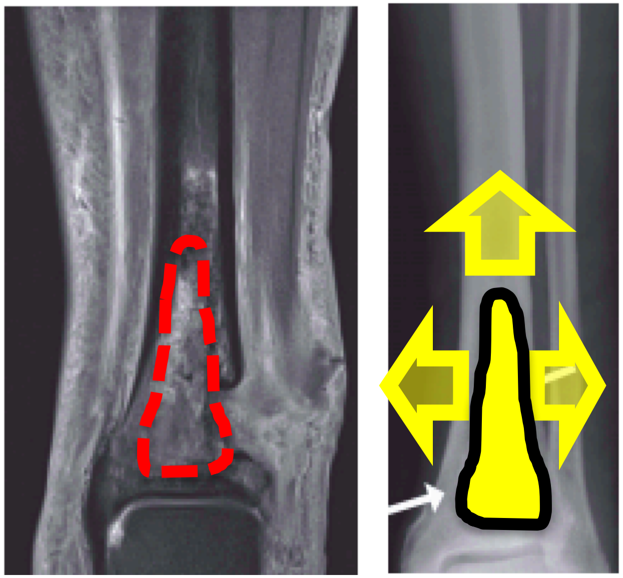
Single-stage treatment of chronic osteomyelitis with a new absorbable, gentamicin-loaded, calcium sulphate/hydroxyapatite biocomposite

A PROSPECTIVE SERIES OF 100 CASES

Mac Nally M. et al.
Oxford Bone infection unit

***Bone Joint J* 2016;98-B:1289–96.**

Chirurgie en 1 temps

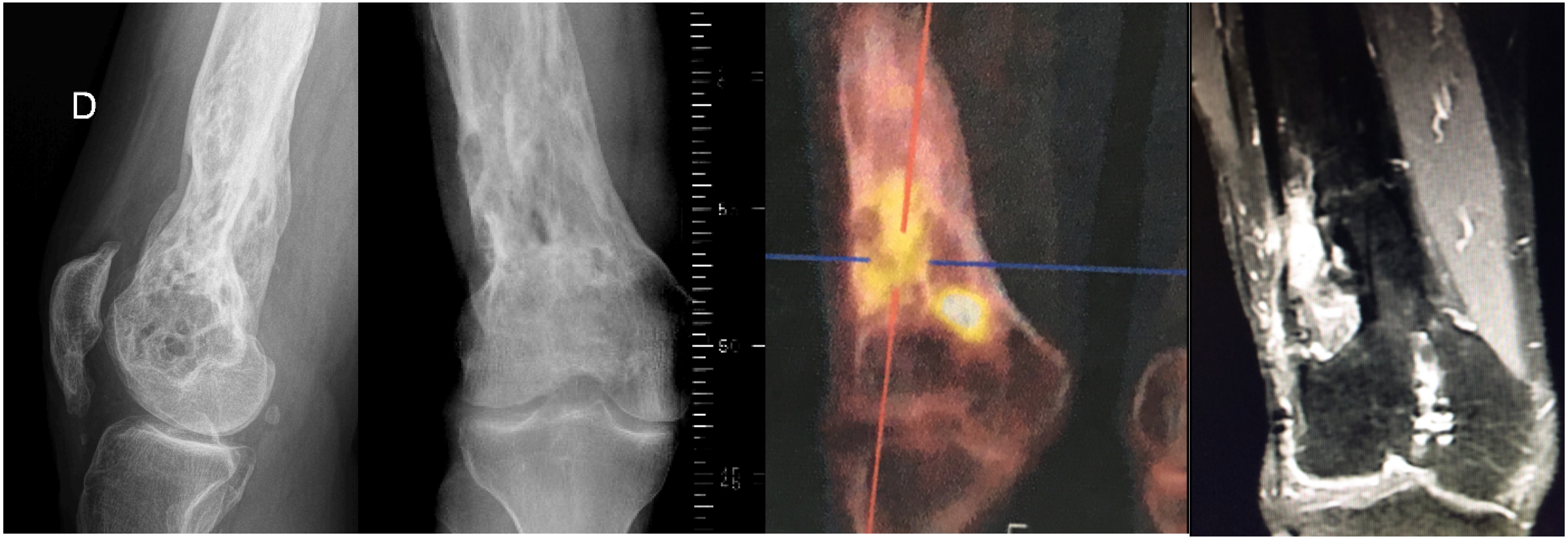


96% guérison

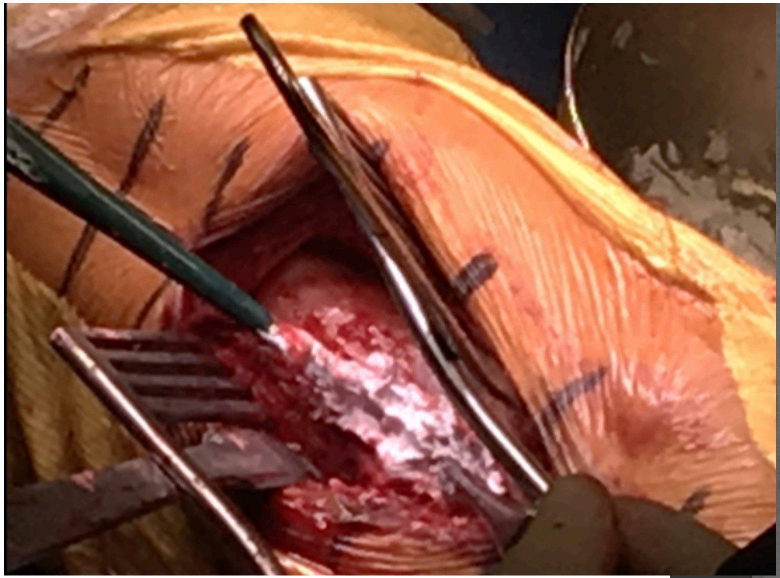
Homme de 62 ans. Fracture ouverte fémur distal il y a 20 ans, infection à *Pseudomonas*. Douleurs chroniques **mécaniques** sur arthrose handicapante. **CRP négative**, scintigraphie positive.

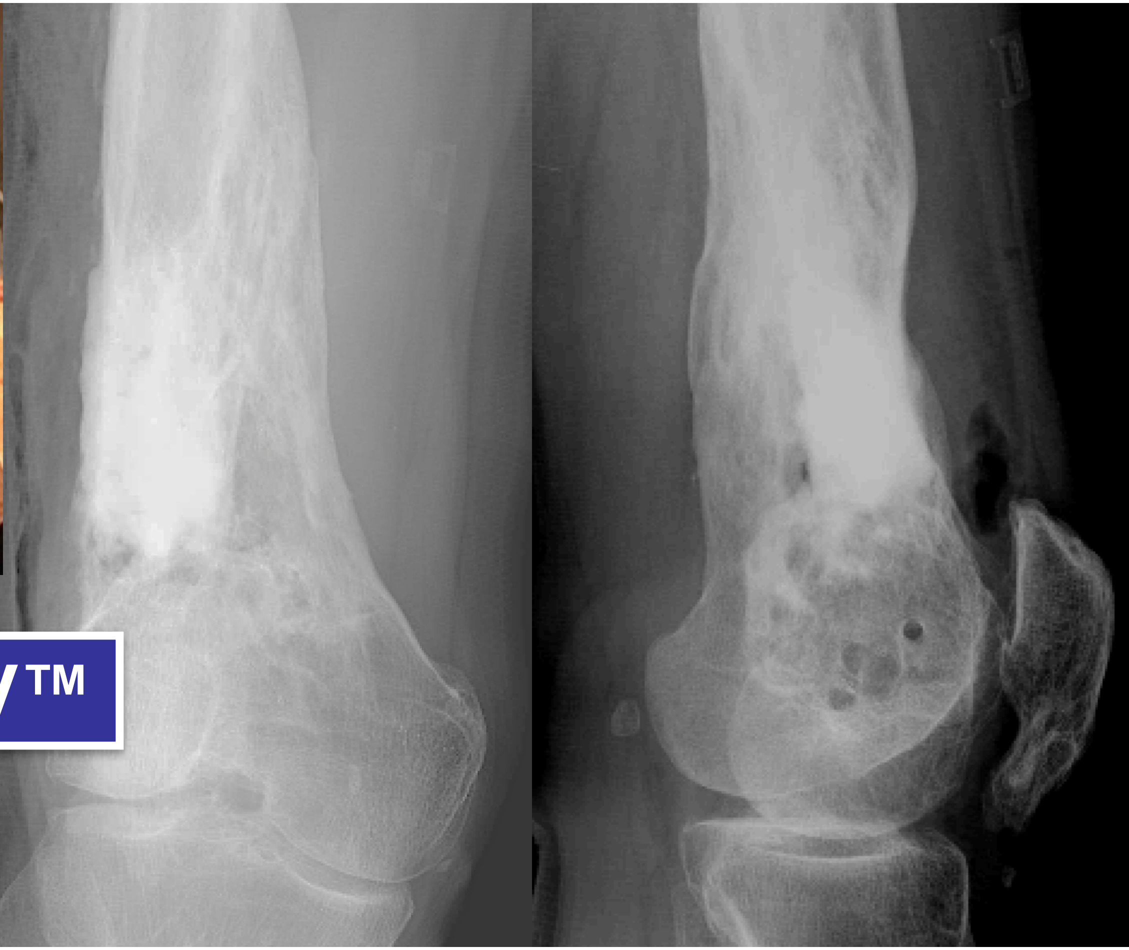
Indication de PTG

Séquelles d’ostéomyélite ?
Ostéomyélite chronique ?



PTG de 1ère intention ? **PTG de résection ?**

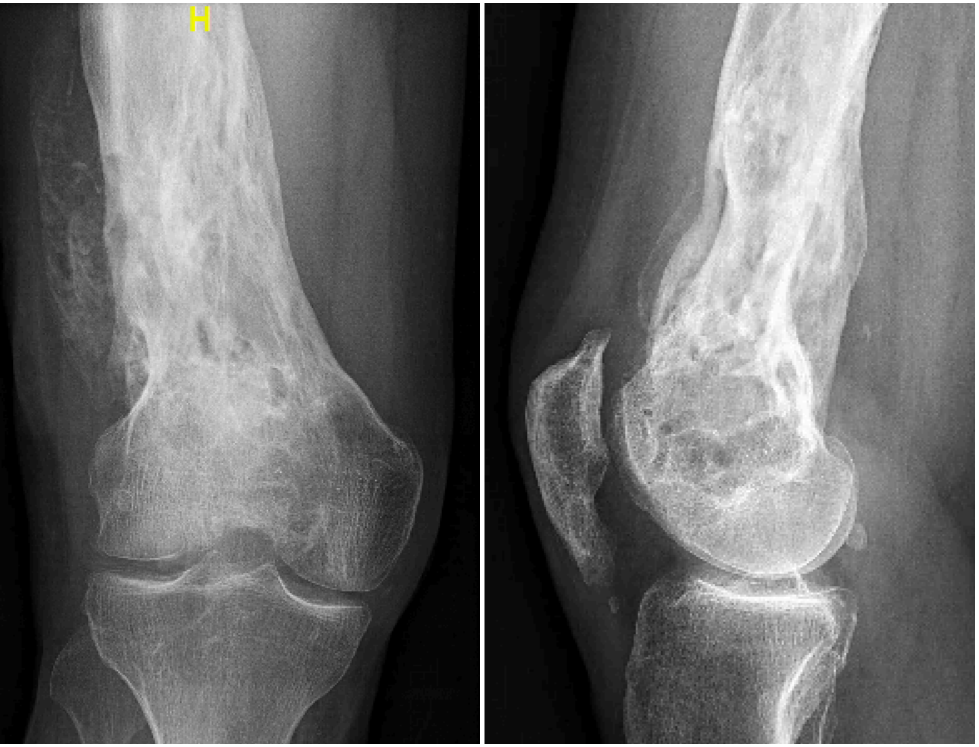




CERAMENT G™ & V™

***P. aeruginosa* en culture !**

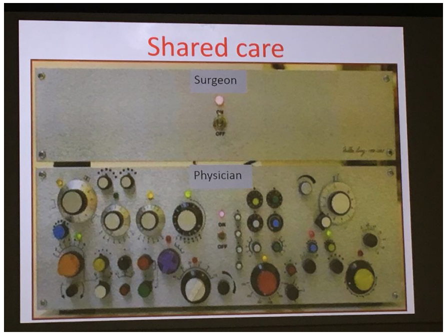
3 mois d’antibiotiques systémiques



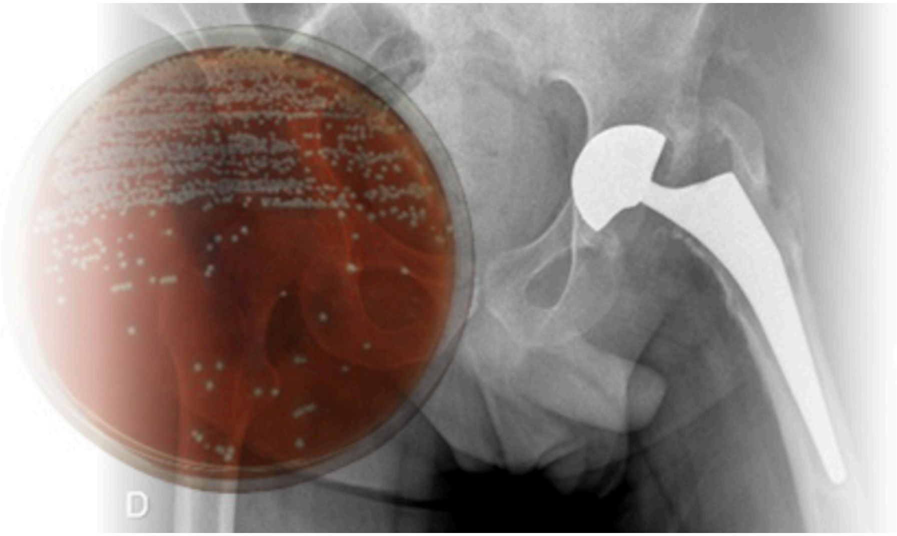
Plus aucune douleur à 6 mois

Antibiothérapie locale

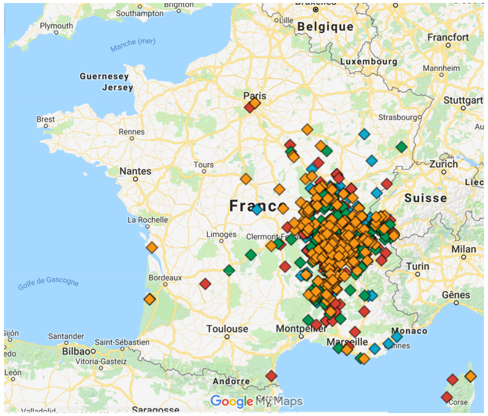
- Progrès considérables ces dernières années
- Nombreux « transporteurs »
- Combinaisons d'antibiotiques
- Fortes doses, exposition prolongée
- Importance des RCP CRIOAc pour déterminer la meilleurs stratégie médico-chirurgicale
- Et choisir **ensemble** ✌️😃✌️ le bon antibiotique !



http://www.crioac-lyon.fr



- Published cases
- Open acces studies in pdf
- All thesis in pdf
- **Newsletter**


Belgique
Francfort
Luxembourg
Plymouth
Southampton
Manche (mer)
Guernesey
Jersey
Paris
Stuttgart
Strasbourg
Brest
Rennes
Nantes
Tours
Zurich
Suisse
France
La Rochelle
Limoges
Clermont-Ferrand
Milan
Turin
Bordeaux
Golfe de Gascogne
Gênes
Toulouse
Montpellier
Monaco
Marseille
Santander
Saint-Sébastien
Bilbao
Vitoria-Gasteiz
Andorre
Corse
Saragosse
Google My Maps

Hospices Civils de Lyon

ciri Centre International de Recherche en Infectiologie

CRIOAc LYON

STAPHYLOCOQUES Centre National de Référence

UCB Lyon 1