8e journée scientifique du CRIOGO
Poitiers, 23 novembre 2018

Infections du rachis

Antibiothérapie : quels enjeux ?

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Université Claude Bernard Lyon 1

Infections du rachis

Antibiothérapie : quels enjeux ?

… ADULTES

… HORS TUBERCULOSE et BRUCELLOSE

Enjeux #1 : Cibler la physiopathologie

Rationnel physiopathologique : chronicité

Début des symptômes

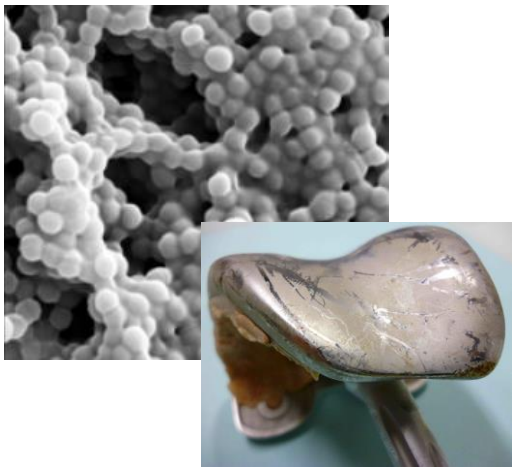
Diagnostic
Début de prise en charge

3-4 sem

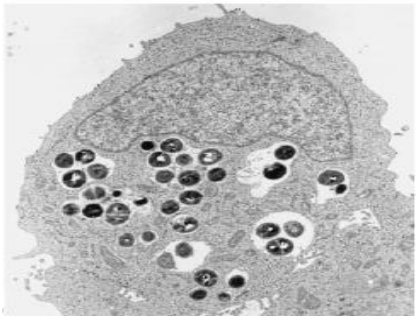
< 3-4 semaines
IOA AIGUE

> 3-4 semaines
IOA CHRONIQUE

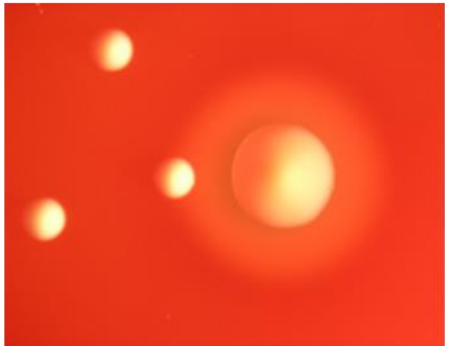
BIOFILM



INTRACELLULAIRE



SMALL COLONY VARIANTS

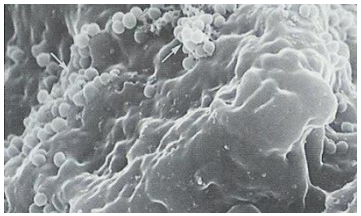


Rationnel physiopathologique : biofilm

Mécanisme de « tolérance » aux antibiotiques (≠ résistance)

Architecture du biofilm
Barrière physique à la pénétration

Induction de gènes de résistance spécifiques
Ex : pompes à efflux ndvB
+ augmentation fréquence mutations



Adsorption des antibiotiques
Ex : S. aureus et PNAG, acides téchoïques

Effet inoculum : densité bactérienne importante

Inactivation par les enzymes matricielles

Réduction du métabolisme bactérien

- Faible multiplication
- Diminution de l'expression des protéines membranaires (porines)
- Anaérobiose et inactivité des aminoglycosides

Stewart, Lancet 2001 – Cremet, DMID 2013 – Richards, Chembiochim 2009 – ***Olsen, Eur J Microbiol Infect Dis 2015***

Rationnel physiopathologique : biofilm

J Antimicrob Chemother 2014; **69** Suppl 1: i37–i40
doi:10.1093/jac/dku254

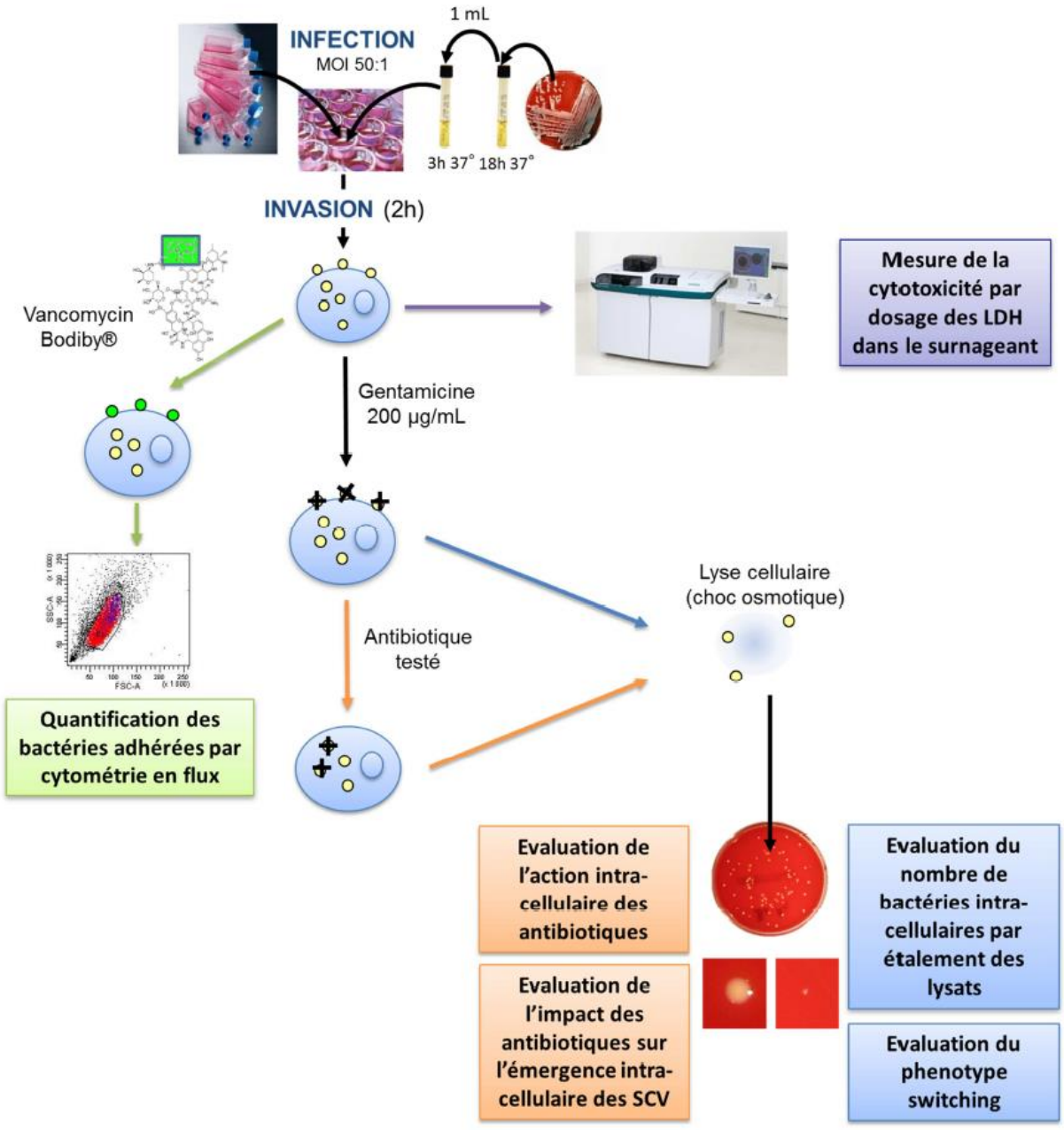
Journal of Antimicrobial Chemotherapy

Impact of bacterial biofilm on the treatment of prosthetic joint infections

Cédric Jacqueline* and Jocelyne Caillon

Antibiotics	Inhibition of biofilm formation (adhesion)	Biofilm penetration	Bactericidal activity in biofilm
Vancomycin	+	++	+
Linezolid	+	++	+
Daptomycin	+	+++	++
Rifampicin	+	+++	++
Moxifloxacin	+	++	++
Rifampicin + daptomycin	+	+++	+++
Rifampicin + vancomycin	+	++	++
Rifampicin + linezolid	+	+++	+++

Rationnel physiopathologique : intracellulaire



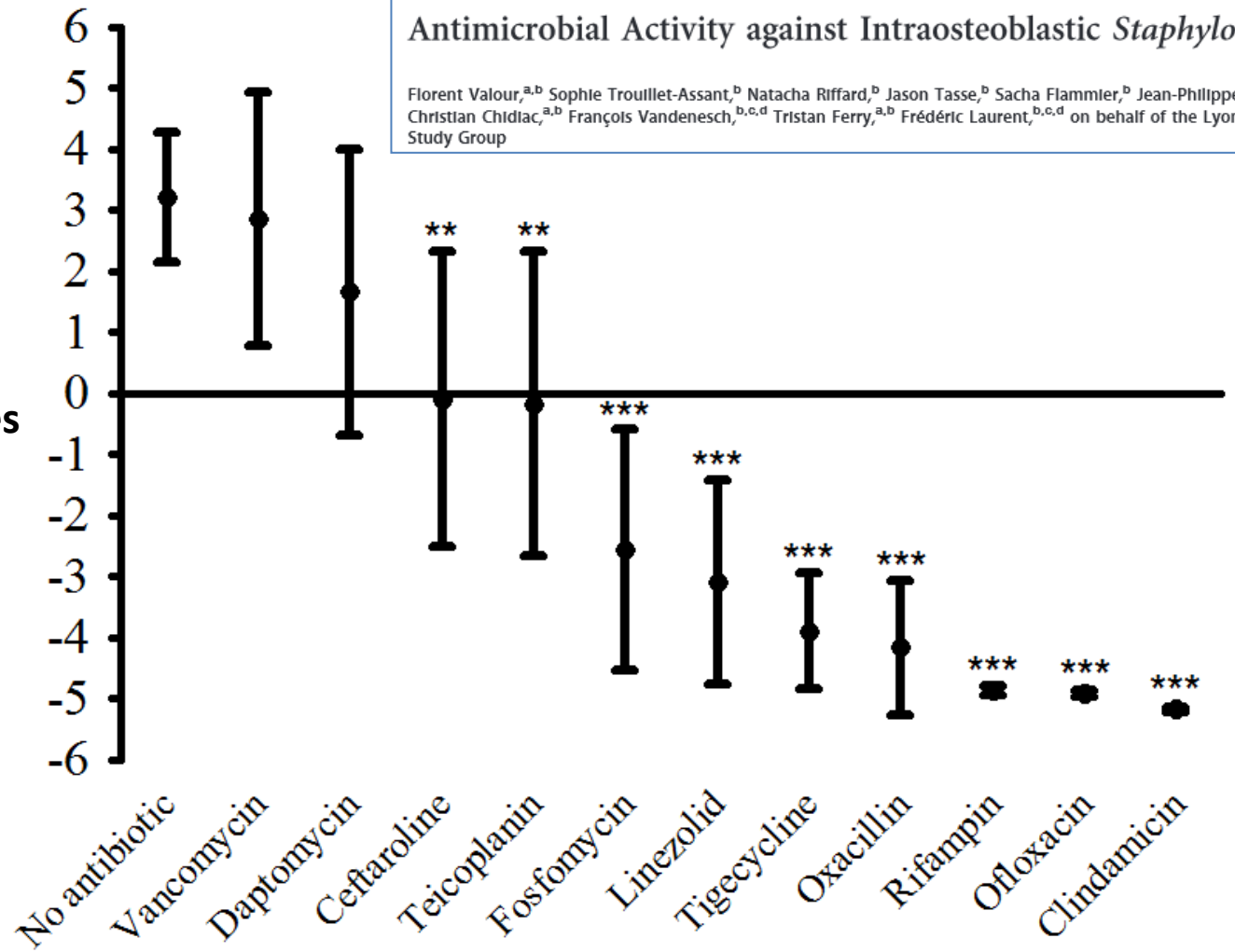
Rationnel physiopathologique : intracellulaire

AAC
Journals.ASM.org

Antimicrobial Activity against Intraosteoblastic *Staphylococcus aureus*

Florent Valour,[a,b] Sophie Trouillet-Assant,[b] Natacha Riffard,[b] Jason Tasse,[b] Sacha Flammier,[b] Jean-Philippe Rasigade,[b,c] Christian Chidiac,[a,b] François Vandenesch,[b,c,d] Tristan Ferry,[a,b] Frédéric Laurent,[b,c,d] on behalf of the Lyon Bone and Joint Infection Study Group

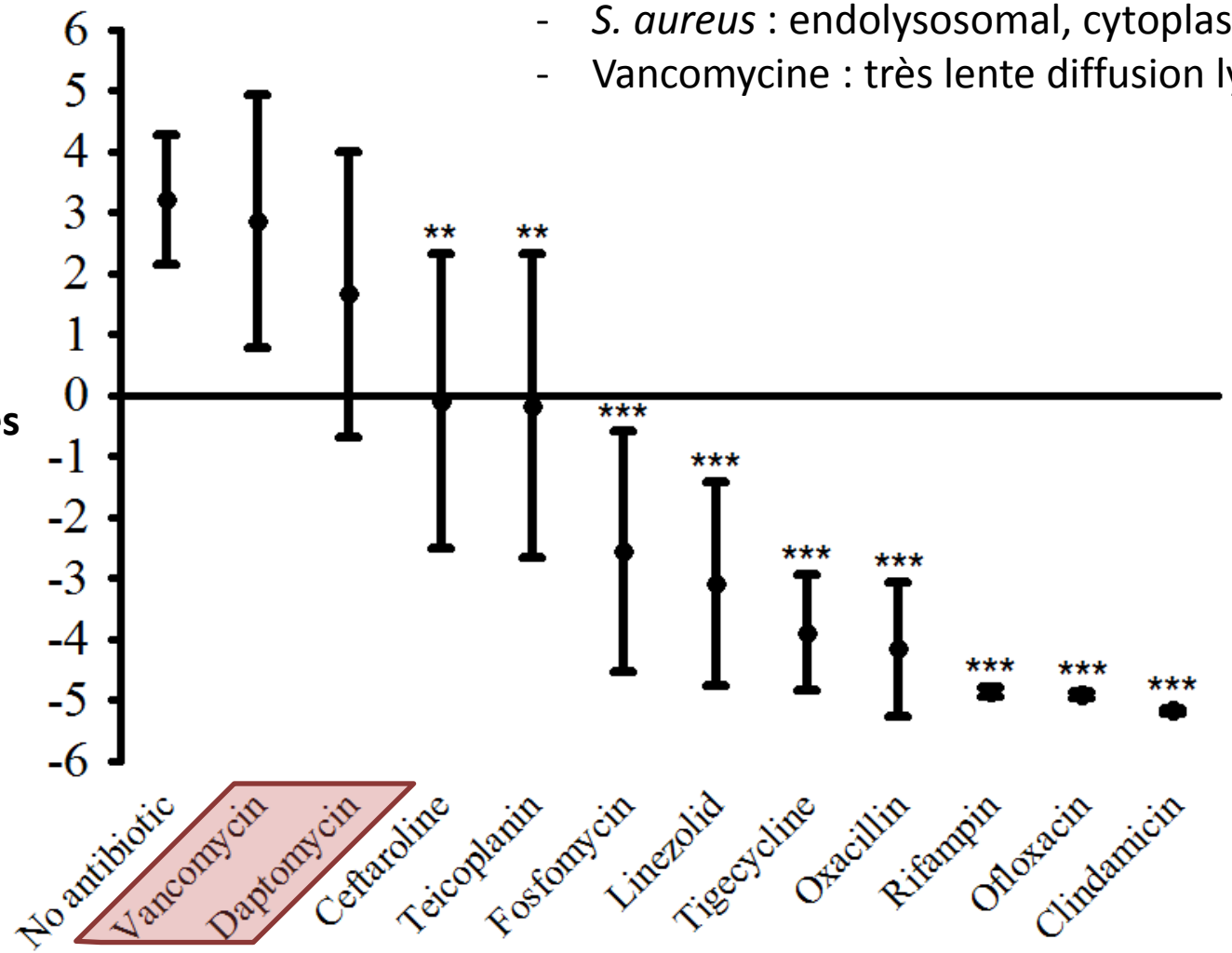
Δlog10 pour 100,000 cellules



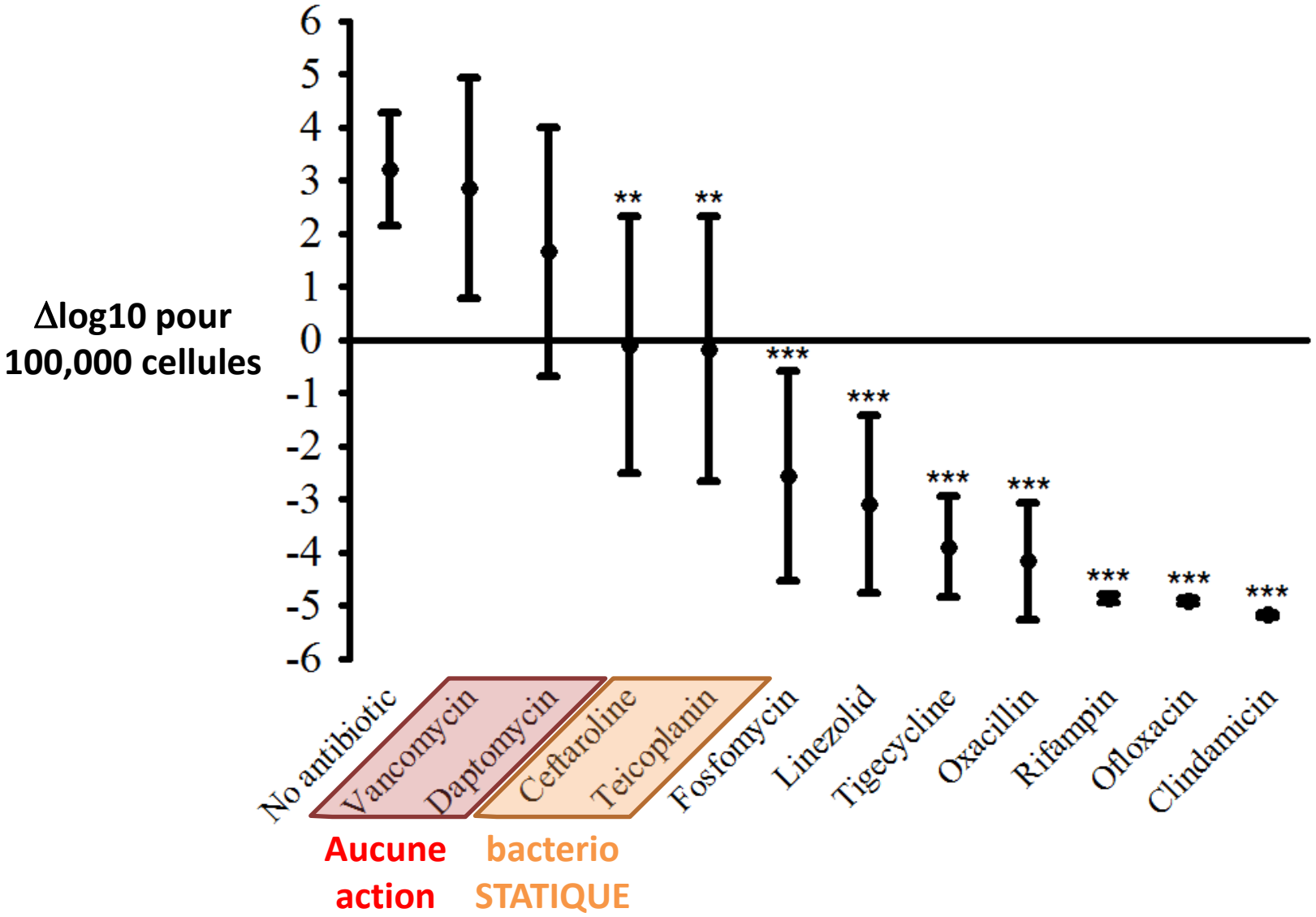
Rationnel physiopathologique : intracellulaire

Importance de la localisation intra-cellulaire

- *S. aureus* : endolysosomal, cytoplasme (30%)
- Vancomycine : très lente diffusion lysosomale



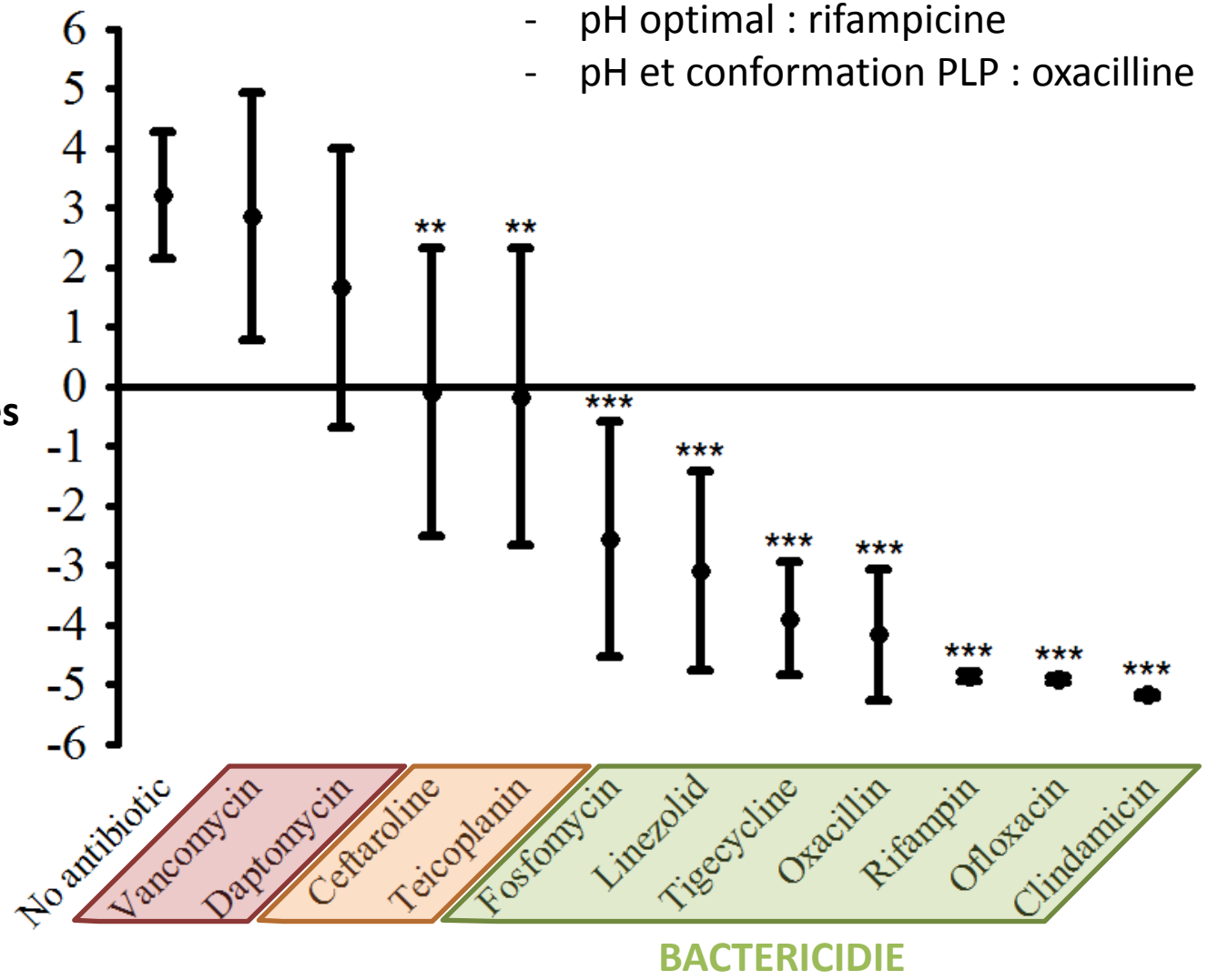
Rationnel physiopathologique : intracellulaire



Rationnel physiopathologique : intracellulaire

Importance des conditions physico-chimiques

- pH optimal : rifampicine
- pH et conformation PLP : oxacilline



Carryn et al. Infect Dis Clin North Am 2003 – Lemaire et al. AAC 2007, 2008 et 2009 – Sandberg et al. AAC 2009

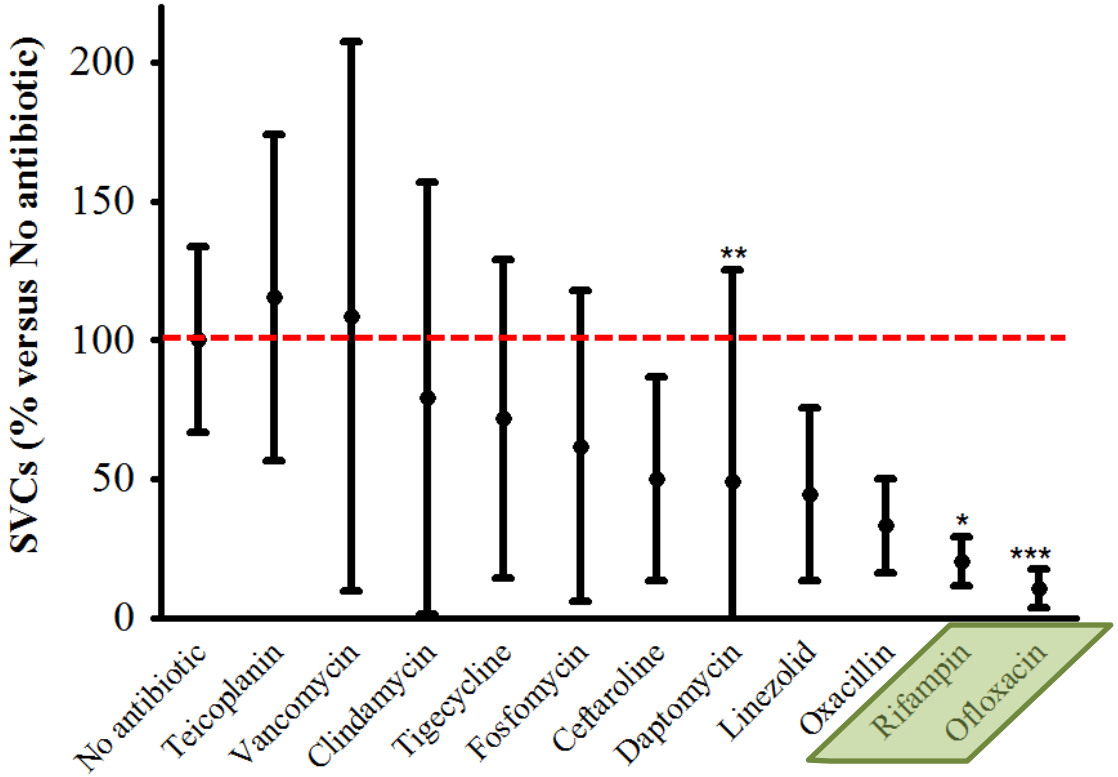
Rationnel physiopathologique : intracellulaire

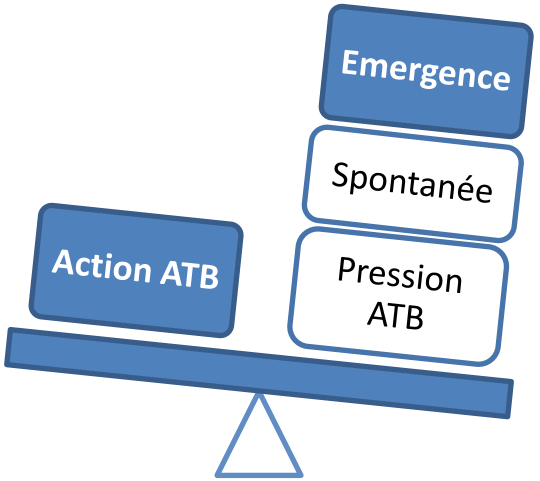
EMERGENCE INTRACELLULAIRE DE SCVs

AAC
Journals.ASM.org

Antimicrobial Activity against Intraosteoblastic *Staphylococcus aureus*

Florent Valour,[a,b] Sophie Trouillet-Assant,[b] Natacha Riffard,[b] Jason Tasse,[b] Sacha Flammier,[b] Jean-Philippe Rasigade,[b,c] Christian Chidiac,[a,b] François Vandenesch,[b,c,d] Tristan Ferry,[a,b] Frédéric Laurent,[b,c,d] on behalf of the Lyon Bone and Joint Infection Study Group





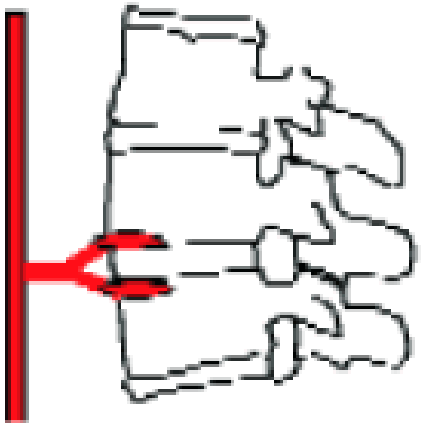
Concentration osseuse

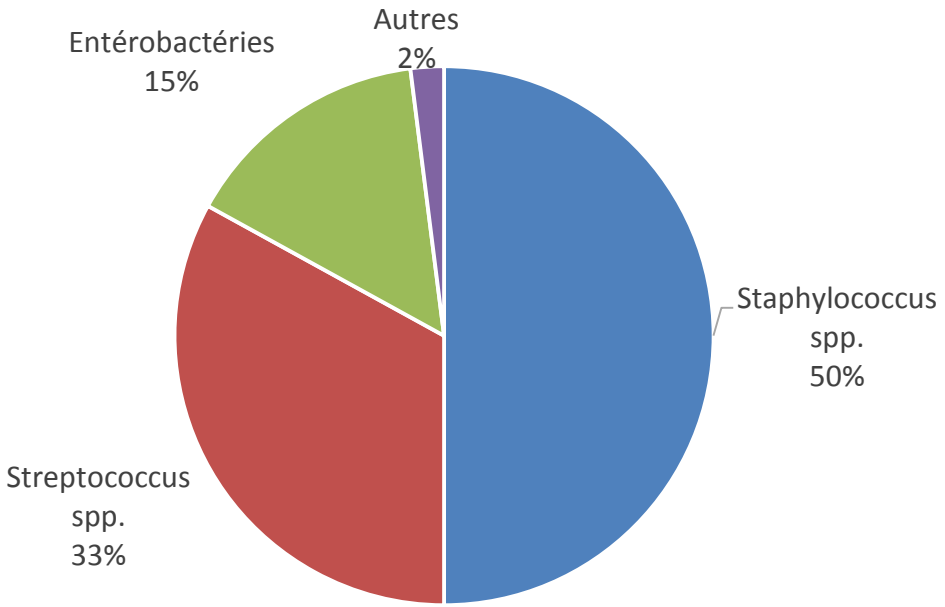
Enjeux #2 : Antibiothérapie probabiliste

SDI : rationnel microbiologique

+++ DISSÉMINATION HÉMATOGÈNE +++

Monomicrobien
Causes de bactériémies





Extension d'un foyer de contiguïté

Fistules digestives
Aorte
(ostéites sacrées / escarres)

Inoculation

Ponctions
Chirurgie

SDI : antibiothérapie probabiliste

Indication

NON SYSTEMATIQUE !

- Présentation septique grave
- Post-opératoire immédiat (troubles neurologiques)
- Forte suspicion clinico-radiologique sans documentation

SDI : antibiothérapie probabiliste

Indication

NON SYSTEMATIQUE !

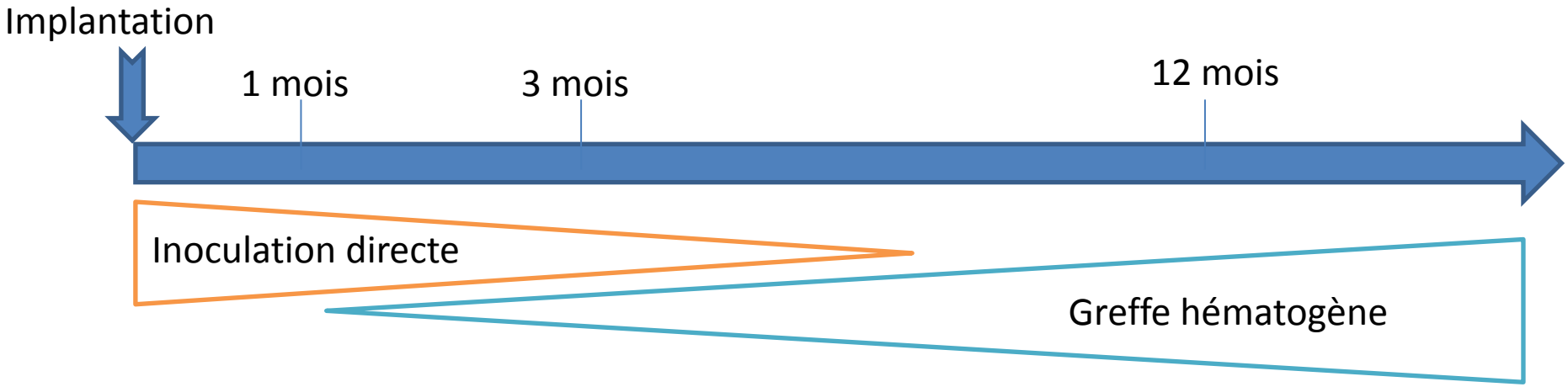
- Présentation septique grave
- Post-opératoire immédiat (troubles neurologiques)
- Forte suspicion clinico-radiologique sans documentation

Nature

- Non consensuelle, peu (pas) d'études
- Selon porte d'entrée et sévérité du tableau clinique

SPILF 2007	pénicilline M IV (oxa/cloxacilline 150 mg/kg/j) + gentamicine (3-4 mg/kg/j)
IDSA 2015	peu spécifié vancomycine + [ciprofloxacine ou céfépime ou carbapénème]

Infection / matériel : rationnel microbiologique



Surgical Neurology International

SNI: Spine, a supplement to Surgical Neurology International

OPEN ACCESS

Editor-in-Chief:
Nancy E. Epstein, MD
Winthrop University
Hospital, Mineola, NY, USA

Infection with spinal instrumentation: Review of pathogenesis, diagnosis, prevention, and management

Manish K. Kasliwal, Lee A. Tan, Vincent C. Traynelis

Infection / matériel : rationnel microbiologique

Authors [reference #]	Causative organisms (%)	Early infection (<90 days) vs. late infection (>90 days) (%)	Monomicrobial vs. polymicrobial (%)
Weinstein *et al.*[143]	*Staphylococcus aureus* 73.9 *Staphylococcus* epi 10.9 *Enterococcus* faecalis 6.5 *Pseudomonas* species 4.3 *Proteus mirabilis* 2.2	Early 93.5 Late 6.5	Monomicrobial 76.1 Polymicrobial 23.9
Cahill *et al.*[16]	*S. aureus* 47.5 MSSA 24.6 MRSA 16.4 Sensitivity unavailable 6.6 *S. epidermidis* 19.7 *Pseudomonas aeruginosa* 16.4 *Escherichia coli* 14.8	Early 52.5 Late 47.5	Monomicrobial 65.6 Polymicrobial 34.4
Fang *et al.*[40]	*S. aureus* 56.3 *S. epidermidis* 37.5 *Enterococcus* 22.9 *E. coli* 8.3 *P. aeruginosa* 8.3 *Enterobacter* 6.3 *Streptococcus* 4.2 *Candida* 2.1	Early 83.3 Late 16.7	Monomicrobial 52.1 Polymicrobial 47.9
Kim *et al.*[72]	MRSA 35 MSSA 30 No growth 20	Early 70 Late 30	Monomicrobial 100 Polymicrobial 0
Levi *et al.*[78]	*S. aureus* 52.9 *Streptococcus* sp. 5.9 *Proteus mirabilis* 5.9 Mixed organisms 29.4 No growth 5.9	Early 94.1 Late 5.9	Monomicrobial 70.6 Polymicrobial 29.4
Clark *et al.*[36]	Culture x 3 days-No growth 90 Culture x 7 days- *S. epidermidis* 50 *Propionibacterium acnes* 25 *Enterococcus* 16.7	Early 0 Late 100	Monomicrobial 100 Polymicrobial 0
Muschik *et al.*[89]	*S. aureus* 13.3 *S. epidermidis* 4.4 No growth 82.2	Early 0 Late 100	Monomicrobial 100 Polymicrobial 0
Richards *et al.*[107]	*Propionibacterium acnes* 52.2 *S. epidermidis* 17.4 *Micrococcus varians* 4.3 *S. aureus* 4.3 No growth 21.7	Early 0 Late 100	Monomicrobial 100 Polymicrobial 0

EARLY INFECTIONS
(< 90 days)

- Plurimicrobien 25%
- *S. aureus* 50-75%
- SCN 10-30%
- Entérocoque 5-20%
- BGN 5-30%

LATE INFECTIONS
(> 90 days)

- Monomicrobien
- *S. aureus* 0-10%
- SCN 5-50%
- Entérocoque 15%
- *C. acnes* 25-50%
- BGN 0%

Infection / matériel : antibiothérapie probabiliste

PAS DE RECOMMENDATIONS SPECIFIQUES

- Large spectre étiologique possible
- Caractère plurimicrobien
- Recommandations infections / prothèse

BETA-LACTAMINE à LARGE SPECTRE
+
VANCOMYCINE

Usuellement : VANCOMYCINE + PIPERACILLINE-TAZOBACTAM

Infection / matériel : antibiothérapie probabiliste

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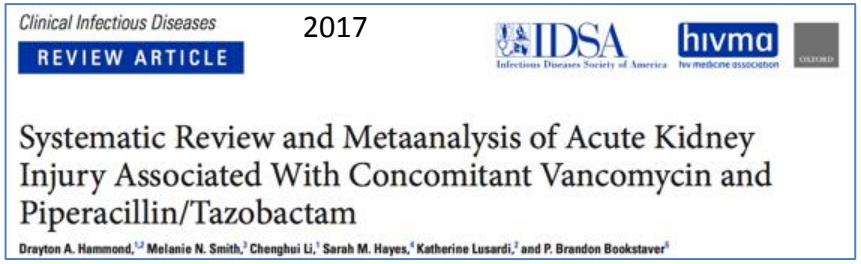


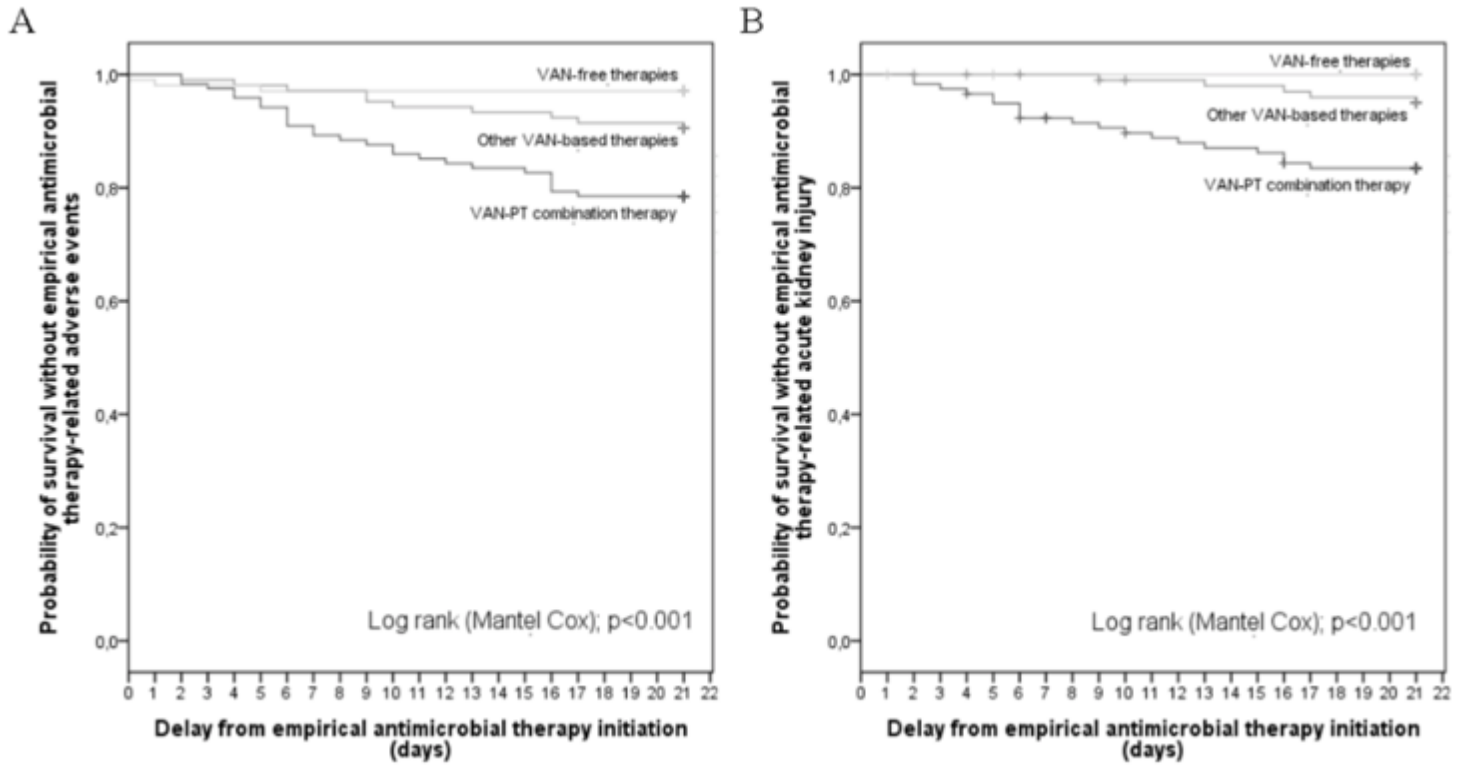
Infection / matériel : antibiothérapie probabiliste

Tolerability of prosthetic joint infection empirical antimicrobial therapy: a prospective cohort study

AAC 2018

Claire Triffault-Fillit[1,2,*], Florent Valour[1,2,3], Ronan Guillo[1,2], Michel Tod[1,4,5], Sylvain Goutelle[1,4,5], Sébastien Lustig[1,5,6], Michel-Henry Fessy[1,5,7], Christian Chidiac[1,2,3], and Tristan Ferry[1,2,3] on behalf of the Lyon BJI study group

PJI avec traitement empirique
333 patients
42 effets secondaires (12.6%)
FR ES et IRA : VAN et VAN-PTZ
Pas (peu) de surdosage



Infection / matériel : antibiothérapie probabiliste

PAS DE RECOMMENDATIONS SPECIFIQUES

- Large spectre étiologique possible
- Caractère plurimicrobien
- Recommandations infections / prothèse

↓

BETA-LACTAMINE à LARGE SPECTRE
+
VANCOMYCINE

Usuellement : VANCOMYCINE + PIPERACILLINE-TAZOBACTAM

Time to switch ! VANCOMYCINE + AXEPIM +/- METRONIDAZOLE
DAPTOMYCINE + …

Infection / matériel : antibiothérapie probabiliste

PAS DE RECOMMENDATIONS SPECIFIQUES

- Large spectre étiologique possible
- Caractère plurimicrobien
- Recommandations infections / prothèse

↓

BETA-LACTAMINE à LARGE SPECTRE
+
VANCOMYCINE

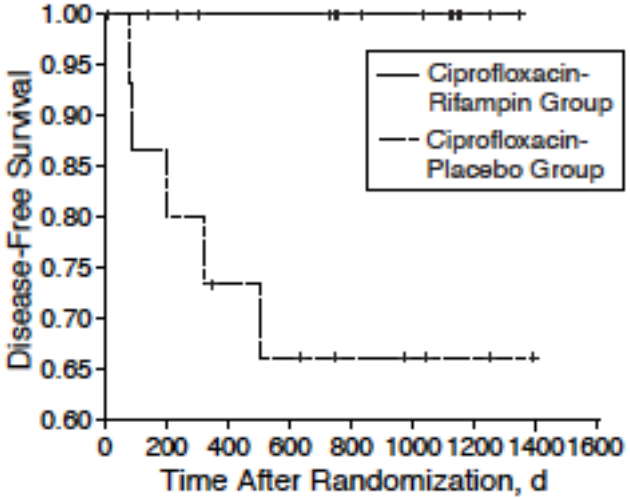
Usuellement : VANCOMYCINE + PIPERACILLINE-TAZOBACTAM

Time to switch !	VANCOMYCINE + AXEPIM +/- METRONIDAZOLE DAPTOMYCINE + …
ISO tardives	VANCOMYCINE + DALACINE ?

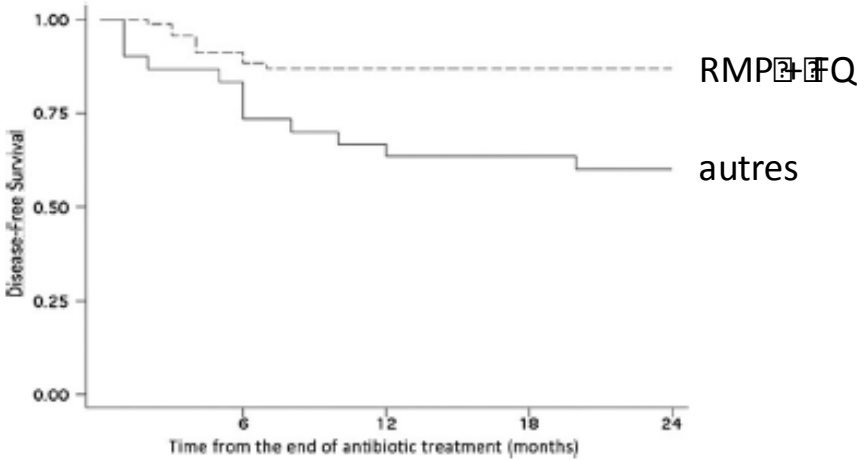
Enjeux #3 : Place de la rifampicine et des quinolones

Antibiothérapie ciblée : rôle de la rifampicine

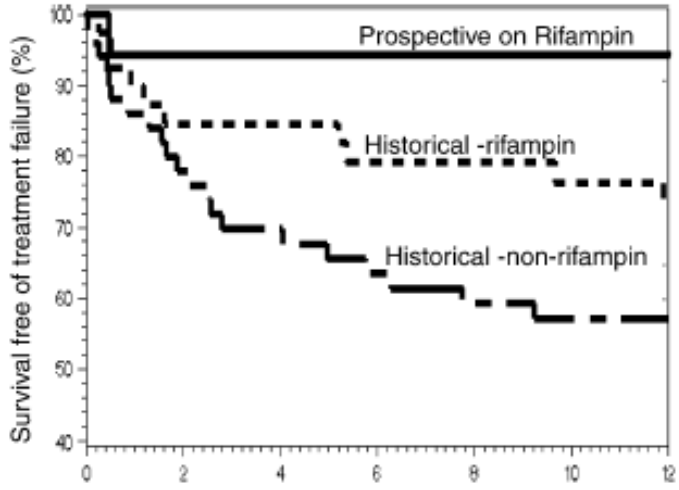
Zimmerli et al, JAMA 1998
ECR, 33 patients, IOA aiguë / matériel à SA



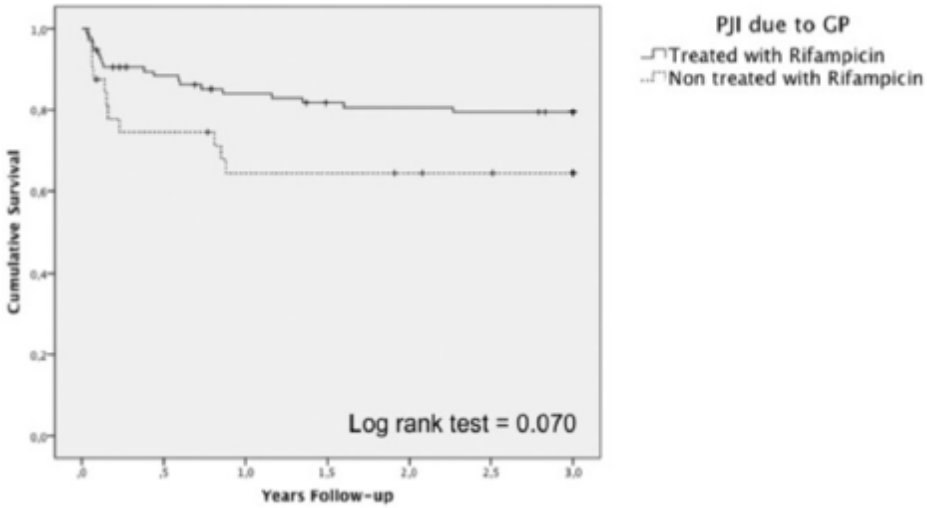
Senneville et al, CID 2011
98 PJI à SA



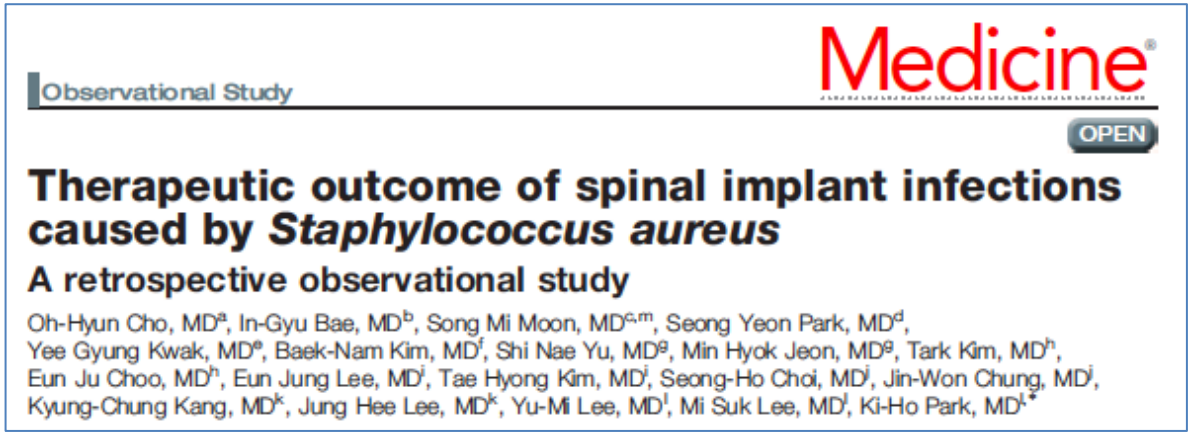
El Helouet al, EJCMID 2010
91 PJI SA



Tornero al, 2014
160 PJI SA aiguës



Infection / matériel : place de la rifampicine



Observational Study

Medicine

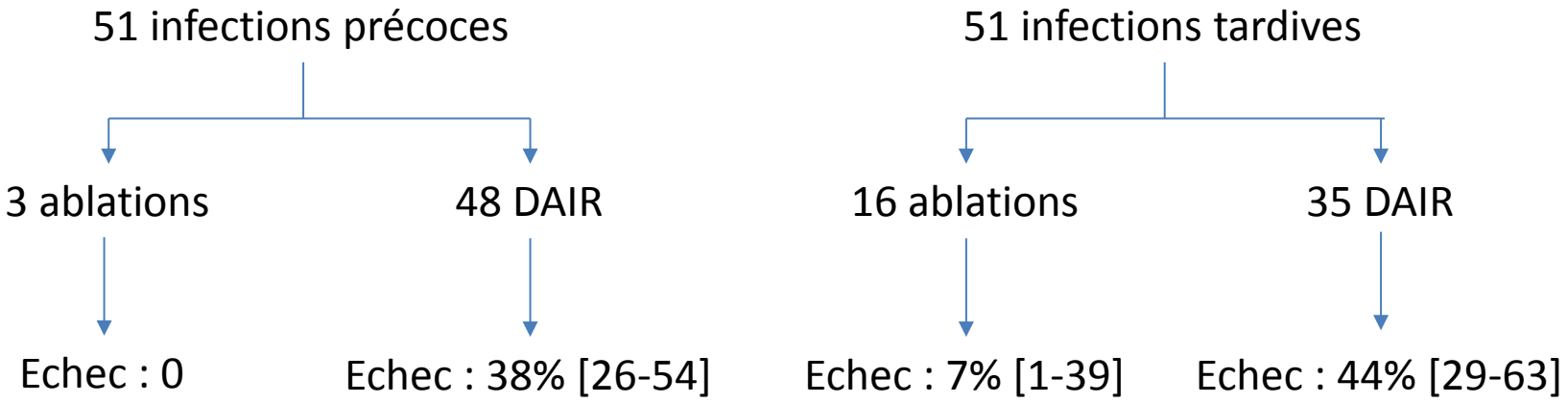
OPEN

Therapeutic outcome of spinal implant infections caused by *Staphylococcus aureus*

A retrospective observational study

Oh-Hyun Cho, MD[a], In-Gyu Bae, MD[b], Song Mi Moon, MD[c,m], Seong Yeon Park, MD[d], Yee Gyung Kwak, MD[e], Baek-Nam Kim, MD[f], Shi Nae Yu, MD[g], Min Hyok Jeon, MD[g], Tark Kim, MD[h], Eun Ju Choo, MD[h], Eun Jung Lee, MD[i], Tae Hyong Kim, MD[i], Seong-Ho Choi, MD[i], Jin-Won Chung, MD[i], Kyung-Chung Kang, MD[k], Jung Hee Lee, MD[k], Yu-Mi Lee, MD[l], Mi Suk Lee, MD[l], Ki-Ho Park, MD[k]*

102 patients
75% MRSA
50% précoce (< 1 mois)
81% DAIR, 19% ablation
Durée médiane ATB 7,4 sem



FR d'échec : MRSA, rétention de l'implant … et …

Infection / matériel : place de la rifampicine

Observational Study

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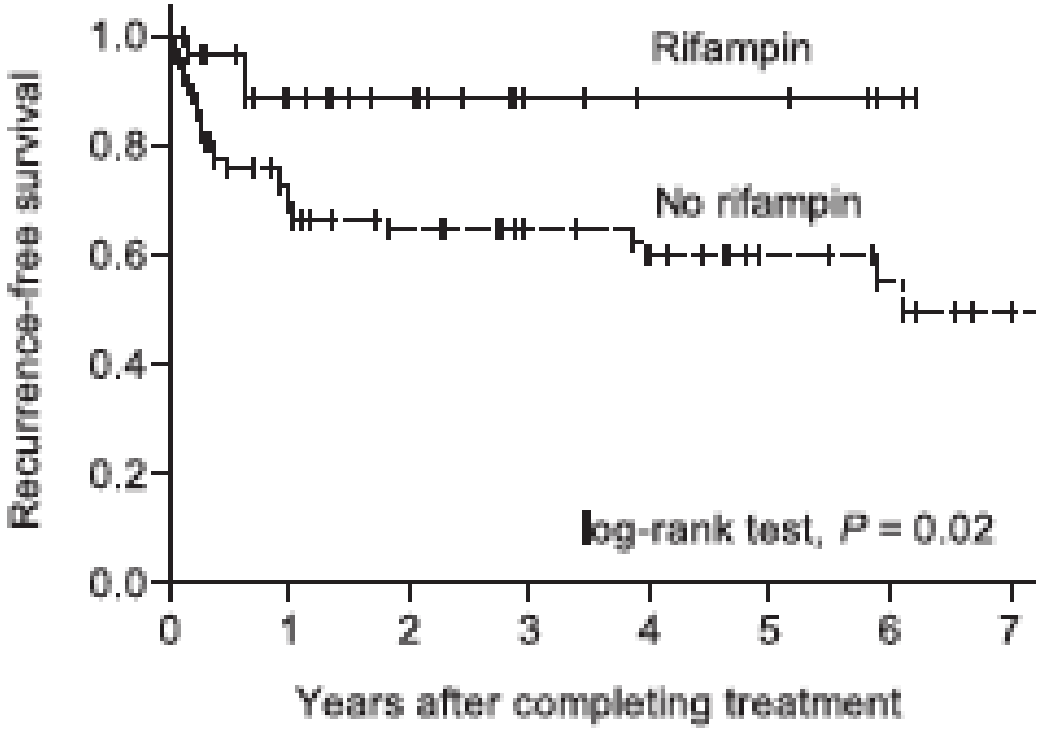
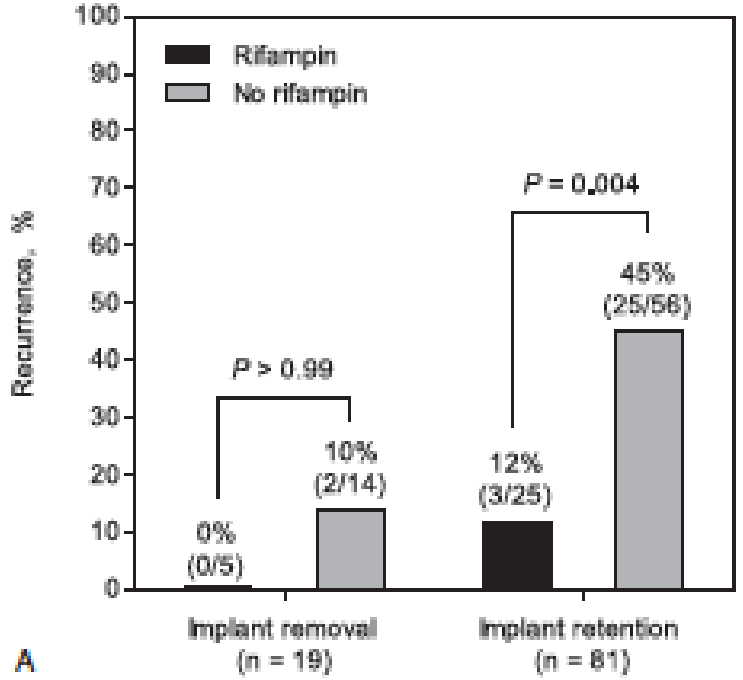




Infection / matériel : place de la rifampicine

STREPTO / ENTEROCOQUES

THE BONE & JOINT JOURNAL

■ ARTHROPLASTY

High failure rates in treatment of streptococcal periprosthetic joint infection

RESULTS FROM A SEVEN-YEAR RETROSPECTIVE COHORT STUDY

D. Akgün,
A. Trampuz,
C. Perka,
N. Renz

Aims

To investigate the outcomes of treatment of streptococcal periprosthetic joint infection (PJI) involving total knee and hip arthroplasties.

Patients and Methods

Characteristics of prosthetic joint infections due to *Enterococcus* sp. and predictors of failure: a multi-national study

E. Tornero[1], E. Senneville[2], G. Euba[3], S. Petersdorf[4], D. Rodriguez-Pardo[5], B. Lakatos[6], M. C. Ferrari[7], M. Pilares[8], A. Bahamonde[9], R. Trebse[10], N. Benito[11], L. Sorli[12], M. D. del Toro[13], J. M. Baraiaetxaburu[14], A. Ramos[15], M. Riera[16], A. Jover-Sáenz[17], J. Palomino[18], J. Ariza[3] and A. Soriano[1] on behalf of the European Society Group of Infections on Artificial Implants (ESGIAI)

Outcome of patients with streptococcal prosthetic joint infections with special reference to rifampicin combinations

E. Riaux[1], M. Titecat[2], O. Robineau[3], J. Lora-Tamayo[4], Y. El Samad[5], M. Etienne[1], N. Frebourg[6], N. Blondiaux[7], B. Brunschweiler[8], F. Dujardin[9], E. Beltrand[10], C. Loiez[2], V. Cattoir[11], J.P. Canarelli[8], C. Hulet[12], M. Valette[3], S. Nguyen[3], F. Caron[1], H. Migaud[13], and E. Senneville[3,14*] on behalf of the G4 bone and joint infection study group (G4BJIS)

The Not-So-Good Prognosis of Streptococcal Periprosthetic Joint Infection Managed by Implant Retention: The Results of a Large Multicenter Study

Jaime Lora-Tamayo,[1,2] Éric Senneville,[3] Alba Ribera,[2,4,5] Louis Bernard,[6,7] Michel Dupon,[8] Valérie Zeller,[9] Ho Kwong Li,[5] Cédric Arvieux,[7,10] Martin Clauss,[11] Ilker Uçkay,[12] Dace Vigante,[13] Tristan Ferry,[14] José Antonio Iribarren,[15] Trisha N. Peel,[16] Parham Sendi,[17] Nina Gorišek Miksić,[18] Dolors Rodríguez-Pardo,[2,19] María Dolores del Toro,[2,20] Marta Fernández-Sampedro,[2,21] Ulrike Dapunt,[22] Kaisa Huotari,[23] Joshua S. Davis,[24] Julián Palomino,[2,20] Danielle Neut,[25] Benjamin M. Clark,[25] Thomas Gottlieb,[27] Rihard Trebše,[28] Alex Soriano,[2,29,30] Alberto Bahamonde,[31] Laura Guío,[2,32] Alicia Rico,[33] Mauro J. C. Salles,[34] M. José G. Pais,[35] Natividad Benito,[2,36] Melchor Riera,[2,37] Lucía Gómez,[38] Craig A. Aboltins,[39] Jaime Esteban,[40] Juan Pablo Horcajada,[41] Karina O'Connell,[42] Matteo Ferrari,[43] Gábor Skaliczki,[44] Rafael San Juan,[1,2] Javier Cobo,[2,45] Mar Sánchez-Somolinos,[2,46] Antonio Ramos,[47] Efthymia Giannitsioti,[48] Alfredo Jover-Sáenz,[49] Josu Mirena Baraia-Etxaburu,[50] José María Barbero,[51] Peter F. M. Choong,[52] Nathalie Asseray,[7,53] Séverine Ansart,[7,54] Gwenäel Le Moal,[7,55] Werner Zimmerli,[11] and Javier Ariza[2,4], for the Group of Investigators for Streptococcal Prosthetic Joint Infection[a]

CUTIBACTERIUM ACNES

AAC Journals.ASM.org

Role of Rifampin against *Propionibacterium acnes* Biofilm *In Vitro* and in an Experimental Foreign-Body Infection Model

Ulrika Furustrand Tafin,[a] Stéphane Corvec,[a,b] Bertrand Betrisey,[a] Werner Zimmerli,[c] and Andrej Trampuz[a]

INTERET DISCUTE – PAS DE DONNEES RACHIS

Infection / matériel : place des fluoroquinolones

STAPHYLOCOQUES

International Orthopaedics (SICOT) (2015) 39:1785–1791
DOI 10.1007/s00264-015-2819-2

ORIGINAL PAPER

Predictors of treatment outcome in prosthetic joint infections treated with prosthesis retention

Ari-Pekka Puhto[1] · Teija Puhto[2] · Tuukka Niinimäki[1] · Pasi Ohtonen[3] · Juhana Leppilahti[1] · Hannu Syrjälä[2]

113 PJI aiguës
66 SA et SCN

- RMP + ciprofloxacine (n=23)
- RMP + autres que FQ (n=29) : HR 6
- Pas de RMP (n=14) : HR 14.4

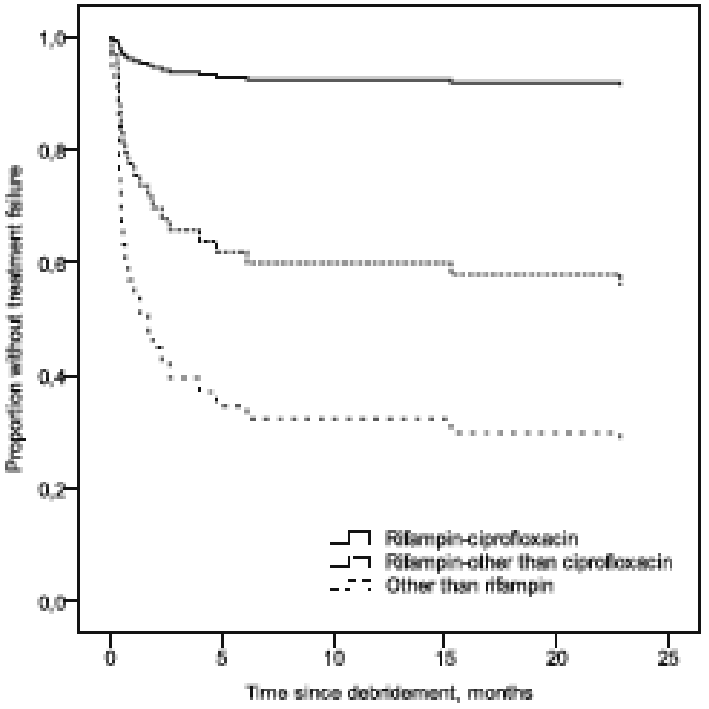


Fig. 3 Survival curves for staphylococcal prosthetic joint infections (PJIs) based on antibiotic treatment group

Infection / matériel : place des fluoroquinolones

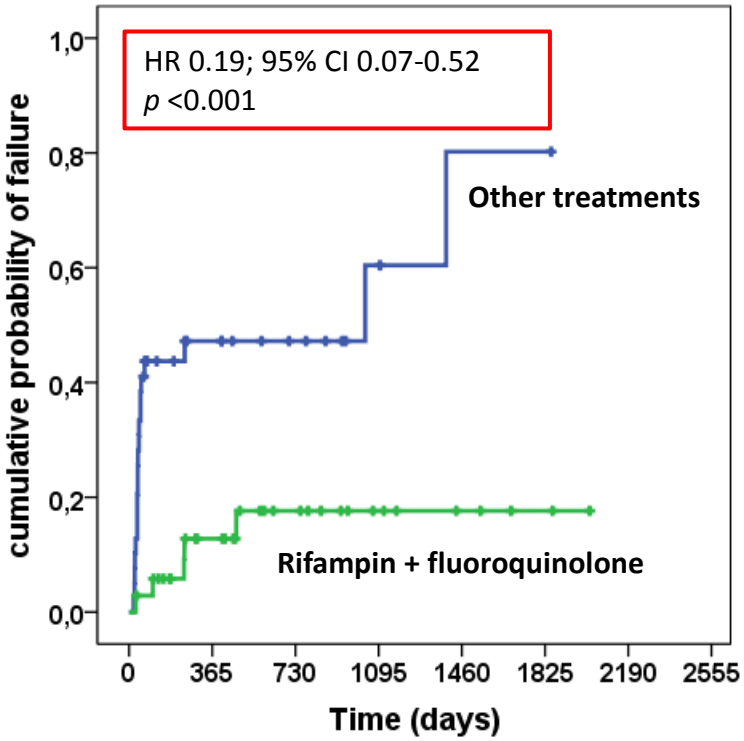
STAPHYLOCOQUES

2018

Staphylococcal acute post-operative PJI treated with DAIR and impact of rifampin: a retrospective cohort study in France

A. Becker, C. Triffault-Fillit, E. Forestier, O. Lesens, C. Cazorla, S. Descamps, B. Boyer, C. Chidiac, and T. Ferry on behalf of the IPASTAPH Study Group

79 PJI traitées par DAIR
21,6% d'échec
74% sous RMP, 44% sous RMP+FQ



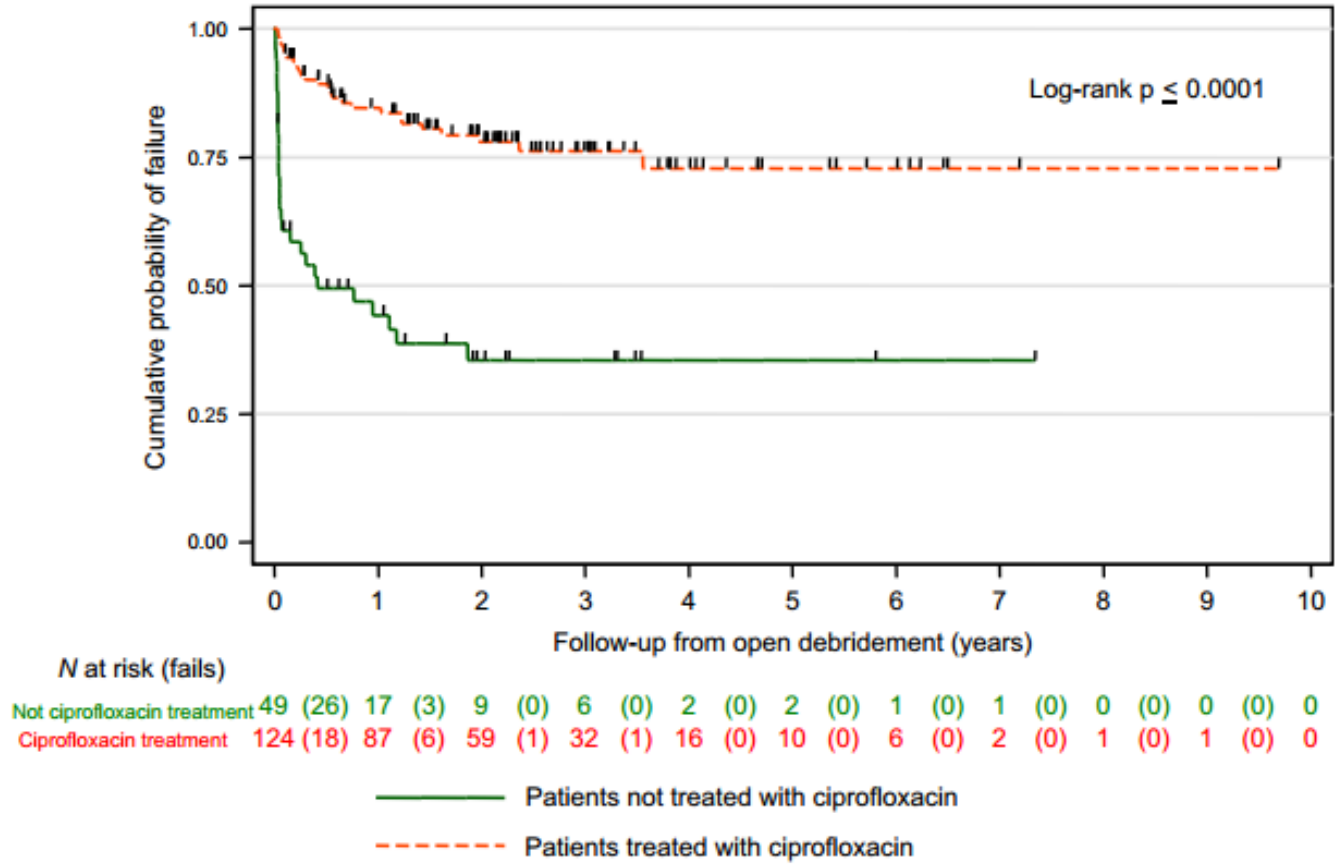
Infection / matériel : place des fluoroquinolones

BGN

Gram-negative prosthetic joint infection: outcome of a debridement, antibiotics and implant retention approach. A large multicentre study

D. Rodríguez-Pardo[1], C. Pigrau[1], J. Lora-Tamayo[2], A. Soriano[3], M. D. del Toro[4], J. Cobo[5], J. Palomino[6], G. Euba[2], M. Riera[7], M. Sánchez-Somolinos[8], N. Benito[9], M. Fernández-Sampedro[10], L. Sorli[11], L. Guio[12], J. A. Iribarren[13], J. M. Baraia-Etxaburu[14], A. Ramos[15], A. Bahamonde[16], X. Flores-Sánchez[17], P. S. Corona[17] and J. Ariza[2] on behalf of the REIPI Group for the Study of Prosthetic Infection*

Clinical Microbiology and Infection, Volume 20 Number 11, November 2014



Enjeux #4 : Durées de traitement

SDI = 6 semaines

Antibiotic treatment for 6 weeks versus 12 weeks in patients with pyogenic vertebral osteomyelitis: an open-label, non-inferiority, randomised, controlled trial

Louis Bernard, Aurélien Dinh, Idir Ghout, David Simo, Valerie Zeller, Bertrand Issartel, Vincent Le Moing, Nadia Belmatoug, Philippe Lesprit, Jean-Pierre Bru, Audrey Therby, Damien Bouhour, Eric Dénes, Alexa Debard, Catherine Chirouze, Karine Fèvre, Michel Dupon, Philippe Aegerter, Denis Mulleman, on behalf of the Duration of Treatment for Spondylodiscitis (DTS) study group*

359 patients
41% *S. aureus*
Randomisation à J15

	6-week regimen	12-week regimen	Difference in proportion of patients*	95% CI
Intention-to-treat analysis, n	176	175		
Cured	160 (90·9%)	159 (90·9%)	+0·1	−6·2 to 6·3
Cured and alive†	156 (88·6%)	150 (85·7%)	+2·9	−4·2 to 10·1
Cured without further antibiotic treatment‡	142 (80·7%)	141 (80·6%)	+0·1	−8·3 to 8·5
Per-protocol analysis, n	146	137		
Cured	137 (93·8%)	132 (96·4%)	−2·5	−8·2 to 2·9
Cured and alive†	133 (91·1%)	126 (92·0%)	−0·9	−7·7 to 6·0
Cured without further antibiotic treatment‡	NA	NA	NA	NA

Data are number, or number (%) unless otherwise specified. 32 patients (16 in the 6-week group and 16 in the 12-week group) were classified as cases of probable failure of treatment by the independent validation committee. Of 68 protocol violations excluded from the per-protocol population, 18 cases were classified as failure and 50 as cure in the intention-to-treat population. *6-week group minus 12-week group. †Death in cases classified as probable cure by the independent validation committee were classified as failure. ‡Further antibiotic treatment was regarded as a treatment failure. NA=not applicable.

Table 2: **Primary outcome analyses of patients with vertebral osteomyelitis according to duration of antibiotic treatment**

IDSA
Infectious Diseases Society of America

IX. What Is the Optimal Duration of Antimicrobial Therapy in Patients With NVO?

Recommendations

26. We recommend a total duration of 6 weeks of parenteral or highly bioavailable oral antimicrobial therapy for most patients with bacterial NVO (strong, low).

SDI = 6 semaines pour tous ?

Antibiotic treatment for 6 weeks versus 12 weeks in patients with pyogenic vertebral osteomyelitis: an open-label, non-inferiority, randomised, controlled trial

*Louis Bernard, Aurélien Dinh, Idir Ghout, David Simo, Valerie Zeller, Bertrand Issartel, Vincent Le Moing, Nadia Belmatoug, Philippe Lesprit, Jean-Pierre Bru, Audrey Therby, Damien Bouhour, Eric Dénes, Alexa Debard, Catherine Chirouze, Karine Fèvre, Michel Dupon, Philippe Aegerter, Denis Mulleman, on behalf of the Duration of Treatment for Spondylodiscitis (DTS) study group**

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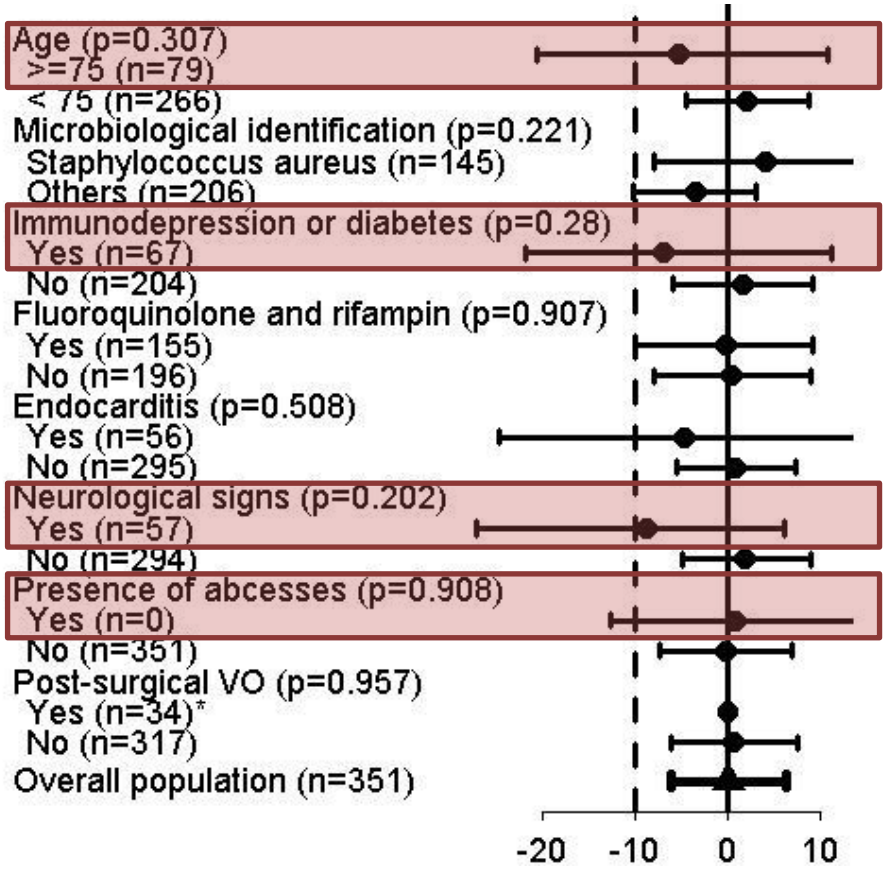
41% *S. aureus*



Facteurs de risque d'échec

	Failure	Univariate analysis		Multivariable analysis	
		OR [95% CI]	P	OR [95% CI]	p
Age					
<75	19/266 (7.1)				
≥75	13/85 (15.3)	1.08 [1.01 - 1.16]	0.023	1.08 [1.01 - 1.16]	0,028
***S. aureus* infection**					
No	10/206 (4.9)				
Yes	22/145 (15.2)	1.11 [1.04 - 1.18]	0.001	1.16 [1.08 - 1.24]	<0.001
Endocarditis					
No	23/295 (7.8)				
Yes	9/56 (16)	1.09 [1 - 1.18]	0.049	1.08 [0.99 - 1.18]	0,074
Fluoroquinolon or rifampin treatment					
Yes	14/155 (9)	1 [0.94 - 1.06]	0.961	0.95 [0.88 – 1.03]	0.113
No	18/196 (9.2)				

- 19 **(5%)** patients **avec déficit neurologique**
- 3 **(0,9%)** patients avec **drainage** (percutanée)
- **Pas** de précision sur d'éventuels patients nécessitant une instrumentation
- **>95% des patients sans problème sévère de mobilité à M+12**

SDI = 6 semaines pour tous ?

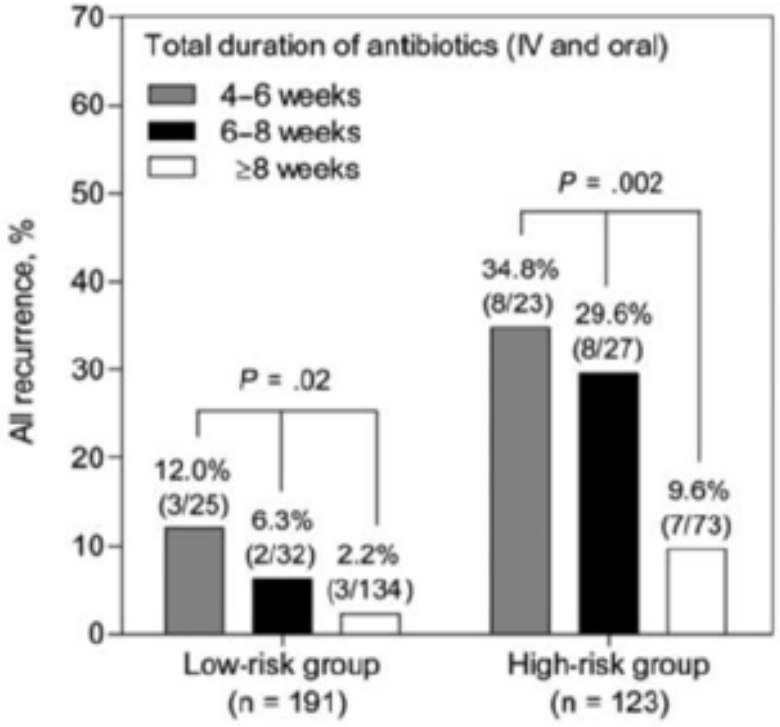
FACTEUR DE RISQUE D'ECHEC n°1 : AGE, COMORBIDITES

Optimal Duration of Antibiotic Therapy in Patients With Hematogenous Vertebral Osteomyelitis at Low Risk and High Risk of Recurrence

Ki-Ho Park,[1] Oh-Hyun Cho,[2] Jung Hee Lee,[3] Ji Seon Park,[4] Kyung Nam Ryu,[4] Seong Yeon Park,[5] Yu-Mi Lee,[6] Yong Pil Chong,[7] Sung-Han Kim,[7] Sang-Oh Lee,[7] Sang-Ho Choi,[7] In-Gyu Bae,[2] Yang Soo Kim,[7] Jun Hee Woo,[7] and Mi Suk Lee[1]

CID 2016

314 patients
SDI documentée
S. aureus : 59%
MRSA : 25%



Groupe « haut risque »

- Insuffisance rénale terminale
- MRSA
- Abcès non drainé

SDI = 6 semaines pour tous ?

FACTEUR DE RISQUE D'ECHEC n°1 : AGE, COMORBIDITES

Optimal Duration of Antibiotic Therapy in Patients With Hematogenous Vertebral Osteomyelitis at Low Risk and High Risk of Recurrence

Ki-Ho Park,[1] Oh-Hyun Cho,[2] Jung Hee Lee,[3] Ji Seon Park,[4] Kyung Nam Ryu,[4] Seong Yeon Park,[5] Yu-Mi Lee,[6] Yong Pil Chong,[7] Sung-Han Kim,[7] Sang-Oh Lee,[7] Sang-Ho Choi,[7] In-Gyu Bae,[2] Yang Soo Kim,[7] Jun Hee Woo,[7] and Mi Suk Lee[1]

CID 2016

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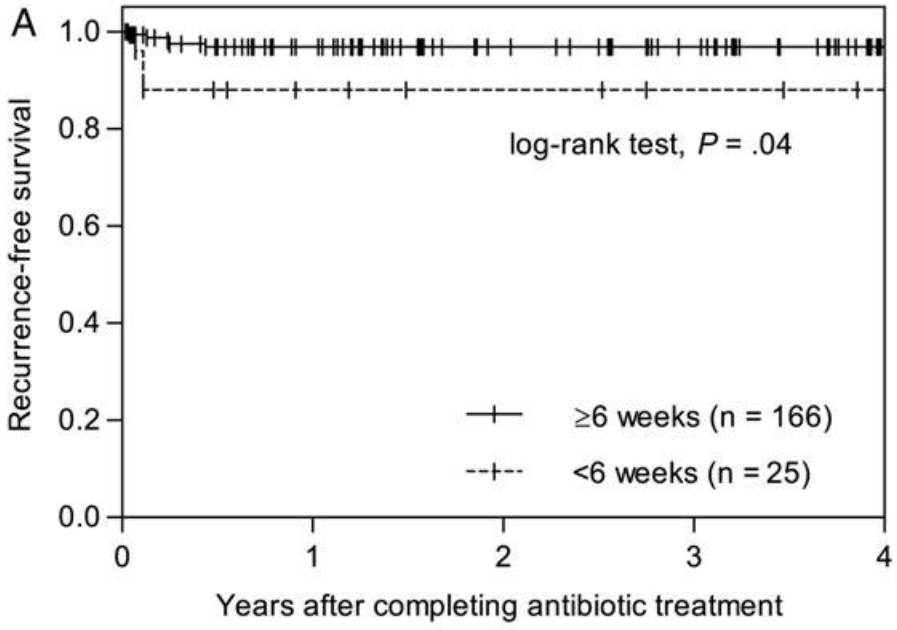
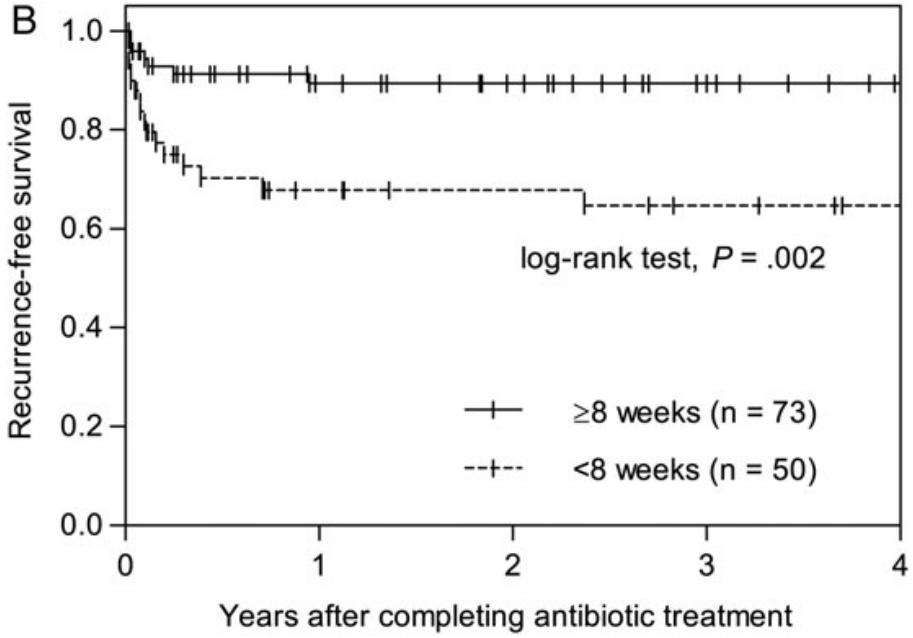


BAS RISQUE



HAUT RISQUE

SDI = 6 semaines pour tous ?

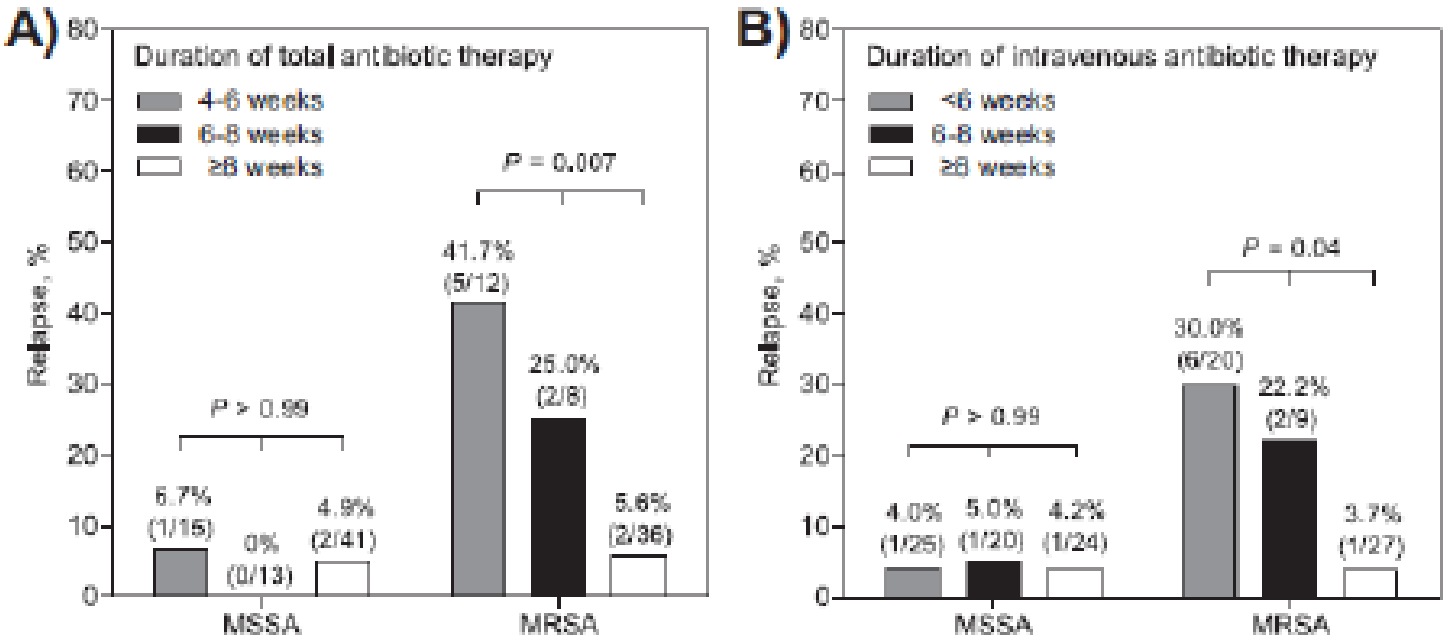
FACTEUR DE RISQUE D'ECHEC n°2 : *S. AUREUS*, MRSA, BMR

Clinical characteristics and therapeutic outcomes of hematogenous vertebral osteomyelitis caused by methicillin-resistant *Staphylococcus aureus*

Ki-Ho Park [a,b,c], Yong Pil Chong [a,c], Sung-Han Kim [a], Sang-Oh Lee [a], Sang-Ho Choi [a], Mi Suk Lee [b], Jin-Yong Jeong [c,d], Jun Hee Woo [a], Yang Soo Kim [a,c,*]

J Infect 2013

139 patients
MRSA : 45%



Durée totale

Durée IV

SDI = 6 semaines pour tous ?

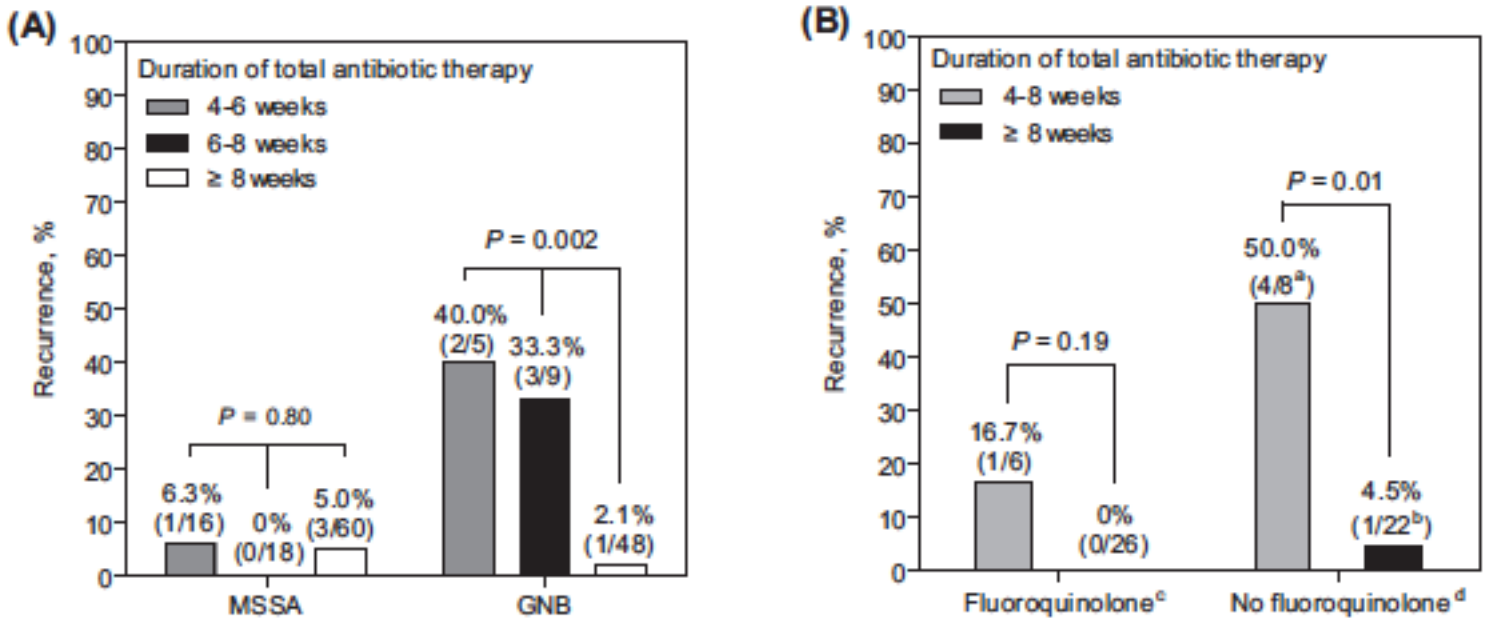
FACTEUR DE RISQUE D'ECHEC n°2 : *S. AUREUS*, MRSA, BMR

Clinical characteristics and outcomes of hematogenous vertebral osteomyelitis caused by gram-negative bacteria

Ki-Ho Park [a,g], Oh Hyun Cho [b,g], Myounghwa Jung [a], Kyung-Soo Suk [c], Jung Hee Lee [d], Ji Seon Park [e], Kyung Nam Ryu [e], Sung-Han Kim [f], Sang-Oh Lee [f], Sang-Ho Choi [f], In-Gyu Bae [b], Yang Soo Kim [f], Jun Hee Woo [f], Mi Suk Lee [a,*]

313 patients
BGN 21%

J Infect 2014



SDI = 6 semaines pour tous ?

FACTEUR DE RISQUE D'ECHEC n°3 : SEVERITE, COMPLICATIONS ?

Vertebral Osteomyelitis: Long-Term Outcome for 253 Patients from 7 Cleveland-Area Hospitals

Martin C. McHenry,[1] Kirk A. Easley,[2] and Geri A. Locker[2]
Departments of [1]Infectious Diseases and Biostatistics and [2]Epidemiology, The Cleveland Clinic Foundation, Ohio

CID 2002

253 patients
Récidive : 36 (14%)
dont 30 documentées
ATB ≥ 4 sem : 33 pts

Facteurs de risque :
- Abcès paravertébraux
- Atteinte de plus de 3 niveaux
- Diabète
- Fistulisation chronique
- Bactériémie récurrente

Factor	No. of patients with relapse/ no. with factor (%)	1-Year relapse rate ± SE	P^a
Sex			
Male	21/160 (13)	10.4 ± 2.5	.53
Female	15/93 (16)	14.3 ± 3.8	
Place of acquisition of VO			
Hospital	18/83 (22)	17.5 ± 4.4	.009
Community	18/170 (11)	9.1 ± 2.3	
Epidural abscess			
Present	8/43 (19)	17.9 ± 6.2	.36
Absent	28/210 (13)	10.6 ± 2.2	
Paravertebral abscess			
Present	18/66 (27)	19.1 ± 5.2	<.001
Absent	18/187 (10)	9.4 ± 2.2	
Motor weakness or paralysis			
Present	12/62 (19)	21.4 ± 5.8	.09
Absent	24/191 (13)	9.1 ± 2.2	
Gibbous deformity			
Present	9/27 (33)	23.9 ± 8.5	.002
Absent	27/226 (12)	10.4 ± 2.2	
Chronically draining sinus			
Present	7/13 (54)	25.0 ± 12.5	<.001
Absent	29/240 (12)	11.1 ± 2.1	
Recurrent bacteremia			
Present	20/36 (56)	53.0 ± 8.6	<.001
Absent	16/217 (7)	4.7 ± 1.5	
Diabetes			
Present	16/79 (20)	20.3 ± 4.9	.036
Absent	20/174 (11)	8.1 ± 2.2	
Contiguous involvement of >3 vertebrae			
Present	13/37 (35)	26.7 ± 7.7	<.001
Absent	23/216 (11)	9.3 ± 2.1	

SDI = 6 semaines pour tous ?

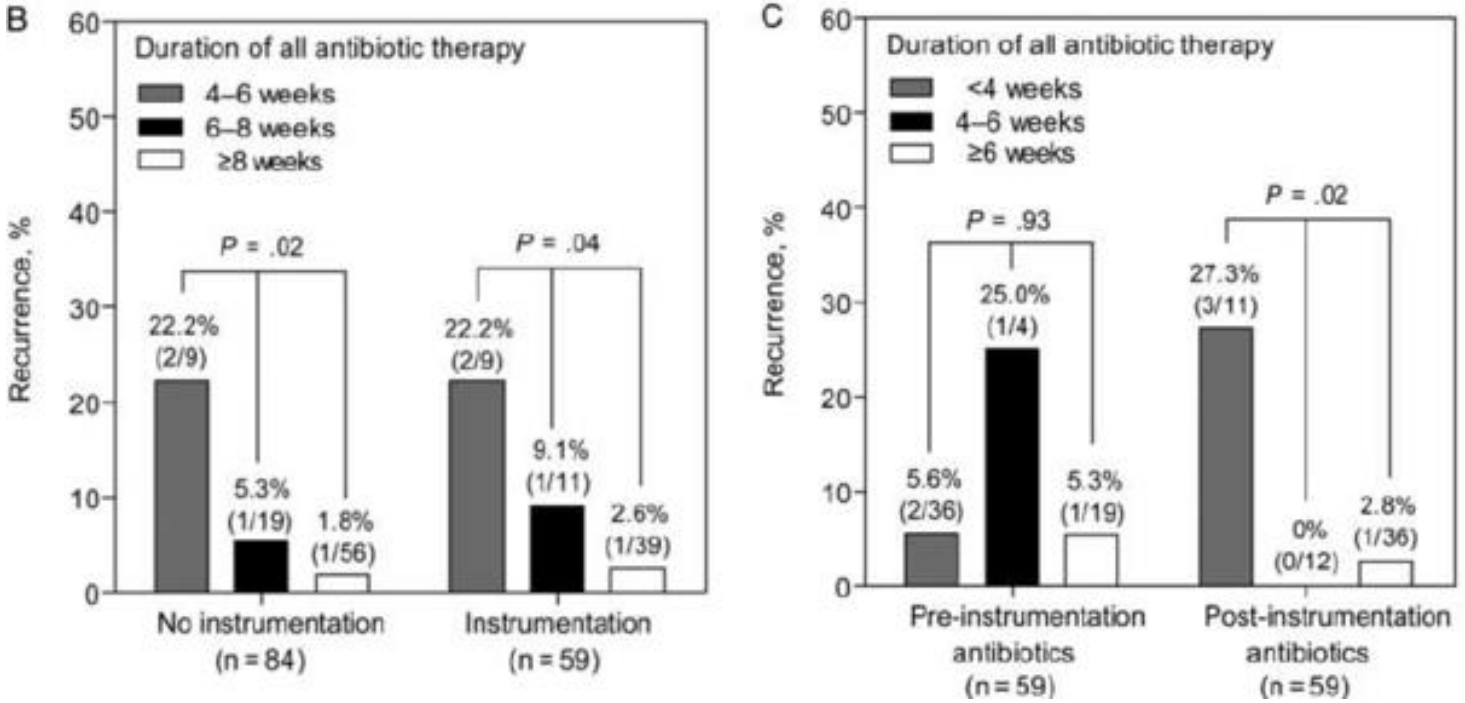
FACTEUR DE RISQUE D'ECHEC n°4 : INSTRUMENTATION ?

Therapeutic Outcomes of Hematogenous Vertebral Osteomyelitis With Instrumented Surgery

CID 2015

Ki-Ho Park,[1] Oh-Hyun Cho,[2] Yu-Mi Lee,[3] Chisook Moon,[3] Seong Yeon Park,[4] Song Mi Moon,[5] Jung Hee Lee,[6] Ji Seon Park,[7] Kyung Nam Ryu,[7] Sung-Han Kim,[8] Sang-Oh Lee,[8] Sang-Ho Choi,[8] Mi Suk Lee,[1] Yang Soo Kim,[8] Jun Hee Woo,[8] and In-Gyu Bae[2]

153 patients
S. aureus (53%)
Débridement : 61%
Instrumentation : 39%



SDI = 6 semaines pour tous ?

Patients à risque d'échec

- Âge > 75 ans, comorbidités (diabète, IR)
- Formes sévères / extensives
- *S. aureus* (notamment MRSA)
- BMR (RMP ou FQ non utilisables)
- Instrumentation ?

→ 8-12 semaines ?

SDI = 6 semaines pour tous ?

Patients à risque d'échec
- Âge > 75 ans, comorbidités (diabète, IR)
- Formes sévères / extensives
- *S. aureus* (notamment MRSA)
- BMR (RMP ou FQ non utilisables)
- Instrumentation ?

→ 8-12 semaines ?

➜ RISQUE D'EFFETS SECONDAIRES ?

Antibiotic treatment for 6 weeks versus 12 weeks in patients with pyogenic vertebral osteomyelitis: an open-label, non-inferiority, randomised, controlled trial

Louis Bernard, Aurélien Dinh, Idir Ghout, David Simo, Valerie Zeller, Bertrand Issartel, Vincent Le Moing, Nadia Belmatoug, Philippe Lesprit, Jean-Pierre Bru, Audrey Therby, Damien Bouhour, Eric Dénes, Alexa Debard, Catherine Chirouze, Karine Fèvre, Michel Dupon, Philippe Aegerter, Denis Mulleman, on behalf of the Duration of Treatment for Spondylodiscitis (DTS) study group*

	6-week regimen (n=176)	12-week regimen (n=175)	Total (n=351)	p value
Clostridium difficile infection	2 (1%)	2 (1%)	4 (2%)	1
Antibiotic intolerance	12 (7%)	9 (5%)	21 (6%)	0·66

AAC

Antimicrobial-Related Severe Adverse Events during Treatment of Bone and Joint Infection Due to Methicillin-Susceptible *Staphylococcus aureus*

Florent Valour,[a,b] Judith Karsenty,[a] Anissa Bouaziz,[a] Florence Ader,[a,b] Michel Tod,[c] Sébastien Lustig,[d] Frédéric Laurent,[b,e,f] René Ecochard,[g] Christian Chidiac,[a,b] Tristan Ferry,[a,b] on behalf of the Lyon BJI Study Group

200 patients
30 avec EIG (15%)
Délai médian : 14 jours (15-61)

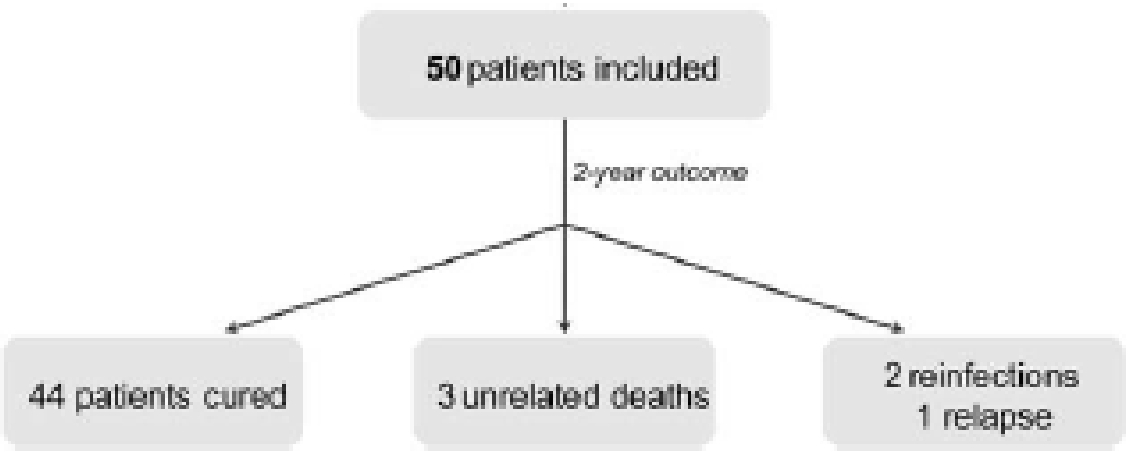
➜ RISQUE DE DYSBIOSE / BMR ?

Infections / matériel : durée de traitement

Three-Month Antibiotic Therapy for Early-Onset Postoperative Spinal Implant Infections

Vincent Dubée,[1] Thibaut Lenoir,[2] Véronique Leflon-Guibout,[3] Claire Briere-Bellier,[1] Pierre Guigui,[2,4] and Bruno Fantin[1,4]

50 patients
DAIR
ATB IV 2 semaines puis relais per os
Total 3 mois



Infections / matériel : durée de traitement

INFECTIOUS DISEASES, 2016
http://dx.doi.org/10.1080/23744235.2016.1255351

Taylor & Francis
Taylor & Francis Group

ORIGINAL ARTICLE

Efficacy of debridement, antibiotic therapy and implant retention within three months during postoperative instrumented spine infections

Heidi Wille[a,b], Frédéric-Antoine Dauchy[a], Arnaud Desclaux[a], Hervé Dutronc[a], Marc-Olivier Vareil[a,b], Véronique Dubois[c], Jean-Marc Vital[d] and Michel Dupon[a]

129 ISO < 3 mois traitées par DAIR (J22 en moyenne)
Durée médiane ATB : 10,7 sem
RMP / SA et FQ / BGN +++

Taux de succès primaire : 82.2%

15 succès après 2e DAIR / 23 patients en échec

Taux succès global après 1/2 DAIR : 93.8%

Table 2. Risk factors for relapse, multivariate analysis.

Variables	Odds ratio	95% CI	*p*-Value
Polymicrobial infection	3.81	1.06–13.66	.03
BMI $\geq$25 kg/m^2	0.25	0.07–0.89	.03
MSSA infection	1.97	0.65–5.90	.23
Antibiotic therapy duration >12 weeks	1.99	0.65–6.10	.23

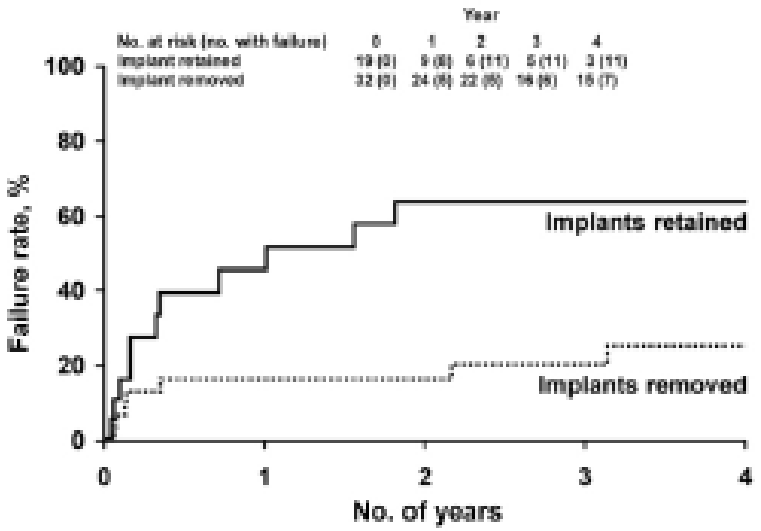
Infections / matériel : durée de traitement

The Management and Outcome of Spinal Implant Infections: Contemporary Retrospective Cohort Study

Todd J. Kowalski,[1] Elie F. Berbari,[2] Paul M. Huddleston,[3] James M. Steckelberg,[2] Jayawant N. Mandrekar,[4] and Douglas R. Osmon[2]

Treatment strategy	Patients with early-onset infection (n = 30)	Patients with late-onset infection (n = 51)
Surgical management strategy		
Debridement and retention	28 (93)	13 (25)
Implant removal	1 (3)	32 (63)
No surgery[a]	1 (3)	6 (12)
Main parenteral antimicrobial therapy		
β-Lactam[b]	12 (40)	21 (41)
Vancomycin	8 (27)	15 (29)
Combination therapy[c]	6 (20)	8 (16)
Fluoroquinolone	1 (3)	0
Carbapenem	0	1 (2)
Other[d]	3 (10)	6 (12)
Suppressive antimicrobial therapy strategy attempted	23 (77)	16 (31)
Suppressive antimicrobial used		
β-Lactam	9 (39)	3 (19)
Minocycline	5 (22)	4 (25)
TMP-SMX	3 (13)	0
Fluoroquinolone	3 (13)	1 (6)
Clindamycin	0	1 (6)
Combination therapy[c]	3 (13)	7 (44)
Duration of antimicrobial therapy, median days (IQR)		
Parenteral	41 (27–43)	42 (36–44)
Oral[e]	30 (26–33)	39 (20–50)
Suppressive	303 (147–672)	410 (61–667)

51 patients avec ISO tardive (> 1 ms)



Infections / matériel : durée de traitement

The Management and Outcome of Spinal Implant Infections: Contemporary Retrospective Cohort Study

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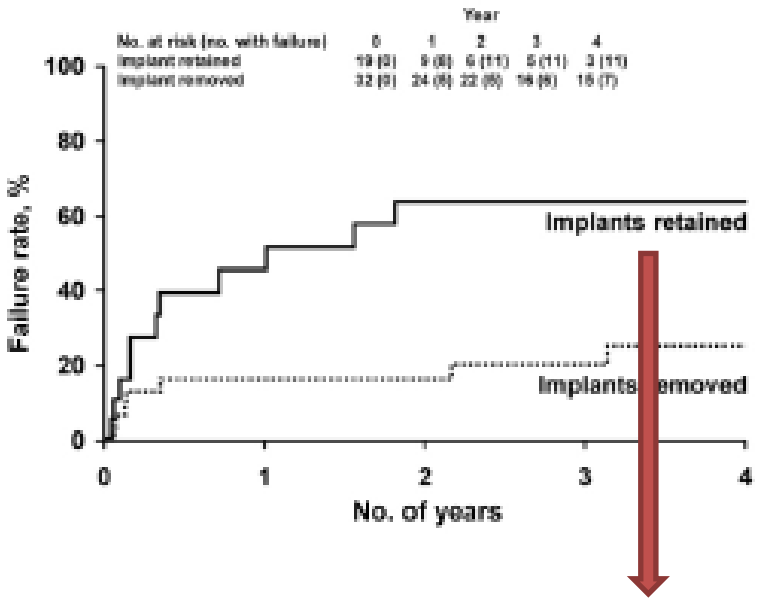
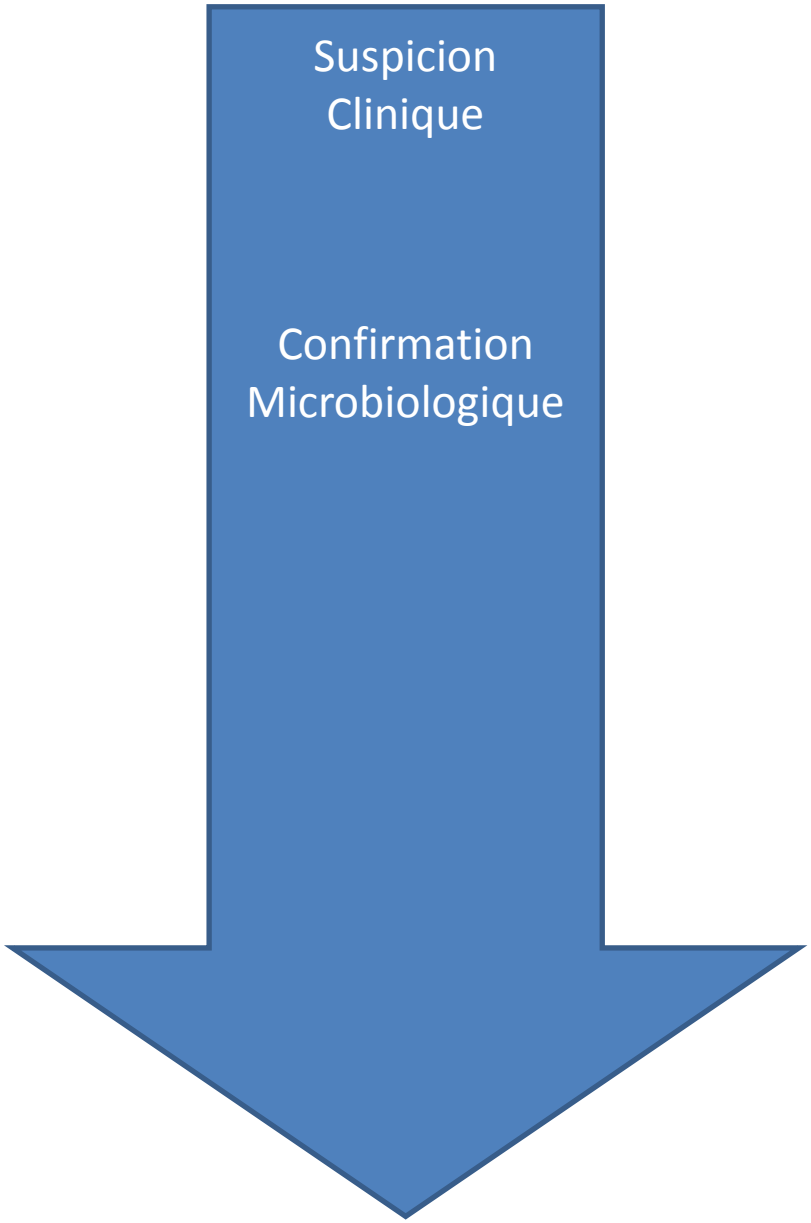
β-Lactam	9 (39)	3 (19)
Minocycline	5 (22)	4 (25)
TMP-SMX	3 (13)	0
Fluoroquinolone	3 (13)	1 (6)
Clindamycin	0	1 (6)
Combination therapy[c]	3 (13)	7 (44)
Duration of antimicrobial therapy, median days (IQR)		
Parenteral	41 (27–43)	42 (36–44)
Oral[e]	30 (26–33)	39 (20–50)
Suppressive	303 (147–672)	410 (61–667)

51 patients avec ISO tardive (> 1 ms)



ATB suppressive ?

Synthèse SDI



PAS D'ANTIBIOTHERAPIE PROBABILISTE

sauf
- sepsis sévère
- post-opératoire si neurochirurgie

Staph MS	pénicilline M IV + RMP (si H–)
Staph MR	vanco (dapto ?) + RMP (si H–)
Strepto	Amoxicilline (+ RMP ?)
BGN	Béta-lactamine

J15 : relais per os si bonne évolution

Sauf EI ?! (essai POET)

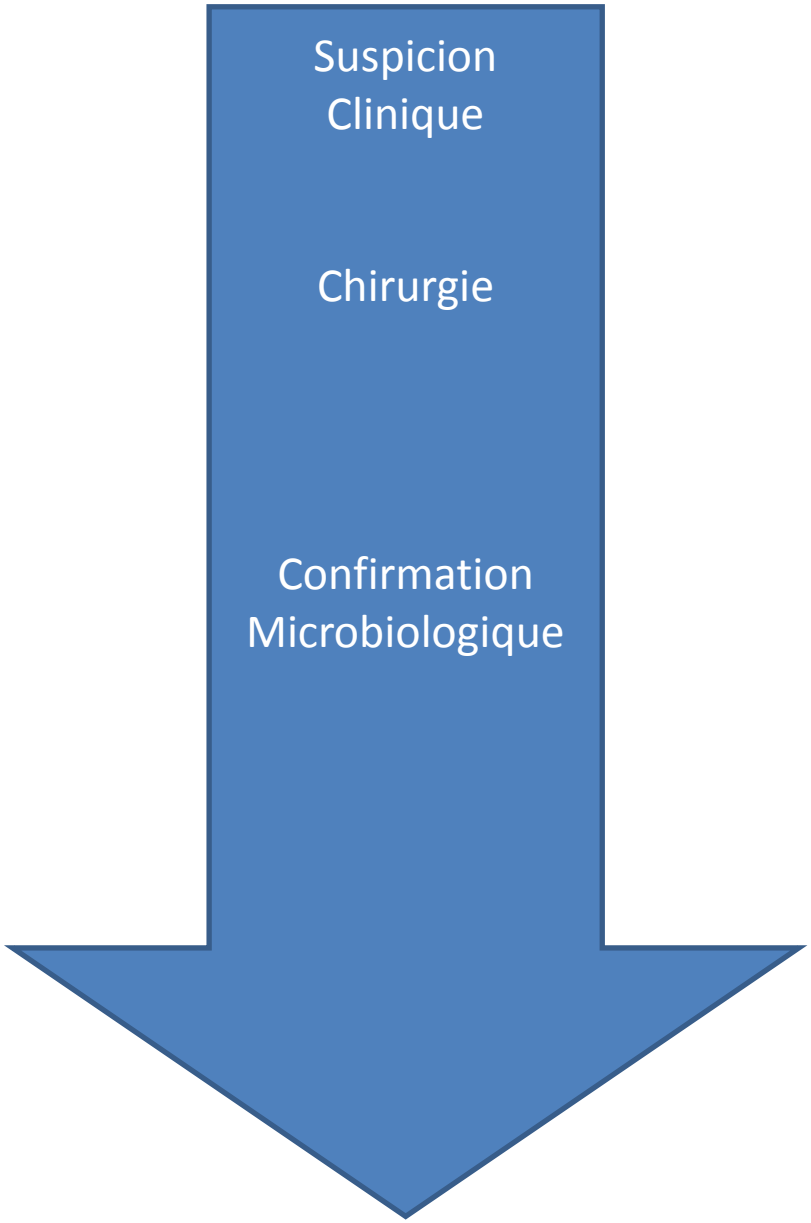
Molécules « os/biofilm proof » :

- Staphylocoque : RMP + FQ +++
- Strepto : amoxicilline (+ RMP ?)
- BGN : FQ

S6 : arrêt du traitement

Sauf FR échec : 3 mois ?

Synthèse : infection / matériel



PAS D'ANTIBIOTHERAPIE EN PRE-OPERATOIRE
sauf sepsis sévère

ANTIBIOTHERAPIE PROBABILISTE
- Vancomycine (daptomycine ?)
- Céfépime

+/- métronidazole

ANTIBIOTHERAPIE CIBLEE

Staph MS	pénicilline M IV + RMP (si H–)
Staph MR	vanco (dapto ?) + RMP (si H–)
Strepto	Amoxicilline (+ RMP ?)
BGN	Béta-lactamine

J15 : relais per os si bonne évolution
Molécules « os/biofilm proof » : RMP, FQ

M3 : arrêt du traitement
Sauf FR échec : 6 mois ? Traitement suppressif ?
Intérêt du PET ?

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