

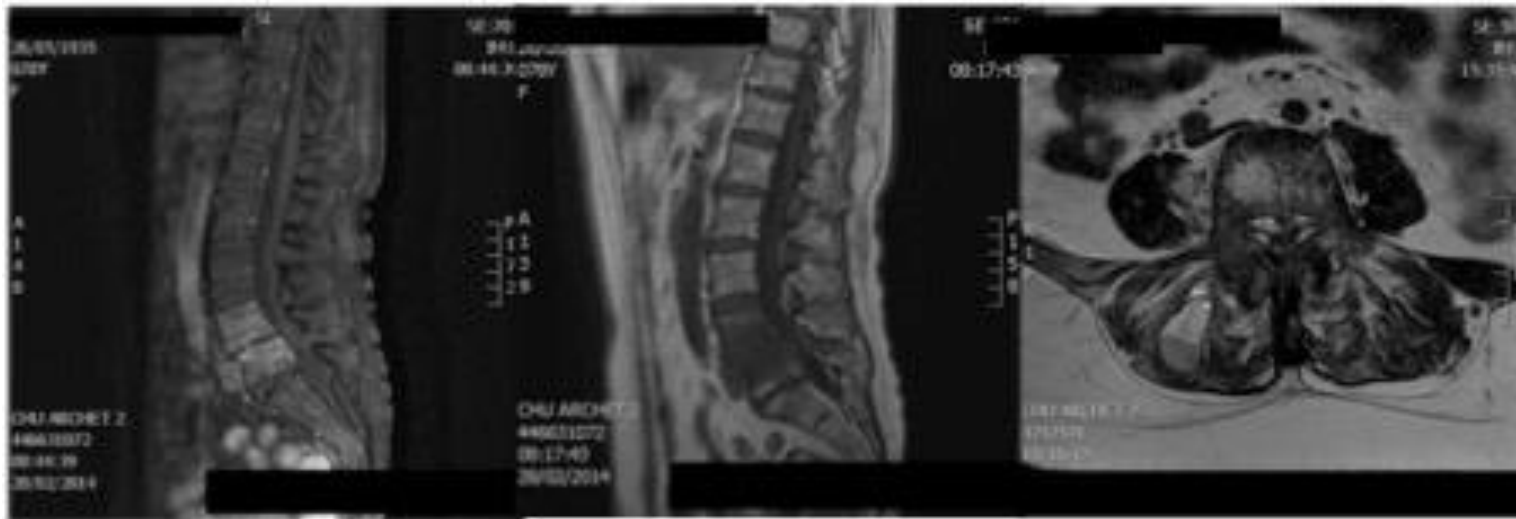


Infections disco-vertébrales

Johan Courjon
CHU de Nice, SMIT



04.92.03.21.34
CRIOAC-SUD-MED@chu-nice.fr
courjon.j@chu-nice.fr



Available online at
ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en



Guidelines

2022 SPILF - Clinical Practice guidelines for the diagnosis and treatment of disco-vertebral infection in adults



M. Lacasse^a, S. Derolez^b, E. Bonnet^{c,*}, A. Amelot^d, B. Bouyer^e, R. Carlier^f, G. Coiffier^g, J.P. Cottier^h, A. Dinhⁱ, I. Maldonado^j, F. Paycha^k, J.M. Ziza^l, P. Bemer^m, L. Bernard^a, the Review group
 Géraldine Bart^{aa}, Pascal Coquerelle^{ab}, Stéphane Corvec^{ac}, Anne Cotten^{ad}, Marion Couderc^{ae}, E. Denes^{af}, Arnaud Dupeyron^{ag}, Sophie Godot^{ah}, Marion Grare^{ai}, A. Homs^{aj}, Brigitte Lam^{ak}, Jean Philippe Lavigne^{al}, V. Lemoing^{am}, Edouard Pertuiset^{an}, P. Ribinik^{ao}, France Roblot^{ap}, Eric Senneville^{aq}, Jean Philippe Talarmin^{ar}, I. Tavares Figueiredo^{as}, Marie Titeca^{at}, Valérie Zeller^{au}

Retard diagnostic

Gestion de la bactériémie:

- Porte d'entrée
- Endocardite ?

Prise en charge
médico-
chirurgicale

Diagnostic

- Hémocultures
- Ponction biopsie DV

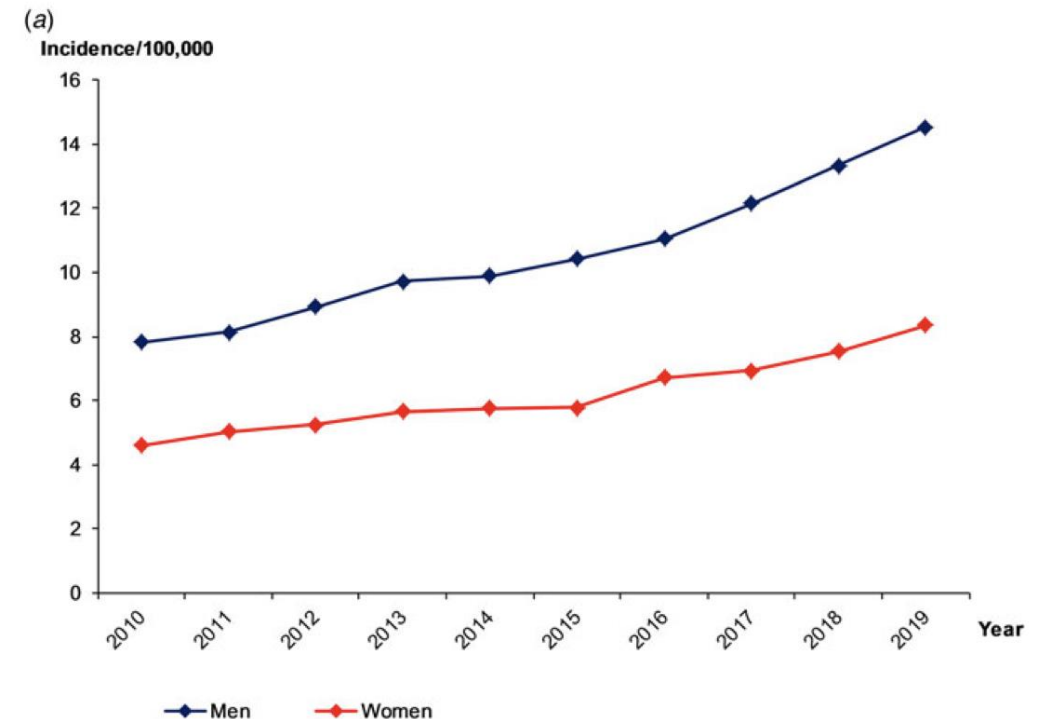
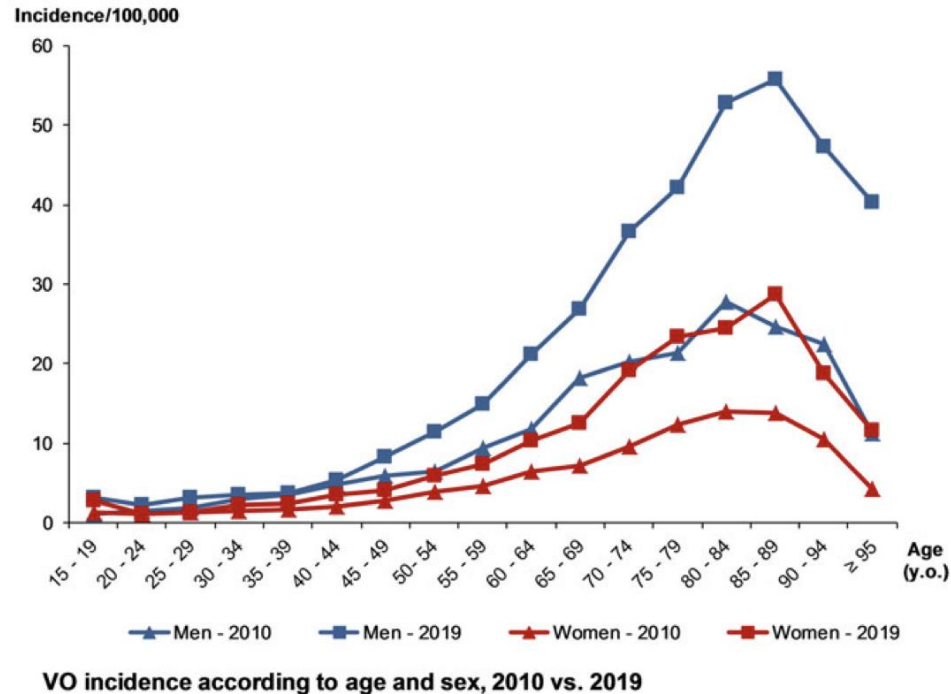
Séquelles: 27% des patients
décrivent un retentissement sur
la vie quotidienne

Physiopathologie

- Voie hématogène la plus fréquente
 - Bactériémie $\approx \frac{3}{4}$ des cas
- Inoculation aux plateaux vertébraux puis atteinte discale
- Par inoculation directe en cas d'infection de site opératoire

Epidémiologie

- 2.2 à 11.3 / 100 000 patients-années
- Plus élevée chez les patients de plus de 70 ans



Données France 2010 2019, 42 105 patients, âge moyen 65ans

Terrain

14 études 1008 épisodes de PVO

Âge médian 59 ans

- Diabetes mellitus (24%),
- intravenous drug abuse (11%),
- immunosuppression (7%),
- malignancy (6%),
- Alcoholism (5%),
- rheumatic disease (5%),
- liver cirrhosis (4%),
- renal failure (4%),
- radiation or osteopenic fracture (3%).
- **Only 1 of 14 studies states that 28% of its patients had no underlying medical illness.**

Présentation clinique

- 11 à 59 jours avant diagnostic
- Rachialgie 86%
- Fièvre 60%
- Déficit neurologique 34%
 - déficit moteur
 - déficit sensitif
 - dysfonction vésicale
 - radiculopathie

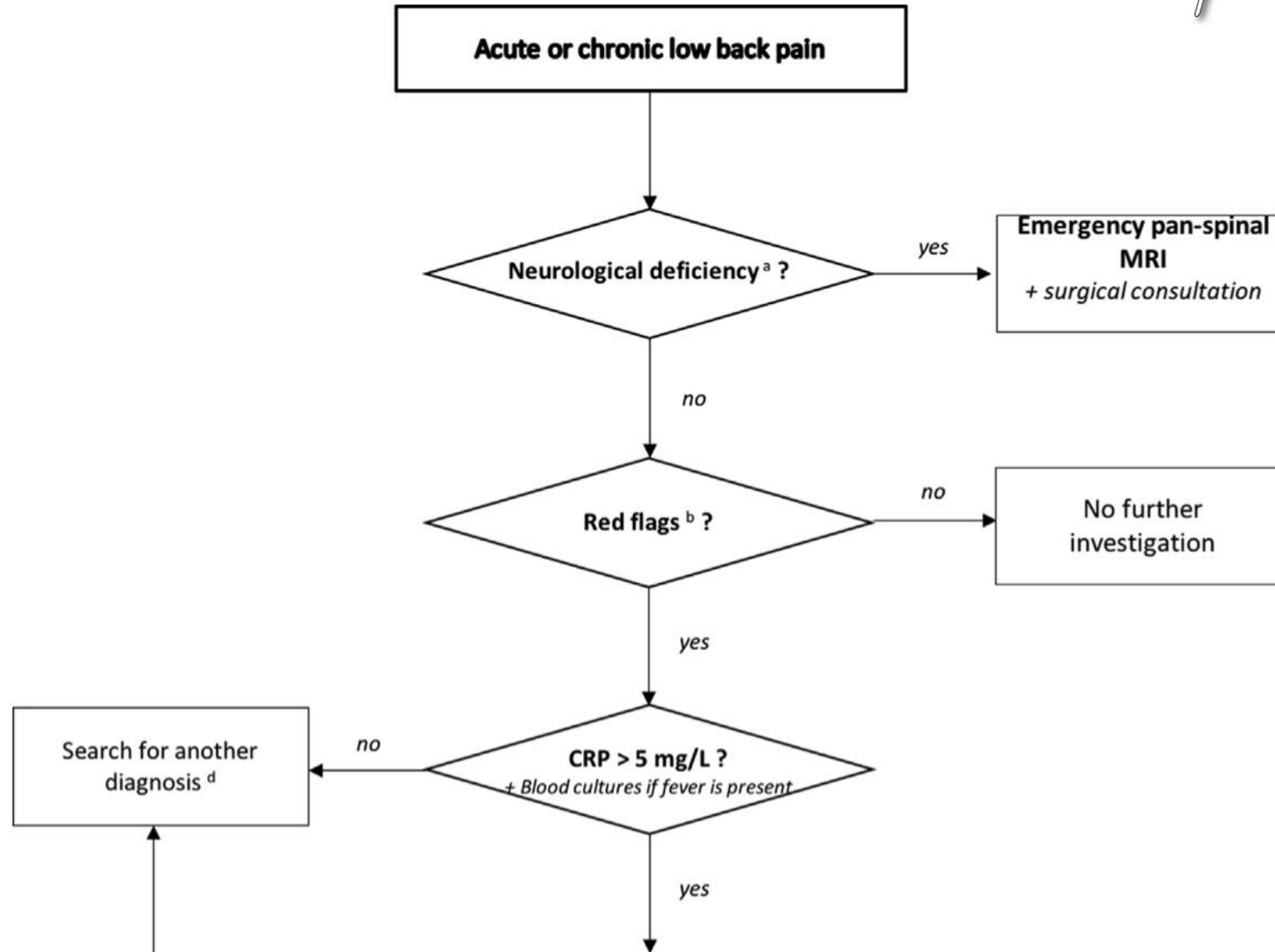
Localisation

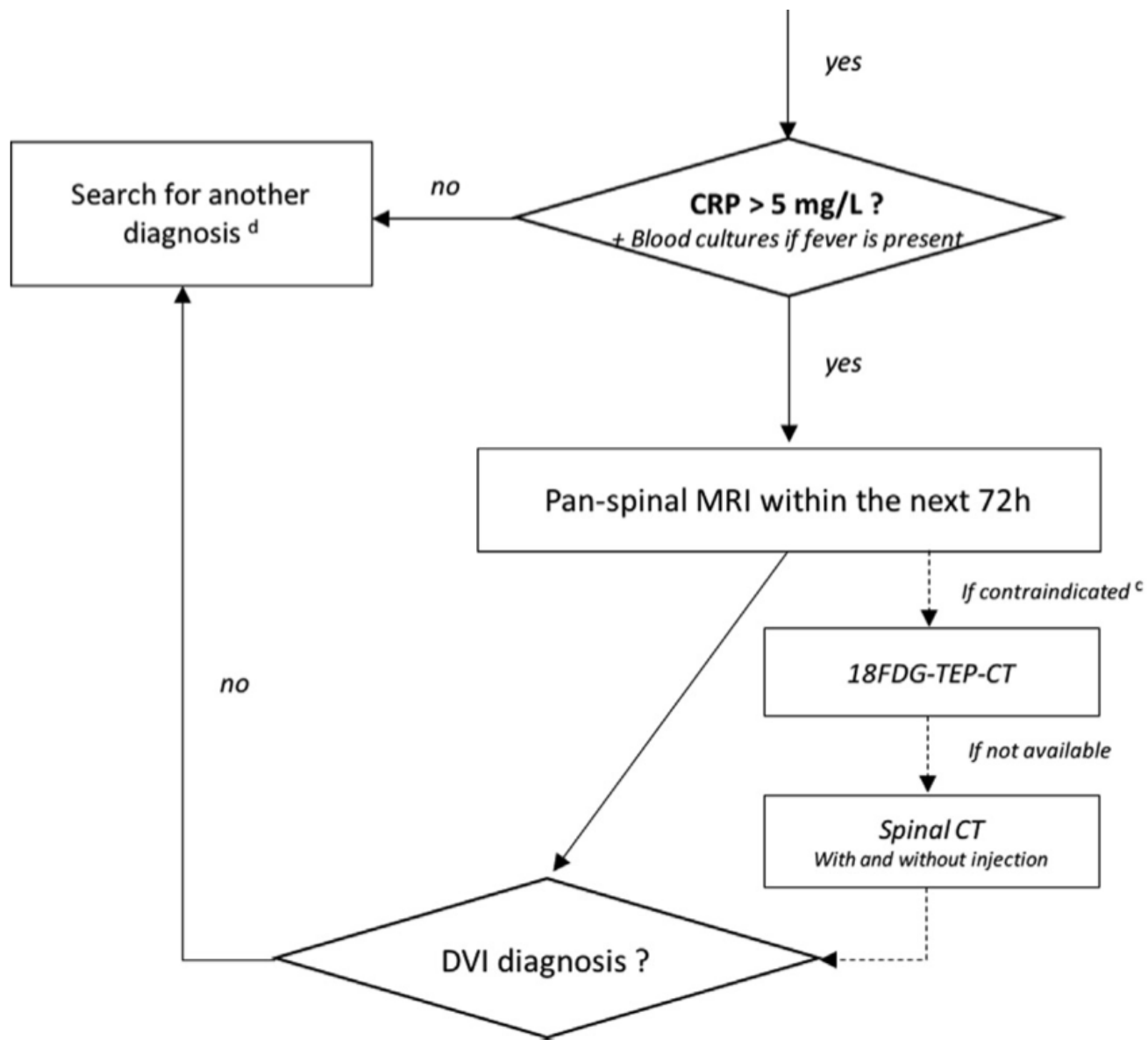
- Lombaire 58%
- Thoracique 30%
- Cervicale 11%
- Multifocale 4%
 - Fréquence plus élevée dans d'autres séries, 10 à 30%

Diagnostic iconographique



UDIV
Âge sup à 35 ans
Fièvre
Horaire inflammatoire
Localisation thoracique



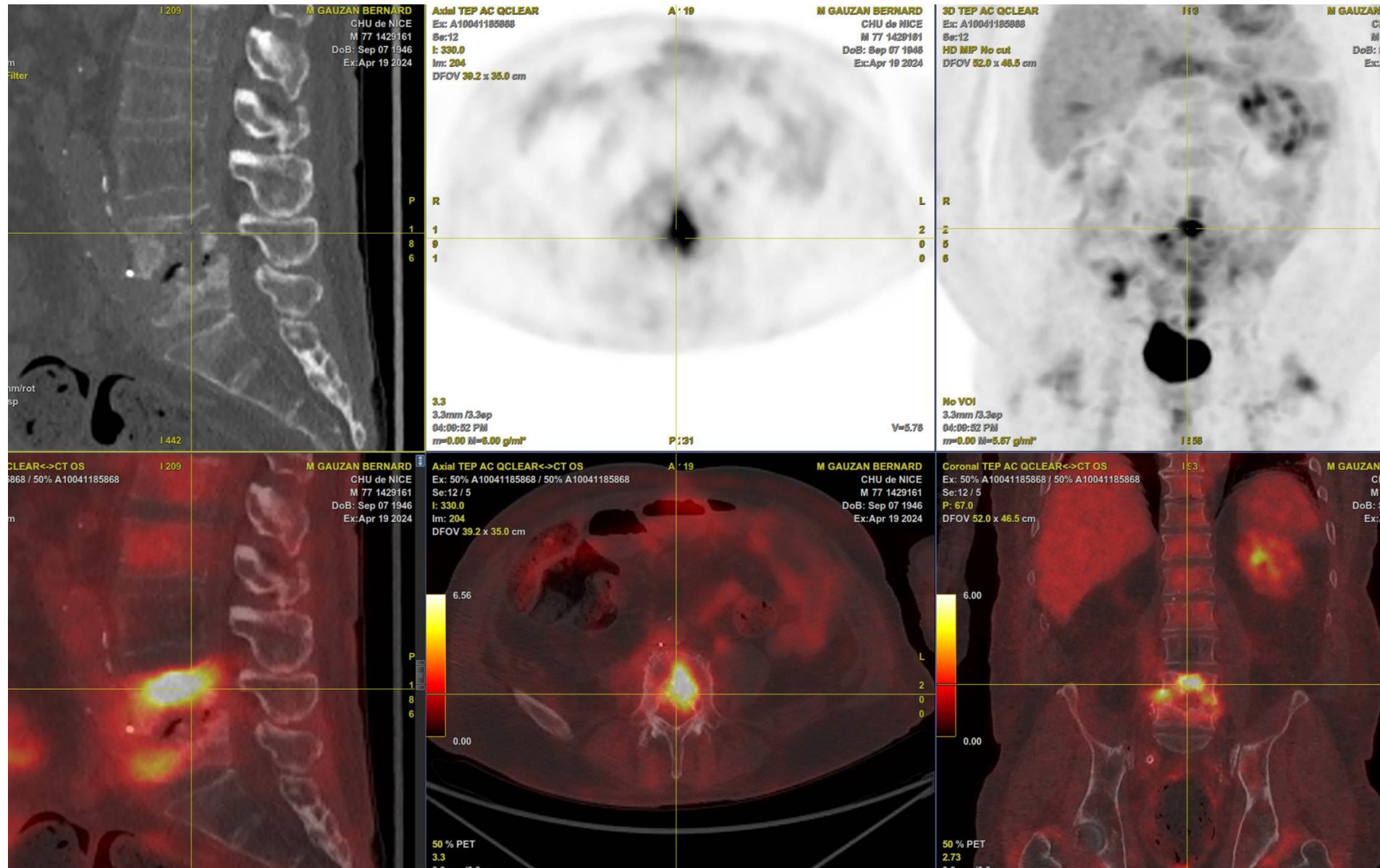


Délai max pour l'apparition des anomalies à l'IRM: 10 jours

Diagnostic iconographie



Diagnostic iconographie PET-TDM 18FDG



Diagnostic iconographique

- Pas de scintigraphie osseuse
- Radiographies en charge F+P de l'ensemble du rachis dans les premiers jours (sensibilité pour instabilité sous-jacente)
- TDM diagnostic différentiel / destruction osseuse / évaluation du risque mécanique

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



Lancet 2014

*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 Debar, Catherine Chirouze, Karine Fèvre, Michel Dupon, Philippe Aegerter, Denis Mulleman, on behalf of the Duration of Treatment for Spondylodiscitis (DTS) study group**

Description des patients à travers l'étude DTS

	6-week regimen (n=176)	12-week regimen (n=175)	Total (n=351)
Microbiological identification			
<i>Staphylococcus aureus</i> †	69 (39%)	76 (43%)	145 (41%)
Coagulase-negative <i>Staphylococcus</i> ‡	29 (16%)	32 (18%)	61 (17%)
<i>Streptococcus</i> spp	32 (18%)	31 (18%)	63 (18%)
<i>Enterococcus</i> spp	11 (6%)	15 (9%)	26 (7%)
Enterobacterial spp	22 (13%)	16 (9%)	38 (11%)
Associated endocarditis*			
Duke definite	23/127 (18%)	28/130 (22%)	51/257 (20%)
Probable	4/127 (3%)	1/130 (1%)	5/257 (2%)
Neurological signs	25 (14%)	32 (18%)	57 (16%)

Tuberculose: jusqu'à 30% selon les séries et la zone géographique

Epidémiologie bactérienne

	France	Pays occidentaux
S. aureus	41%	24-66%
S-CoN	17%	2-27%
Streptocoques	12%	1-27%
Entérocoques	7%	2-8%
Entérobactéries	11%	4-33%
Autres	7%	5-15%
Candida spp	NC	1-7%
Plurimicrobien	NC	2-32%
Mycobactéries	NC	13-31%

Autres : Fièvre Q, Bartonellose, Brucellose, Whipple

Spondylodiscite et endocardite infectieuse

- Association IDV/Ei plus forte pour les streptocoques du groupe viridans que pour *S. aureus* (Murillo et al. CMI 2014)
- Association IDV/Ei plus forte pour les streptocoques et entérocoques que pour *S. aureus* (Mulleman et al. J rheumatol 2006 Koslow et al. Am J Med 2014)
- Etude DTS, plus de 75 ans: non infériorité de 6 vs 12sem non démontrée et mortalité plus élevée (21% vs 3%), Ei et infections à streptocoques plus fréquentes (Courjon et al. Plos One 2017)

Documentation microbiologique

	6-week regimen (n=176)	12-week regimen (n=175)	Total (n=351)
Microbiological diagnosis			
Blood culture	119 (68%)	121 (69%)	240 (68%)
CT-vertebral biopsy	67 (38%)	71 (41%)	138 (39%)
Perioperative surgical biopsy	9 (5%)	10 (6%)	19 (5%)

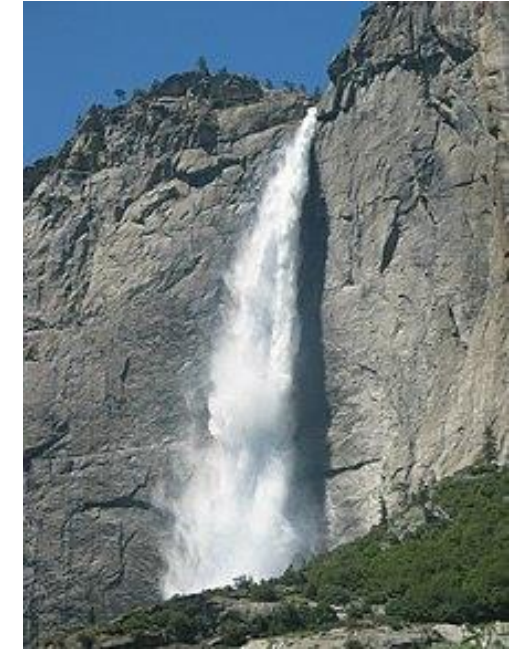
Effects of Volume and Periodicity on Blood Cultures

JAMES LI,* JAMES J. FLORDE, AND LARRY G. CARLSON

Veterans Administration Medical Center, Seattle, Washington 98108

Received 9 May 1994/Returned for modification 16 June 1994/Accepted 15 August 1994

Blood specimens collected for culture by using the high-volume resin-based BACTEC system over an 18-month period at the Seattle Veterans Administration Center were examined in this study. Of 7,783 cultures obtained, 624 were classified as true positives. Patients in this group had between 20 and 60 ml of blood drawn per culture and separated into 10-ml aliquots for incubation. Analysis of the results stratified by cultured volume and time interval between specimen collection accorded yield advantage to culture volume at the maximal amounts tested. No advantage was observed with any particular interval of collection. Increasing cultured volume from 20 to 40 ml increased yield by 19%. Increasing cultured volume from 40 to 60 ml increased yield by an additional 10%. The same effect was seen whether cultures were drawn simultaneously or serially within 24 h. These observations support other reports demonstrating increased yield with increased cultured blood volume. However, they demonstrate increases in yield at volumes much higher than previously considered. In conclusion, this study demonstrates that high-volume blood cultures drawn serially or simultaneously return the best yields.



Ponction Biopsie quelle cible ?

Sensibilité rapportée:
30 à 77%

Sehn J et al. Eur J Radiology 2011
Mylona E et al., Sem Arth Rheum 2009
Bavhan et al. Brit Med Clin inf Dis 2010
Marschall J et al., CID 2011



Which tissues are best for microbiological diagnosis in patients with pyogenic vertebral osteomyelitis undergoing needle biopsy?

Clin Microbiol Infect 2015; 21: 931–935

C.-J. Kim¹, S.-J. Kang², P. G. Choe¹, W. B. Park¹, H.-C. Jang², S.-I. Jung², K.-H. Song¹, E. S. Kim¹, H. B. Kim¹, M.-d. Oh¹, K.-H. Park² and N. J. Kim¹

1) Department of Internal Medicine, Seoul National University College of Medicine, Seoul and 2) Department of Infectious Disease, Chonnam National University Medical School, Gwang-ju, Republic of Korea

The culture positive rates of vertebral bodies and soft tissues were 39.7% (29/73), and 63.5% (40/63), respectively ($p < 0.05$)

The culture positive rates of intervertebral discs, paraspinal abscesses and psoas abscesses were 52.9% (9/ 17), 70.6% (24/34) and 58.3% (7/12)

In a multivariate analysis, positive blood culture (aOR 2.57, 95% CI 1.01–6.59), and soft tissues as biopsy site compared with vertebral bodies (aOR 2.28, 95% CI 1.08–4.78) were independent factors associated with tissue culture positivity.

PBDV: organisation

- Préparation des demandes de prélèvements + tubes et flacons
- Gestion de l'antalgie
- Les prélèvements sont-ils bien arrivés au labo ?
- Hémocultures au retour ? **Non**

Permet de vérifier l'atteinte de la cible avec la présence d'un infiltrat inflammatoire

Ideally, 5 samples should be taken in order of priority:

- 1/ the search for pyogenic bacteria from 3 specimens,
 - 2/ histological analysis (including ideally: a fragment of each of the plates adjacent to the disc of the infected stage, a disc fragment, a fragment of the adjacent soft tissues)
 - 3/ testing for mycobacteria and/or fungi from one of the frozen specimens
 - 4/ molecular biology testing for microorganisms in case of negative culture and/or antibiotic treatment at the time of DVB.
-

Si première PBDV non contributive ?

Diagnostic contribution of a second percutaneous needle biopsy in patients with spontaneous diskitis and negative blood cultures and first biopsy [Joint Bone Spine 83 \(2016\) 715–719](#)

William Terreaux^{a,*}, Marion Geoffroy^a, Xavier Ohl^b, Louis Job^c, Philippe Cart^d,

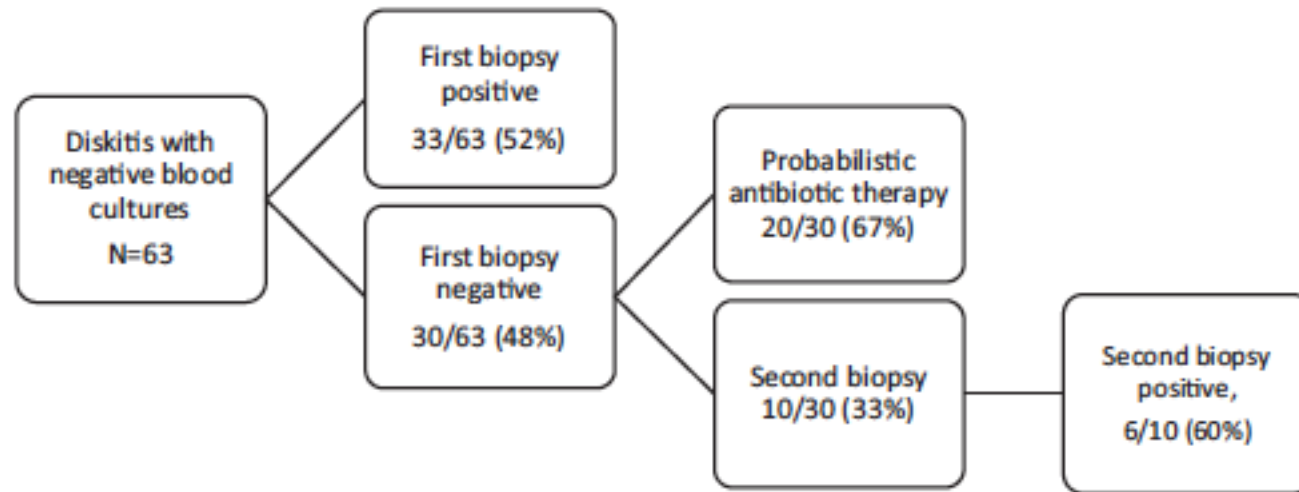


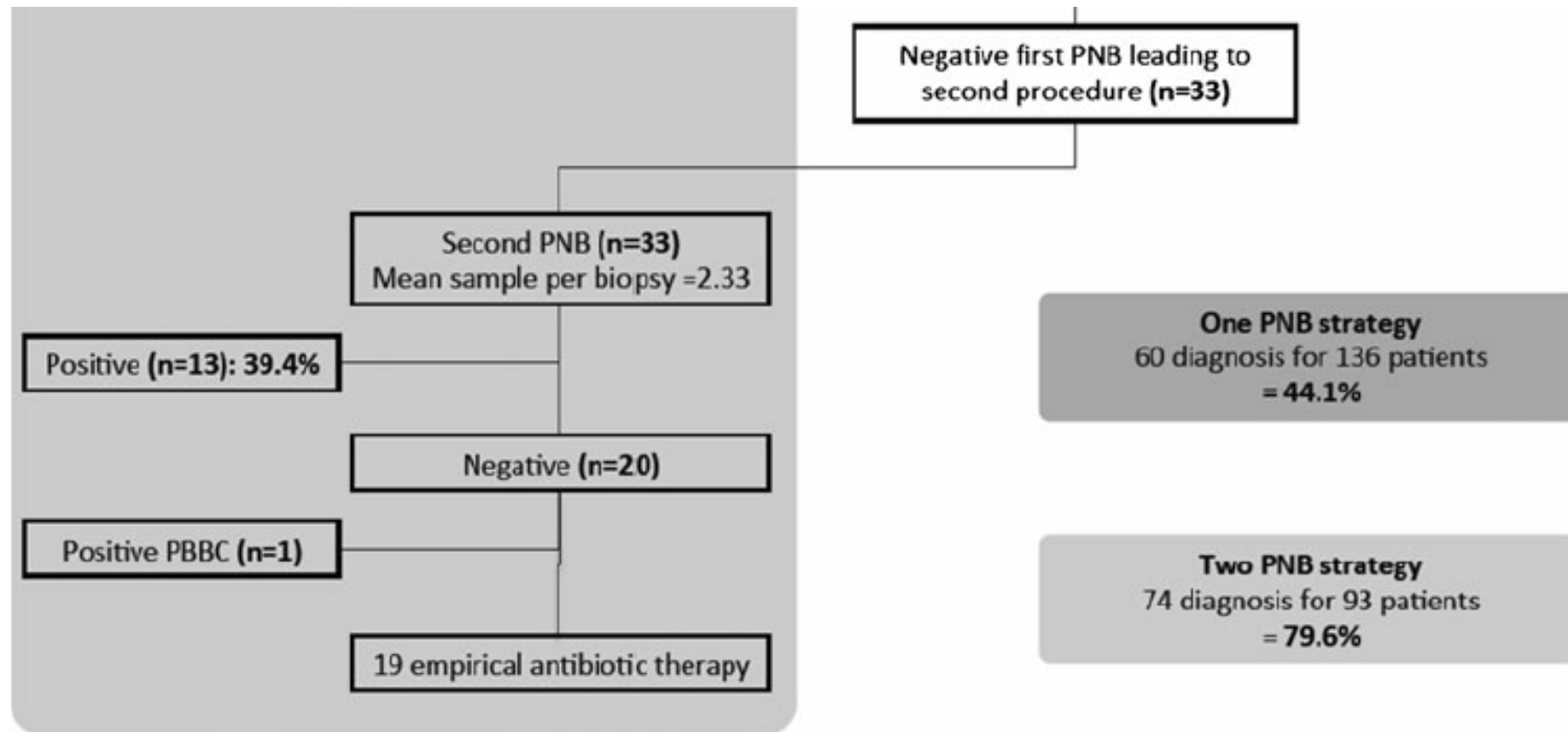
Fig. 2. Percutaneous needle biopsy results.

Antibiotic therapy within the 6 months preceding the first biopsy was significantly associated with having a negative first biopsy (15/30 versus 7/33; odds ratio, 3.13; 95% confidence interval, 1.07–9.13; $P < 0.05$)

Si première PBDV non contributive ?

Microbiological diagnosis of vertebral osteomyelitis: relevance of second percutaneous biopsy following initial negative biopsy and limited yield of post-biopsy blood cultures

G. Gras • R. Buzele • J. J. Parienti • F. Debiais • A. Dinh • Eur J Clin Microbiol Infect Dis (2014)



Si deux biopsies non contributives :
réévaluer les données
iconographiques + discussion
biopsies chirurgicales

Outcome

à M12

	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

Pronostic

- Taux de mortalité 6% (rôle de *S. aureus*)
- Récidive 8%
- 27% des patients rapportant un retentissement sérieux sur leur vie quotidienne à distance
 - persistance des douleurs 28%
 - parésie 16%
 - dysfonction vésicale 7%

Facteurs de risque d'évolution défavorable

- Âge > 75 ans
- Atteinte neurologique au diagnostic
- Endocardite infectieuse
- Dialyse
- Absence d'identification microbienne
- *S aureus*

Pola E et al. Eur Spine J 2018

Kuo G et al. Ther Clin Risk Manag 2018

Bernard L et al Lancet 2015

Traitements

Antibiothérapie (hors endocardite infectieuse associée) 6 semaines

- S. aureus
 - Traitement d'une bactériémie identifiée: IV 7 jours
 - PO : LEVO + RFP ou Clindamycine monothérapie
- Streptocoques
 - Amoxicilline 2-3g / 8h ou Clindamycine ou Levofloxaxine
- Entérocoque
 - Amoxicilline 2-3g / 8h
- Enterobacterales
 - Levofloxaxine

Evaluation de la stabilité rachidienne

Table 2

Spinal Instability Neoplastic Score (SINS) from Fischer et al.
Spinal stability if 0-6 points, intermediate stability if 7-12 points, and instability if 13-18 points [57].

Component	Score
Location	
Junctional (O-C2; C7-T2; T11-L1; L5-S1)	3
Mobile spine (C3- ; L2-4)	2
Semirigid (T3-10)	1
Rigid (S2-S5)	0
Mechanical pain	
Yes	3
No	2
Pain-free lesion	1
Bone lesion	
Lytic	2
Mixed (lytic/blastic)	1
Blastic	0
Radiographic spinal alignment	
Subluxation/translation present	4
Deformity	2
Normal	0
Vertebral body collapse	
>50% collapse	3
<50% collapse	2
No collapse with >50% body involved	1
None of the above	0
Posterolateral involvement	
Bilateral	3
Unilateral	1
None of the above	0

Instabilité rachidienne

- Destruction osseuse > 50%
- Angulation > 20% - Translation > 5 mm
- Atteinte de 2 des 3 axes de stabilité

Traitement chirurgical

Presentation and Outcomes After Medical and Surgical Treatment Versus Medical Treatment Alone of Spontaneous Infectious Spondylodiscitis: A Systematic Literature Review and Meta-Analysis

Taylor DG et al.

Global Spine Journal
2018, Vol. 8(4S) 49S-58S

50 articles, 1991 à 2017, 4173 patients

- 63% des patients bénéficiant d'un traitement chirurgical
 - Décompression et ostéosynthèse dans 80% des cas
 - Décompression seule 22%
 - Voie antéro-postérieure en 1 temps 33%
 - Chirurgie en 2 temps 26%

Original article

Safety and efficacy of percutaneous instrumentation combined with antibiotic treatment in spondylodiscitis

Arnauld Lambert^{a,*}, Yann Philippe Charles^a, Yves Ntilikina^a, Nicolas Lefebvre^b, Yves Hansmann^b, Erik André Sauleau^c, Jean-Paul Steib^a

^a Service de chirurgie du Rachis, hôpitaux universitaires de Strasbourg, 67200 Strasbourg, France
^b Service de maladies infectieuses et tropicales, hôpitaux universitaires de Strasbourg, 67200 Strasbourg, France
^c Département de santé publique, hôpitaux universitaires de Strasbourg, université de Strasbourg, 67200 Strasbourg, France

28 patients Aucune ISO, aucune récurrence d'infection



Table 1
Clinical parameters for back pain (VAS) and quality of life (EQ-5D). A probability of change > 0.95 was considered significant between to time points.

VAS	Preoperative	Day 5	6 weeks	3 months	1 year	2 years
Average ± SD	7.0 ± 1.2	3.2 ± 1.8	2.2 ± 1.4	1.9 ± 1.5	1.6 ± 1.5	1.4 ± 1.3
Range	5 to 9	0 to 8	0 to 5	0 to 5	0 to 4	0 to 4
Probability		1.0000	0.9742	0.9279	0.9023	0.9601

Autres Traitements

- Prévention des complications du décubitus
- En l'absence d'instabilité pas de décubitus dorsal strict
- Pas d'instabilité = pas de corset sauf discussion pour lésions cervicales
- Corticothérapie
 - En sauvetage si complication neurologique si chirurgie non mise en œuvre
 - Analogie avec métastase médullaire
 - Antibiothérapie adaptée en place

Suivi

- Pas d'IRM systématique
- Radiographie si infection destructrice pour le suivi de la stabilité