SFCR
Société Française de Chirurgie Rachidienne

SOFCOT 2015 – Journée des Spécialités

Symposium: Infections du Rachis et Instrumentation

Hôpitaux de Lyon

Infections du Site Opératoire après Instrumentation Rachidienne. Aspects Chirurgicaux.

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CONTEXTE

- ISO: Complication fréquente

Eur Spine J

Table 4 Causes of 30-day reoperation

n = 175/10680 (1,6%)

Causes of reoperation	Number of cases (%)	Interval from index surgery to reoperation, average days ± SD (range)
SSI*	65 (37.1)	15.9 ± 6.3 (3–30)
Hematoma	41 (24.0)	3.8 ± 5.2 (0–19)
PS malpositioning	18 (10.2)	12.8 ± 8.0 (4–29)
Inadequate decompression	11 (6.2)	13.7 ± 9.5 (2–27)
Bone graft dislodgement		
Thoracolumbar	6 (3.4)	6.3 ± 5.2 (0–14)
Anterior cervical	5 (2.8)	8.6 ± 8.0 (1–22)
Anterior cervical plate-related trouble	3 (1.7)	21.0 ± 10.5 (9–29)
Inadequate O-C2 angle	3 (1.7)	6.6 ± 7.0 (0–14)
Recurrent lumbar hernia	3 (1.7)	10.3 ± 5.1 (6–16)

**SSI Surgical Site Infection*

A multi-center study of reoperations within 30 days of spine surgery

Takayoshi Shimizu[1] · Shunsuke Fujibayashi[1] · Mitsuru Takemoto[1] · Bungo Otsuki[1,2] · Hiroaki Kimura[1] · Masato Ota[3] · Akira Kusuba[4] · Youngwoo Kim[5] · Tsunemitsu Soeda[6] · Kei Watanabe[7] · Takeshi Sakamoto[7] · Akira Uchikoshi[8] · Naoya Tsubouchi[9] · Shuichi Matsuda[1]

Eur Spine J

Received: 22 April 2015 / Revised: 4 July 2015 / Accepted: 5 July 2015

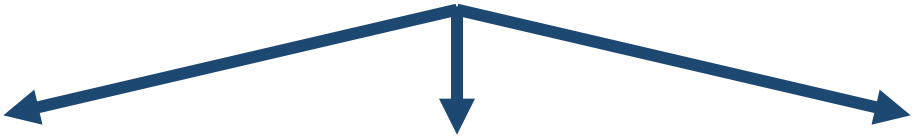
ISO: 1ère cause de réintervention dans le premier mois post-opératoire

CONTEXTE

- ISO: Complication fréquente
- Progrès (FDR mieux connus et dépistés)
- Coût médico-économique
- Spécificités:
  - Risque neurologique en cas d'instabilité
  - Risque pseudarthrose et complication mécanique
  - Variabilité des situations (voie d'abord, matériel…)

D'après Gerometta et al, Hegde et al, Lazennec et al, Pull te Gunne et al , Weinstein et al

FACTEURS de RISQUE



Patient

- Age > 65 ans
- **Diabète** RRx2
- Obésité
- Tabac
- Alcool

Procédure

- Durée chirurgie
- Pertes sanguines
- **Matériel** RRx8
- **Postérieure** RRx2
- Etendue du montage
- Indications

Microbiologie

- Staph aureus
- Autres cocci G +
- BGN
- BMR
- Polymicrobienne

- *ATBprophylaxie*

D'après Abdul-Jabbar et al, Collins et al, Fang et al, Gerometta et al, Hegde et al, Lazennec et al, Pull te Gunne et al , Weinstein et al, Wimmer et al

Facteurs liés à la procédure

Spine (Phila Pa 1976). 2012 Jul 1;37(15):1340-5. doi: 10.1097/BRS.0b013e318246a53a.

Surgical site infection in spinal surgery: description of surgical and patient-based risk factors for postoperative infection using administrative claims data.

Abdul-Jabbar A, Takemoto S, Weber MH, Hu SS, Mummaneni PV, Deviren V, Ames CP, Chou D, Weinstein PR, Burch S, Berven SH.

Department of Orthopaedic Surgery, University of California, San Francisco, CA 94143, USA. amir.abdul-jabbar@ucsf.edu

n=6628 chir.

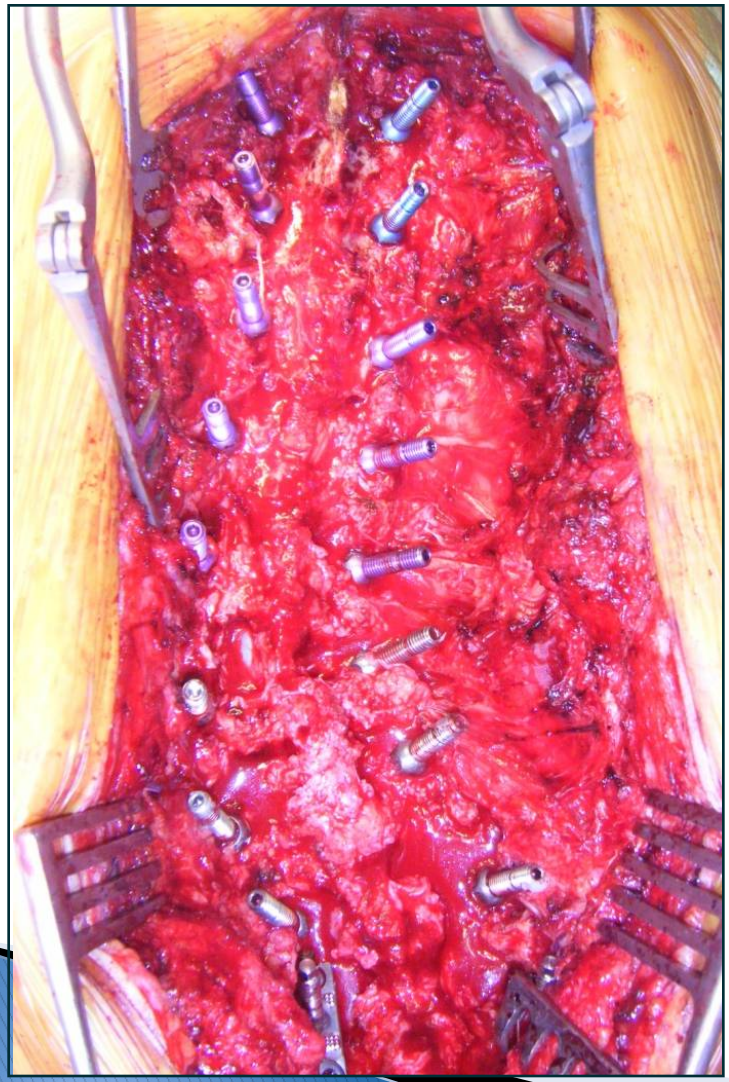
193 ISO (2.9%)

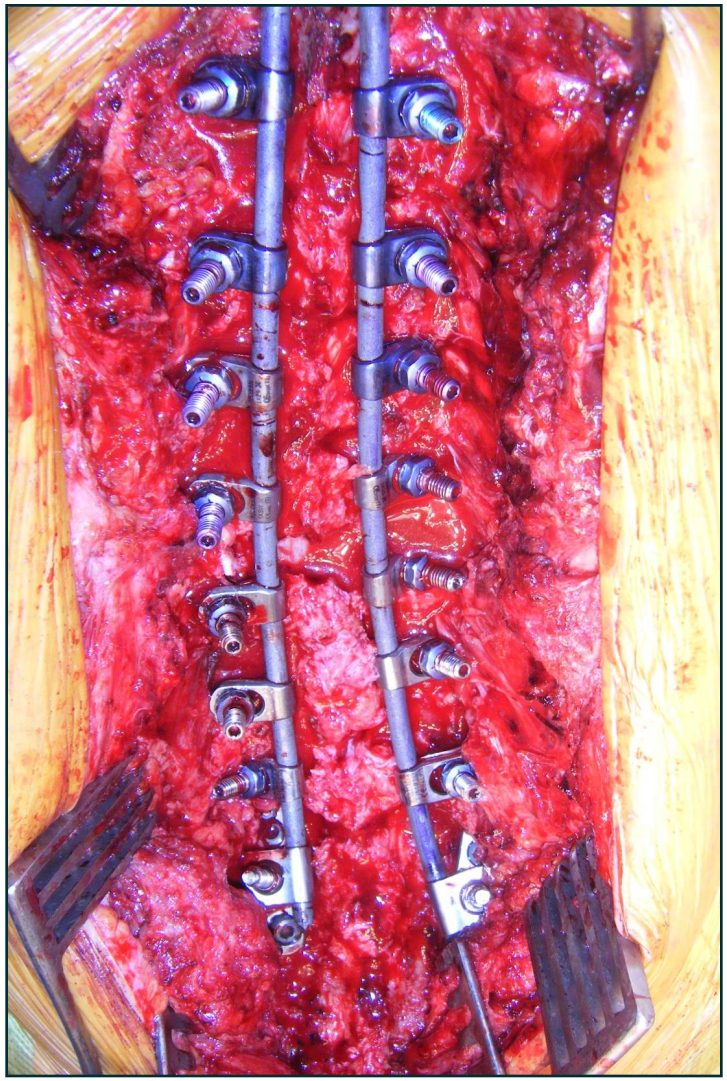
[2005-2010]

Risk Factor	Odds Ratio	95% CI	*P*	
Bone/CT neoplasm	5.61	1.87–16.81	0.002	
>12 levels	2.48	1.31–4.69	0.005	↑
8–12 levels	2.09	1.37–3.12	0.001	↑
Sacrum/pelvis	2.04	1.32–3.07	0.001	↑
Coronary artery disease	1.48	0.92–2.37	0.103	
Diabetes mellitus	1.42	0.93–2.18	0.108	
Thoracic spine	1.36	0.94–1.97	0.102	
Single level	0.44	0.20–0.94	0.042	
Anterior approach	0.04	0.01–0.27	0.001	↓

CI indicates confidence interval; CT, connective tissue.

Chirurgie à risque: chirurgie postérieure instrumentée étendue





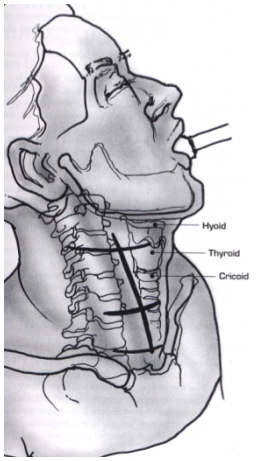
Extension au sacrum

Risk Factor	Odds Ratio	95% CI	*P*
Sacrum/pelvis	2.04	1.32–3.07	0.001

- Fréquente
  - Pathologie dégénérative
  - Déformations
- Proximité avec le périnée
- Cicatrice « malmenée »
  - Appui en position allongée
  - Orthèse
- Incontinence

Orthesia

Risque faible



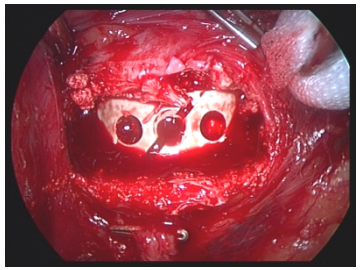
Chirurgie cervicale antérieure (ACDF)

World Neurosurg. 2014 Dec;82(6):1380-7. doi: 10.1016/j.wneu.2013.09.022. Epub 2013 Sep 18.

Surgical complications of anterior cervical diskectomy and fusion for cervical degenerative disk disease: a single surgeon's experience of 1,576 patients.

Nanda A[1], Sharma M[2], Sonig A[2], Ambekar S[2], Bollam P[2].

patients. Hoarseness was seen in 1.2% (n = 19) of our patients. A total of 0.88% (n = 14) of the patients had worsening of myelopathy/radiculopathy in the immediate postoperative period. Superficial wound **infection** occurred in 0.2% (n = 3) of our patients. Postoperative **neck** hematoma was seen in 0.1% (n = 2), recurrent laryngeal nerve palsy in 0.1% (n = 2), esophageal tear



Chirurgie lombaire antérieure/latérale

Eur Spine J. 2015 Feb 27. [Epub ahead of print]

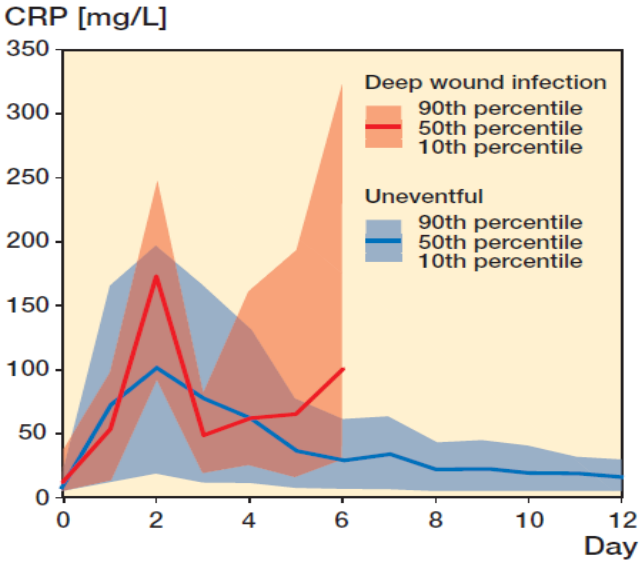
Visceral, vascular, and wound complications following over 13,000 lateral interbody fusions: a survey study and literature review.

Uribe JS[1], Deukmedjian AR.

RESULTS: Between 2003 and 2013, 13,004 patients were treated with MIS-LIF by the 40 surgeons who responded to the survey. Of those patients, 0.08 % experienced a visceral complication (bowel injury), 0.10 % experienced a vascular injury, 0.27 % experienced a superficial wound infection, and 0.14 % experienced a deep wound infection.

DEMARCHE DIAGNOSTIQUE

- Aucun signe spécifique
- Δ^{ic} Souvent évident en postopératoire immédiat
  - Signes généraux: Fièvre, frissons
  - Signes locaux: Ecoulement (signe le + fréquent)
  - Syndrome inflammatoire évolutif (CRP)

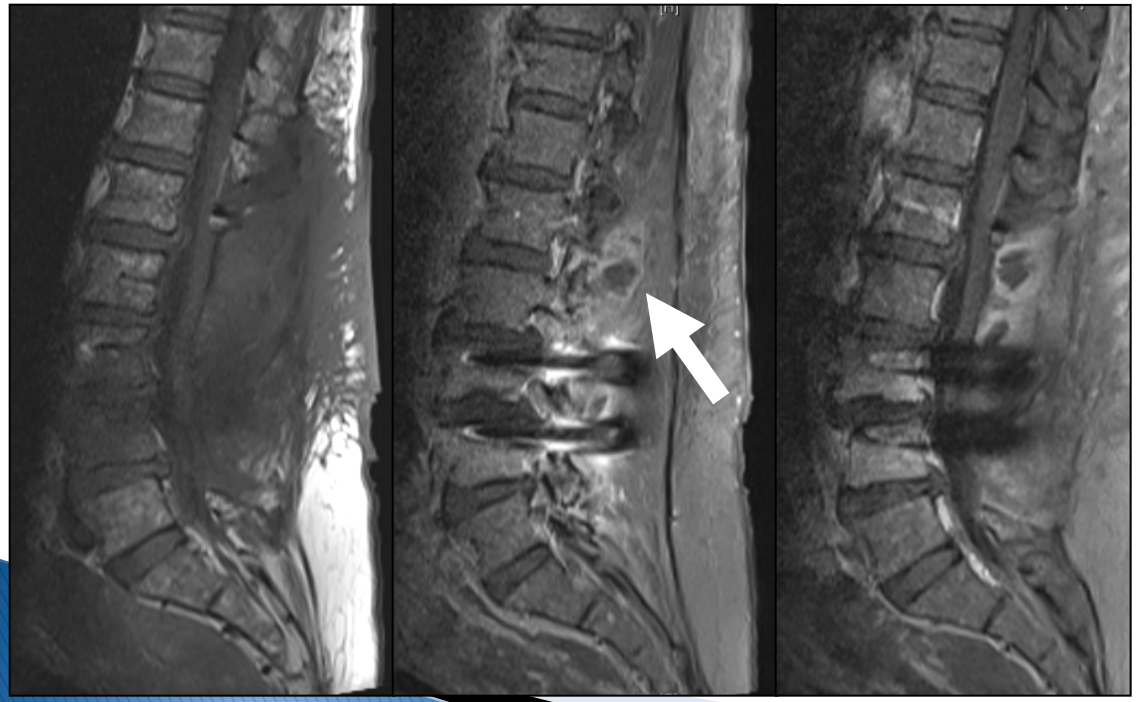


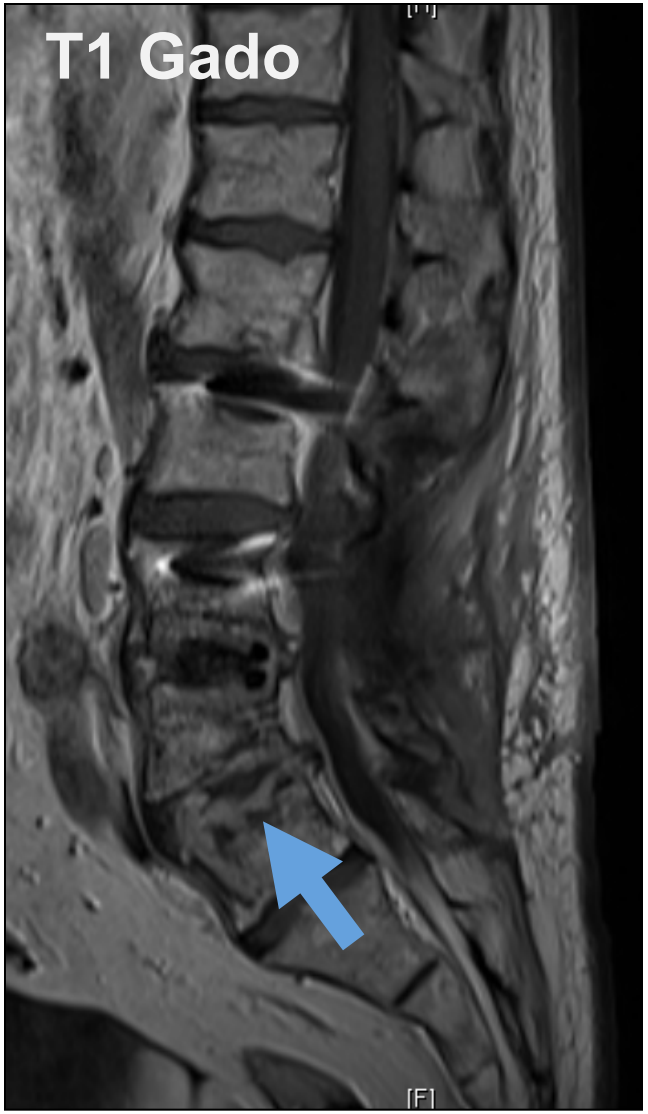
CRP: Pic à J2

C-reactive protein levels for early detection of postoperative infection after fracture surgery in 787 patients

M Neumaier and M Scherer, Acta Orthop 2015

- Imagerie (peu d'intérêt en aigu)
  - RX: matériel
  - TDM/IRM: collection/abcès
  - Inflammation locale post-op
  - Artéfacts liés au matériel

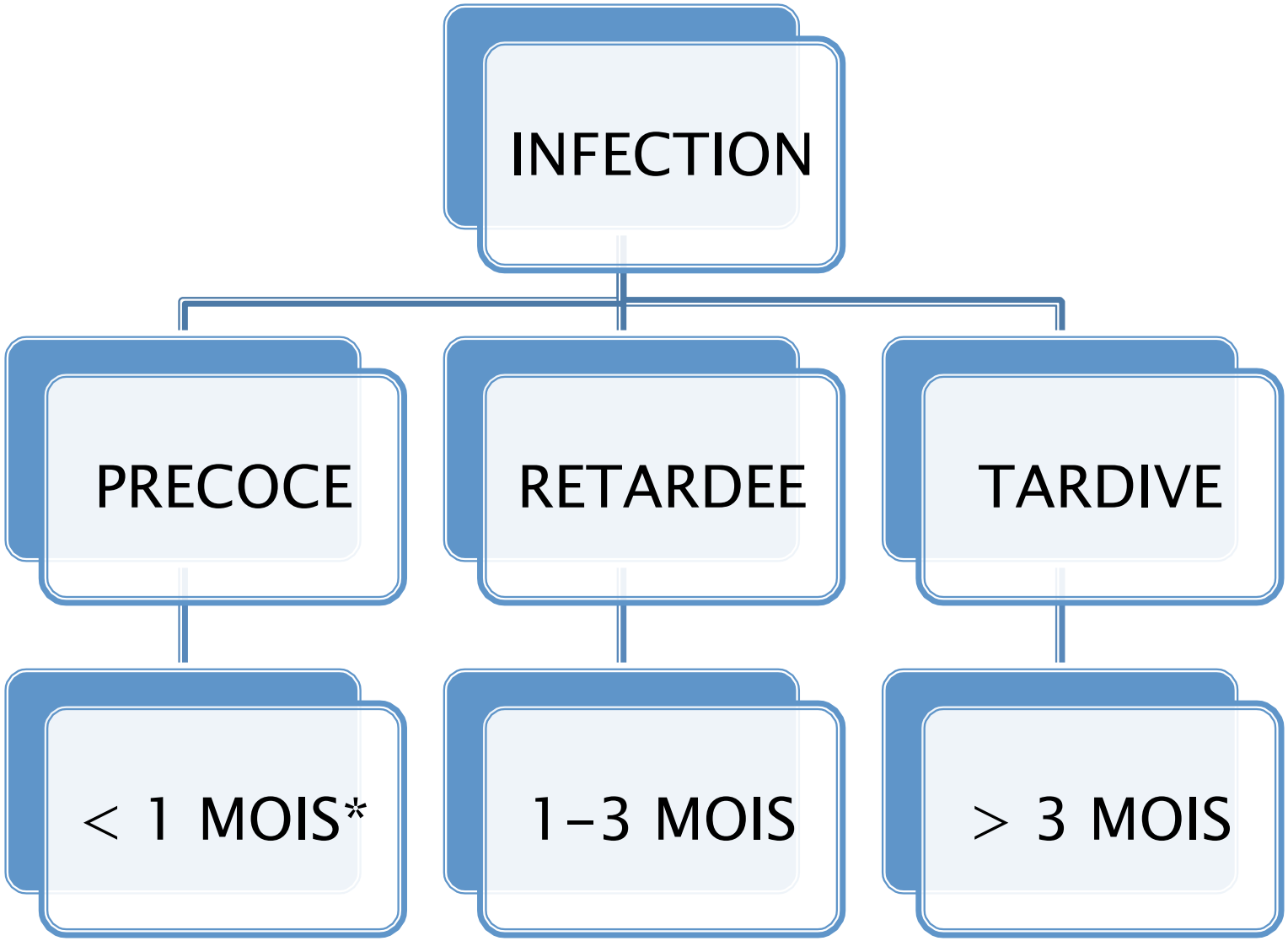




DIAGNOSTIC BACTERIOLOGIQUE

- Essentiel: IDENTIFICATION précise germes
- PLV superficiels (peu de valeur)
- Hémocultures
- Ponction-biopsie sous scanner

- **PRELEVEMENTS PROFONDS AU BO (au moins 4)**



* Délai variant entre 3 sem et 3 mois

Caractériser l'ISO

- Superficielle / profonde (aponévrose) ?
- Précoce / tardive ?
- Rachis instrumenté / NON instrumenté ?
- Germe(s) en cause ?

Stratégie thérapeutique

Chinese Medical Journal 2013;126 (20)

Management of postoperative instrumented spinal wound infection

FANG Xiu-tong, and Kirkham B. Wood

n=41 *ISO / 851 patients, soit 4,9%*

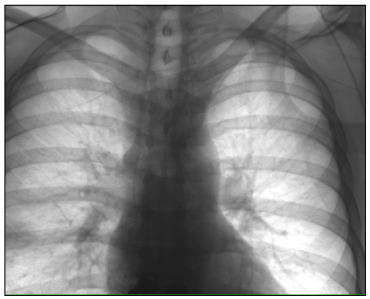
Table 1. Patients demographic data (*n* (%))

Groups	Incidence of infection	Instrumentation reserved
Acute infection	33 (3.9)*	32 (96.9)‡
Superficial infection	5 (0.6)†	5
Deep infection	28 (3.3)†	27
Delayed infection	8 (1.0)*	1 (12.5)‡
Superficial infection	1 (0.1)†	1
Deep infection	7 (0.9)†	0
P values	<0.05	<0.01

Infections précoces profondes:
70% ISO (*n=28/41*)

STRATEGIE THERAPEUTIQUE
Principes généraux

- ATB adaptée aux PLV profonds (IV puis relais par voie orale)



Pic-line

- Prise en charge chirurgicale
  1. Lavage-parage du foyer opératoire
  2. Instrumentation
     - Matériel laissé en place
     - Remplacement en 1 temps
     - Ablation complète définitive/temporaire
     - Ablation partielle

INFECTION PRECOCE (<1 mois)

- Reprise au bloc opératoire sous AG^{ale}
- Débridement – Lavage – parage
- PLV bactério. multiples (au moins **4** PLV profonds)
- **Le matériel NETTOYE est LAISSE en place*** +++
- Fermeture sur drainages multiples et aspiratifs

** Sauf mobilisation évidente*

Chinese Medical Journal 2013;126 (20)

Management of postoperative instrumented spinal wound infection

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P values	<0.05	<0.01

*Correlation is significant between acute infection and delayed infection.
†Correlation is significant between superficial infection and deep infection.

Rétention 97%

Ablation 100%

Preservation of Spinal Instrumentation After Development of Postoperative Bacterial Infections in Patients Undergoing Spinal Arthrodesis

Ahmed, Raheel MD, PhD*; Greenlee, Jeremy D.W. MD*; Traynelis, Vincent C. MD†

Journal of Spinal Disorders & Techniques:
August 2012 - Volume 25 - Issue 6 - p 299–302
doi: 10.1097/BSD.0b013e31821fbf72
Original Articles

Abstract

17 ISO (2%) / 854 Chir.
2 ans de recul

Study Design: This is a retrospective review.

Objective: The purpose of this study is to evaluate the efficacy of medical and surgical management of postoperative infections after the placement of spinal instrumentation in the context of retaining the instrumentation.

Methods: Of 854 consecutive patients who had undergone spinal instrumentation by the senior author, 17 patients were identified who developed postoperative infections, 16 of which were treated by the senior author.

Results: All patients underwent surgical debridement and received antimicrobial therapy in consultation with the infectious diseases consultants. Spinal instrumentation was preserved in all cases. Two patients had clinical and radiologic evidence of nonunion and later underwent a staged instrumentation revision procedure. Eradication of the infection was successful in all patients. The mean follow-up period was 2.1 years (range, 12 mo to 4.5 y).

Conclusions: A combination of aggressive surgical debridement with microbial-guided pharmacotherapy enabled infection cure in all patients with postoperative bacterial infections after spinal instrumentation. Adjunct measures including the use of wound vacuum devices and long-term suppressive antimicrobial therapy were also used in high-risk patients. These results show that postoperative bacterial infections in the setting of spinal instrumentation can be successfully treated without removing titanium alloy instrumentation.

Evidence-based management of deep wound infection after spinal instrumentation

Journal of clinical neuroscience

February 2015 Volume 22, Issue 2,

Rishi R. Lall, Albert P. Wong, Rohan R. Lall, Cort D. Lawton, Zachary A. Smith, Nader S. Dahdaleh

Department of Neurosurgery, Northwestern University Feinberg School of Medicine, 676 N. St. Clair, Suite 22
Chicago, IL 60611, USA

Abstract

In this study, evidence-based medicine is used to assess optimal surgical and medical management of patients with post-operative deep wound infection following spinal instrumentation. A computerized literature search of the PubMed database was performed. Twenty pertinent studies were identified. Studies were separated into publications addressing instrumentation retention *versus* removal and publications addressing antibiotic therapy regimen. The findings were classified based on level of evidence (I–III) and findings were summarized into evidentiary tables. No level I or II evidence was identified. With regards to surgical management five studies support instrumentation retention in the setting of early deep infection. In contrast, for delayed infection, the evidence favors removal of instrumentation at the time of initial debridement. Surgeons should be aware that for deformity patients, even if solid fusion is observed, removal of instrumentation may be associated with significant loss of correction. A course of intravenous antibiotics followed by long-term oral suppressive therapy should be pursued if instrumentation is retained. A shorter treatment course may be appropriate if hardware is removed.

OPTIONS A EVALUER (1)

- Irrigation-lavage
- « Second-look » systém. en cas d'infection sévère
- VAC thérapie

- Staph / BMR
- Tissus nécrotiques et purulents +++
- Récidive écoulement
- Patient reste fébrile > 48H

Spine J. 2013 Aug 24. pii: S1529-9430(13)00715-8. doi: 10.1016/j.spinee.2013.06.040. [Epub ahead of print]

Negative pressure wound therapy (NPWT) for spinal wounds: a systematic review.

Ousey KJ, Atkinson RA, Williamson JB, Lui S.

CONCLUSIONS: Published reports are limited to small retrospective and case studies, with no reports of NPWT being used as a prophylactic treatment. Larger prospective RCTs of NPWT are needed to support the current evidence that it is effective in treating spinal wound complications. In addition, future studies

OPTIONS A EVALUER (2)

- ATB locale: Poudre de vancomycine

Spine J. 2015 Jan 27. pii: S1529-9430(15)00079-0. doi: 10.1016/j.spinee.2015.01.030. [Epub ahead of print]

Intrasite Vancomycin Powder for the Prevention of Surgical Site Infection in Spine Surgery: A Systematic Literature Review.

Kang DG[1], Holekamp TF[2], Wagner SC[3], Lehman RA Jr[4].

⊕ **Author information**

Abstract

BACKGROUND CONTEXT: Deep surgical site infections (SSIs) following spinal surgery are a significant burden to the patient, patient's family and the healthcare system. Due to increasing pressures to reduce SSIs and control costs, some spine surgeons have begun placing lyophilized vancomycin powder directly into the surgical wound at the conclusion of the procedure. However, the literature supporting this practice remains limited.

PURPOSE: To review the current literature examining the use of prophylactic intrasite vancomycin powder to control SSIs in spinal surgery, and determine if any standard recommendations can be made.

STUDY DESIGN/SETTING: Systematic review.

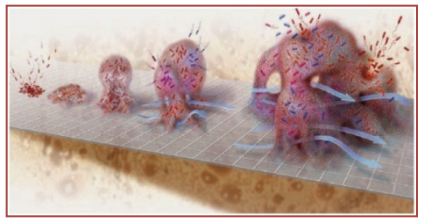
METHODS: Ovid MEDLINE and PubMed were searched to identify English language articles.

RESULTS: No current guidelines are available for the use of intrasite vancomycin powder in preventing surgical site infections, and no standard dosage for the drug exists. Based on the limited literature currently available, there appears to be a protective effect of intrasite vancomycin powder on the incidence of SS without evidence of significant risk of side effects, but the evidence is limited. However, case reports do exist describing systemic side effects following intrasite vancomycin powder during spine surgery.

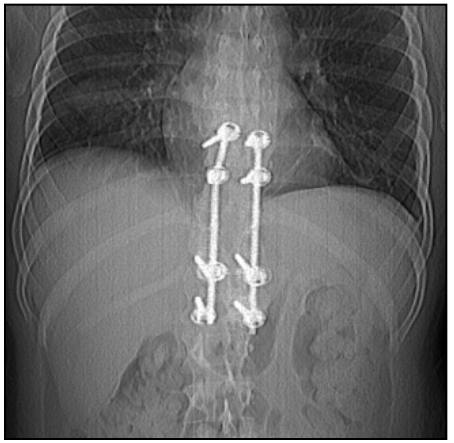
CONCLUSIONS: The interpretation of the available evidence supporting the use of intrasite vancomycin powder in surgical wounds is limited, and its extrapolation should be performed with caution. Despite the lack of significant high-quality evidence available in the literature, many surgeons have adopted this practice; anecdotally it continues to provide protection from infection without apparent significant risk of side effects.

INFECTION TARDIVE

Biofilm

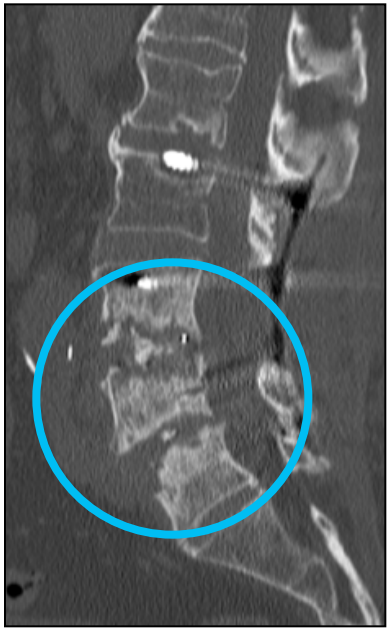


ABLATION DE L'INSTRUMENTATION



- Situation idéale:
  - Rachis stable et consolidé
  - Ablation matériel facile

- Situations délicates:
  - Rachis instable/non consolidé
  - Longue instrumentation
  - Matériel difficile d'accès

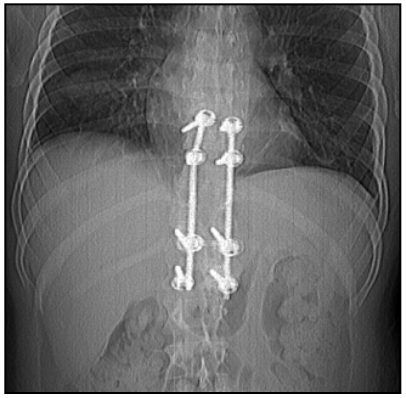
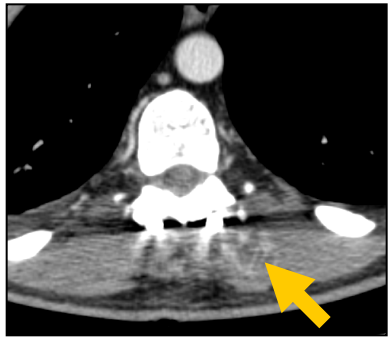


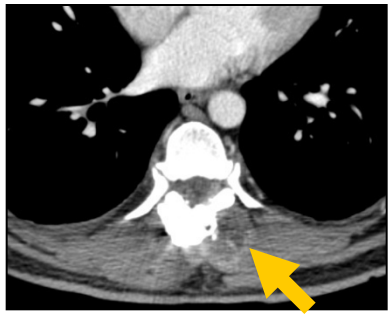
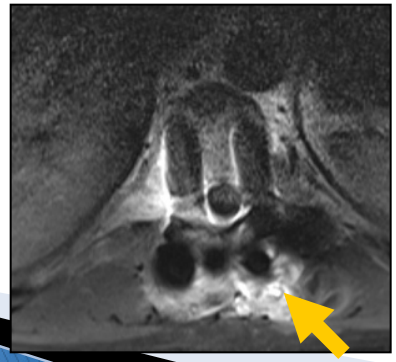
Evidence-based management of deep wound infection after spinal instrumentation

Rishi R. Lall, Albert P. Wong, Rohan R. Lall, Cort D. Lawton, Zachary A. Smith, Nader S. Dahdaleh
Department of Neurosurgery, Northwestern University Feinberg School of Medicine, 676 N. St. Clair, Suite 22
Chicago, IL 60611, USA

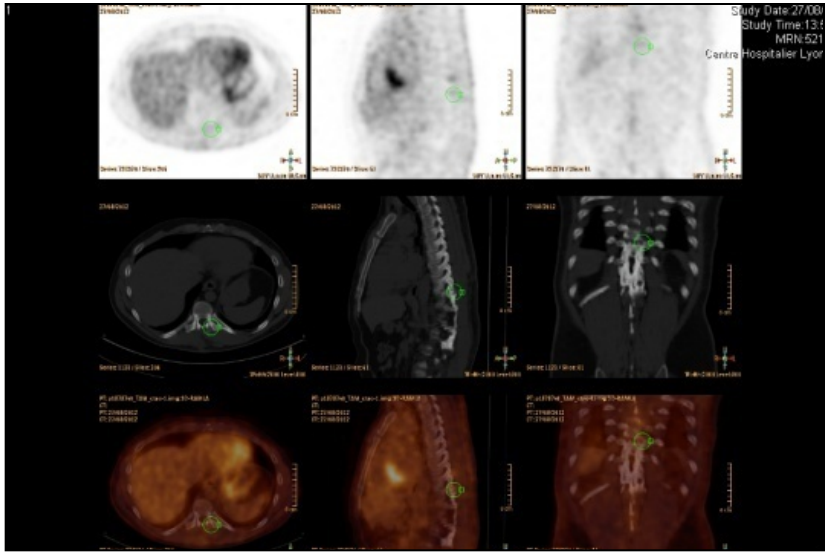
Journal of clinical neuroscience
February 2015 Volume 22, Issue 2, Pages 238–242

Chirurgie il y a 15 ans (fracture rachis)
Tableau septique
Hemoc + à Staph Meti-S

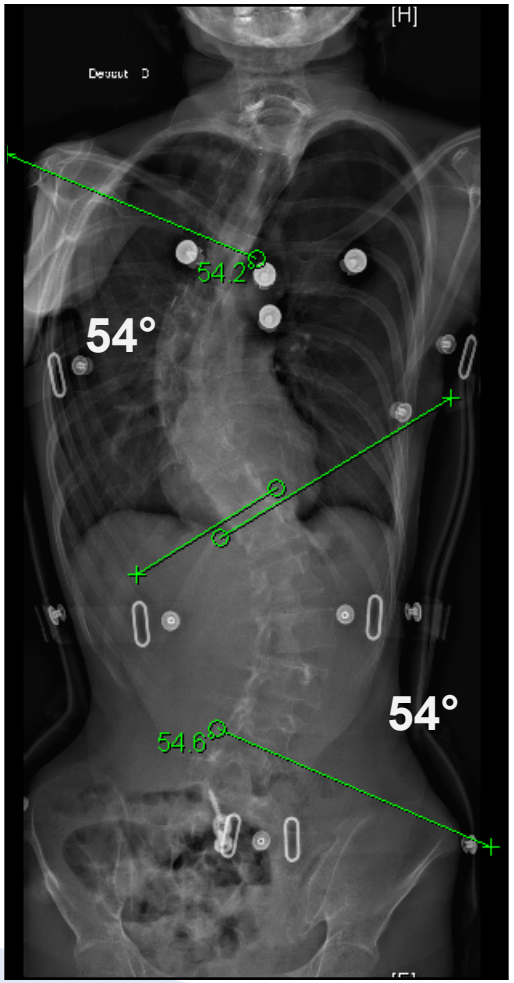




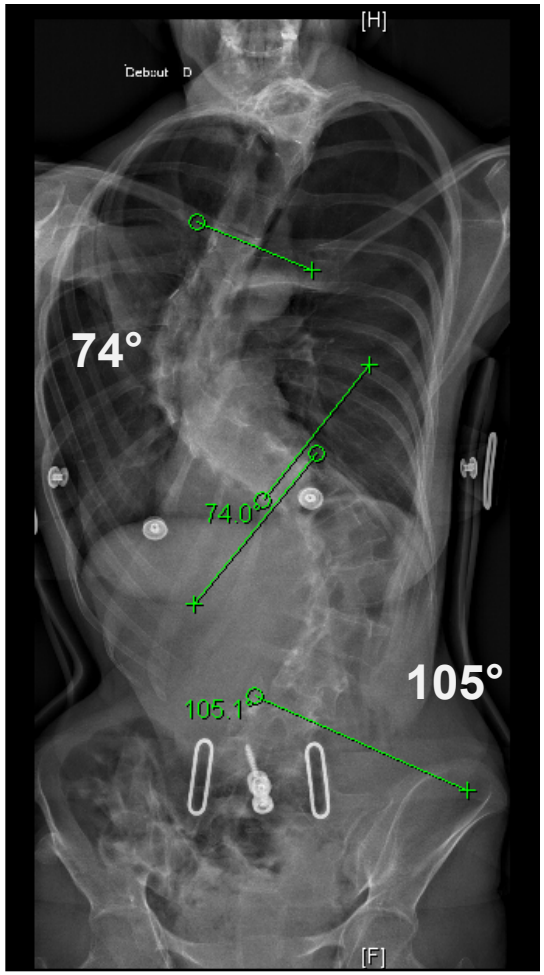
Longues instrumentations: AMO et risque mécanique

JUIN 2011

JUILLET 2011

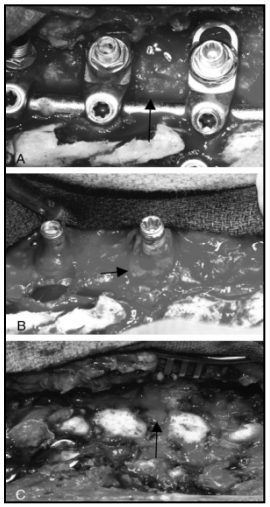


JANV 2013



Ablation du matériel et risque mécanique

RESULTATS de la LITTERATURE



Spine (Phila Pa 1976). 2009 Jan 1;34(1):60-4. doi: 10.1097/BRS.0b013e31818ed75e.

Failure of attempted implant retention in spinal deformity delayed surgical site infections.

Hedequist D, Haugen A, Hresko T, Emans J.

Children's Hospital Boston/Harvard Medical School, 300 Longwood Avenue, Boston, MA 02114, USA. Daniel.hedequist@childrens.harvard.edu

Abstract

STUDY DESIGN: A retrospective case series.

OBJECTIVE: To determine if implant retention is possible in spinal deformity cases which present as a delayed (greater than 3 months) surgical site infection.

SUMMARY OF BACKGROUND DATA: The retention of spinal implants in deformity surgery is possible with an acute surgical site infection. Currently, the decision whether or not to retain implants in a delayed surgical site infection is unclear.

METHODS: A retrospective review of 26 cases of delayed surgical site infections after spinal deformity surgery. Data and information was recorded regarding the initial management of the surgical site infection, the number of operations performed related to the infection, and whether or not the infection could be cleared with implant retention. The number of operations, hospital days, and charges related to the treatment of the infection were recorded.

RESULTS: In this series no patient was able to clear their infection without spinal implant removal. The number of operations required to clear the infection, length of hospitalization, and financial charges were proportionate to the timing of implant removal.

CONCLUSION: Delayed surgical site infections after spinal instrumentation for deformity need to be treated with implant removal to clear the surgical site infection. Patients may require to undergo repeat instrumentation and fusion at a later date if they develop progressive deformity or symptomatic pseudarthrosis after implant removal.

2008 2010 2011 2012 2012 2012

AMO antérieur

CYPHOSE, FRACTURE MATERIEL, PSEUD.

N^elle STABILISATION

SUIVI MEDICO-CHIRURGICAL

- Médecin Référent en Infectiologie/CRIOAc
  - Durée/relais/arrêt
  - Tolérance et efficacité de l'Antibiothérapie
- Chirurgien du Rachis
  - Suivi de l'instrumentation/consolidation osseuse
  - Détection complications mécaniques et/ou neurologiques
- Suivi assuré à moyen terme, **2 ans** minimum

The follow-up of patients with postoperative infection of the spine

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CONCLUSIONS

- Variabilité des situations cliniques
- ISO précoce: Lavage avec rétention matériel + ATB
- ISO tardive: Ablation de l'instrumentation expose parfois au risque neurologique et/ou mécanique
- Prise en charge multidisciplinaire

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