

Décolonisation nasale de *Staphylococcus aureus*: transposer la pratique de la chirurgie cardiaque vers l'orthopédie?

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Inserm CIC 1408- Axe Vaccinologie, I-Reivac

Présage (Institut de prévention en santé globale)

Liens d'Intérêt

- Membre du groupe prévention de la SPILF
- Investigateur associé/ principal essai vaccins académiques et industriels CIC 1408 Axe vaccinologie-I-REIVAC: Sanofi Pasteur; GSK, MSD, Pfizer....
- Bourse par Pfizer pour un travail sur la couverture vaccinale des patients immunodéprimés au CHU de Saint-Etienne
- Formations aux MG (Pfizer, Sanofi-Pasteur)
- Advisory Board Vaccin *S. aureus* (Pfizer)
- Collaboration étude préclinique (Sanofi -Pasteur)
- Investigateur principal d'un PHRC CIBERSTAPH: décolonisation ciblée des porteurs persistants en hémodialyse



- Conflit d'intérêt: AUCUN

De quoi parle t-on?

- *S. aureus* est le 1^{er} agent responsable d'infections du site opératoire (ISO)
- Les infections sont endogènes dans > 80% des cas: souche du patient
- Les porteurs dits 'persistants' (portage prolongé, charge bactérienne élevée) sont ceux qui sont à haut risque d'infection

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Brief report

Are the risk factors associated with *Staphylococcus aureus* nasal carriage in patients the same than in healthy volunteers? Data from a cohort of patients scheduled for orthopedic material implantation 

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Frederic Farizon MD, PhD^d, Bruno Pozzetto MD, PhD^{a,c}, Frederic Lucht MD, PhD^{a,b}

Dans la « vraie vie », les facteurs de risque de portage sont différents de ceux chez les volontaires sains: obésité et sujets plus jeunes sont les plus à risque de portage

Tong et al., CMR 2015

Surveillance des infections du site opératoire dans les établissements de santé français. Résultats 2016

Kalmeijer *et al.*, Infect Control Hosp Epidemiol. 2000;21:319-23

Verhoeven PO, et al., Expert Rev Anti Infect Ther. 2014 Jan;12(1):75-89.

Verhoeven PO, et al., Medicine (Baltimore). 2016 Apr;95(14):e3231

De quoi parle t-on?

- La colonisation à *S. aureus* est associée à un sur-risque d'infections à cette bactérie, notamment en chirurgie:
 - Chirurgie cardio-thoracique: x 3 à 9
 - Chirurgie vasculaire: X10
 - Chirurgie orthopédique: X 3 à 16

Kluytmans *et al.*, J Infect Dis 1995
Munoz *et al.*, J Hosp Infect 2008
Donker JMW, PLoS ONE 2012
Kalmeijer *et al.*, ICHE 2000
Berthelot *et al.*, EJCMI 2010

Risque infectieux et colonisation à *S. aureus*: orthopédie

RISK FACTORS FOR SURGICAL-SITE INFECTION ([SSI] UNIVARIATE ANALYSIS)

Risk Factor	N= 272	RR	CI ₉₅
Any SSI			
Male gender		4.1	1.5-10.9
Underlying illness		2.6	0.9-7.7
Removing hair with razor blade		2.4	0.5-11.3
Surgeon 1		3.4	1.3-8.8
<i>Staphylococcus aureus</i> nasal carriage (any)		2.3	0.8-6.4
<i>S aureus</i> nasal carriage (high level)		3.1	1.1-9.0
<i>S aureus</i> SSI			
Male gender		3.0	0.8-11.5
Underlying illness		4.4	1.1-17.0
Removing hair with razor blade		2.6	0.3-22.1
Surgeon 1		3.1	0.8-12.2
<i>Staphylococcus aureus</i> nasal carriage (any)		8.9	1.7-45.5
<i>S aureus</i> nasal carriage (high level)		16.0	3.1-82.2

Abbreviations: CI₉₅, 95% confidence interval; RR, relative risk.

En analyse multivariée:

• Any SSI:

<i>S. aureus</i> nasal carriage (high level)	p= 0.04
Male gender	p=0.005
Surgeon 1	p=0.006

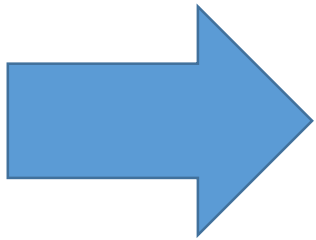
• *S. aureus* SSI:

<i>S. aureus</i> nasal carriage (high level)	p= 0.002
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Kalmeijer *et al.*, Infect Control Hosp Epidemiol. 2000;21:319-23

Risks factors	Univariate analysis	Multivariate analysis	
	p-value	p-value	Exp (B) 95% CI
N= 3908			
For SSI overall			
Centre	<0.01	0.0379	Adjustment factor
Age	0.03		
BMI	<0.001		
Tobacco use	0.003	0.0018	2.244 [1.352-3.726]
Diabetes	0.04		
Cancer	0.06		
Corticosteroids	0.1		
First implantation	0.07		
Duration of surgery	0.004		
Haematoma	0.002	0.0026	4.665 [1.714-12.695]
Nasal carriage of <i>S. aureus</i>	0.3		
NNIS	<0.001	<0.0001	3.073 [1.874-5.038]
ASA score >2	<0.01		
For SSI due to <i>S. aureus</i>			
Centre	NS	0.9978	Adjustment factor
ASA score >2	<0.01		
BMI	0.2		
Tobacco use	0.005	0.0024	3.907 [1.621-9.420]
Diabetes	0.025		
Cancer	0.02		
Duration of surgery	0.02		
Nasal carriage of <i>S. aureus</i>	0.02	0.0208	2.786 [1.169-6.640]
NNIS	<0.001	0.0007	5.205 [2.013-13.455]

Berthelot *et al.*, Eur J Clin Microbiol Infect Dis. 2010 ;29:373-82



Agir sur ce portage devrait permettre de réduire les infections du site opératoire à *S. aureus*

Les études.....

S. AUREUS SURGICAL-SITE AND NOSOCOMIAL INFECTIONS

N Engl J Med 2002;346:1871-7

INTRANASAL MUPIROCIN TO PREVENT POSTOPERATIVE STAPHYLOCOCCUS AUREUS INFECTIONS

TRISH M. PERL, M.D., JOSEPH J. CULLEN, M.D., RICHARD P. WENZEL, M.D., M. BRIDGET ZIMMERMAN, PH.D.,
MICHAEL A. PFALLER, M.D., DEBORAH SHEPPARD, JENNIFER TWOMBLY, R.N., PAMELA P. FRENCH, M.D., M.P.H.,
LOREEN A. HERWALDT, M.D., AND THE MUPIROCIN AND THE RISK OF *STAPHYLOCOCCUS AUREUS* STUDY TEAM*

TABLE 4. OVERALL AND *STAPHYLOCOCCUS AUREUS*-SPECIFIC RATES OF NOSOCOMIAL INFECTION AMONG PATIENTS WHO RECEIVED MUPIROCIN AND THOSE WHO RECEIVED PLACEBO.

TYPE OF INFECTION	MUPIROCIN RECIPIENTS			PLACEBO RECIPIENTS		
	TOTAL (N=1933)	S. AUREUS CARRIERS (N=444)	NONCARRIERS (N=1489)	TOTAL (N=1931)	S. AUREUS CARRIERS (N=447)	NONCARRIERS (N=1484)
	number/total number (percent)					
Nosocomial infection*	218/1933 (11.3)	57/444 (12.8)	161/1489 (10.8)	220/1931 (11.4)	72/447 (16.1)	148/1484 (10.0)
Nosocomial <i>S. aureus</i> infection*	45/1884 (2.4)	17/430 (4.0)	28/1454 (1.9)	55/1886 (2.9)	34/439 (7.7)†	21/1447 (1.5)
Surgical-site infection	152/1933 (7.9)	44/444 (9.9)	108/1489 (7.3)	164/1931 (8.5)	52/447 (11.6)	112/1484 (7.5)
<i>S. aureus</i> surgical-site infections‡	43/1892 (2.3)	16/432 (3.7)	27/1460 (1.8)	46/1894 (2.4)	26/439 (5.9)	20/1455 (1.4)

*This group includes *S. aureus* infections of the bloodstream, respiratory tract, catheter, and surgical site.

†P=0.02 for the comparison with the *S. aureus* carriers in the mupirocin group (odds ratio, 0.49; 95 percent confidence interval, 0.25 to 0.92).

Preventing Surgical-Site Infections in Nasal Carriers
of *Staphylococcus aureus*

Lonneke G.M. Bode, M.D., Jan A.J.W. Kluytmans, M.D., Ph.D., Heiman F.L. Wertheim, M.D., Ph.D.,
Diana Bogaers, I.C.P., Christina M.J.E. Vandenbroucke-Grauls, M.D., Ph.D., Robert Roosendaal, Ph.D.,
Annet Troelstra, M.D., Ph.D., Adrienne T.A. Box, B.A.Sc., Andreas Voss, M.D., Ph.D., Ingeborg van der Tweel, Ph.D.,
Alex van Belkum, Ph.D., Henri A. Verbrugh, M.D., Ph.D., and Margreet

RANDOMIZATION

Patients were randomly assigned in a 1:1 ratio to either active treatment with mupirocin ointment 2% (Bactroban, GlaxoSmithKline) in combination with chlorhexidine gluconate soap, 40 mg per milliliter (Hibiscrub, Mölnlycke), or placebo ointment in combination with placebo soap. Placebo soap

	Mupirocin and Chlorhexidine	Placebo	RR (95% CI)
All surgical patients (n=808) (No. of <i>S. aureus</i> infections / No. of patients)	16/441 (3.6%)	31/367 (8.4%)	0.41 (0.22-0.76)
Cardiothoracic surgery (n=391)	3/220 (1.4%)	15/171 (8.8%)	0.14 (0.04-0.51)
Gastrointestinal surgery (n=43) [†]	2/22 (9.1%)	3/21 (14.3%)	0.60 (0.09-4.01)
General surgery (n=107) [‡]	3/61 (4.9%)	3/46 (6.5%)	0.74 (0.14-3.85)
Orthopedics (n=172)	1/85 (1.2%)	4/87 (4.6%)	0.25 (0.03-2.26)
Vascular surgery (n=95) [*]	7/53 (13.2%)	6/42 (14.3%)	0.91 (0.28-2.96)

R1 Il est recommandé de réaliser une décolonisation du portage de *Staphylococcus aureus* chez les patients bénéficiant d'une chirurgie cardiaque pour réduire le taux d'infection du site opératoire à *S. aureus*. (A2)

R5 Aucune recommandation n'est émise sur la nécessité d'une décolonisation de *Staphylococcus aureus* pour réduire le taux d'infection du site opératoire.



les ANTIBIOS juste ce qu'il faut

PRÉSERVER l'efficacité des antibiotiques, LIMITER l'émergence des bactéries multirésistantes

R9 Il est recommandé d'associer à la décolonisation nasale péri-opératoire de *Staphylococcus aureus* par mupirocine, une décolonisation corporelle et oropharyngée par un produit antiseptique efficace contre *S. aureus*. (B3)

Mise à jour de
la conférence de consensus
**Gestion
préopératoire
du risque infectieux**

Octobre 2013

R2 Aucune recommandation ne peut être émise sur le bénéfice de la décolonisation du portage de *Staphylococcus aureus* sur le taux d'infection du site opératoire à *S. aureus* chez les patients bénéficiant d'une chirurgie orthopédique prothétique programmée. (C3)



Novembre 2016



4.2 Decolonization with mupirocin ointment with or without chlorhexidine gluconate body wash for the prevention of *Staphylococcus aureus* infection in nasal carriers undergoing surgery

Recommendations

1. The panel recommends that patients undergoing cardiothoracic and orthopaedic surgery with known nasal carriage of *S. aureus* should receive perioperative intranasal applications of mupirocin 2% ointment with or without a combination of CHG body wash.
(Strong recommendation, moderate quality of evidence)
2. The panel suggests considering to treat also patients with known nasal carriage of *S. aureus* undergoing other types of surgery with perioperative intranasal applications of mupirocin 2% ointment with or without a combination of CHG body wash.
(Conditional recommendation, moderate quality of evidence)

Nouvelles données?

Association of a Bundled Intervention With Surgical Site Infections Among Patients Undergoing Cardiac, Hip, or Knee Surgery

JAMA 2015. 313(21):2162-71

Marin L. Schweizer, PhD; Hsiu-Yin Chiang, MS, PhD; Edward Septimus, MD; Julia Moody, MS; Barbara Braun, PhD; Joanne Hafner, RN, MS; Melissa A. Ward, MS; Jason Hickok, MBA, RN; Eli N. Perencevich, MD, MS; Daniel J. Diekema, MD; Cheryl L. Richards, MJ, LPN, LMT; Joseph E. Cavanaugh, PhD; Jonathan B. Perlin, MD, PhD; Loreen A. Herwaldt, MD

Dépistage portage MSSA/MRSA
Décolonisation si portage
ATB prophylaxie adaptée

Table 2. Poisson Regression Analysis of Monthly Rates of Complex *Staphylococcus aureus* Surgical Site Infections per 10 000 Operations

	Preintervention Period		Intervention Period		Rate Ratio for Bundled Intervention (95% CI)	P Value
	No. Operations	Rate	No. Operations	Rate		
All operations	28 700	1.00	18 441	0.58 (0.37-0.92) ^a	.02	
Urgent/emergent	10 100	1.03	6500	1.03 (0.41-2.57) ^a	.95	
Scheduled	18 600	0.55	11 941	0.55 (0.35-0.86) ^a	.009	
Cardiac operations	7500	1.00	4700	0.86 (0.47-1.57) ^b	.63	
Urgent/emergent	3000	1.44	1900	1.44 (0.53-3.91) ^b	.48	
Scheduled	4500	0.72	2800	0.72 (0.45-1.15) ^b	.17	
Hip or knee arthroplasties	20 000	1.00	12 500	0.48 (0.29-0.80) ^c	.005	
Urgent/emergent	7000	0.44	4500	0.44 (0.07-2.72) ^c	.38	
Scheduled	13 000	0.51	8000	0.51 (0.30-0.85) ^c	.009	

Malgré un gros effectif cela reste une étude avant/après non randomisée, non contrôlée

Abbreviations: SSI, surgical site infection.

^a Compared with the monthly rates of complex *S aureus* SSIs after all operations performed during the preintervention period.

^b Compared with the monthly rates of complex *S aureus* SSIs after all cardiac operations performed during the preintervention period.

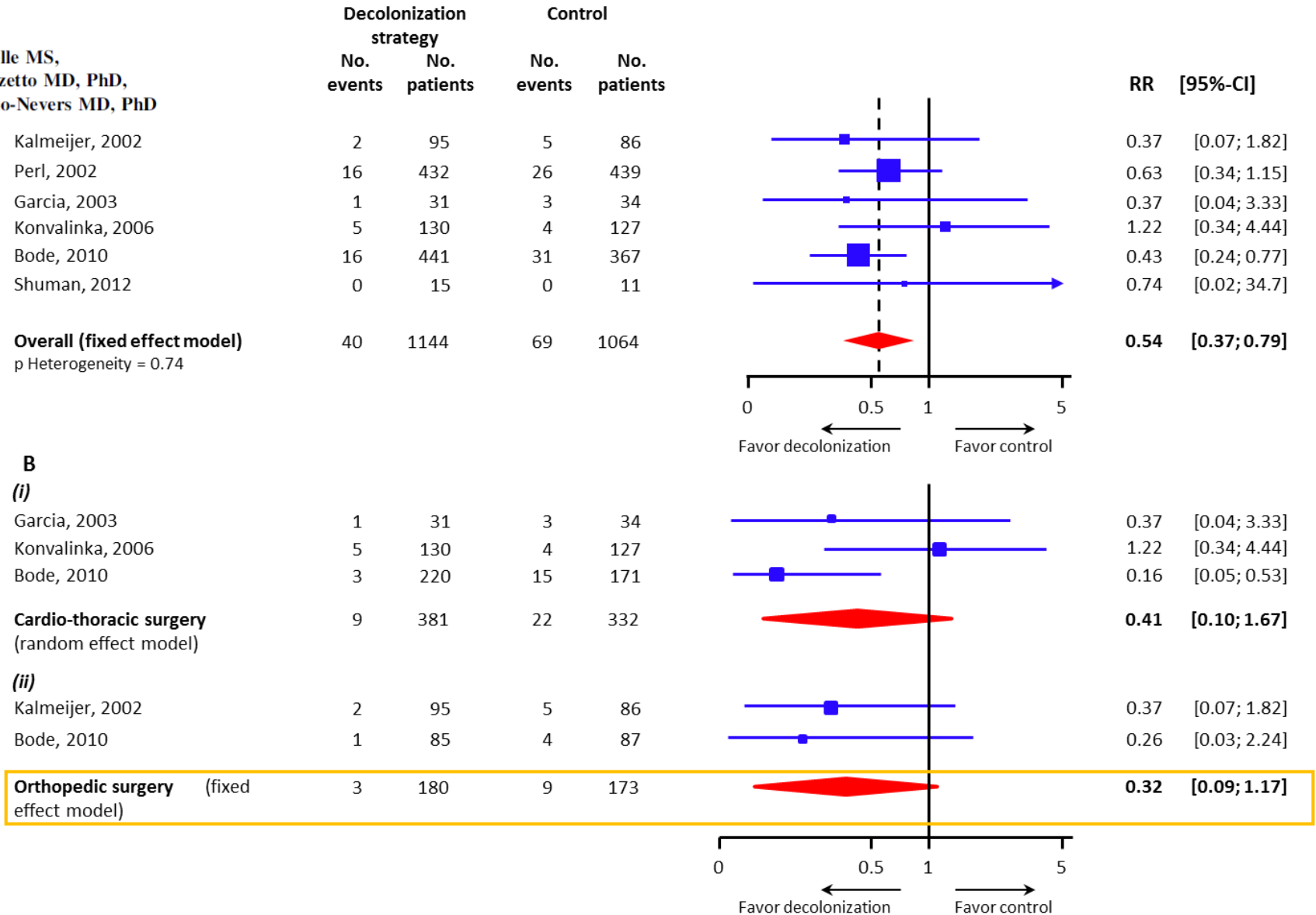
^c Compared with the monthly rates of complex *S aureus* SSIs after all hip or knee arthroplasties performed during preintervention period.

Bénéfice de la décolonisation en chirurgie orthopédique?

Staphylococcus aureus Screening and Decolonization in Orthopaedic Surgery and Reduction of Surgical Site Infections

Paul O. Verhoeven MD, MS, Philippe Berthelot MD, PhD, Celine Chapelle MS,
Julie Gagnaire PharmD, MS, Florence Grattard MD, PhD, Bruno Pozzetto MD, PhD,
Frédéric Farizon MD, PhD, Frederic Lucht MD, PhD, Elisabeth Botelho-Nevers MD, PhD

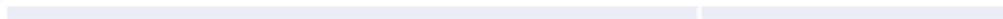
Clin Orthop Relat Res (2013) 471:3709–3711



Nécessite une étude randomisée
contre placebo:
>15000 patients, 4500 porteurs

Faute d'étude de qualité que
fait-on?

En pratique dans les centres.....ce qui est fait



En pratique dans les centres.....ce qui est fait

- Etude auprès du CRIOAC de Lyon et de la SFHG:

Les méthodes de dépistage et les protocoles de décolonisation utilisés sont hétérogènes.

Aucune différence n'a été observée entre les pratiques de praticiens exerçant en secteur public et les pratiques des praticiens exerçant en secteur privé que ce soit pour le dépistage ou pour la décolonisation.

Des protocoles hétérogènes....

- Pour le dépistage
 - Problème de sensibilité possible
- Pour la décolonisation
 - povidone iodée pommade: en partie inactivée dans les sécrétions nasales
 - Peu de données avec la povidone iodée, nécessité d'une formulation spéciale, non disponible en France
- Quant aux autres (acide fusidique etc....) encore moins de données!



Risque de faux sentiment de sécurité? Soignant, soigné?

Hill RL, et al., J Hosp Infect. 2000;45(3):198-205

Rezapoor M, et al., J Arthroplasty. 2017 Sep;32(9):2815-2819

Phillips M, et al., . Infect Control Hosp Epidemiol. 2014 Jul;35(7):826-32.

La vraie vie en chirurgie cardiaque où il y a des recommandations....

La vraie vie c'est plus compliqué que les essais!

Pathologie Biologie 58 (2010) 127–130



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R É S U M É

Le dépistage en ambulatoire des patients porteurs présentant une colonisation urinaire et devant bénéficier d'une chirurgie orthopédique est-il réaliste ?

Is it possible to detect Staphylococcus aureus colonization in outpatients before orthopedic surgery hospitalization?

O. Bajolet^{a,*}, E. Toussaint^a, S. Diallo^b, V. Vemet-Garnier^a, E. Dehd

But de l'étude. – Évaluer la faisabilité de la réalisation en externe de la recherche de *Staphylococcus aureus* au niveau nasal et d'un examen cyto bactériologique des urines (ECBU) dans une population de patients devant bénéficier d'une chirurgie orthopédique afin de réaliser une chimiodécontamination nasale et cutanée en cas de colonisation à *S. aureus* et un traitement des bactériuries en amont de l'hospitalisation.

Méthodes. – Inclusion des patients devant bénéficier d'une chirurgie orthopédique réglée de type prothèse de hanche, prothèse de genou, chirurgie du rachis avec mise en place de matériel, entre le 1^{er} octobre 2007 et le 30 juin 2008 (réalisation des examens biologiques en externe). Une procédure de chimiodécontamination nasale et cutanée était remise au patient et communiquée au médecin traitant en cas de résultat positif.

Résultats. – Les résultats des examens biologiques pour au moins un des deux examens ont été obtenus pour 240 patients sur 263 inclus. Seuls 21,4 % des patients (48 positifs/224 recherches) étaient colonisés à *S. aureus* dont trois à *S. aureus* résistant à la méticilline. Parmi les patients colonisés à *S. aureus*, 70,8 % (n = 34) ont bénéficié d'une chimiodécontamination nasale et cutanée. Les patients (8,9 %, 20/225) présentaient une bactériurie, le micro-organisme le plus fréquemment isolé étant *Escherichia coli* (n = 16).

Conclusion. – Si la recherche et la gestion de la colonisation à *S. aureus*, ainsi que celle des bactériuries chez les patients bénéficiant d'une chirurgie orthopédique est possible en externe, le suivi des dossiers par une personne de l'établissement de soins est impératif.

Prior *Staphylococcus Aureus* Nasal Colonization: A Risk Factor for Surgical Site Infections Following Decolonization

Nicholas Ramos, MD

Anna Stachel, MPH

Michael Phillips, MD

Jonathan Vigdorichik, MD

James Slover, MD, MS

Joseph A. Bosco, MD

[J Am Acad Orthop Surg.](#) 2016 Dec;24(12):880-885

Abstract

Introduction: *Staphylococcus aureus* (*S aureus*) decolonization regimens are being used to mitigate the risk of surgical site infection (SSI). However, their efficacy is controversial, with mixed results reported in the literature.

Methods: Before undergoing primary total knee arthroplasty (TKA), total hip arthroplasty (THA), or spinal fusion, 13,828 consecutive patients were screened for nasal *S aureus* and underwent a preoperative decolonization regimen. Infection rates of colonized and noncolonized patients were compared using unadjusted logistic regression. An adjusted regression analysis was performed to determine independent risk factors for SSI.

Results: The rate of SSI in colonized patients was 4.35% compared with only 2.39% in noncolonized patients. In our TKA cohort, unadjusted logistic regression identified *S aureus* colonization to be a significant risk factor for SSI (odds ratio [OR], 2.9; $P < 0.001$). After controlling for other potential confounders including age, body mass index, tobacco use, and American Society of Anesthesiologists score, an SSI was 3.8 times more likely to develop in patients colonized with *S aureus* (OR, 3.8; $P = 0.0025$). The THA and spine colonized patients trended toward higher risk in both unadjusted and adjusted models; however, the results were not statistically significant.

Discussion: The results of our study suggest that decolonization may not be fully protective against SSI. The risk of infection after decolonization is not lowered to the baseline of a noncolonized patient.

Level of Evidence: Level IV

- Echec de décolonisation ou bien
- Présence d'autres sites de portage possible
- Non détectés par seul écouvillon nasal
- Pouvant être associés à un sur-risque

Evaluation of a Strategy of Screening Multiple Anatomical Sites for Methicillin-Resistant *Staphylococcus aureus* at Admission to a Teaching Hospital

Matthieu Eveillard, PharmD, MPH;
Arnaud de Lassence, MD; Evelyne Lancien, BSc;
Guilène Barnaud, PharmD, PhD;
Jean-Damien Ricard, MD, PhD;
Marie-Laure Joly-Guillou, MD, PhD

We compared the sensitivity of screening with nasal culture alone with that of a multiple-site screening method for the identification of carriers of methicillin-resistant *Staphylococcus aureus* at hospital admission. If nasal cultures alone had been used during the 1-year study, 27.0% of carriers of methicillin-resistant *S. aureus* would have been missed, which corresponds to 560 theoretical isolation days. If rectal screening had not been used, 431 theoretical isolation days would have been missed, and, if axillary screening had not been used, 99 theoretical isolation days would have been missed.

Infect Control Hosp Epidemiol 2006; 27:181-184



Expert Review of Anti-infective Therapy

ISSN: 1478-7210 (Print) 1744-8336 (Online) Journal homepage: <http://www.tandfonline.com/loi/ierz20>

Epidemiology and clinical relevance of *Staphylococcus aureus* intestinal carriage: a systematic review and meta-analysis

Julie Gagnaire, Paul O. Verhoeven, Florence Grattard, Josselin Rigail, Frédéric Lucht, Bruno Pozzetto, Philippe Berthelot & Elisabeth Botelho-Nevers

Universelle ou ciblée?

Chirurgie cardiaque: ~40 000/an
Chirurgie orthopédique: > 230 000/an



Original Article

Decreased Hospital Costs and Surgical Site Infection Incidence With a Universal Decolonization Protocol in Primary Total Joint Arthroplasty

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ABSTRACT

Background: *Staphylococcus aureus* colonization has been identified as a key modifiable risk factor in the reduction of surgical site infections (SSI) related to elective total joint arthroplasty (TJA). We investigated the incidence of SSIs and cost-effectiveness of a universal decolonization protocol without screening consisting of nasal mupirocin and chlorhexidine before elective TJA compared to a program in which all subjects were screened for *S aureus* and selectively treated if positive.

Methods: We reviewed 4186 primary TJAs from March 2011 through July 2015. Patients were divided into 2 cohorts based on the decolonization regimen used. Before May 2013, 1981 TJA patients were treated under a "screen and treat" program while the subsequent 2205 patients were treated under the universal protocol. We excluded the 3 months around the transition to control for treatment bias. Outcomes of interest included SSI and total hospital costs.

Results: With a universal decolonization protocol, there was a significant decrease in both the overall SSI rate (5 vs 15 cases; 0.2% vs 0.8%; $P = .013$) and SSIs caused by *S aureus* organisms (2 vs 10; 0.09% vs 0.5%; $P = .01$). A cost analysis accounting for the cost to administer the universal regimen demonstrated an actual savings of \$717,205.59. TJA complicated by SSI costs 4.6× more to treat than that of an uncomplicated primary TJA.

Conclusion: Our universal decolonization paradigm for elective TJA is effective in reducing the overall rate of SSIs and promoting economic gains for the health system related to the downstream savings accrued from limiting future reoperations and hospitalizations.

Mupirocin Resistance in Isolates of *Staphylococcus* spp. from Nasal Swabs in a Tertiary Hospital in France

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 François Vandenesch,^{a,b,c} Jean-Philippe Rasigade,^{a,b,c} Frederic Laurent^{a,b,c}

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Prevalence of methicillin and mupirocin resistance, including low- and high-level resistance, among *S. aureus* and coagulase-negative staphylococcal strains found in intensive care units and orthopedic surgery wards

Staphylococcal strain ^a	No. (%) of strains in ^b :		P value ^c	Total no. (%) (n = 635)
	OS patients (n = 318)	ICU patients (n = 317)		
<i>S. aureus</i>	36 (11.3)	49 (15.4)	NS	85 (13.4)
MRSA	1 (0.3)	7 (2.2)	<0.05	8 (1.3)
LMupR	0 (0.0)	0 (0.0)	NS	0 (0.0)
HMupR	0 (0.0)	0 (0.0)	NS	0 (0.0)
CoNS	282 (88.7)	268 (84.5)	NS	550 (86.6)
MRCoNS	67 (21.1)	194 (61.2)	<0.001	261 (41.1)
LMupR	1 (0.3)	11 (3.5)	<0.01	12 (1.9)
HMupR	20 (6.3)	11 (3.5)	NS	31 (4.9)

Et la résistance dans tout cela?

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Acquisition of high-level mupirocin resistance in CoNS following nasal decolonization with mupirocin

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Table 1. Main results: detection of mupirocin-resistant CoNS in 936 surgical patients with nasal samples taken at T1 and T2

	Mupirocin-resistant CoNS	
	T1	T2
All patients (n=936)	192	406
high-level resistance	179	400
intermediate resistance	13	6
Patients without colonization at T1 (n=744)	0	277
high-level resistance at T2	0	273
intermediate resistance at T2	0	4
Patients colonized with mupirocin-resistant CoNS at T1	192	129

In vivo transfer of high-level mupirocin resistance from *Staphylococcus epidermidis* to methicillin-resistant *Staphylococcus aureus* associated with failure of mupirocin prophylaxis

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Objectives: We examined the molecular basis of the emergence of mupirocin resistance in a methicillin-resistant *Staphylococcus aureus* (MRSA) strain colonizing a nursing home resident undergoing mupirocin prophylaxis.

Patient and methods: A persistent carrier of mupirocin-susceptible MRSA participated in a trial of mupirocin for nasal decolonization among nursing home residents. During prophylaxis a high-level mupirocin-resistant MRSA emerged in the nasal isolates from this patient. *S. aureus* and coagulase-negative staphylococci were isolated prior to, during and after 14 days of mupirocin treatment. The staphylococcal isolates and their plasmids were examined by molecular genetic methods.

Results: All mupirocin-susceptible and -resistant MRSA isolates possessed the same genotype. The patient was also colonized by a single mupirocin-resistant *Staphylococcus epidermidis* strain. The mupirocin-resistant MRSA and *S. epidermidis* strains harboured identical plasmids that carried the *mupA* determinant and genes for conjugative DNA transfer in staphylococci. These plasmids could be transferred *in vitro* from both clinical isolates to *S. aureus* RN2677.

Conclusions: The MRSA strain contained a conjugative plasmid expressing *mupA* that was identical with that found in the *S. epidermidis* strain which colonized the patient. These findings suggest that transfer of *mupA* from *S. epidermidis* to MRSA probably occurred during mupirocin prophylaxis.

Mupirocin and *Staphylococcus aureus*: a recent paradigm of emerging antibiotic resistance

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- SARM/ SAMS????
- Taux de base très élevé
- Toutefois doublement du résistance

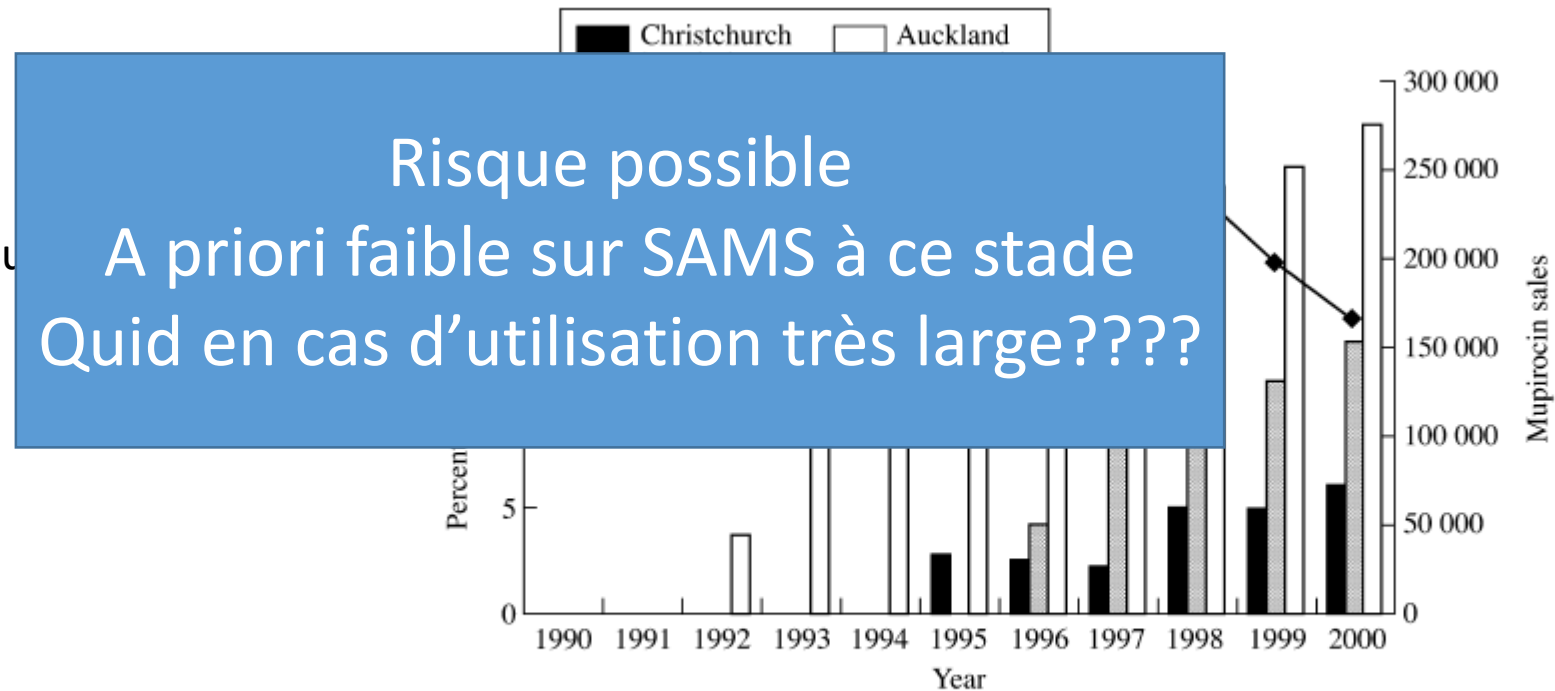


Figure 1. Mupirocin resistance among *S. aureus* isolates in hospital and community laboratories (Table 1, data source 1), and units of mupirocin sold per year, 1990–2000. No data were available for Christchurch and Auckland hospital laboratories, 1990–1994, or the Auckland community laboratory, 1990–1991.

Prevalence of Chlorhexidine-Resistant Methicillin-Resistant *Staphylococcus aureus* following Prolonged Exposure

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Chlorhexidine has been increasingly utilized in outpatient settings to control methicillin-resistant *Staphylococcus aureus* (MRSA) outbreaks and as a component of programs for MRSA decolonization and prevention of skin and soft-tissue infections (SSTIs). The objective of this study was to determine the prevalence of chlorhexidine resistance in clinical and colonizing MRSA isolates obtained in the context of a community-based cluster-randomized controlled trial for SSTI prevention, during which 10,030 soldiers were issued chlorhexidine for body washing. We obtained epidemiological data on study participants and performed molecular analysis of MRSA isolates, including PCR assays for determinants of chlorhexidine resistance and high-level mupirocin resistance and pulsed-field gel electrophoresis (PFGE). During the study period, May 2010 to January 2012, we identified 720 MRSA isolates, of which 615 (85.4%) were available for molecular analysis, i.e., 341 clinical and 274 colonizing isolates. Overall, only 10 (1.6%) of 615 isolates were chlorhexidine resistant, including three from the chlorhexidine group and seven from nonchlorhexidine groups ($P > 0.99$). Five (1.5%) of the 341 clinical isolates and five (1.8%) of the 274 colonizing isolates harbored chlorhexidine resistance genes, and four (40%) of the 10 possessed genetic determinants for mupirocin resistance. All chlorhexidine-resistant isolates were USA300. The overall prevalence of chlorhexidine resistance in MRSA isolates obtained from our study participants was low. We found no association between extended chlorhexidine use and the prevalence of chlorhexidine-resistant MRSA isolates; however, continued surveillance is warranted, as this agent continues to be utilized for infection control and prevention efforts.

Et après on fait quoi????

Decolonization in Prevention of Health Care-Associated Infections

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Au total,

- Agir sur le portage de *S. aureus* pour prévenir les ISO: cela paraît logique
- Il y a suffisamment de preuve pour le proposer en chirurgie cardiaque
- Pour autant tout n'est pas simple, tout n'est pas encore bien compris ni tranché
- Etendre cela à l'orthopédie.....
- Par contre il faut vite trancher car le vide entre les recommandations nationales et de l'OMS engendre une faille
 - Avec de potentiels effets écologiques!
- Tout cela ne doit pas faire oublier TOUTES les autres mesures de prévention des ISO.

Merci de votre attention

Merci à tous!



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