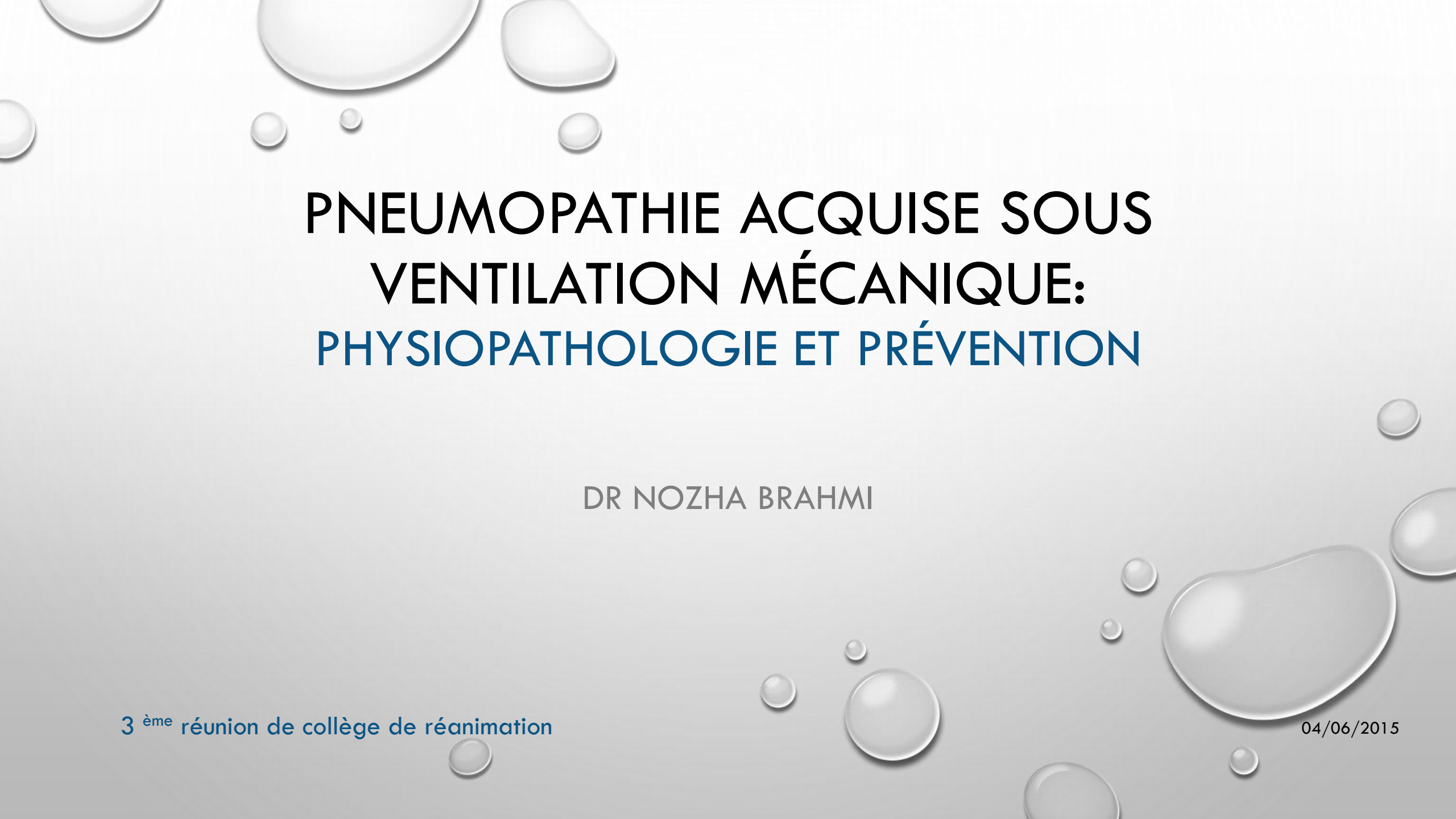


The background of the slide is a light gray gradient, decorated with numerous realistic water droplets of various sizes. Some droplets are at the top left, others are scattered in the middle, and a large cluster of droplets is in the bottom right corner. The main title is centered in the upper half of the slide.

PNEUMOPATHIE ACQUISE SOUS VENTILATION MÉCANIQUE: PHYSIOPATHOLOGIE ET PRÉVENTION

DR NOZHA BRAHMI

INTRODUCTION

- La plus fréquente des IN en réanimation
~50 % des IN en réanimation

Patients infectés / Infections

Incidence pour 100 patients exposés	n patients	n' inf.	Taux (n'/n)	
Pneumopathie liée à l'intubation	10 742	1 417	13,19	/ 100 patients intubés
Bactériémie	16 558	704	4,25	/ 100 patients surveillés
Infection urinaire liée au sondage	14 565	730	5,01	/ 100 patients sondés

Incidence pour 1000 jours d'exposition	n jours	n' inf.	Taux (n'/n)	
Pneumopathie (liée à l'intubation)	93 151 j	1 417	15,21	/ 1000 j d'intubation
Bactériémie (liée au séjour)	185 185 j	704	3,80	/ 1000 j de séjour
Infection urinaire (liée au sondage)	155 895 j	730	4,68	/ 1000 j de sondage urinaire

- Pourrait être évitable dans 55% des cas (*J Control Hospital Epidemiol 2011; 2: 101-14*)
- La plus grave des IN → lourde mortalité

Ventilator-associated Pneumonia

Jean Chastre and Jean-Yves Fagon

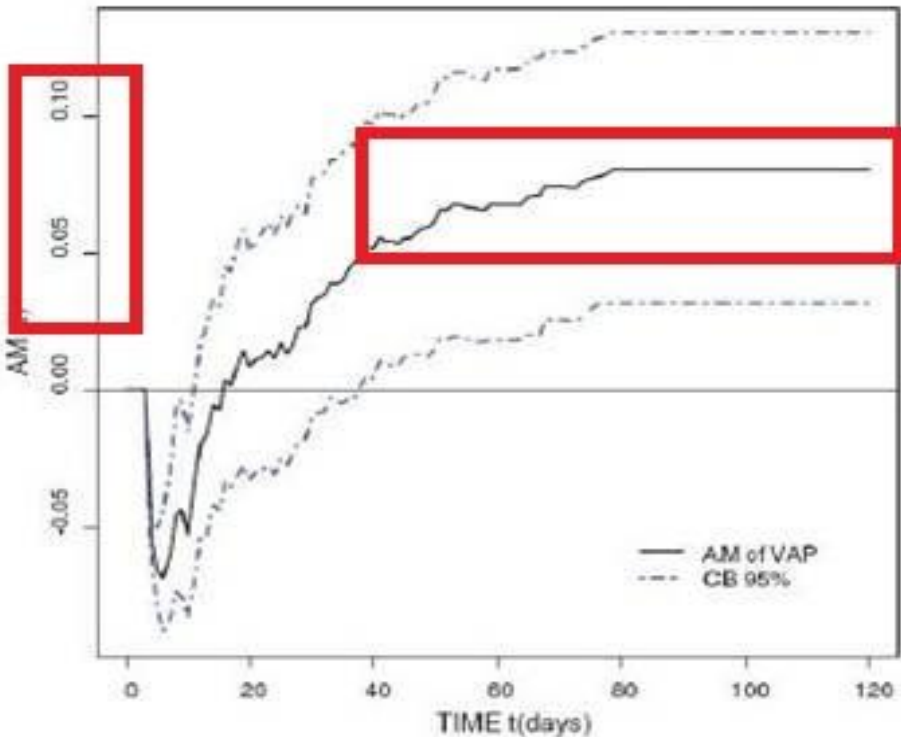
Am J Respir Crit Care Med Vol 165. pp 867–903, 2002

Intensive Care Med (2010) 36:781–789
DOI 10.1007/s00134-010-1824-6

ORIGINAL

Molière Ngille-Makao
Jean-Ralph Zahar
Adrien François
Alexis Tabah
Malté Garrouste-Orgeas
Bernard Allaouchiche
Dany Goldgran-Toledano
Elie Azoulay
Christophe Adrie
Samir Jamali
Christophe Clec'h
Bertrand Souweine
Jean-François Timsit

Attributable mortality of ventilator-associated pneumonia: respective impact of main characteristics at ICU admission and VAP onset using conditional logistic regression and multi-state models



Attributable mortality: 8.1% 95%CI, 3.1–13.1%

OCIATED PNEUMONIA

Diagnostic Criteria	Mortality Rate (%)
Clinical–autopsy	76
Clinical	55
Clinical	44
PSB	71
Clinical	30
Clinical	56
Clinical–PSB	33
PSB/BAL	24
Clinical	37
PSB/BAL	53
PSB/BAL	57
Clinical–PSB/BAL	24
PSB	44
PSB/BAL	38
PTC/BAL	63
PSB/BAL	78
PSB/BAL	52
PSB/BAL	57

DEFINITION

Définition PAVM: CDC 2002

- Délai: 48 h
- images RX progressives et persistantes
- Signes cliniques
- sécrétions bronchiques
- confirmation: bactériologique

Peu de sensibilité
Peu de spécificité

NOUVELLE DEFINITION: PAVM

- ≥ 5 jour
- Hypoxémie persistante au moins pendant 2 jours
- Augmentation de 20% de la FiO_2 ou de + 3cmH₂O la PEP
- Contexte infectieux, nécessitant le maintien d'une ATB pendant au moins 4 jours
- Inclusion de GB dans la cellule infectée



PHYSIOPATHOLOGY

04/06/2015

The Pathogenesis of Ventilator-Associated Pneumonia: Its Relevance to Developing Effective Strategies for Prevention

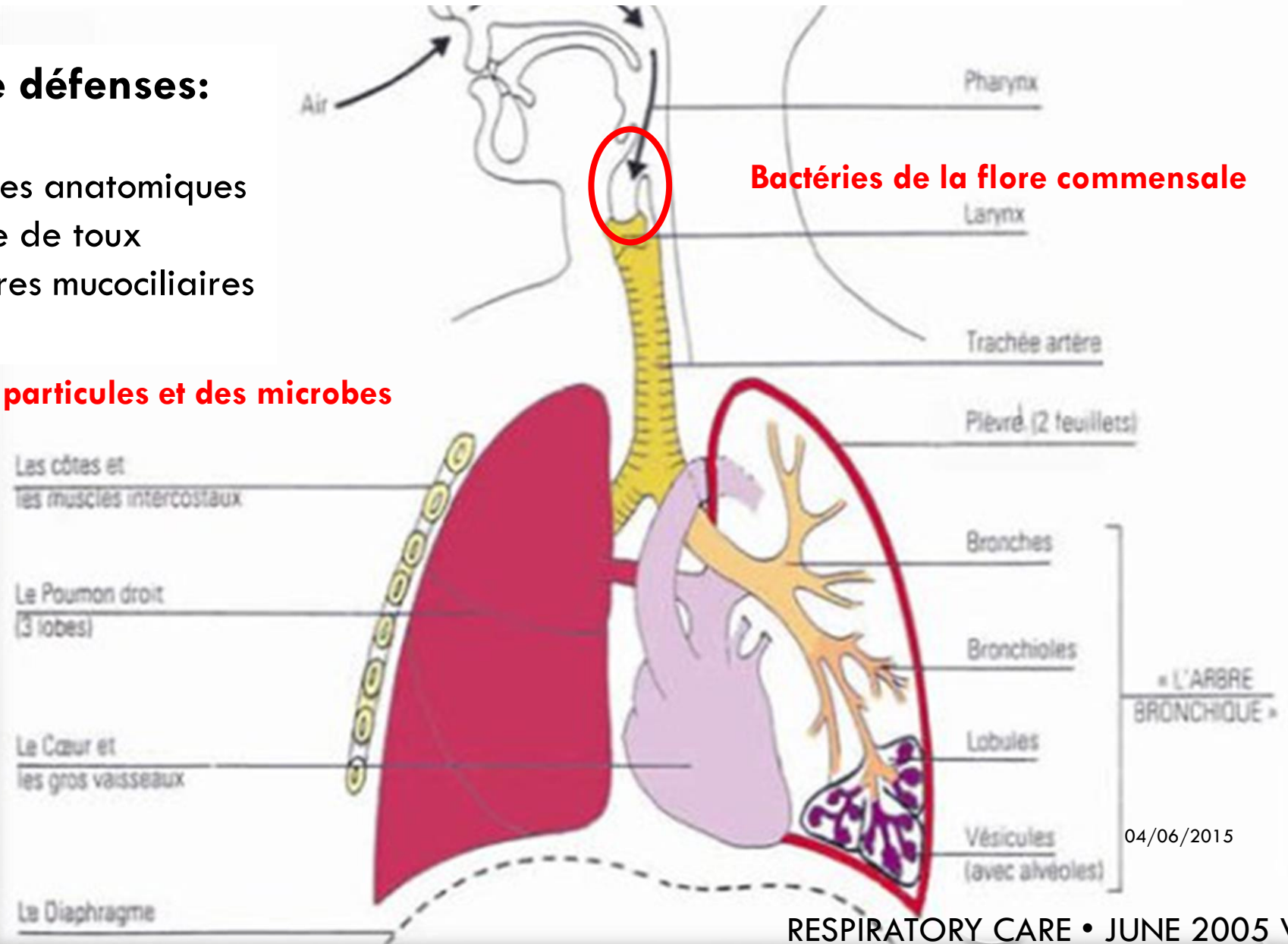
Nasia Safdar MD MSc, Christopher J Crnich MD MSc, and Dennis G Maki MD

Mécanismes de défenses:

VAS

- Barrières anatomiques
- Réflexe de toux
- Structures mucociliaires

Élimination des particules et des microbes



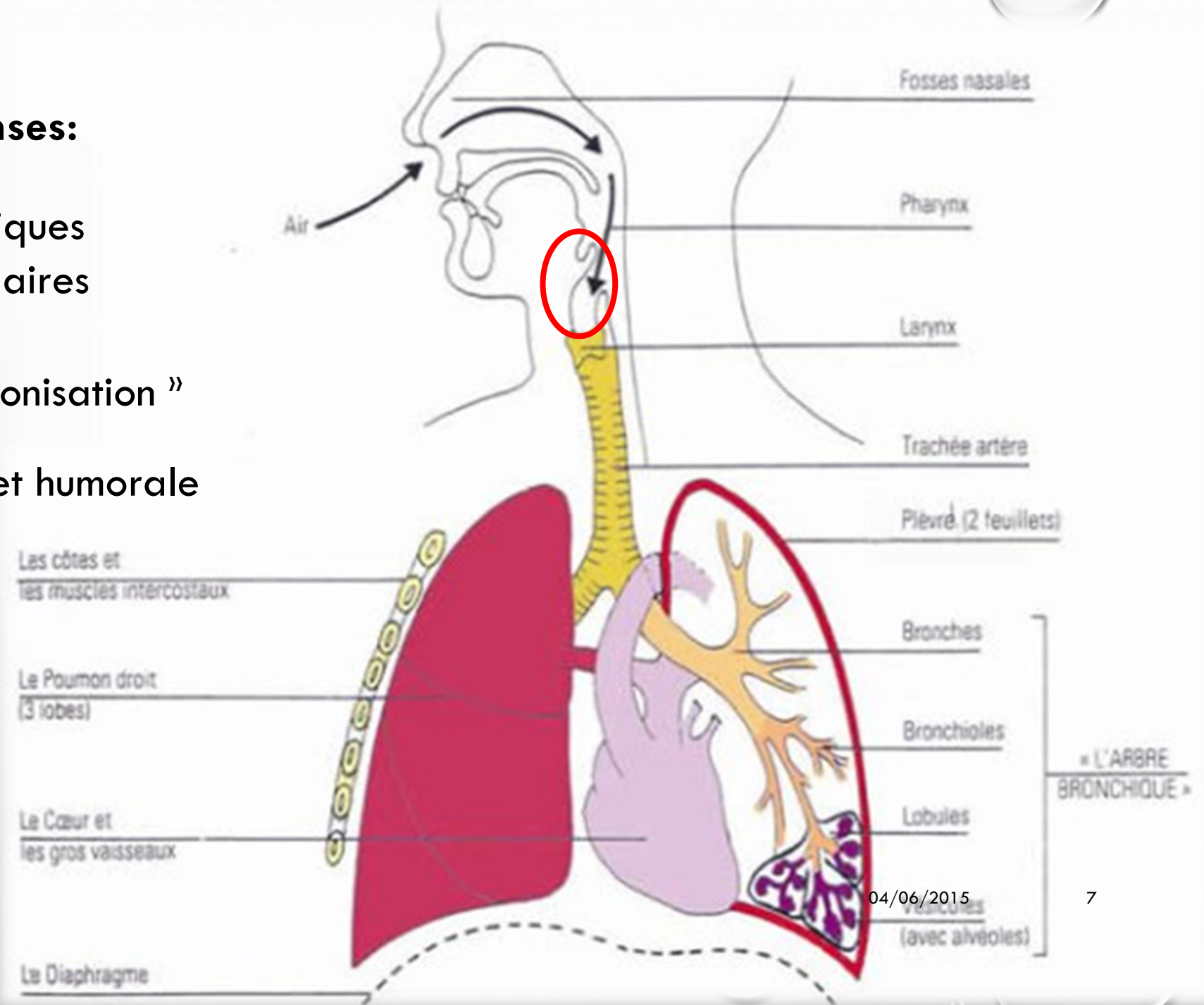
Mécanismes de défenses:

VAS

- Barrières anatomiques
- Structures mucociliaires

VAI

- “ Free microbial colonisation ”
- Défense cellulaire et humorale



PHYSIOPATHOLOGIE SDRA, SDMV ET DÉFENSES DES VAI

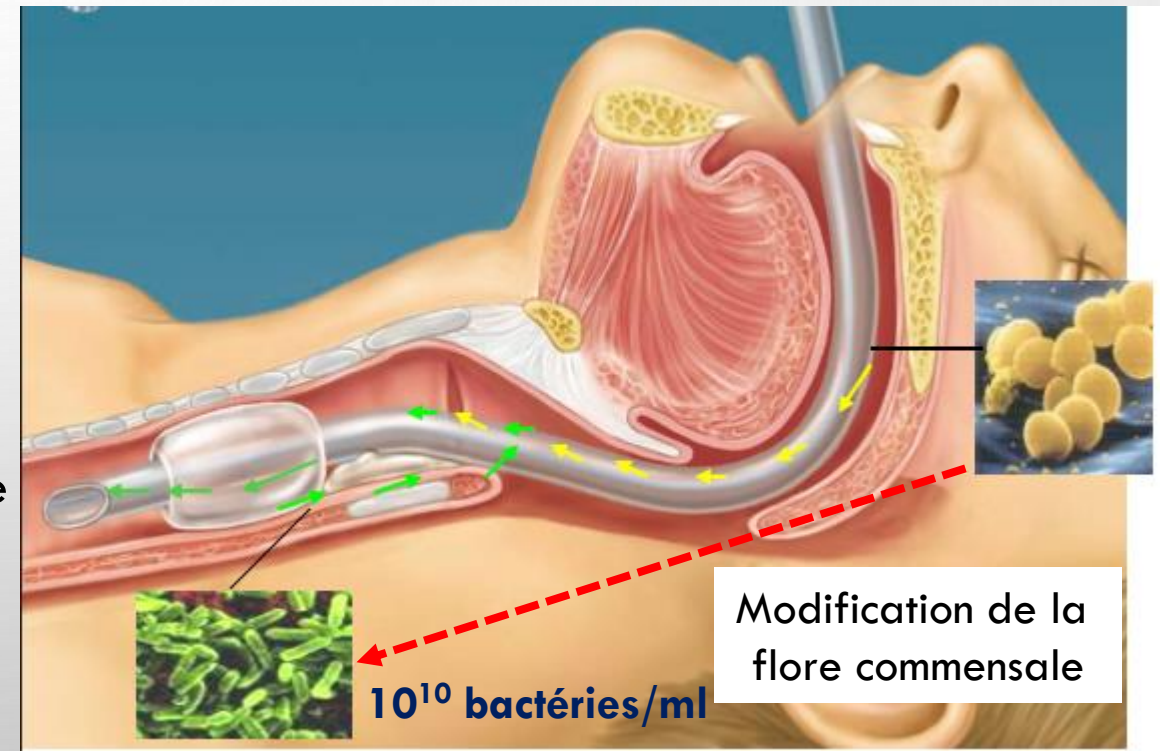
- Œdème pulmonaire → Inhibition de la phagocytose (*Laforce 72*)
- Inactivation du surfactant alvéolaire. (*Harlan 66*)
- Hypoxie locale → Dysfonction du macrophage alvéolaire.
- Inflammation locale → ↓Capacité de migration et bactéricidie des neutrophiles (*Martin 91*)
- ↑↑↑ ↑elastase → Clivage des IgG et IgA, dégradation de la fibronectine (*Green 68*)
- Sepsis extra-pulm → ↓recrutement neutrophiles, ↓TNFα, ↓bactéricidie des macrophages (*Nelson 90, White 86, Monneret2009*)
- Infection locale → ↓activité du système réticulo-endothélial (↓capacité opsonisation)
- Acidose → ↓fonction du macrophage alvéolaire
- Malnutrition → ↓activité antibactérienne pulmonaire (translocation)
- Choc → Ischémie-reperfusion: ↓activité macrophage, lymphocytes et PN (*Sherwood 2000*)

CHEZ LE PATIENT SOUMIS A UNE VM

SITUATIONS FAVORISANTES DES PAVM

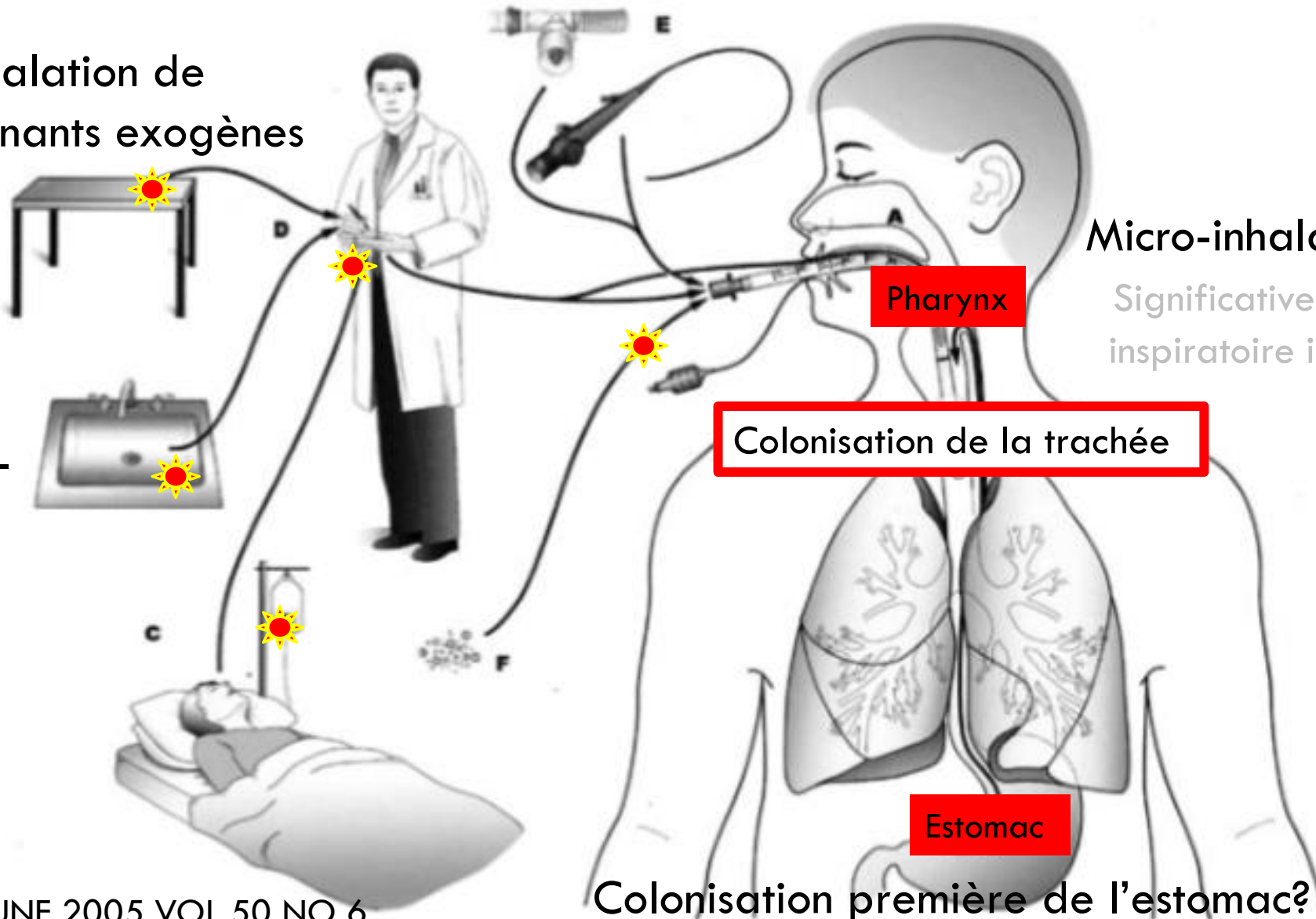
- 1- Comorbidités
 - 2- Dénutrition
 - 3- Non respect des règles d'hygiène
 - 4- Antibiothérapie
 - 5- L'utilisation de protecteurs gastriques
 - 6- Présence de la sonde d'intubation ++++
-
- ✓ Abolition du réflexe de la toux
 - ✓ Compromet l'activité des cellules miciliaires
 - ✓ Lésions de l'épithélium trachéal → adhésion bactérienne
-
- ✓ Réalise un véritable enduit qui permet le passage des germes des VAS aux VAI

“Endothelial Intubated Pneumoniae”



THE PATHOGENESIS OF VENTILATOR-ASSOCIATED PNEUMONIA

Inhalation de
contaminants exogènes



Micro-inhalations répétées

Significatives lors d'effort
inspiratoire important en VS

Pharynx

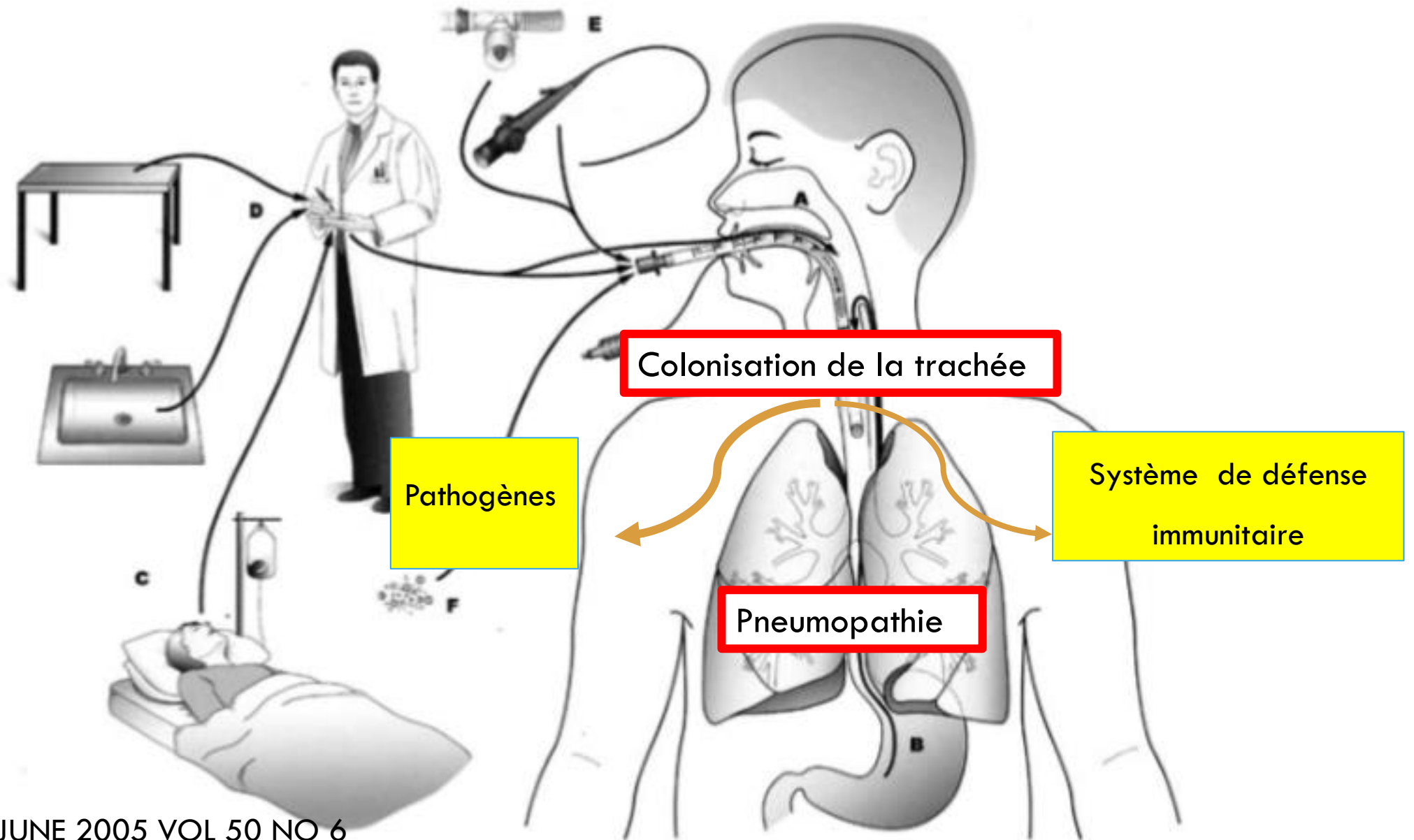
Colonisation de la trachée

Estomac

Colonisation première de l'estomac?

Hématogène +/-

THE PATHOGENESIS OF VENTILATOR-ASSOCIATED PNEUMONIA



PREVENTION

**Limitier la transmission
croisée.**

Sevrage précoce.

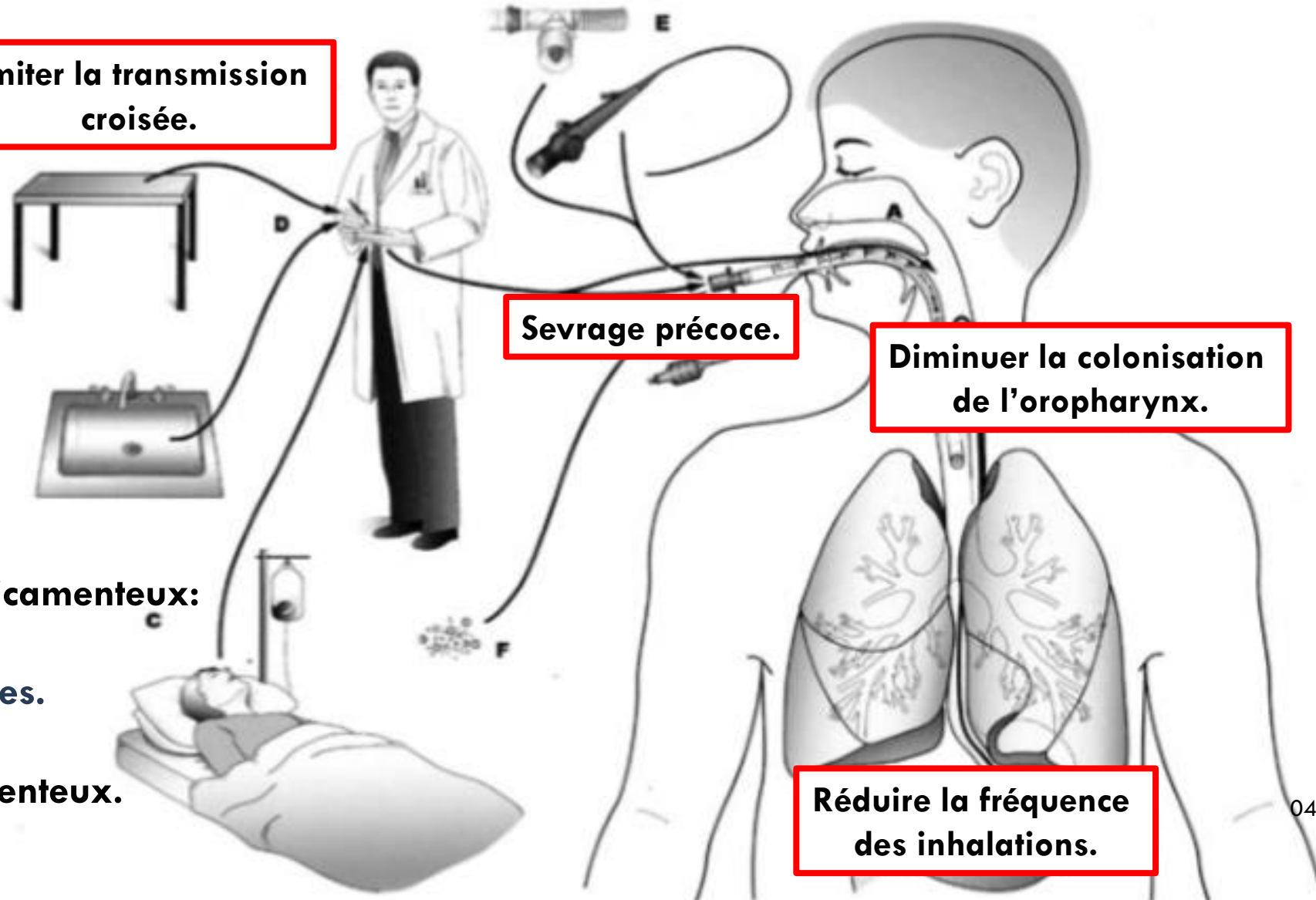
**Diminuer la colonisation
de l'oropharynx.**

Moyens non médicamenteux:
Spécifiques.
Non spécifiques.

Moyens médicamenteux.

**Réduire la fréquence
des inhalations.**

04/06/2015



APPROCHE GLOBALE.

- ✓ Littérature très abondante
- ✓ Évolution progressive des attitudes
 - Consensus et guidelines
 - Appropriation locale
 - “Bouquets” de mesures ou “ bundles of care ”



HYGIENE ET DESINFECTION BUCCO-PHARYNGEE

04/06/2015



HYGIÈNE DES MAINS



04/06/2015

Role of hand hygiene in healthcare-associated infection prevention

							Duration of follow-up	Reference
2008	(1) Six pilot hospitals	Alcohol-based hand rub introduction, hand hygiene observation, training, posters, promotional gadgets	(1) Compliance increase from 21% to 48%	(1) Significant reduction ($P = 0.035$) in MRSA bacteraemia (from 0.05 to 0.02 per 100 patient discharges per month) and of clinical MRSA isolates ($P = 0.003$) (2) Reduction in MRSA bacteraemia (from 0.03 to 0.01 per 100 patient discharges per month, $P = 0.09$) and of clinical MRSA isolates ($P = 0.043$)	(1) 2 years	42	2 years	22
	(2) All public hospitals in Victoria (Australia)		(2) Compliance increase from 20% to 53%		(2) 1 year		6 years	23
2008	Urology Unit	Alcohol-based hand rub introduction, hand hygiene observation, training, posters, patient education	Compliance increase from 0% (estimation) to 28.2%	Significant reduction ($P < 0.001$) in HCAI rates from 13.1% to 2.1%	6 months	43	11 months	24
2008	NICU						8 months	25
2008	NICU	Alcohol-based hand rub introduction, hand hygiene observation, training, posters, performance feedback, focus groups	Compliance increase from 6.3% to 81.2%	Significant reduction ($P = 0.009$) in HCAI incidence (4.1 vs 1.2 per 1000 patient-days)	18 months	44	9 months	26
2008	NICU						3.5 years	27
				No impact on HCAI rates (9.7 vs 13.5 per 1000 patient-days) (P -value NA)	7 months	45	8 months	28

HCAI, healthcare-associated infection; ICU, intensive care unit; NICU, neonatal intensive care unit; MICU, medical intensive care unit; VRE, vancomycin-resistant enterococcus; MRSA, methicillin-resistant *Staphylococcus aureus*; SSI, surgical site infection; NA, not available.

avec u

Friction hydro-alcoolique

Avant



Après



04/06/2015

HYGIÈNE BUCCALE

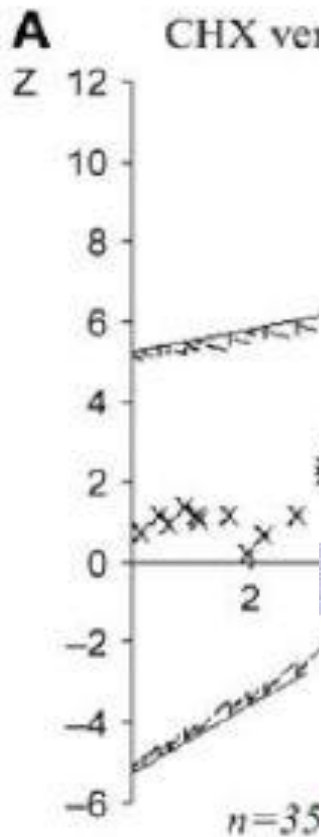
« ORAL HYGIEN CARE »

- L'OROPHARYNX EST UN RÉSERVOIR DE GERMES ET EST DONC UNE ZONE À PRIVILÉGER!
- HYGIÈNE BUCCALE PAR CHLORHEDINE +++
- CONCENTRATION OPTIMALE NON CONNUE

0,12% OU 0,2% ???

Oral Decontamination Incidence of Vent

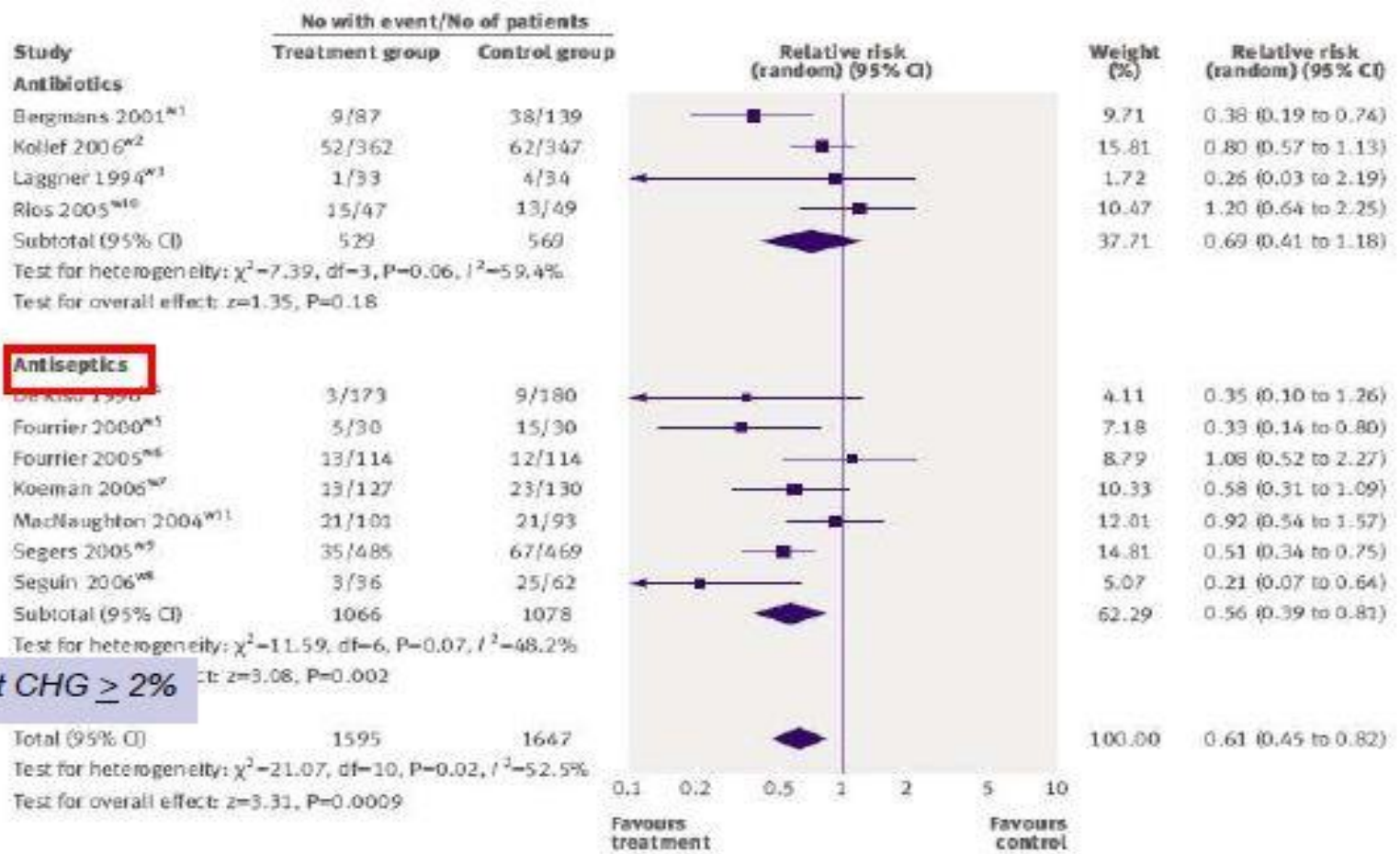
Mirelle Koeman, Andre J. A. M. van
de Smet, Graham Ramsay, Tom P.
Ingeborg van der Tweel, Andy M.



Hétérogénéité: plutôt CHG ≥ 2%

Oral decontamination for prevention of pneumonia in mechanically ventilated adults: systematic review and meta-analysis.

Chan EY, Ruest A, Meade MO, Cook DJ.

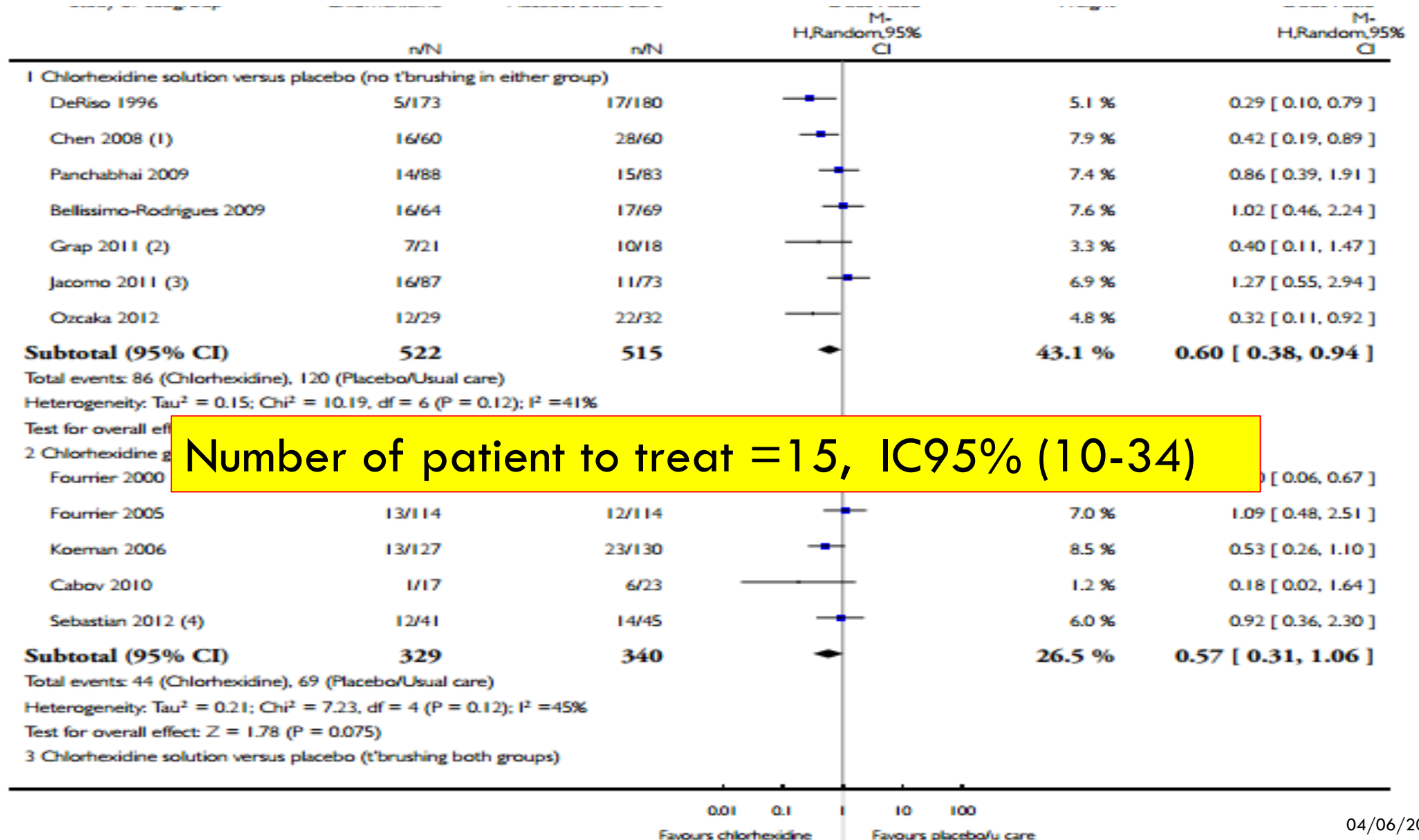


Analysis 1.1. Comparison 1 Chlorhexidine versus placebo/usual care, Outcome 1 Incidence of VAP.

Review: Oral hygiene care for critically ill patients to prevent ventilator-associated pneumonia

Comparison: 1 Chlorhexidine versus placebo/usual care

Outcome: 1 Incidence of VAP



DÉCONTAMINATION DIGESTIVE SÉLECTIVE?

PRINCIPE:

- DES ANTIBIOTIQUES TOPIQUES ADMINISTRÉS DANS LE TUBE DIGESTIF QUI NE SERONT NON ABSORBÉS.
- RESPECTENT LA FLORE COMMENSALE ET « TUENT » LES GERMES PATHOGÈNES!

- 1- Dans les pays avec très peu de germes résistants, ils ont montré un intérêt.
- 2- Un rebond des germes multirésistants à l'arrêt.

DECONTAMINATION DIGESTIVE SELECTIVE

Table 1 Randomized controlled trials of selective decontamination of the digestive tract (SDD)^{a,b}

Author	n	VAP incidence (versus control) - %	P-value	Mortality (versus control) - %	P-value
Kerver [13]	96	12 vs. 85%	< 0.001	29 vs. 32%	NS
Ledingham [14]	324	2 vs. 11%	0.006	24 vs. 24%	NS
Ulrich [15]	100	15 vs. 50%	< 0.001	31 vs. 54%	< 0.02
Aerdts [16]	88	0 vs. 26%	0.0001	12 vs. 15%	NS
Blair [17]	331	7 vs. 26%	0.002	15 vs. 19%	NS
Hartenauer [18]	200	10 vs. 45%	< 0.01	31 vs. 36%	NS
Gastinne [19]	445	12 vs. 15%	NS	34 vs. 30%	NS
Cockerill [20]	150	4 vs. 5%	NS	11 vs. 19%	NS
Hammond [21]	322	7 vs. 6%	NS	12 vs. 12%	NS
Jacobs [22]	91	0 vs. 9%	NS	39 vs. 54%	NS
Rocha [23]	101	15 vs. 46%	< 0.001	21 vs. 44%	< 0.05
Winter [24]	183	3 vs. 18%	< 0.05	36 vs. 43%	NS
Ferrer [25]	80	18 vs. 24%	NS	31 vs. 27%	NS
Palomar [26]	83	17 vs. 50%	0.005	24 vs. 31%	NS
Verwaest [27]	660	9 vs. 18%	0.026	18 vs. 17%	NS
Sánchez-García [28]	271	11 vs. 29%	< 0.001	39 vs. 47%	NS
Krueger [29]	546	2 vs. 11%	0.007	20 vs. 29%	NS

04/06/2015

22

^aTrials reporting incidence rates of pneumonia. ^bAdministration of non-absorbable antibiotics in the mouth *and* the intestines, combined with a short course of systemic antibiotics. VAP, ventilator-associated pneumonia; NS, not significant; -, no data available.

Does selective digestive decontamination prevent ventilator-associated pneumonia in trauma patients?

Chaari A¹, Zribi E, Dammak H, Ghadoun H, Chtara K, Sfar S, Bahloul M, Bouaziz M.

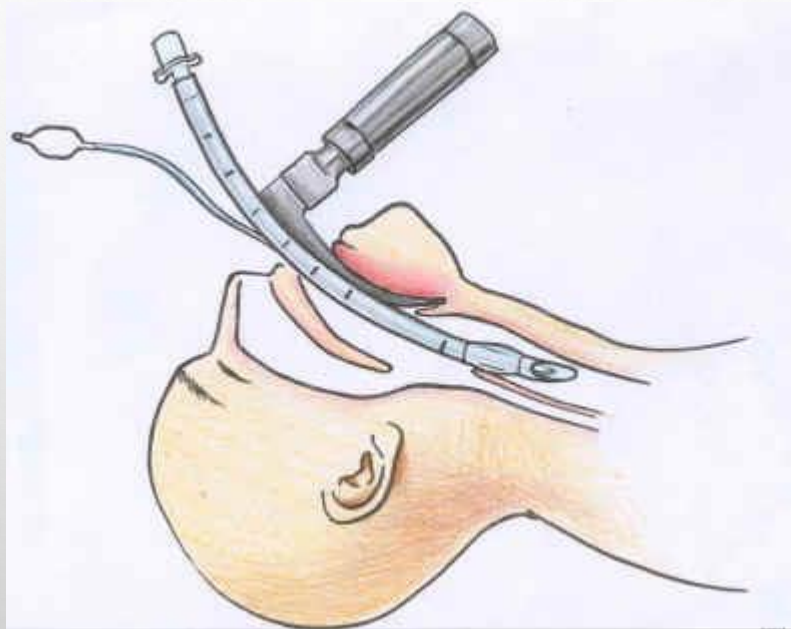
4 groups:

- Groupe A receiving subglottic and gastric treatment suspension (polymyxin E 100 mg, vancomycin 1 g, and amphotericin B 500 mg),
- Group B receiving placebo,
- Group C receiving subglottic placebo and gastric treatment suspension,
- Group D receiving subglottic treatment suspension and gastric placebo.

The suspension was given 4 times a day during 7 consecutive days.

In multivariate analysis, none of the 3 tested regimens was identified as a protective factor against VAP.

MOYENS LIES A LA SONDE D'INTUBATION



04/06/2015

LA SONDE D'INTUBATION

Ballonnet

Conventionnel:

Matériel: polyvinyl chloride (PVC)

Forme: conique

Epaisseur: $> 50\mu\text{m}$

Nouveau:

Matériel: Polyuréthane

Forme: Effilée

Epaisseur: $7\mu\text{m}$

Lucangelo et al, CCM 2008





Technologic Advances in Endotracheal Tubes for Prevention of Ventilator-Associated Pneumonia

Table 2—VAP Incidence in Included Trials

Study/Year	Centers, No.	Total Patients, No.	Intervention ETT, No. (%) [Rate per 1,000 Vent-d]	Control ETT, No. (%) [Rate per 1,000 Vent-d]	P Value	Conclusions
Vallés et al ¹¹ /1995	1	153	14/76 (18.4) [19.9]	25/77 (32.5) [39.6]	.07	Decreasing trend in NP
Zhenq et al ¹² /2008	NA	61	9/30 (30)	16/31 (51)	< .05	Decrease in VAP
Mahul et al ¹³ /1992	1	145	9/70 (12)	21/75 (29)	< .05	Decrease in NP
Bo et al ¹⁴ /2000	NA	68	35 (23)	33 (45)	< .05	Decrease in VAP
Kollef et al ¹⁵ /1999	1	343	8/160 (5) [34.5]	15/183 (8.2) [43.2]	.2	Delaying trend to VAP
Girou et al ¹⁶ /2004	1	18	5/8 (62)	6/10 (60)	.6	No modification of tracheal colonization by intervention and semirecumbent body position
Bouza et al ¹⁷ /2008	1	690	12/331 (3.6) [17.9]	19/359 (5.3) [27.6]	0.2	Decreasing trend in VAP
Yang et al ¹⁸ /2008	NA	91	12/48 (25)	20/43 (46.5)	.03	Decrease in VAP
Smulders et al ¹⁹ /2002	1	105	2/49 (4.1) [6.4]	10/56 (17.9) [21.3]	.02	Decrease in VAP
Lacherade et al ²⁰ /2010	4	333	25/169 (14.8) [17]	42/164 (25.6) [34]	< .001	Decrease in VAP
Lorente et al ²¹ /2007	1	280	11/140 (7.9) [7.5]	31/140 (22.1) [19.9]	.002	Decrease in VAP
Poelaert et al ²² /2008	1	134	15/67 (23)	28/67 (42)	.02	Decrease in early- and late-onset VAP
Miller et al ²³ /2011	1	135	21/7,545 ^a [2.8]	43/8,678 ^a [5.3]	.001	Decrease in VAP
Kollef et al ²⁴ /2008	54	1,509	37/766 (4.8)	56/743 (7.5)	< .03	Decrease in VAP
					.014	
					.03	Decrease in VAP

NA = not available; NP = nosocomial pneumonia; Vent-d = ventilator-days. See Table 1 for expansion of other abbreviations.

^aVentilator-days.

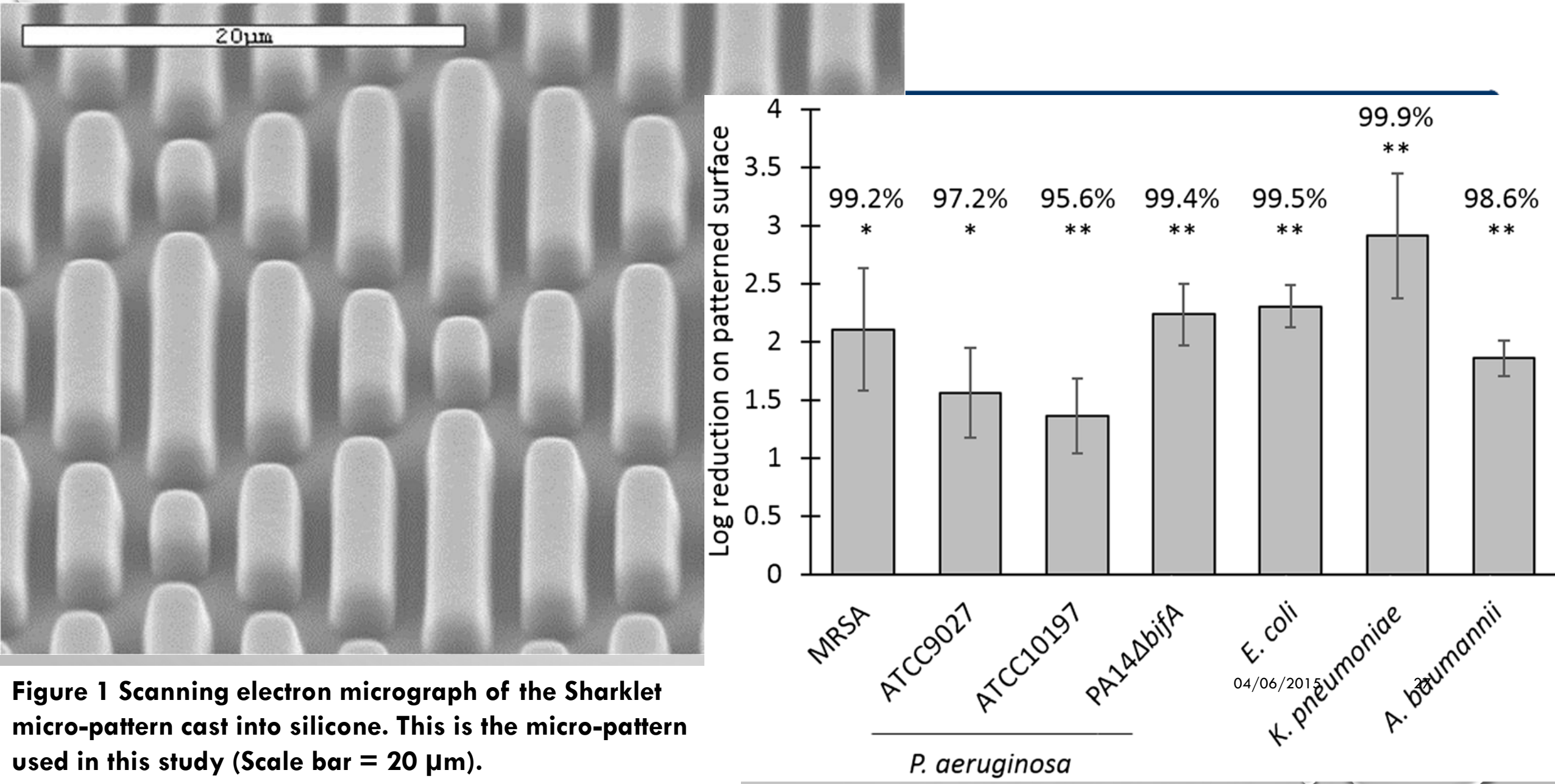
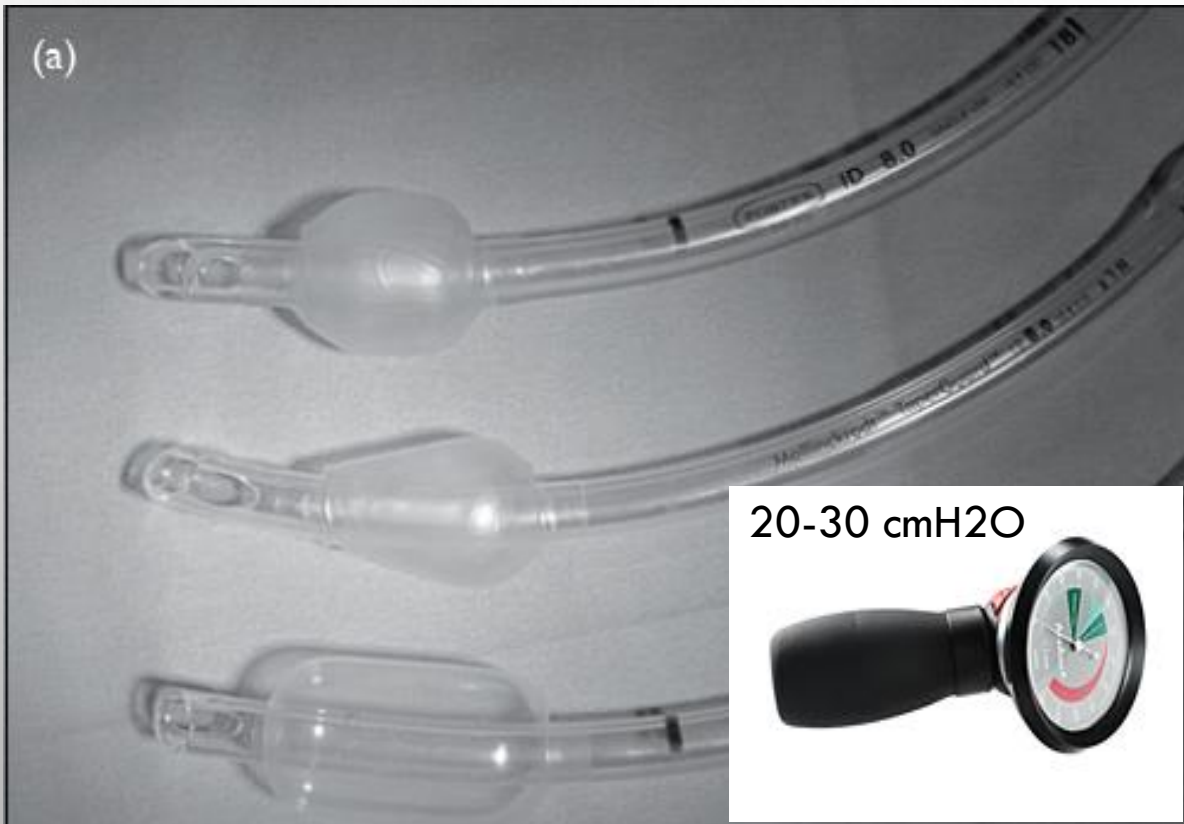


Figure 1 Scanning electron micrograph of the Sharklet micro-pattern cast into silicone. This is the micro-pattern used in this study (Scale bar = 20 μ m).

LA SONDE D'INTUBATION

Pression du ballonnet

CONVENTIONNEL



Monitoring régulier de la Pression du ballonnet.

High-volume low-pressure (HVLP)

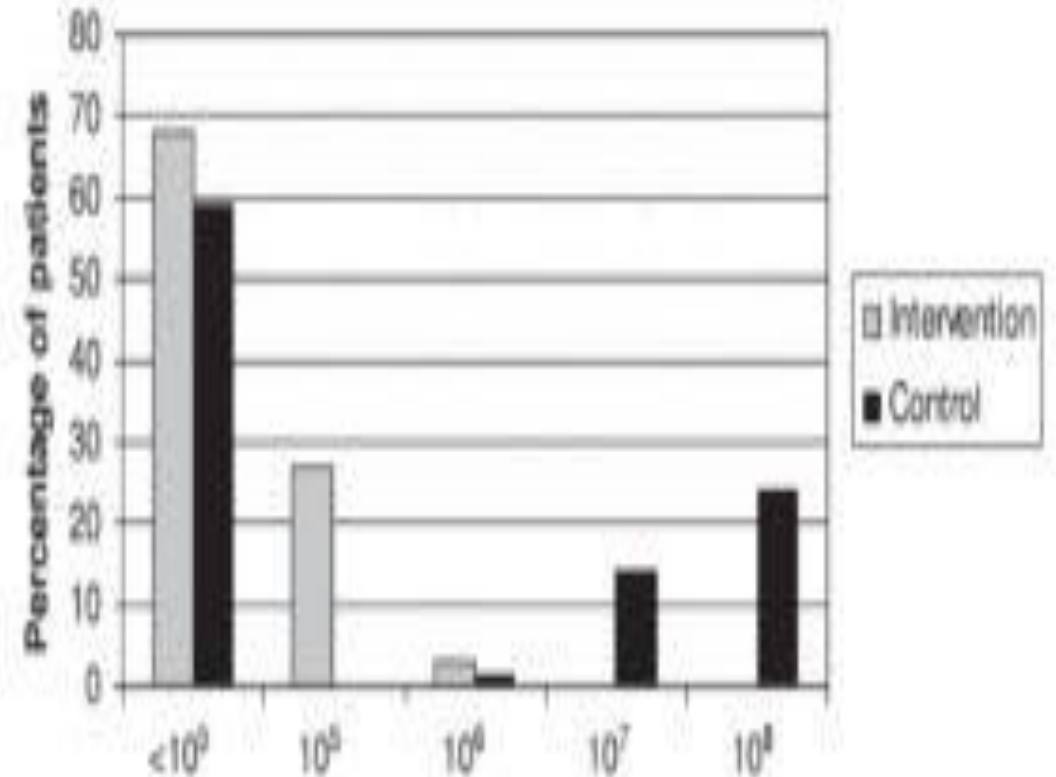


Pression constante, pas besoin de monitoring

CONTRÔLE CONTINU PRESSION BALLONNET?

Continuous Control of Tracheal Cuff Pressure and Microaspiration of Gastric Contents in Critically Ill Patients

Nseir, AJRRCM, 2011



Conclusion:

- 1- Continuous control of P_{cuff} is associated with significantly decreased microaspiration of gastric contents in critically ill patients.
- 2- No significant difference was found in tracheal ischemia score

LA SONDE D'INTUBATION

Total citations found (n=79)

Duplicates excluded (n=17)

BALLONNET IMPRÉGNÉ EN SEL D'ARGENT

Table 2 Quality assessment of included studies

Study	Generation of randomization scheme	Concealment	Blinding	Number of patients lost to follow up (%)	Selective outcome reporting
Kollef 2008 [19,23]	Computer generated randomization sequence	Sequentially numbered envelopes	blinding of investigators and microbiology laboratory assessors	0	No
Rello 2006 [22]	Computer generated randomization sequence	NA	blinding of investigators and microbiology laboratory assessors	0	No

04/06/2015

30

LA SONDE D'INTUBATION

BALLONNET IMPRÉGNÉ EN ARGENT

$\geq 100,000$ CFU/mL. The patients with silver-coated ETTs were consistently less likely to have a microbiologic burden $\geq 10,000$ CFU/mL (9.07% vs. 14.82%, RR=0.64, 95% CI

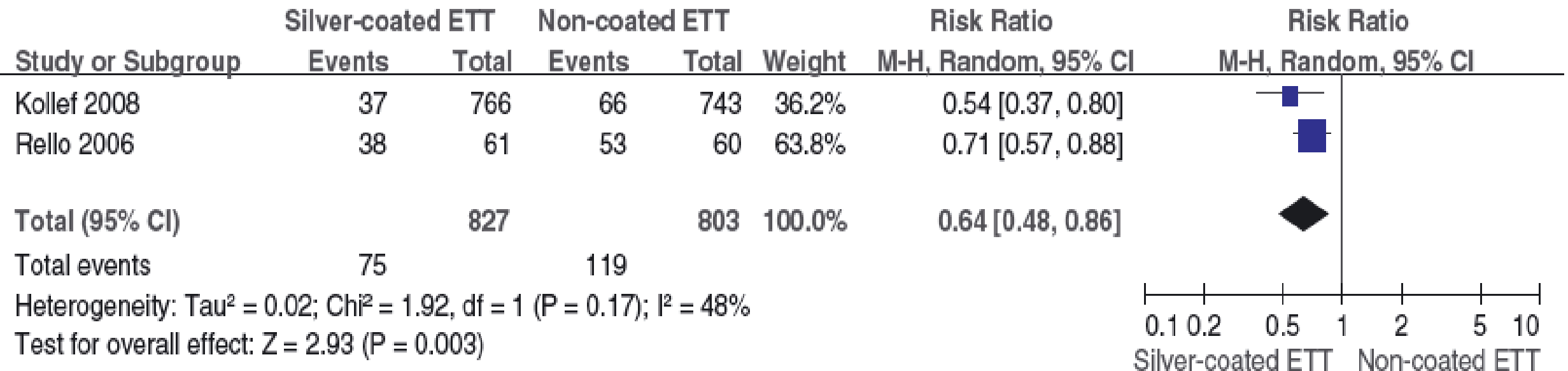
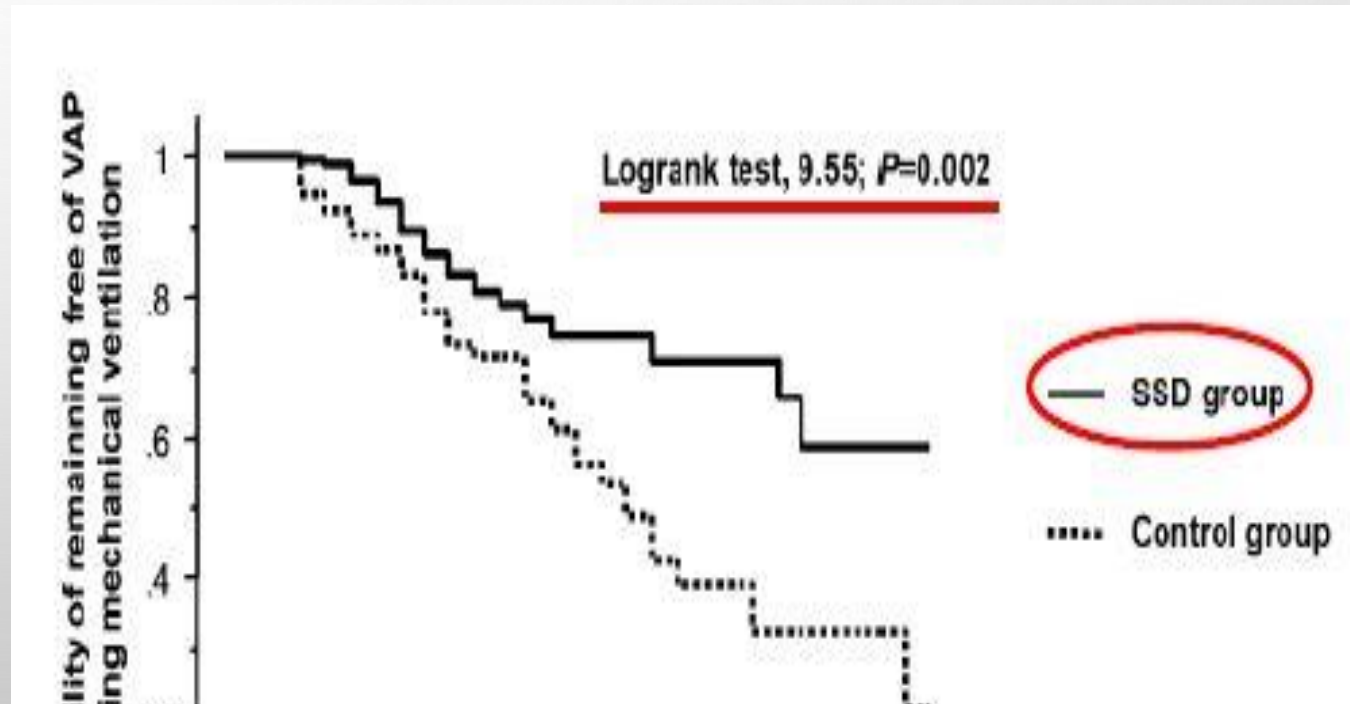


Figure 3. Microbiologic burden $\geq 10,000$ CFU/mL for silver-coated ETT vs. non-coated ETT

LA SONDE D'INTUBATION

- Control des micro-inhalations et de la formation du biofilm
 - Changement de la forme et du matériel du ballonnet de la sonde d'intubation
 - Aspiration sus glottique

Aspiration sus glottique



Lacherade JC. et al. AJRCCM 2010.

Subglottic secretion drainage for the prevention of ventilator-associated pneumonia: A systematic review and meta-analysis*

Crit Care Med 2011 Vol. 39, No. 8

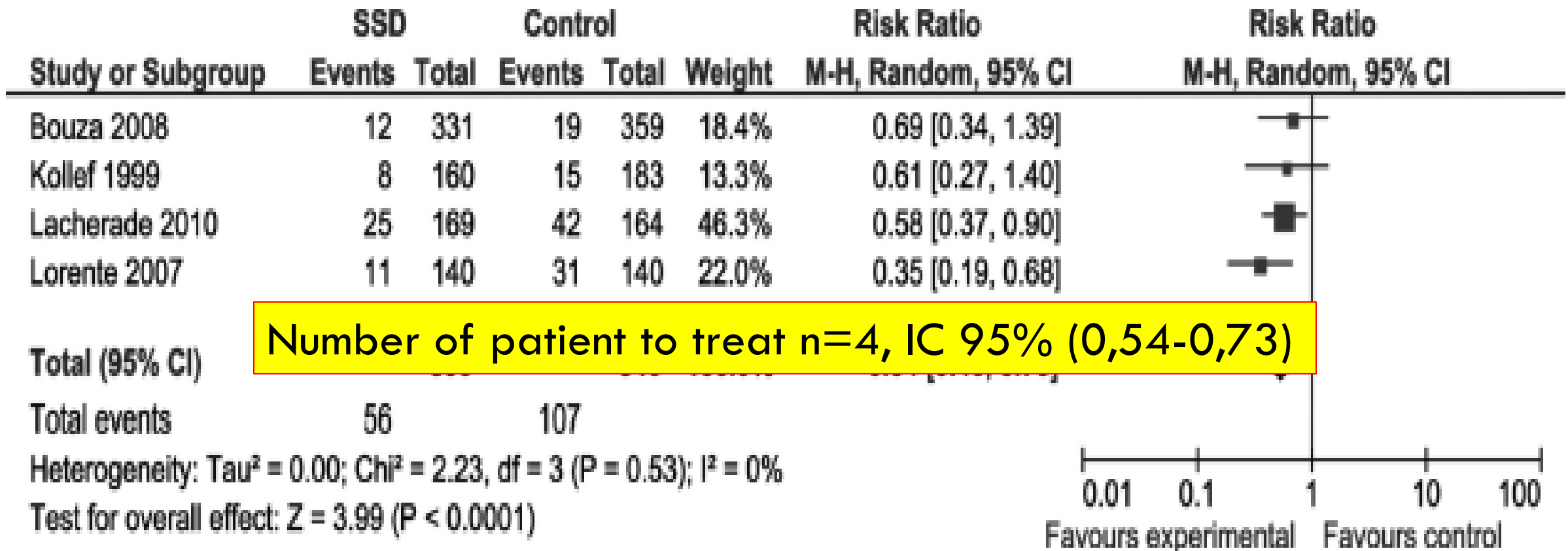
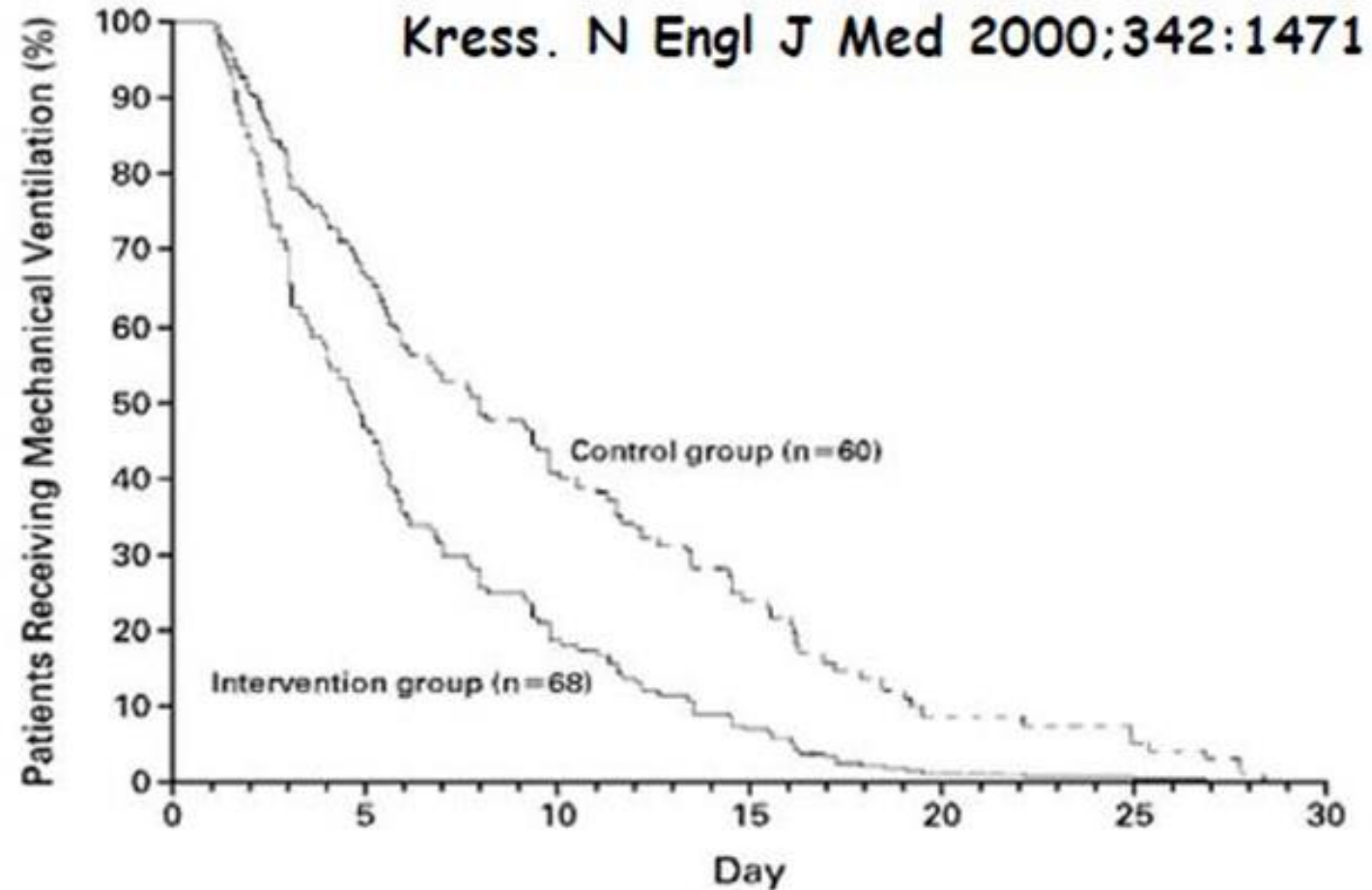


Figure 1. Rate of ventilator-associated pneumonia between groups with subglottic secretion and without subglottic secretion. *M-H*, Mantel-Henszel; *SSD*, subglottic secretion drainage; *CI*, confidence interval.

SEVRAGE PRECOCE

Daily interruption of sedative infusions in critically ill patients undergoing MV



Kaplan-Meier Analysis of the Duration of Mechanical Ventilation

Effect of a nurse-implemented sedation protocol on the incidence of ventilator-associated pneumonia*

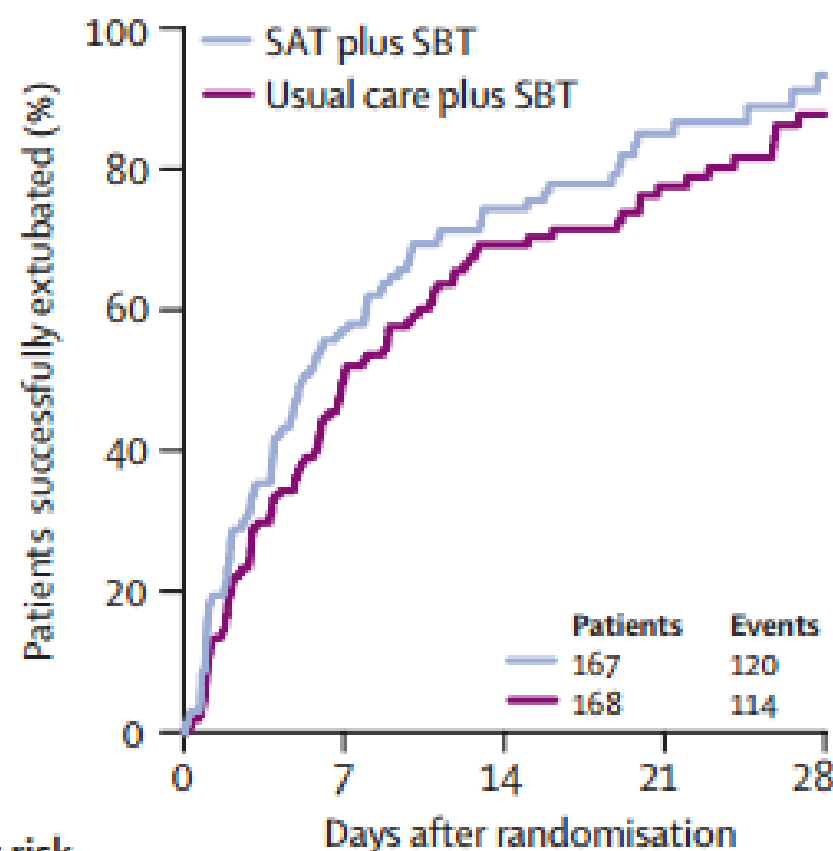
Jean-Pierre Quenot, MD; Sylvain Ladoire, MD; Fabrice Devoucoux, MD; Jean-Marc Doise, MD; Romain Cailliod, MD, PhD; Nicole Cunin, RN; Hervé Aubé, MD; Bernard Blettery, MD; Pierre Emmanuel Charles, MD, PhD

Variable	Control Group (n = 226)	Protocol Group (n = 197)	p Value
VAP, n (%)	34 (15)	12 (6)	.005
Duration of mechanical ventilation, days			.001
Median	8	4.2	
Interquartile range	2.2–22	2.1–9.5	
Unscheduled self-extubation, n (%)	16 (7)	21 (10.7)	.09
Extubation failure, n (%)	29 (13)	11 (6)	.01
Time from end of sedative infusion to extubation, hrs			.01
Median	65	33	
Interquartile range	36–123	12–75	
Length of stay in ICU, days			.004
Median	11	5	
Interquartile range	2.5–27	2.5–13	
Length of stay in hospital, days			.003
Median	21	17	
Interquartile range	5–33	5–22	
ICU mortality, n (%)	88 (39)	63 (31)	.19
In-hospital mortality, n (%)	101 (45)	75 (38)	.22

Efficacy and safety of a paired sedation and ventilator weaning protocol for mechanically ventilated patients in intensive care (Awakening and Breathing Controlled trial): a randomised controlled trial

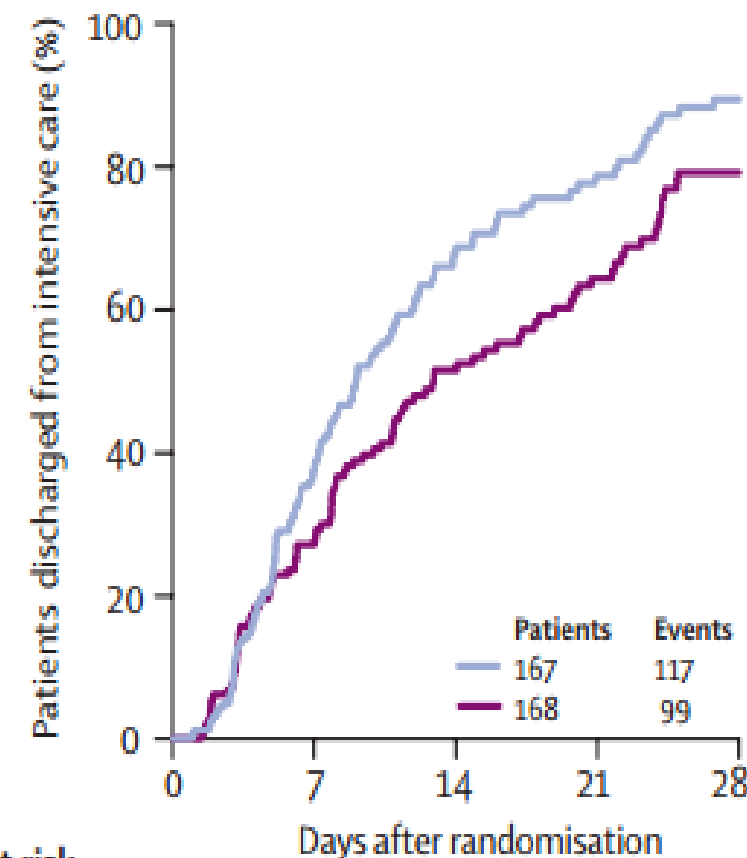
Lancet 2008; 371: 126-34

A



Patients at risk					
	167	57	24	9	3
SAT plus SBT	167	57	24	9	3
Usual care plus SBT	168	68	30	18	8

B



Patients at risk					
	167	89	35	20	10
SAT plus SBT	167	89	35	20	10
Usual care plus SBT	165	102	52	33	18

LA VENTILATION NON INVASIVE (VNI) RESCUE

Comparison: 3 Noninvasive versus invasive weaning

Outcome: 1 Nosocomial pneumonia

Study or subgroup	Noninvasive Weaning n/N	Invasive Weaning n/N	Risk Ratio M- H,Random,95% CI	Weight	Risk Ratio M- H,Random,95% CI
I COPD					
Chen 2001	0/12	7/12		3.3 %	0.07 [0.00, 1.05]
Nava 1998a	0/25	7/25		3.2 %	0.07 [0.00, 1.11]
Prasad 2001					
Rabie 2001					
Rabie Agmy 2012	3/134	30/130		17.8 %	0.10 [0.03, 0.31]
Wang 2004	1/14	8/14		6.6 %	0.13 [0.02, 0.87]
Wang 2005	3/47	12/43		16.9 %	0.23 [0.07, 0.76]
Zheng 2005	1/17	4/16		5.8 %	0.24 [0.03, 1.89]
Zou 2006	7/38	15/38		37.3 %	0.47 [0.21, 1.01]
Subtotal (95% CI)	321	311		100.0 %	0.22 [0.13, 0.37]

Total events: 16 (Noninvasive Weaning), 92 (Invasive Weaning)

Heterogeneity: $\tau^2 = 0.02$; $\chi^2 = 8.25$, $df = 8$ ($P = 0.41$); $I^2 = 3\%$

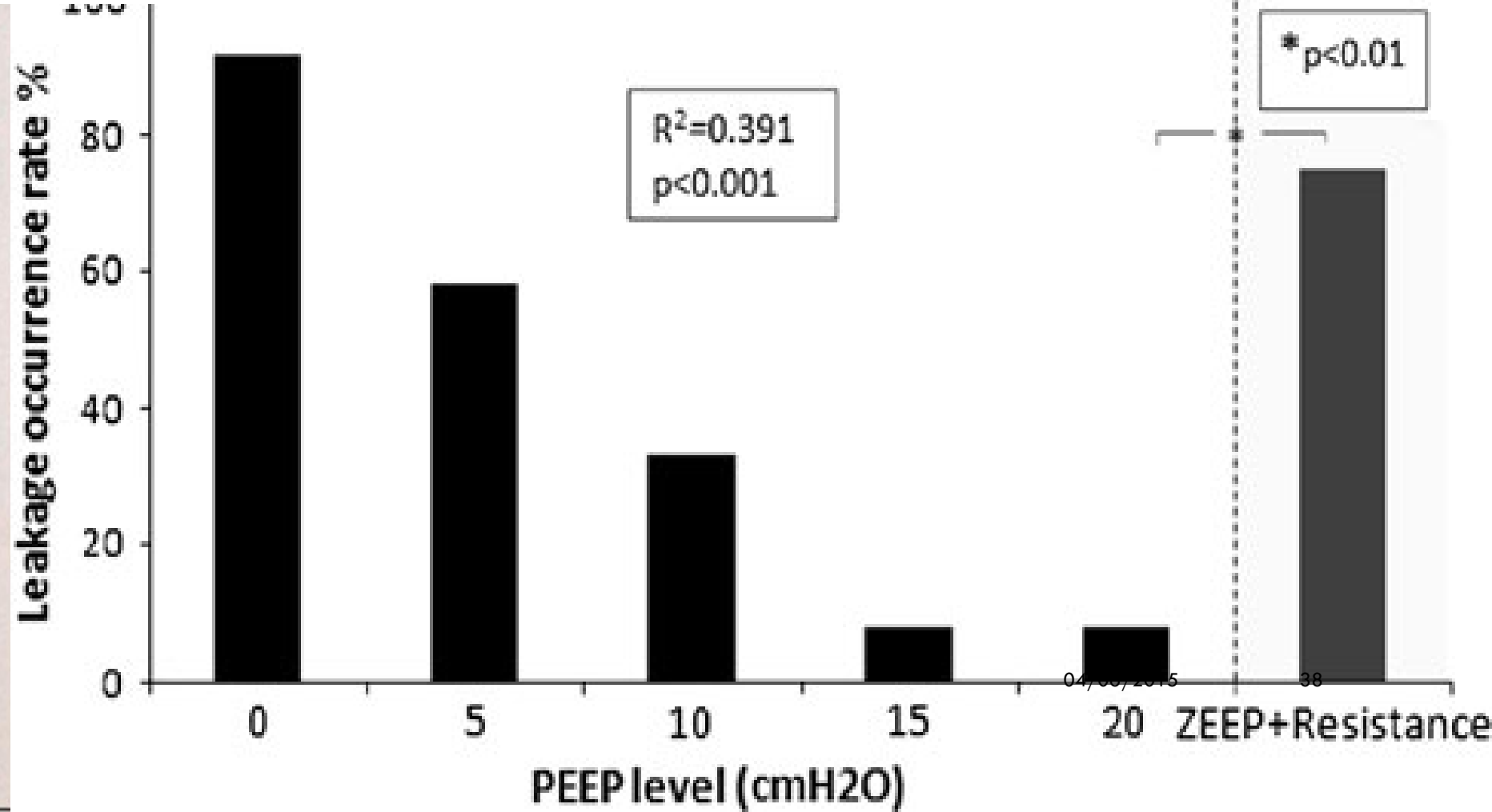
Test for overall effect: $Z = 5.88$ ($P < 0.00001$)

Number of patient to treat = 6, IC95% (0,24-0,56)

EFFET DE LA PEEP

Mechanical influences on fluid leakage past the tracheal tube cuff in a benchtop model

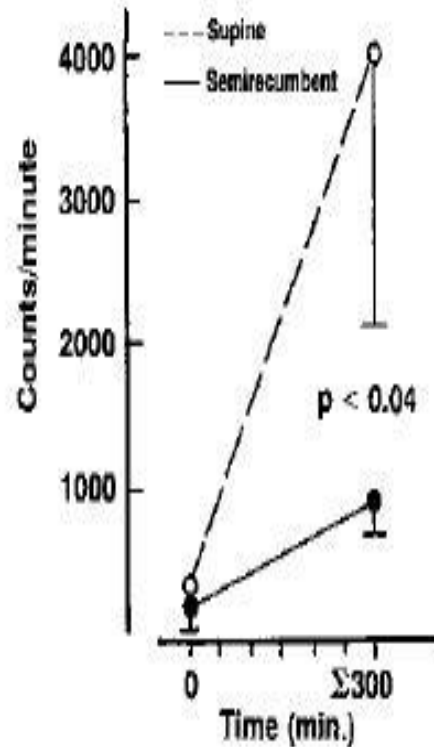
Intensive Care Med (2011) 37:695–700



BODY POSITIONNING

Guidelines : (Basés sur le travail de by Drakulovic)

Recommended Semi-recumbent position (head of bed elevated 30–45°) to reduce gastric reflux.



Risque de reflux

Torres et al – Annals Intern med 1992; 116: 540

BODY POSITIONNING

Supine body position as a risk factor for nosocomial pneumonia in mechanically ventilated patients: a randomised trial

THE LANCET • Vol 354 • November 27, 1999

Single assay study. Patients assigned to supine or semi-recumbent position. Body position was assessed only once a day.

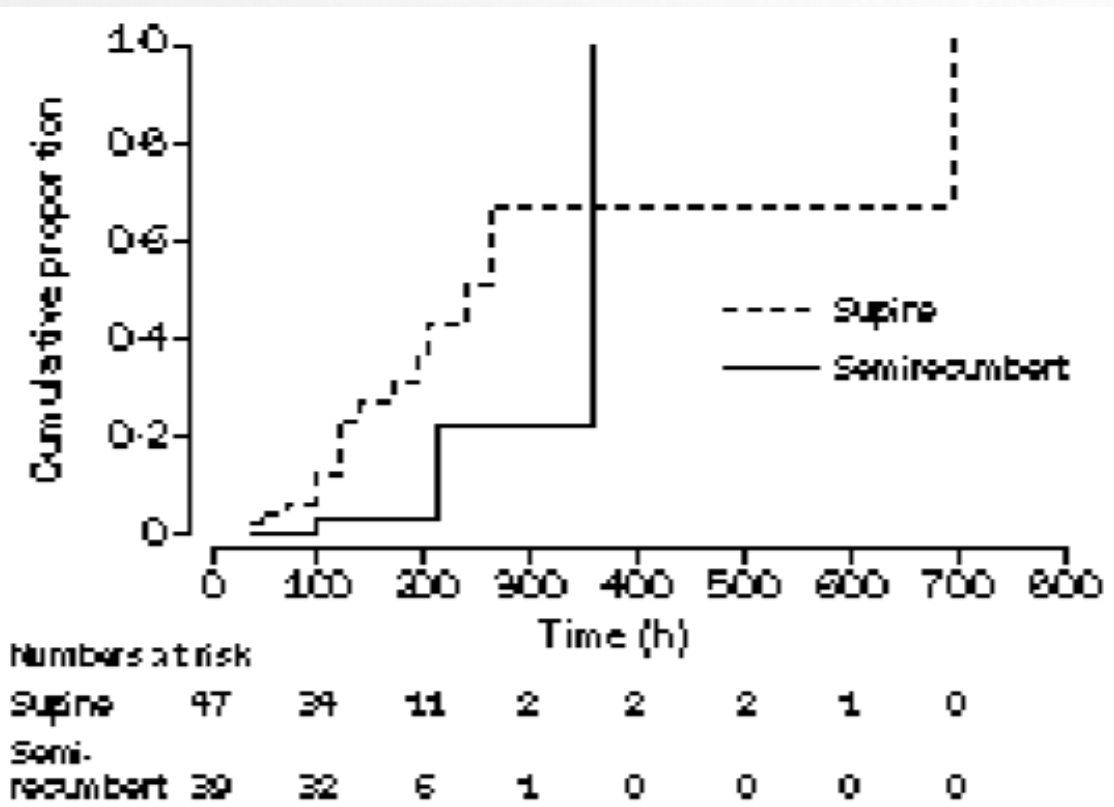


Figure 2: Cumulative proportion of patients with clinically suspected pneumonia

	Body position					
	Supine			Semirecumbent		
	TBAS	PSB	BAL	TBAS	PSB	BAL
Negative cultures	1	..	..	..	..	..
Gram-negative organisms						
Acinetobacter spp	1	..	..	..	..	..
Proteus spp	1	..	..	..	..	..
Pseudomonas spp	2	3	..	2	..	1
Stenotrophomonas spp	..	..	..	..	..	1
Gram-positive organisms						
Staphylococcus aureus (meticillin resistant)	2	3	1	..	..	..
Staphylococcus aureus (meticillin sensitive)	2	1	..	..	..	..
Enterococcus spp	1	..	..	..	..	..
Fungi						
Candida spp	1	..	..	..	..	..
Total number of samples*	10	5	1	2	0	1

TBAS=tracheobronchial aspirate; PSB=protected specimen brush; BAL=bronchoalveolar lavage. Number of all recovered potentially pathogenic microorganisms without respect to the defined thresholds. In addition the following non-pathogenic microorganisms were recovered: *Streptococcus viridans* (n=1), *Chromobacter* spp (n=1).
*p=0.259, χ^2 test.

Table 2: Microorganisms recovered on the day of clinical suspicion of pneumonia

BODY POSITIONNING

Réduction de l'incidence de VAP

☐ Modèles animaux:

Position en décubitus latéral légèrement en dessous de 0° /horizontale.

- Drainage des sécrétions sus glottiques
- Evite les inhalations des germes du tractus digestif

☐ Chez l'homme



ANTIBIOPROPHYLAXIE??

NON! CAR:

- ELLE NE SERT QU'À RETARDER LA SURVENUE DE LA PNEUMOPATHIE.
- ELLE EST ASSOCIÉE À LA SÉLECTION DE GERMES RÉSISTANTS!

PROPHYLAXIE ANTIULCÉREUSE

- Colonisation gastrique favorisée par la modification du pH gastrique (prescription d'anti H1)

- **Etudes récentes**

Aucune relation de cause à effet n'a été retrouvée entre l'alcalinisation du contenu gastrique et la pathogénie de la PAVM

Cook D. N Engl J Med 1998; 338(12):791-797. Hong Kong 2014

APPROCHE GLOBALE.



“ Bundles of care ” “Bouquets” de mesures

Meilleur model: Concept “ four Es ”

- Engage
- Educate
- Execute
- Evaluate

BUNDLES OF CARE

Intensive Care Med
DOI 10.1007/s00134-009-1461-0

ORIGINAL

Caroline S. Hawe
Kirsteen S. Ellis
Chris J. S. Cairns
Andrew Longmate

Reduction of ventilator-associated pneumonia: active versus passive guideline implementation

Published online: 24 March 2009

1 service anglais, 2006-2007

2006 : Création d'un « bundle » en 6 points:

semi-recumbent patient positioning (30–45° angle), oral antisepsis with chlorhexidine, use of sub-glottic suction/drainage endotracheal tubes, daily sedation breaks, daily assessment of readiness to wean and 'tubing management' (the default use of a dry ventilator circuit and use of a heat and moisture exchange filter (HMEF) positioned about the patient's head).

Bundle dans chaque box, engagement de l'encadrement à le diffuser et à le faire appliquer

BUNDLES OF CARE

Table 2 Percentage compliance with protocol elements

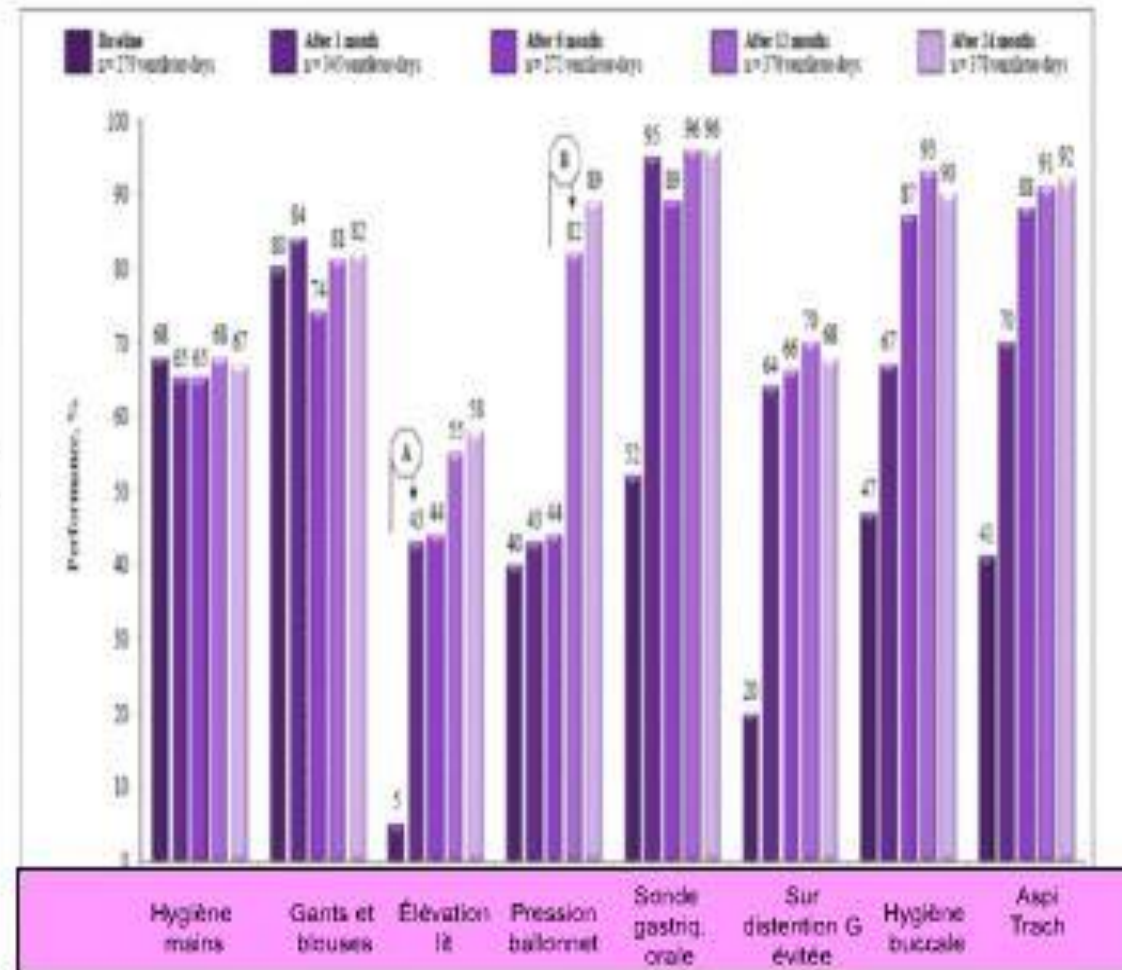
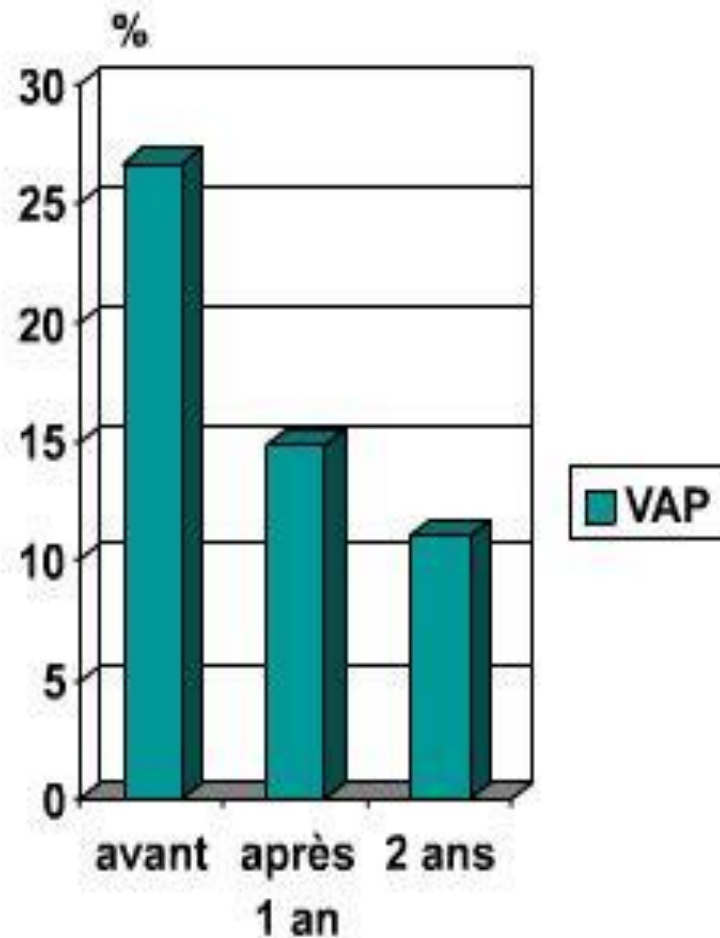
Care element	Level of compliance achieved (%)			Chi-squared <i>P</i> value (Nov 2006 vs. Oct 2007)
	'Passive' implementation period		'Active' implementation period	
	Nov 2006	May 2007	Oct 2007	
Patient at 30°–45° angle	54	80	94	<0.001
Subglottic ETDT	72	92	92	<0.001
Oral antiseptic wash	8	94	100	<0.001
Tubing management	98	98	100	0.31
Daily weaning plan	52	72	72	0.039
Daily sedation holiday	72	86	82	0.23
All elements performed	0	48	54	<0.0001

Table 3 VAP incidence, mortality and LOS

Patients ventilated for >48 h

	Passive implementation period 1 Sept 2005–27 Feb 2007	Active implementation period 27 Feb 2007–31 Dec 2007
Total	374	215
Ventilator days	2,556	1,327
Episodes of VAP	49	10
VAP/1,000 ventilator days	19.17	7.5
Median LOS	4.5	5.0
Mortality	(112/374) 30%	(49/215) 23%

“Bundle of care” ou programme multifacette



STRATEGIES MULTIPLES

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY AUGUST 2014, VOL. 35, NO. 8

ORIGINAL ARTICLE

Strategies to Enhance Adoption of Ventilator-Associated Pneumonia Prevention Interventions: A Systematic Literature Review

Kaier et al. *BMC Infectious Diseases* 2014, **14**:199
<http://www.biomedcentral.com/1471-2334/14/199>



RESEARCH ARTICLE

Open Access

Impact of availability of guidelines and active surveillance in reducing the incidence of ventilator-associated pneumonia in Europe and worldwide

Blot et al. *BMC Infectious Diseases* 2014, **14**:119
<http://www.biomedcentral.com/1471-2334/14/119>



REVIEW

Open Access

How to avoid microaspiration? A key element for the prevention of ventilator-associated pneumonia in intubated ICU patients

CONCLUSION

- 1- Stratégie Réalisable
- 2- Engagement-Application
- 3- Persévérance

The
End !!