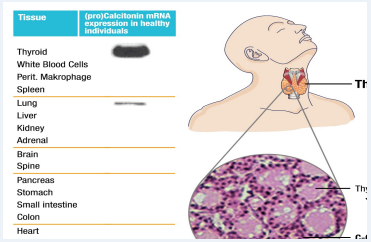
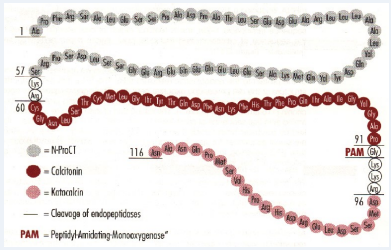
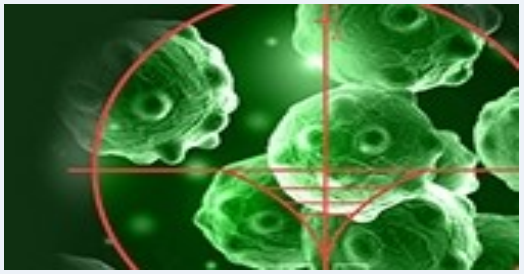
الجمعية التونسية لطب الانعاش
ASSOCIATION TUNISIENNE DE REANIMATION

Cinétique de la Procalcitonine dans la prise en charge des PAVM

Dr Imed Chouchene
Service de Réanimation Médicale
CHU Farhat Hached Sousse
29 Novembre 2019







Réanimation
DOI 10.1007/s13546-01

MISE AU POIN FECTIEUX

Guideline

Chine

TASK FORCE REPORT
AT GUIDELINES

REVIEW

CURRENT OPINION

Ventilator associated pneumonia in the ICU: where has it gone?

SFAR

srlf
SOCIÉTÉ DE RÉANIMATION DE LANGUE FRANÇAISE

Recommandations formalisées d'experts

PNEUMONIES ASSOCIÉES AUX SOINS DE RÉANIMATION

RFE commune SFAR – SRLF
Société Française d'Anesthésie et de Réanimation
Société de Réanimation de Langue Française

En collaboration avec les Sociétés ADARPEF et GFRUP
Association des Anesthésistes Réanimateurs Pédiatriques d'Expression Française,
Groupe Francophone de Réanimation et Urgences Pédiatriques

HEALTHCARE ASSOCIATED PNEUMONIA IN INTENSIVE CARE UNIT

CrossM

ciation

OXFORD

M
Ve tice
Gu erica
an

Pneumonie acquise sous ventilation mécanique: PAVM

Incidence :

5% à 67% *Timsit JF et al. Update on ventilator-associated pneumonia 2017*

Barbier F et al. Hospital-acquired pneumonia and ventilator-associated pneumonia: recent advances in epidemiology and management 2013

(Immunodépression, chirurgie et sujet âgés +++)

2 à 16 par 1000 jours de ventilation mécanique aux Etats Unis et excède 18 pour 1000 jours de ventilation mécanique en Europe

Recommandations formalisées d'experts SFAR et SRLF 2017

Rosenthal VD et al.Am J Infect Control.2012

Morbi-mortalité importante

Pneumonie acquise sous ventilation mécanique: PAVM

- Augmentation de la consommation antibiotique
- Augmentation du coût de Pec (pouvant atteindre 40000 USD)
- Majoration du risque de toxicité
- Sélection de MDR

Florence Beye et al. Adhering to the procalcitonin algorithm allows antibiotic therapy to be shortened in patients with ventilator-associated pneumonia ***jcrc.2019***

Warren DK et al. Outcome and attributable cost of ventilator-associated pneumonia among intensive care unit patients in a suburban medical cente ***Crit Care Med.2003***

Pneumonie acquise sous ventilation mécanique: PAVM

- Plusieurs études ont montré que la durée du TTT ATB peut être raccourcie

Short-course versus prolonged-course antibiotic therapy for hospital-acquired pneumonia in critically ill adults ***Cochrane Database Syst Rev 2011***

Chastre j et al. Comparison of 8 vs 15 days of antibiotic therapy for ventilator-associated pneumonia in adults: a randomized trial ***Jama 2003***

M. Fekih Hassen et al. Durée de l'antibiothérapie lors du traitement des pneumopathies acquises sous ventilation mécanique : comparaison entre sept jours et dix jours. Etude pilote

Annales Françaises d'Anesthésie et de Réanimation 2009

Réticence de plusieurs cliniciens vis-à-vis de la courte durée du TTT

Pneumonie acquise sous ventilation mécanique: PAVM

- Risque d'échec thérapeutique notamment pour les BG- non fermentants (pseudomonasaeruginosa++,acinetobacter, stenotrophomonas…)

Chastre J Jama 2003
Leone M Ann Intensive Care 2018

A standard course of treatment probably does not fit all

Nécessité d'adapter une nouvelle approche de prise en charge
Évaluation clinique++
PROCALCITONINE+++

Antimicrobial Stewardship

SUPPLEME

Antimicrobial Stewardship: Importance for Patient and Public Health

Thomas M. File Jr,[1] Arjun Srinivasan,[2] and John G. Bartlett[3]

[1]Summa Health System, Akron, Ohio; [2]Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, Atlanta, Geo
[3]Johns Hopkins University School of Medicine, Baltimore, Maryland

Clin Infect Dis. 2014;59: S93-96.

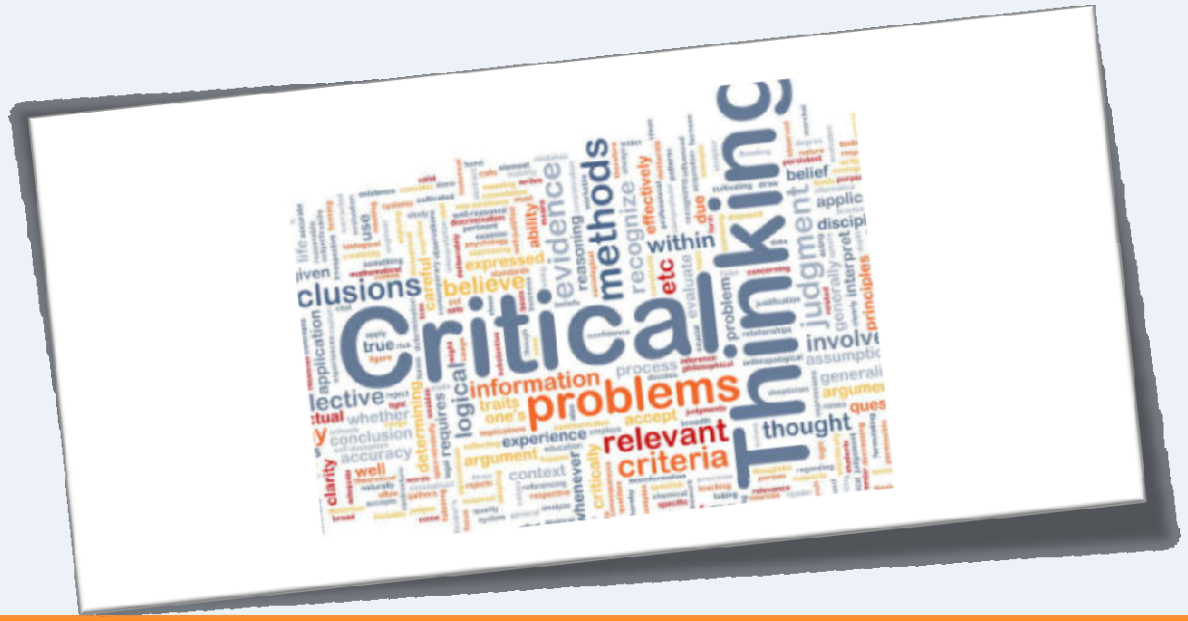
Appropriate antimicrobial usage

Antimicrobial Avoidance when not indicated

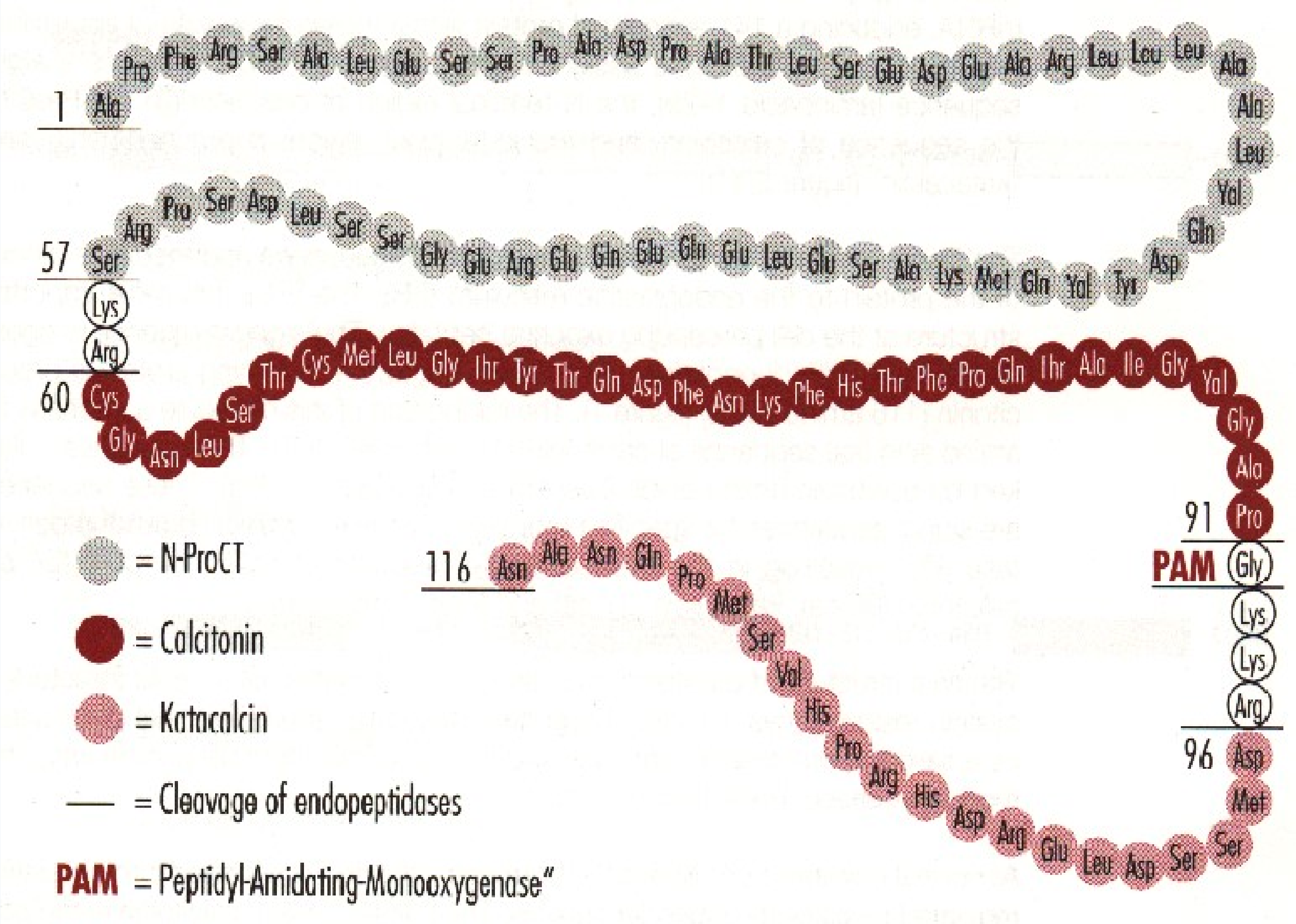
3 D

- Right DRUG
  - Guidelines
  - Local resistance patterns
  - Patient risk stratification
- Right DOSE
  - PK/PD
- Right DURATION

*Polk R. *Clin Infect Dis.* 1999;29:264-274



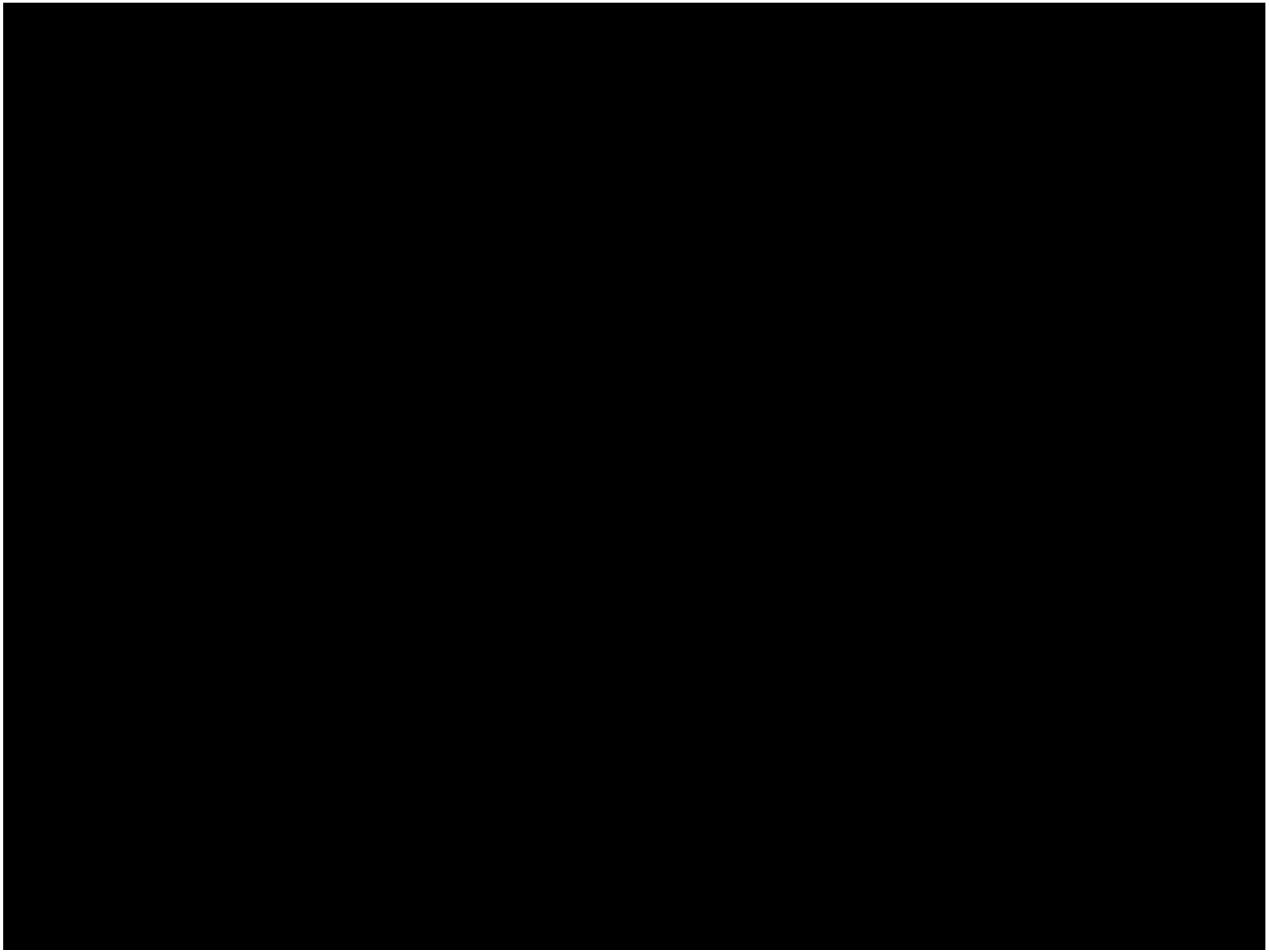
PROCALCITONINE: USEFUL TOOL? MANAGEMENT VAP


1 Ala Pro Phe Arg Ser Ala Leu Glu Ser Ser Pro Ala Asp Pro Ala Thr Leu Ser Glu Asp Glu Ala Arg Leu Leu Leu Ala Ala Leu Val Gln Asp Tyr Val Gln Met Lys Ala Ser Glu Leu Glu Gln Glu Gln Glu Arg Glu Gly Ser Ser Leu Asp Ser Pro Arg Ser 57
Lys
Arg
60 Cys Gly Asn Leu Ser Thr Cys Met Leu Gly Thr Tyr Thr Gln Asp Phe Asn Lys Phe His Thr Phe Pro Gln Thr Ala Ile Gly Val Gly Ala Pro 91
PAM Gly
Lys
Lys
Arg
96 Asp Met Ser Ser Asp Leu Glu Arg Asp His Arg Pro His Val Ser Met Pro Gln Asn Ala Asn 116
= N-ProCT
= Calcitonin
= Katacalcin
= Cleavage of endopeptidases
PAM = Peptidyl-Amidating-Monooxygenase"

Procalcitonine

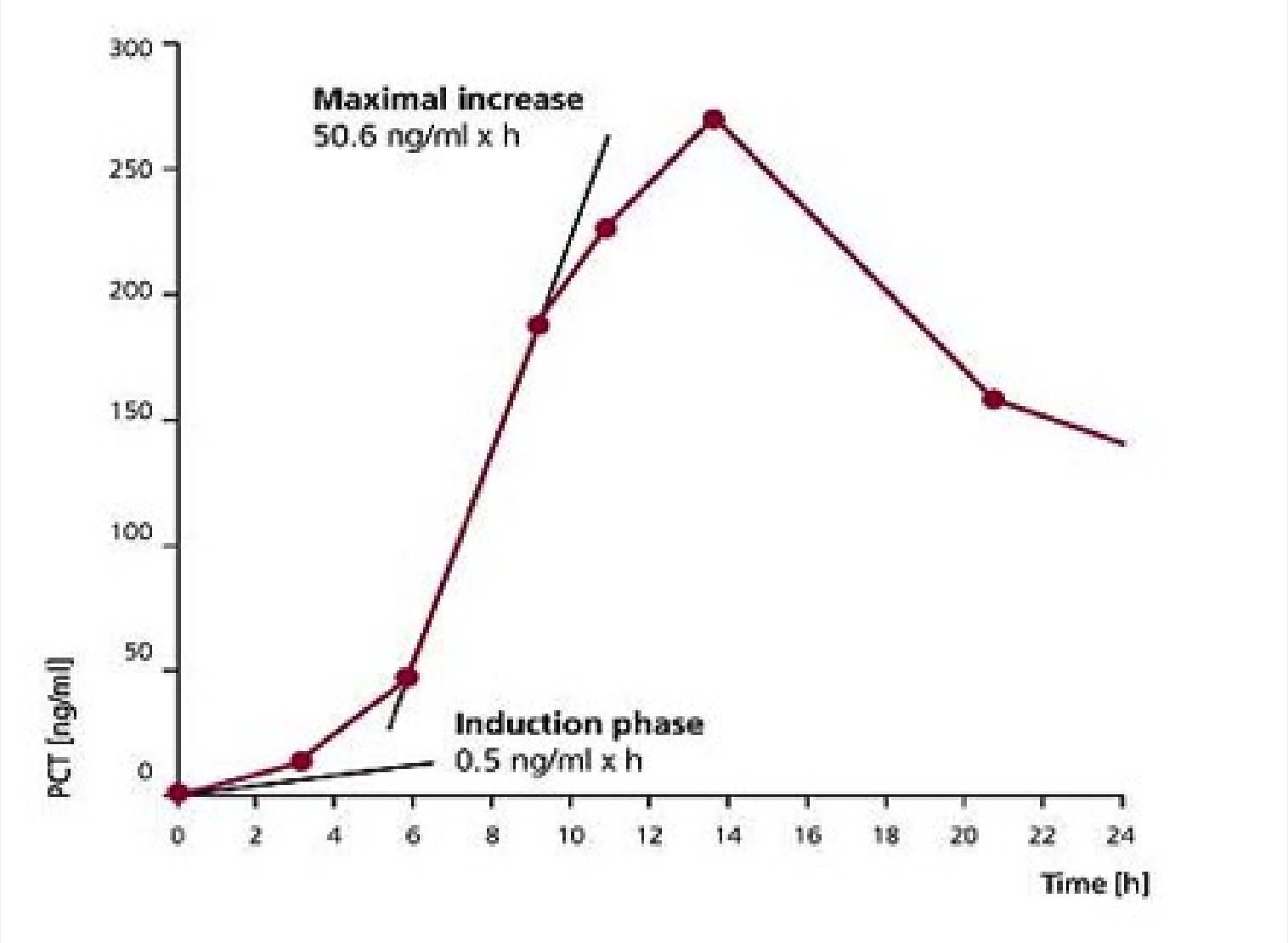
- Peptide (116 AA) précurseur de la calcitonine
- Hormokine : expression hormonale par les cellules neuroendocrines (cellules C thyroide, cellule K pulmonaire…) libération comme des cytokines par le foie, les reins, les monocytes mais pas les leucocytes
- Sécrétion en réponse à infection (endotoxine) et à certains médiateurs pro- inflammatoires (sécrétion : IL-1 β, TNF-α, and IL-6

Niederman Clin Infect Dis. 2008; 47: S127-; Gilbert Clin Infect Dis 2011

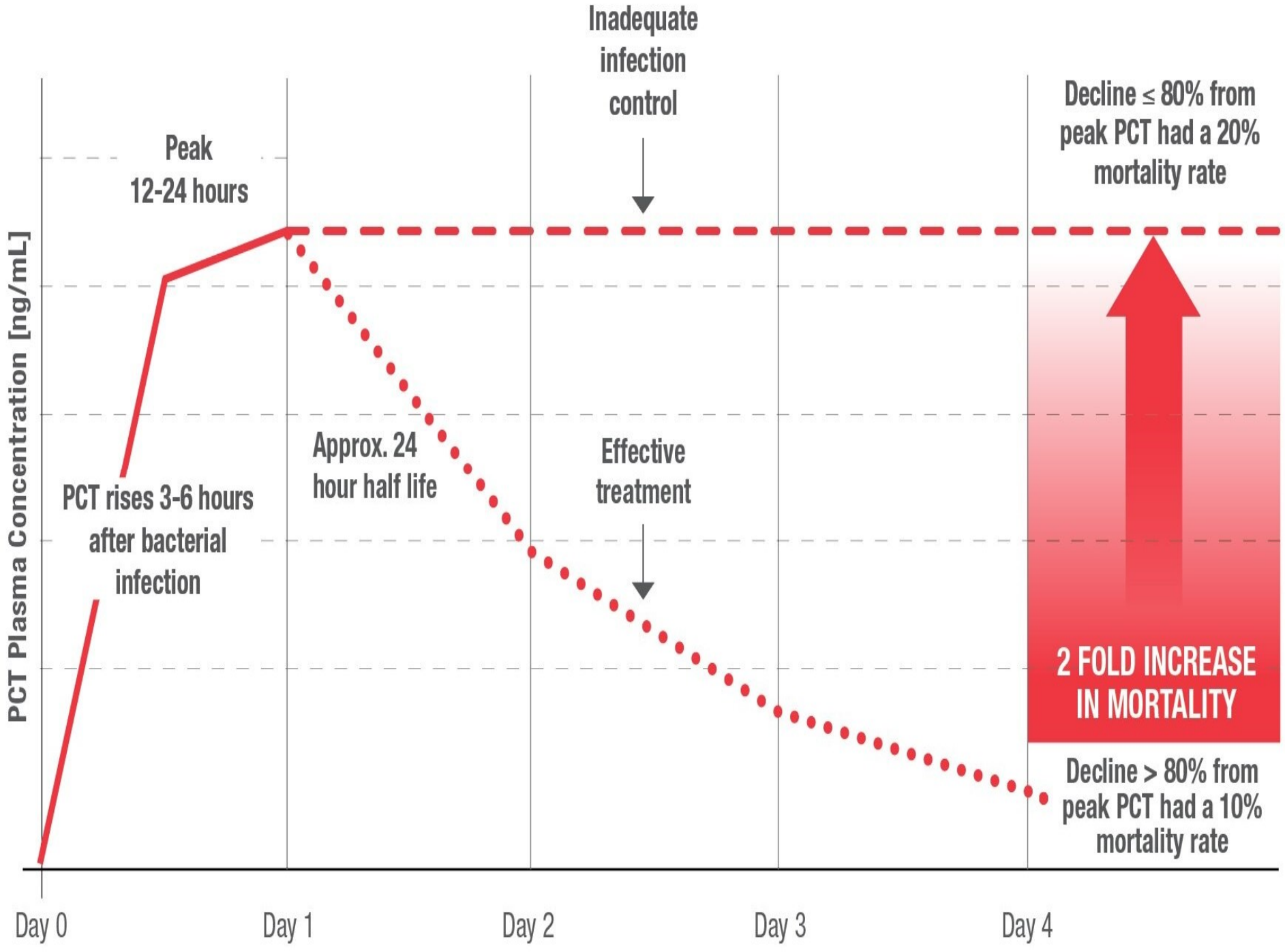


- Réponse rapide à l'infection bactérienne: après induction élévation PCT dans les 2-3 heures
- Interféron gamma Ɣ secrété en cas d'infection virale inhibe la sécrétion PCT
- Sujet normal: taux indétectable (<0.1ng/ml)

  clivage en calcitonine avant sécrétion
- Cinétique non affectée par l'insuffisance rénale et l'épuration extrarénale



Brunkhorst FM, Heinz U, Forycki ZF. Intensive Care Med. 1998 Kinetics of procalcitonin in iatrogenic sepsis.


Inadequate infection control
Peak 12-24 hours
Decline ≤ 80% from peak PCT had a 20% mortality rate
PCT Plasma Concentration [ng/mL]
PCT rises 3-6 hours after bacterial infection
Approx. 24 hour half life
Effective treatment
2 FOLD INCREASE IN MORTALITY
Decline > 80% from peak PCT had a 10% mortality rate
Day 0
Day 1
Day 2
Day 3
Day 4

Procalcitonine et PAVM

- Cochrane Systematic Review
- 3 trials investigating use of PCT.
- Based on recommendation for ABX duration based on PCT level
  - associated with significantly reduced duration of ABX therapy (mean difference -3.20 days; 95% CI -4.45 to -1.95) and 28-day antibiotic-free days (MD 2.80 days; 95% CI 1.39 to 4.21).
  - There were no significant differences in other outcomes, though a trend towards greater recurrence was observed in one study.

Pugh R, et al. Cochrane Database of Systematic Reviews 2011, Issue 10. Art. No.: CD007577

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Informed decisions.
Better health.

Cochrane Database of Systematic Reviews

[Intervention Review]

Procalcitonin to initiate or discontinue antibiotics in acute respiratory tract infections

Schuetz P et al.Cochrane Database of Syste... 17, ...8.

participants in the procalcitonin-guided group had a 2.4-day reduction in antibiotic exposure and a reduction in antibiotic-related side effects (16.3% versus 22.1%).

6708 participants from 26 trial...

Mortality at 30... in procalcitonin-guided p... participants (286 deaths in 3336 ... participants (8.6%) versus 336 deaths in 3372 c... (10.0%)). There was no significant difference with regard to treatment failures. Results were similar for different clinical settings (primary care, emergency department, **intensive care unit**) and types of respiratory infection (VAP++)

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Cochrane Database of Systematic Reviews

[Intervention Review]

Procalcitonin to initiate or discontinue antibiotics in acute respiratory tract infections

Schuetz P et al.Cochrane Database of Systematic Reviews 2017, Issue 10. Art. No.: CD007498.

Table 4. Clinical endpoints overall and stratified by setting and ARI diagnosis *(Continued)*

Ventilator-associated pneumonia	186	194		
30 days mortality, n (%)	29 (15.6%)	23 (12.0%)	0.75 (0.41 to 1.39), P = 0.366	0.644
Treatment failure, n (%)	51 (27.4%)	44 (22.7%)	0.78 (0.48 to 1.28), P = 0.332	0.522
Length of ICU stay, mean (±SD)	23.5 ± 20.5	21.8 ± 19.1	-1.74 (-5.64 to 2.17), P = 0.383	0.441
Length of hospital stay, mean (±SD)	33.8 ± 27.6	32.0 ± 23.1	-2.14 (-7.04 to 2.75), P = 0.391	0.448

Measures of effect: dichotomous outcomes are reported as adjusted OR (95% CI) and continuous outcomes are adjusted mean differences and confidence intervals

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[Intervention Review]

Procalcitonin to initiate or discontinue antibiotics in acute respiratory tract infections

Schuetz P et al.Cochrane Database of Systematic Reviews 2017, Issue 10. Art. No.: CD007498.

Table 6. Antibiotic treatment overall and stratified by setting and ARI diagnosis (*Contin*

Duration of antibiotics (days), mean (±SD)	13.1 ± 7.9	10.8 ± 8.7	-2.22 (-3.80 to -0.65), P = 0.006
Total exposure of antibiotics (days), mean (±SD)	13.1 ± 7.9	10.8 ± 8.7	-2.45 (-4.09 to -0.82), P = 0.003

Note: Duration refers to the total days of antibiotic therapy in participants in whom antibiotics w
the total days of antibiotic therapy in all randomised participants

ORIGINAL ARTICLE

The Indonesian Journal of Internal Medicine 2013

Role of Combined Procalcitonin and Lipopolysaccharide-binding Protein as Prognostic Markers of Mortality in Patients with Ventilator-associated Pneumonia

Cleophas M. Rumende, Dinajani Mahdi

Department of Internal Medicine, Faculty of Medicine, University of Indonesia - Cipto Mangunkusumo Hospital, Jakarta, Indonesia.

- 35 patients inclus
- Cinétique de ***la PCT et de LBP*** conditionnent le pronostic des PAVM
- PCT> 0.5 ng/mL and LBP level >25 µg/mL: J3 et J7 ATB **mauvais pronostic**: p<0;05. sensibilité: 96.3%, specificité of 66.7% avec AUC value 0.81

Efficacy and Safety of Procalcitonin Guida
Patients With Suspected or Confirmed Se
Systematic Review and Meta-Analysis

Irena Iankova, PhD[1]; Philippe Thompson-Leduc, MSc[2]; Noam Y. Kirson, PhD[2]; Ber

Irena Iankova 2017

- OMS: la résistance aux antibiotiques est l'une des plus grandes menaces pour la santé
- États Unis: 37000 décés (CDC) avec un coût annuel estimé à 55 billions de dollars
- Meilleure gestion des ATBS:
  - Réduire la résistance
  - Diminuer les effets secondaires
  - Réduction du coût de prise en charge

Procalcitonine

TABLE 1. Randomized Controlled Trials Included in Meta-Analysis

First Author	Time to Endpoint	PCT Cohort	Control Cohort	PCT Algorithm for AB Cessation (ng/mL)	Adherence (%)	Mean AB Duration (d)	Mean ICU Length of Stay (d)	Mortality
Annane et al (24)	Time until ICU discharge	31	31	< 0.5	63	4.7 (PCT), 4.0 (control)	24.0 (PCT), 31.0 (control)	23% (PCT), 32% (control)
Bouadma et al (25)	28 d	307	314	< 0.5; > 80% change from peak	47	10.3 (PCT), 13.3 (control)	15.9 (PCT), 14.4 (control)	21% (PCT), 20% (control)
de Jong et al (26)	28 d	761	785	≤ 0.5; ≥ 80% change from peak	93	5.7 (PCT), 7.3 (control)	10.2 (PCT), 10.0 (control)	20% (PCT), 25% (control)
Deliberato et al (27)	Time until ICU discharge	42	39	< 0.5; > 90% change from peak	NR	15.5 (PCT), 17.3 (control)	16.3 (PCT), 8.8 (control)	2% (PCT), 10% (control)

Hochreiter et al (28)	Time until ICU discharge	57	53	< 1.0; ≥ 65–75% change from initial level and current level > 1.0	NR	5.9 (PCT), 7.9 (control)	15.5 (PCT), 17.7 (control)	26% (PCT), 26% (control)
Layios et al (29)	Time until ICU discharge	258	251	< 0.5				
Najafi								(control)
						13.5 (control)	7.5 (PCT), 26.5 (control)	21% (PCT), 20% (control)
				level < 1.0; > 90% change if initial PCT ≥ 1.0				
Schroeder et al (32)	Length of hospital stay	14	13	≤ 1.0; ≥ 65–75% change from initial level	NR	6.6 (PCT), 8.3 (control)	16.4 (PCT), 16.7 (control)	21% (PCT), 23% (control)
Shehabi et al (33)	28 d	196	198	< 0.1; < 0.1–0.25 if infection unlikely; > 90% change from baseline level	NR	11.7 (PCT), 13.0 (control)	6.2 (PCT), 6.7 (control)	11% (PCT), 8% (control)

In adult patients with suspected or confirmed sepsis, procalcitonin guidance reduces antibiotics duration with no observed adverse effects on patient outcomes

- In a 2017 meta-analysis
- based on individual data from 6,708 patients, the use of PCT
- guided antibiotic therapy was associated with a 2.4-day reduction in antibiotic exposure (5.7 versus 8.1 days), a reduction in
- antibiotic-related side-effects (16.3% versus 22.1%), as well as
- a reduction in mortality (8.6% versus 10.0%) [8,9]
- Souci : valeur seuil standardisée

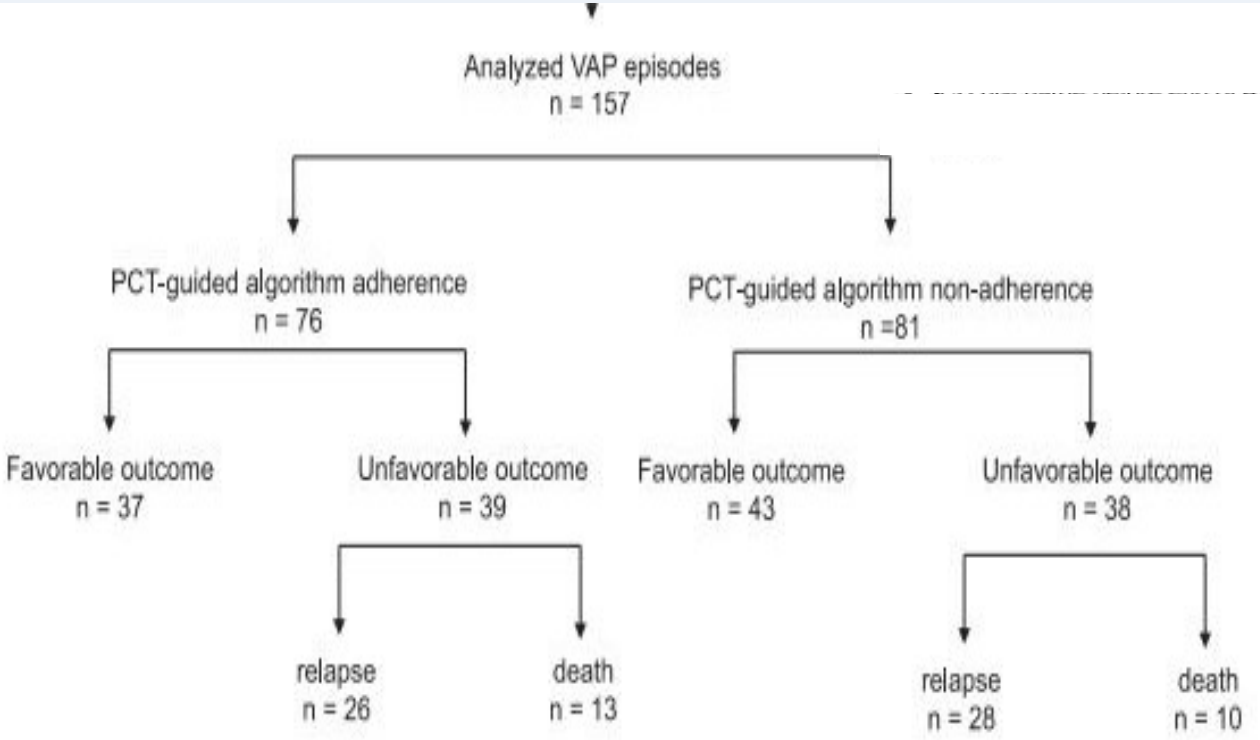
Contents lists available at ScienceDirect

Journal of Critical Care

journal homepage: www.journals.elsevier.com/journal-of-critical-care

Adhering to the procalcitonin algorithm allows antibiotic therapy to be shortened in patients with ventilator-associated pneumonia

Florence Beye [a], Clara Vigneron [b], Auguste Dargent [b,c], Sébastien Prin [b], Pascal Andreu [b], Audrey Large [b], Jean-Pierre Quenot [b,c,d], Julien Bador [e], Rémi Bruyere [f], Pierre-Emmanuel Charles [b,c,*]



Groupe PCT +

Groupe PCT-

VAP antimicrobial management				
Appropriate 1st-line ABT	109 (68.8)	56 (73.7)	53 (65.4)	0.31
Appropriate 2nd-line ABT	126 (80.2)	59 (77.6)	67 (82.7)	0.55
ABT duration (days)	8.8 (3.8)	8.0 (3.5)		0.02
ABT duration beyond the PCT threshold stop value (days)	.	.		.
Outcome				
Length of ICU stay after VAP (days)		21.6 (18.6)	28.3 (30.3)	0.10
MV duration after VAP (d	(19.4)	13.7 (13.6)	18.1 (23.5)	0.16
Ventilator free-	24.3 (19.4)	23.7 (19.1)	25.2 (19.7)	0.48
Unfavorable	77 (49.0)	39 (51.3)	38 (46.9)	0.47
ICU mortality	23 (14.6)	13 (17.1)	10 (12.3)	0.69
VAP recurrence	54 (34.4)	26 (34.2)	28 (34.6)	0.68

Le monitorage de la PCT pourrait être utilisé dans la réalité clinique et permet de réduire la durée de l'ATBpie en cas de PAVM

Eur Respir J 2009; 34: 1364–1375
DOI: 10.1183/09031936.00053209

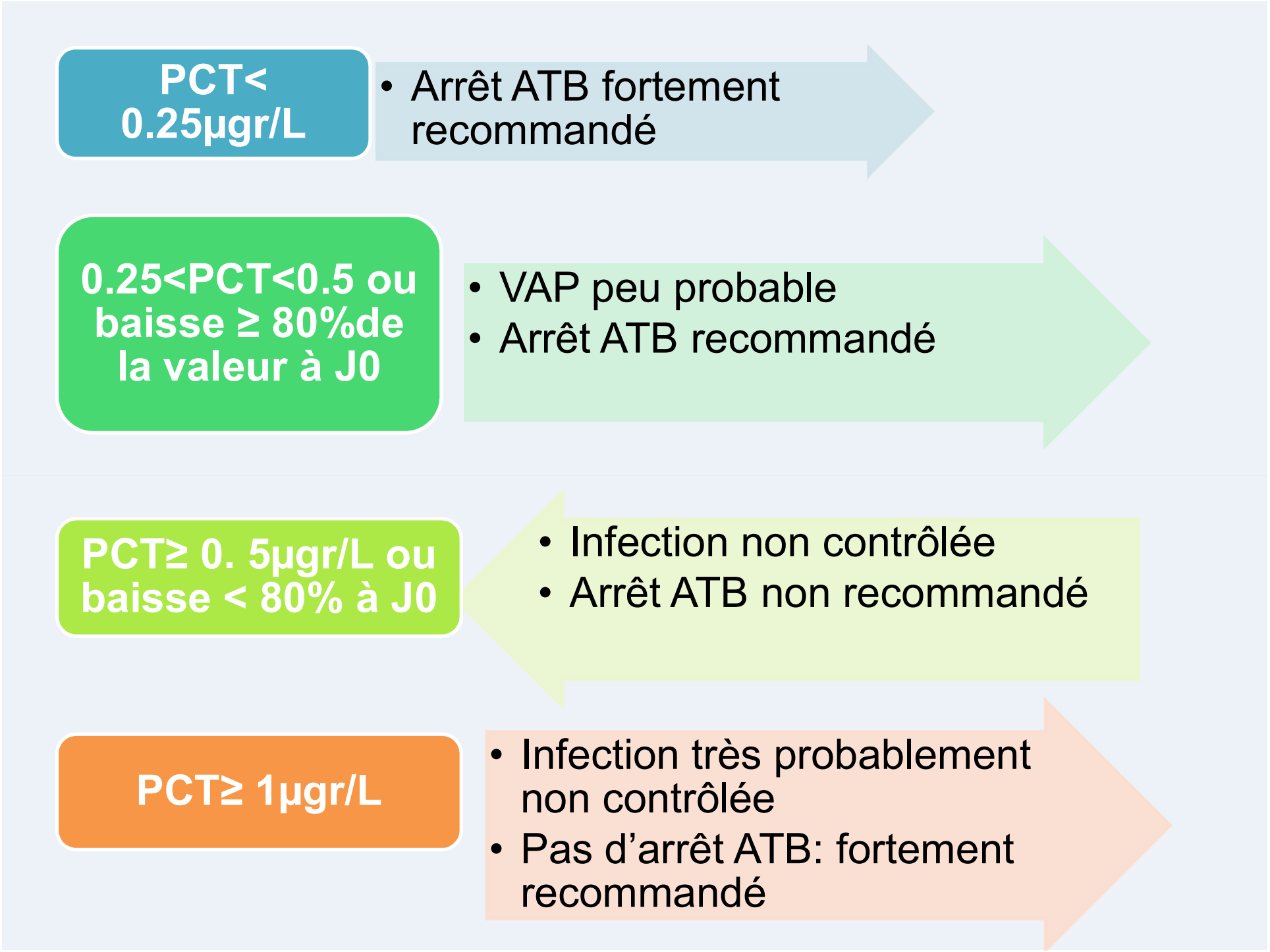
Procalcitonin for reduced antibiotic exposure in ventilator-associated pneumonia: a randomised study

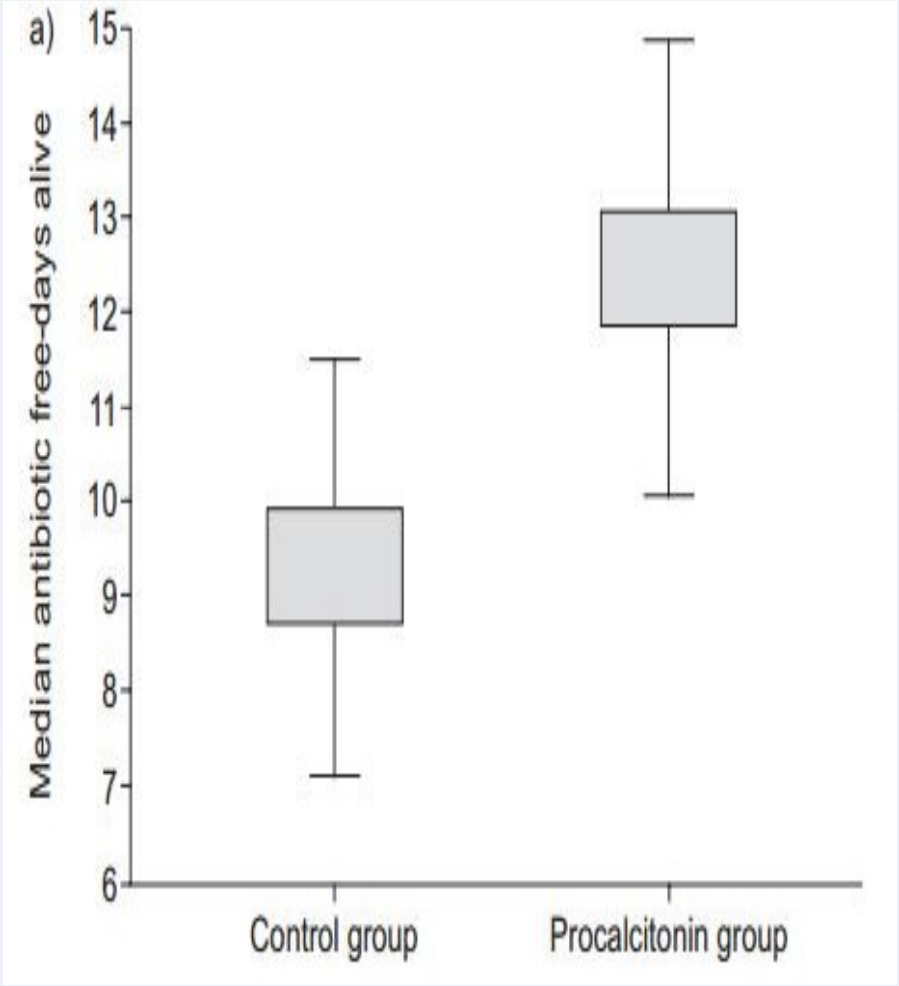
D. Stolz*,#,¶, N. Smyrnios¶, P. Eggimann+, H. Pargger§, N. Thakkar¶, M. Siegemund§, S. Marsch/, A. Azzola**, J. Rakic*, B. Mueller## and M. Tamm*

- Essai contrôlé randomisé multicentrique: ***PROVAP Study***
- 101 patients inclus avec VAP (American thoracic society et Infectious Disease Society of America)

Groupe procalcitonine : 51

Groupe contrôle : 50


PCT< 0.25µgr/L
• Arrêt ATB fortement recommandé
0.25<PCT<0.5 ou baisse ≥ 80%de la valeur à J0
• VAP peu probable
• Arrêt ATB recommandé
PCT≥ 0. 5µgr/L ou baisse < 80% à J0
• Infection non contrôlée
• Arrêt ATB non recommandé
PCT≥ 1µgr/L
• Infection très probablement non contrôlée
• Pas d'arrêt ATB: fortement recommandé



- Nombre de jours sans ATB (dans les 28J) significativement plus élevé dans le groupe PCT :13 (2-21)

  P: 0.049

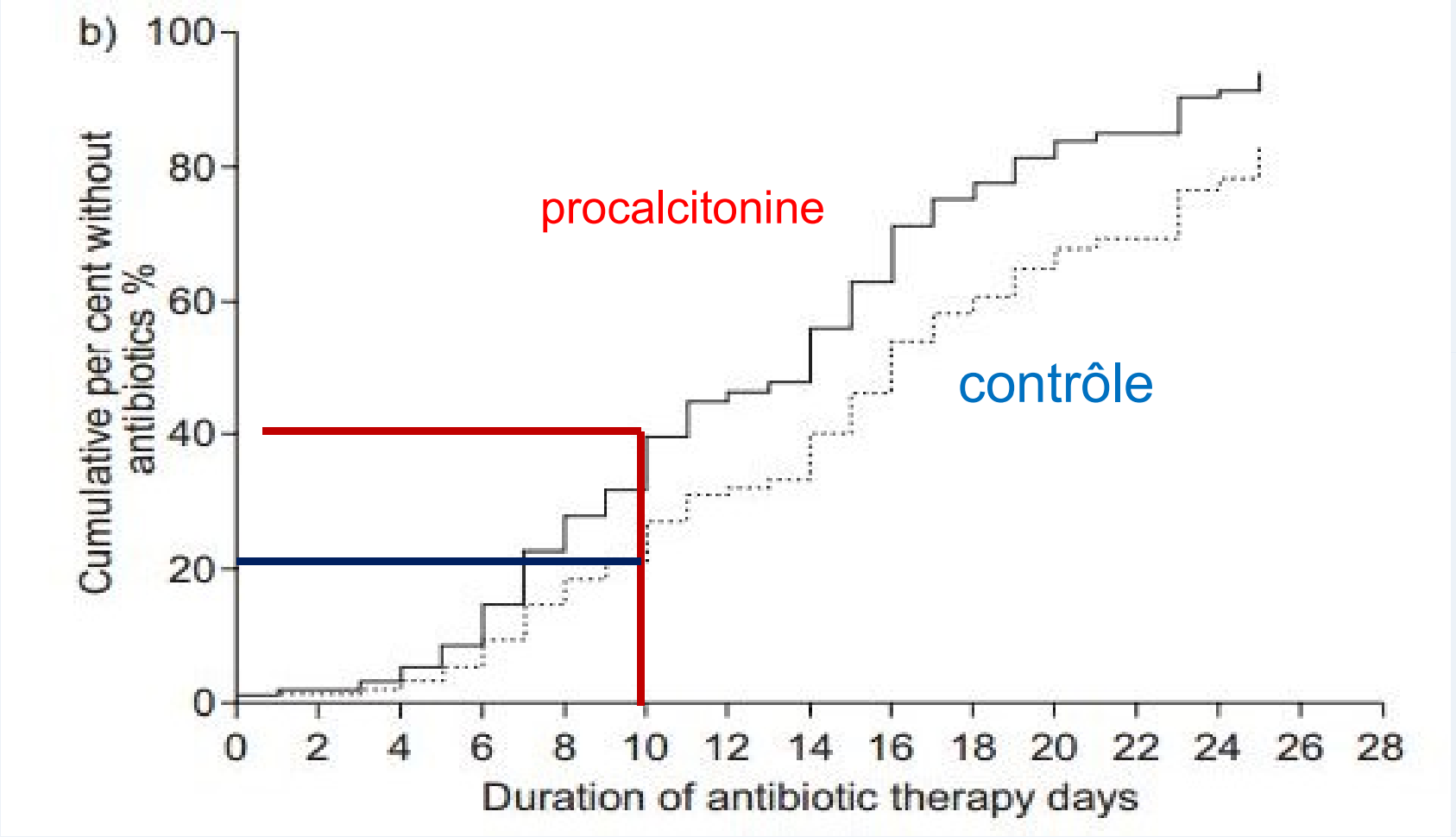

b)
Cumulative per cent without antibiotics %
100
80
60
40
20
0
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28
Duration of antibiotic therapy days
procalcitonine
contrôle

TABLE 4 Secondary study outcomes in patients with ventilator-associated pneumonia (VAP) according to the treatment algorithm

	Control group#	Procalcitonin group*	p-value
MV-free days alive, days 1–28			
All patients	19 (8.5–22.5)		455
No bacteria			0.563
ICU-free days alive, days 1–28			
All patients		10 (0–18)	0.526
Nonfermenting GNB		4 (0–13.5)	0.683
MRSA		9 (1.5–15)	0.548
	7.5 (1–17.8)	14 (7.5–20)	0.139
	18 (1.5–20)	10 (1.–19.5)	0.564
Le			
All	26 (16.8–22.3)	26 (7–21)	0.153
Other bacteria	24 (16.5–32.5)	21.5 (14–28)	0.442
No bacteria	28.5 (16–38)	29 (9.5–33)	0.343
VAP-related clinical deterioration days 1–28*	7 (14)	5 (10)	0.759
Discharge home days 1–28	3 (6)	5 (10)	0.479
Discharge to another institution days 1–28	32 (64)	35 (69)	0.509
Death from all causes days 1–28	12 (24)	8 (16)	0.327
In-hospital mortality	14 (28)	10 (20)	0.322

Data are presented as median (interquartile range) and n (%), unless otherwise stated. MV: mechanical ventilation; GNB: Gram-negative bacilli; MRSA: methicillin-resistant *Staphylococcus aureus*; ICU: intensive care unit. #: n=50; ¶: n=51; *: defined as an increase in clinical pulmonary infection score more than two points.

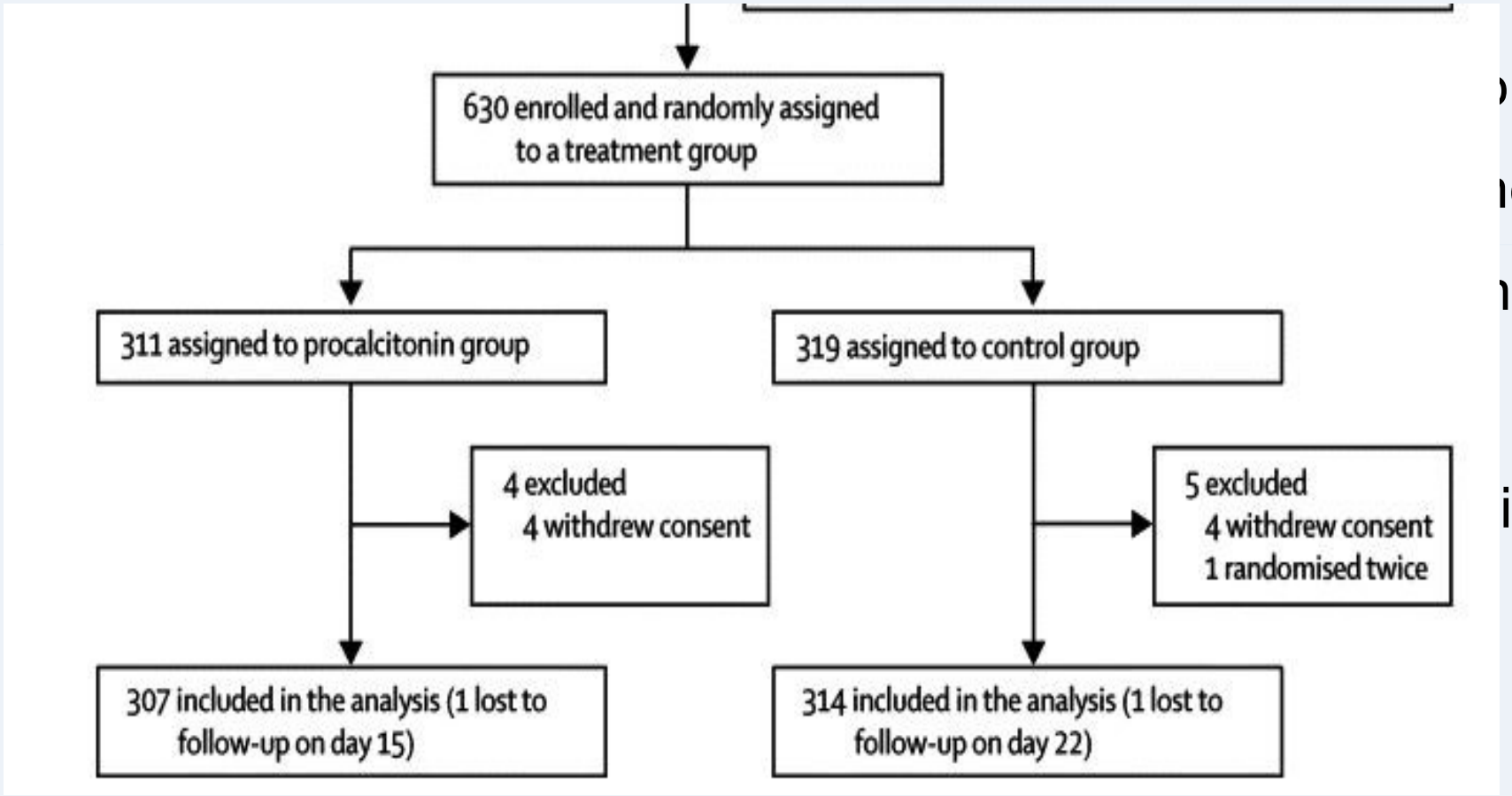
- Réduction significative de la durée ATBpie dans le groupe PCT : 27% (p:0.038)

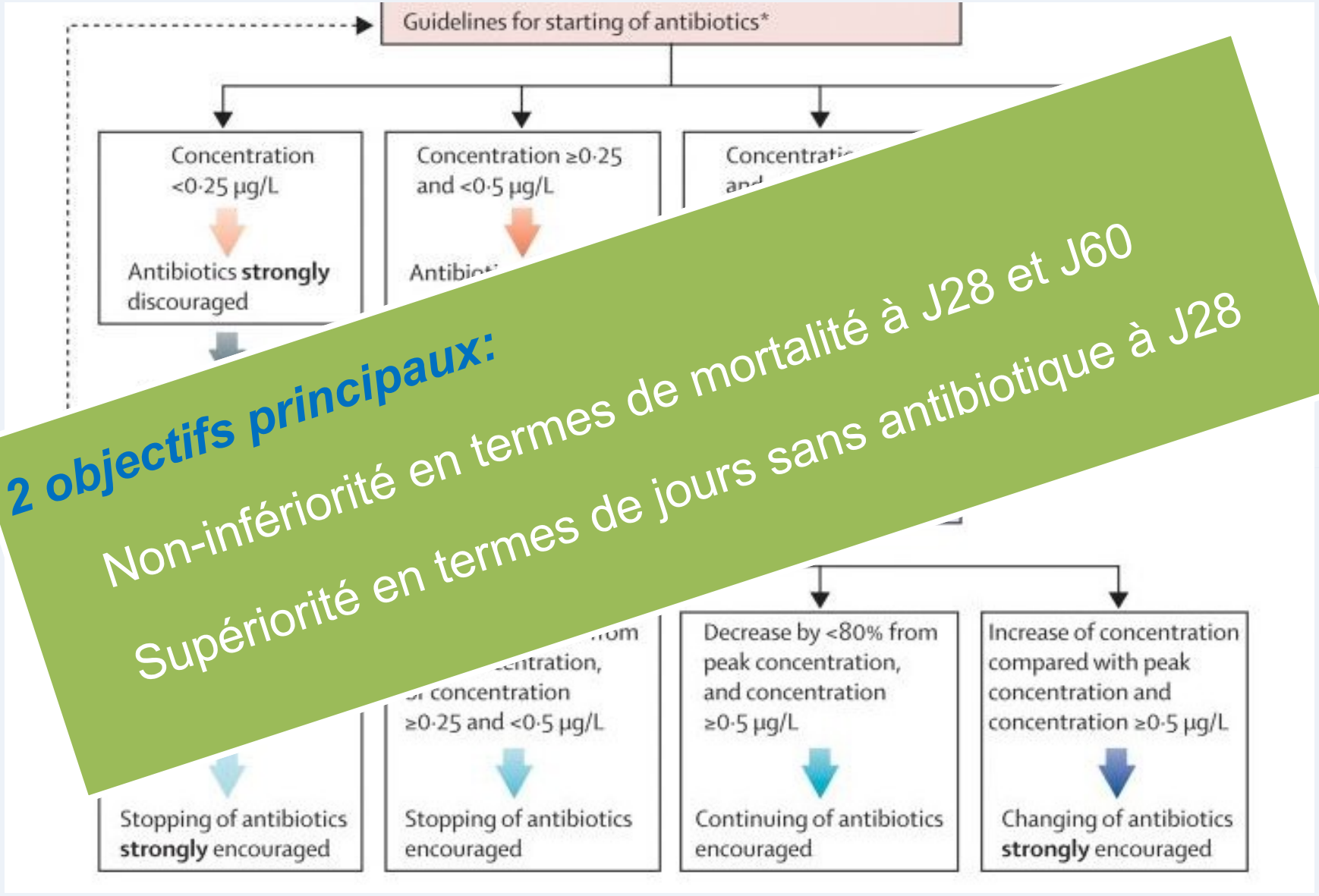
Limites

- Gain modéré de l'usage de la cinétique de la PCT
- La durée courte d'une ATBpie pour VAC n'aggrave pas le tableau
- Faible cohorte
- Difficultés d'interprétation: faux positifs (maladies inflammatoires, défaillance d'organes, infection précédant VAC, chirurgie…)
- Coût et bénéfices non étudiés

THE LANCET
Volume 375, Issue 9713, 6–12 February 2010, Pages 463-474

ETUDE PRORATA





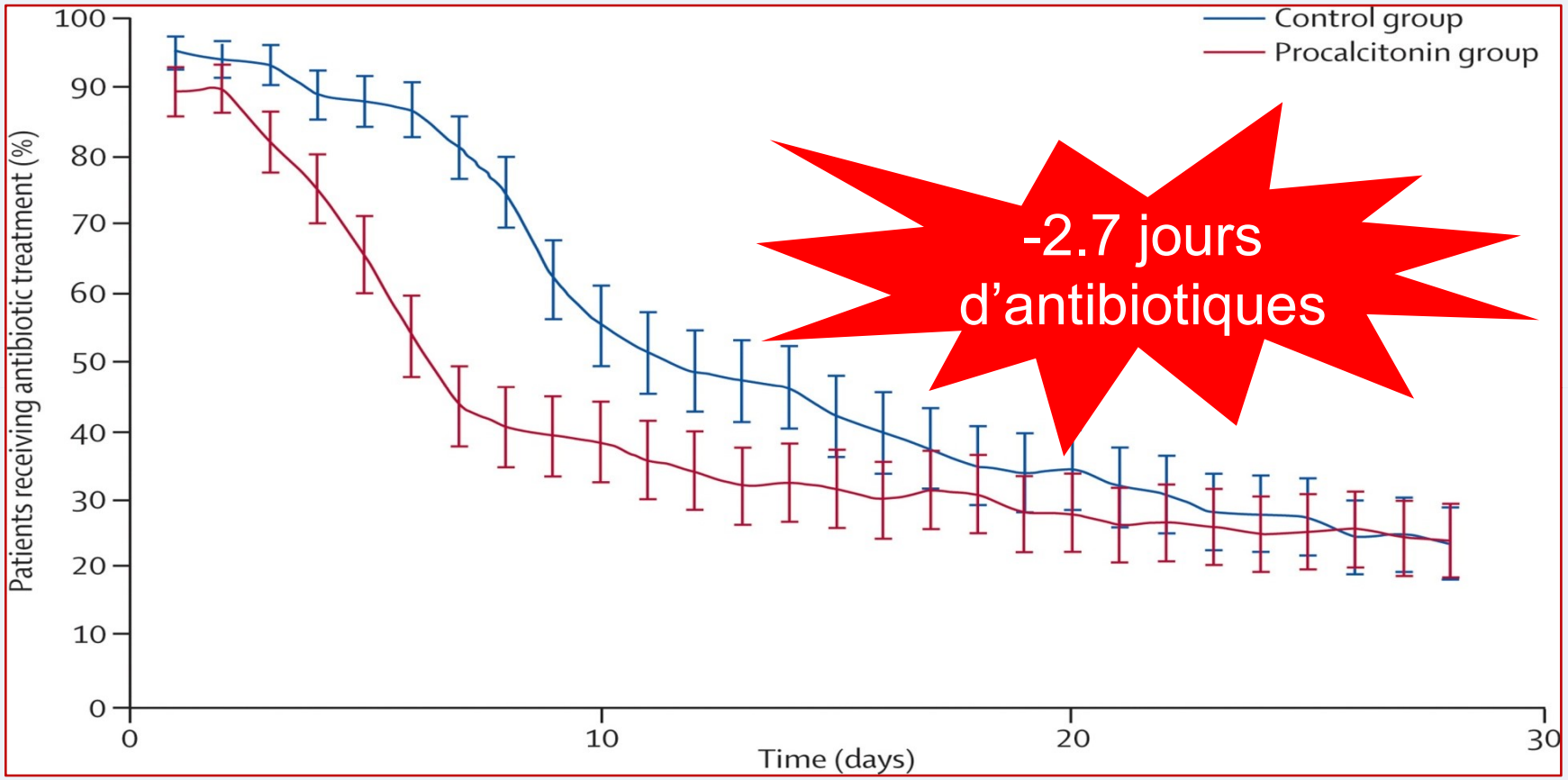
2 objectifs principaux:

Non-infériorité en termes de mortalité à J28 et J60

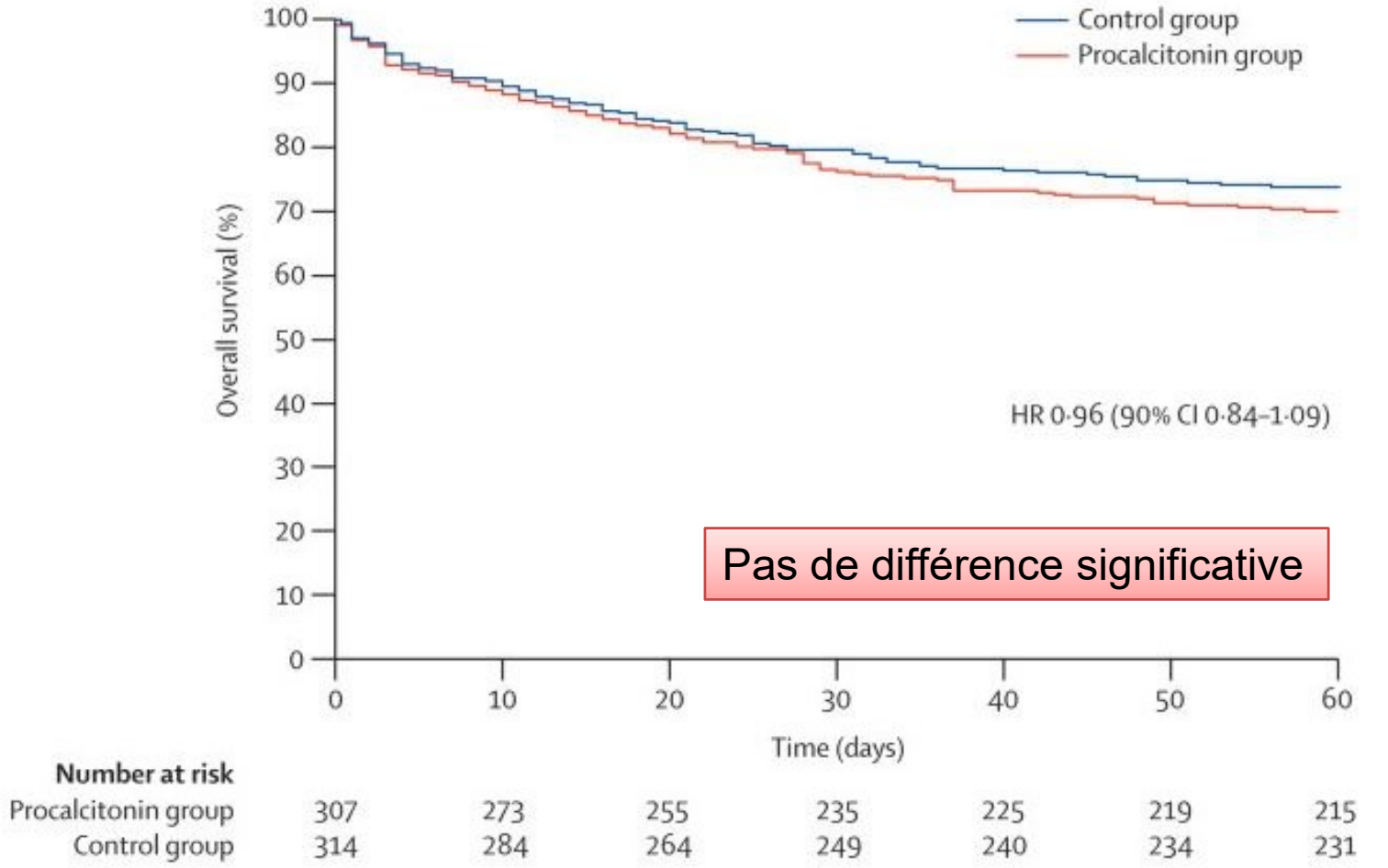
Supériorité en termes de jours sans antibiotique à J28

ETUDE PRORATA

Résultats *Bouadma L et al., Lancet 2010*



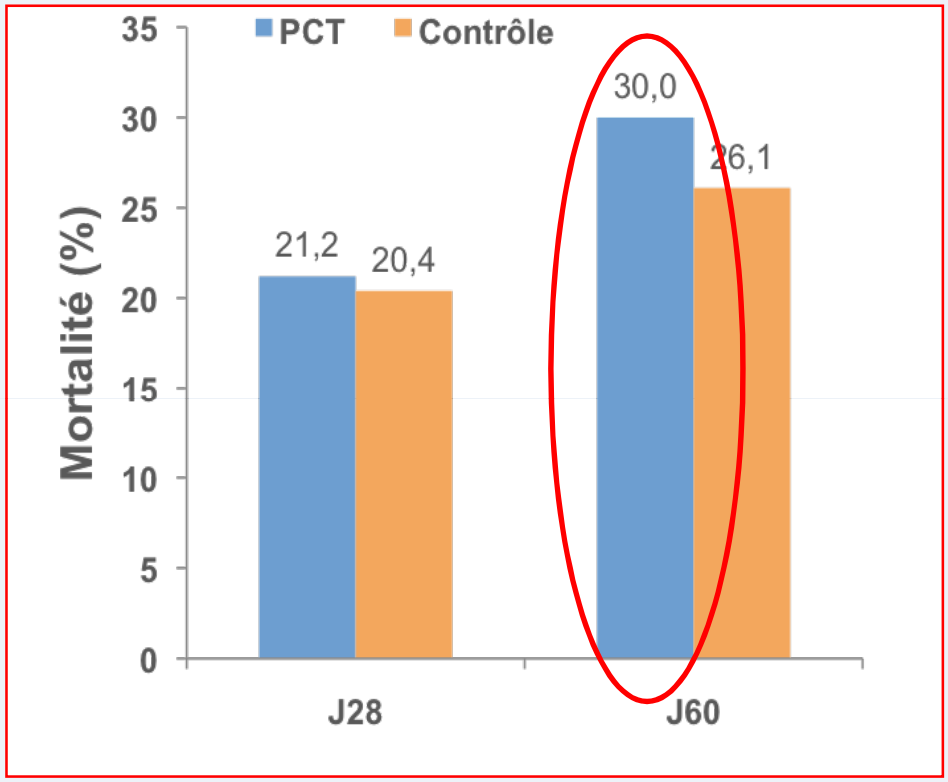
Baisse significative du taux des patients ayant reçu une ATBpie dans le groupe PCTpar rapport au groupe contrôle: p<0.0001

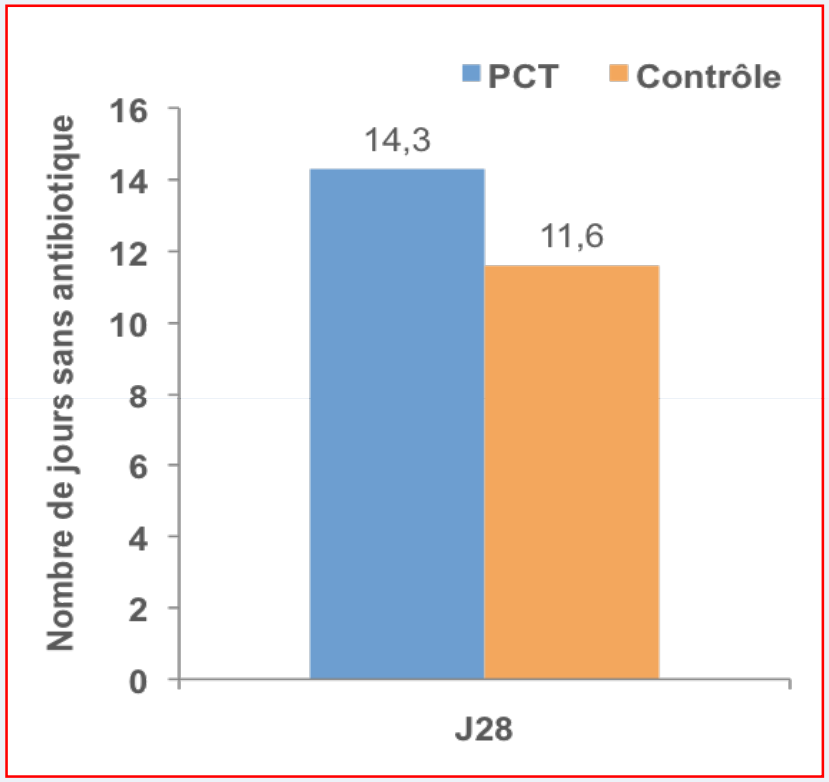


Pas de différence significative

Mortalité : pas de différence significative

Exposition antibiotique : – 23 %





Acquisition bactérie multirésistante (BMR) identique dans les 2 bras (17,9 % versus 16,6 %) mais pas de recherche systématique de colonisation

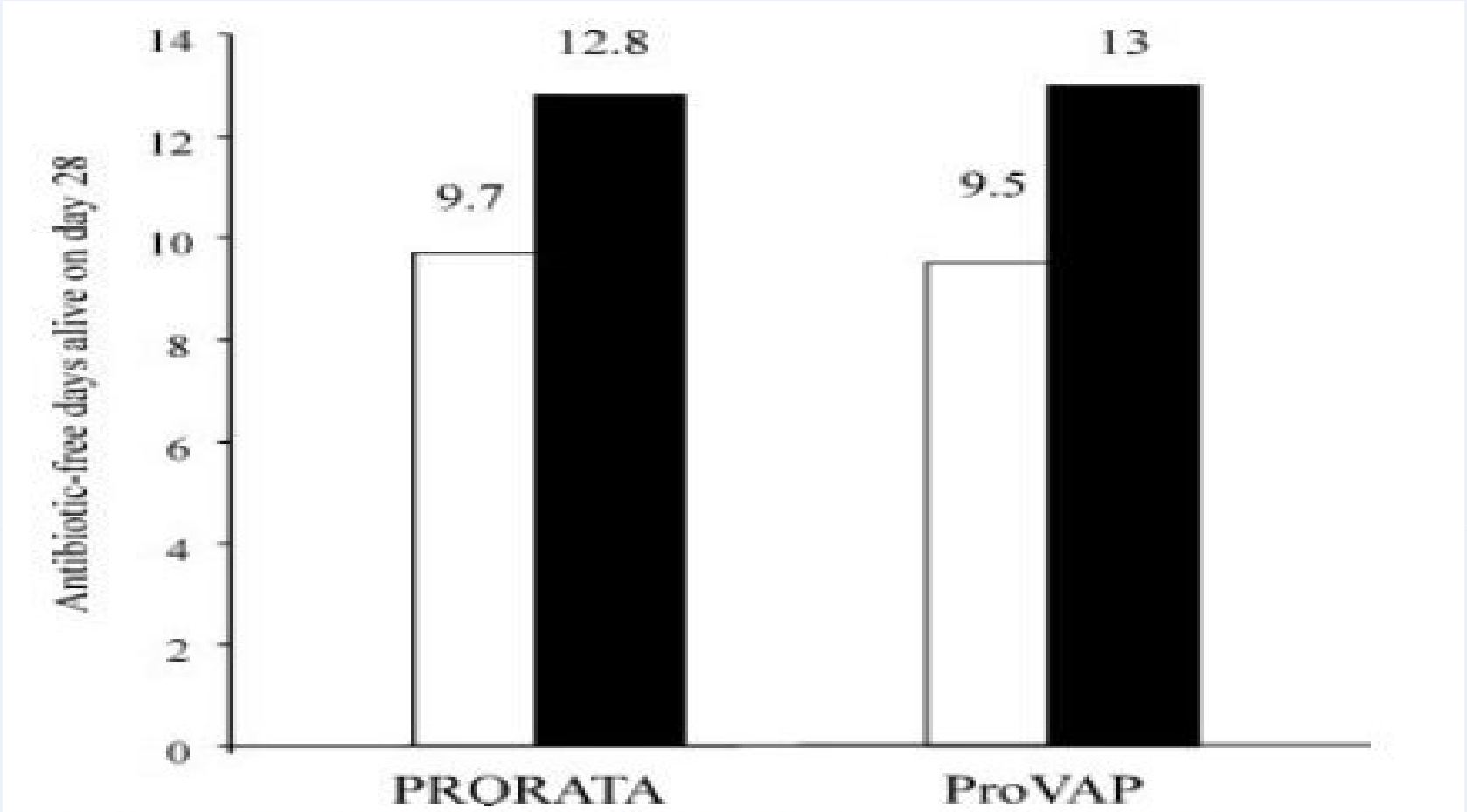


Figure 1 Number of antibiotic-free days alive on day 28 for patients with ventilator-associated pneumonia included in the PRORATA trial[30] or the ProVAP trial,[34] managed according to a procalcitonin algorithm (black bars) or a conventional control strategy (white bars).

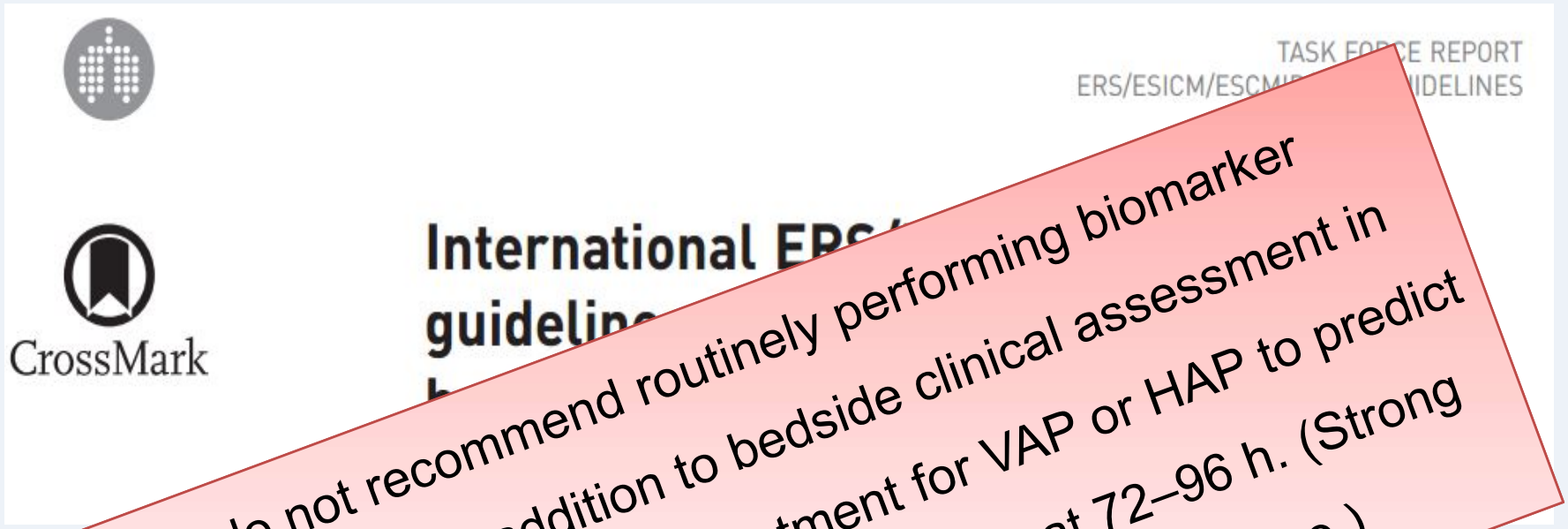
Charles-Edouard Luyt 2011

Value of the Serum Procalcitonin Level to Guide Antimicrobial Therapy for Patients with Ventilator-Associated Pneumonia

Charles-Edouard Luyt, M.D., Ph.D.,[1,2] Alain Combes, M.D., Ph.D.,[1,2] Jean-Louis Trouillet, M.D.,[1,2] and Jean Chastre, M.D.[1,2]

Luyt et al evaluated 73 suspected VAP episodes and found that procalcitonin concentration and rise in procalcitonin had poor diagnostic value for VAP.

Using a cutoff of 0.5 ng/mL, procalcitonin had a sensitivity of 72% and a specificity of 24% for the diagnosis of VAP. However, patients with VAP and sustained elevated procalcitonin had greater hospital mortality than patients with VAP but whose procalcitonin decreased



We do not recommend routinely performing biomarker determinations in addition to bedside clinical assessment in patients receiving antibiotic treatment for VAP or HAP to predict adverse outcomes and clinical response at 72–96 h. (Strong recommendation, moderate quality of evidence.)

or HAP, is

valent to the detection

predict adverse outcomes/clinical

r 72–96 h?

Eur Respir J2017

In patients with HAP with se

PCT be used to r

compar

serial

We do not recommend the routine measurement of serial serum PCT levels to reduce duration of the antibiotic course in patients with HAP or VAP when the anticipated duration is 7–8 days. (Strong recommendation, moderate quality of evidence.)

PRORATA trial 2010
Stolz D 2009
Pontet J 2007
de Jong E 2016

748 Patients

Monitorage de la PCT permet une réduction de l'ATB de 3.2j
Et une baisse significative de la mortalité à j28

Pas de différence dans la mortalité hospitaliére

Guideline

Chinese guidelines for the diagnosis and treatment of hospital-acquired pneumonia and ventilator-associated pneumonia in adults (2018 Edition)

Yi Shi[1#], Yi Huang[2#], Tian-Tuo Zhang[3#], Bin Cao[4#], Hui Wang[5#], Chao Zhuo[6#], Feng Ye[6#], Xin Su[1#], Hong Fan[7#], Jin-Fu Xu[8#], Jing Zhang[9#], Guo-Xiang Lai[10#], Dan-Yang She[11#], Xiang-Yan Zhang[12], Bei He[13], Li-Xian He[9], You-Ning Liu[14], Jie-Ming Qu[15]; on behalf of Infection Study Group of Chinese Thoracic Society, Chinese Medical Association

PCT is also an important predictor of VAP mortality

Dynamic monitoring of PCT level in the course of disease is helpful for deciding the duration of antimicrobial treatment

PCT can’t replace microbiological testing.

Surviving Sepsis Guideline

- We suggest the use of low procalcitonin levels or similar biomarkers to assist the clinician in the discontinuation of empiric antibiotics in patients who appeared septic, but have no subsequent evidence of infection *(Grade 2C).*

Crit Care Med 2013;41:580-637

Effect of Introducing Procalcitonin on Antimicrobial Therapy Duration in Patients With Sepsis and/or Pneumonia in the Intensive Care Unit

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Bryan M. Bichan, PharmD[1], John J. Ro, PharmD[1], Tamara L. Trienski, I

- Observational, historical control to assess impact of PCT in ICU
- 50 patients with PCT at initial suspicion of infection and 48 hrs
  - 50 Control pts--same time frame, diagnosis, gendr, age, APACHE II
- Active ASP in place
- Findings:
  - Duration of ABX decreased by 3.3 days (p=0.0238)
  - Duration in hospital decreased by 4.3 days (p=0.029)
  - Readmission to hospital decreased by 16% (p=0.055)
  - Mortality 2% vs 4% (p=0.5)

PCT: limitations

- Expense
- Turn Around Time
  - Dependent on lab processes
- May require Serial determinations
- Causes other than bacterial infection
- Optimal cutoff

Low PCT and Infection

1. Early course of infections
2. Localized infections

   pharygitis, maxillary sinusitis, cystitis
3. Subacute infectious endocarditis
4. Mycoplasma pneumonia

   (higher than viral but lower than pneumococcus)

KUTZ ET AL. CRIT CARE 2015; 19: 792-;

PCT Non elevated

- PCT levels have not been noted for inflammatory conditions, such as
  - inflammatory bowel disease
  - temporal giant cell arteritis
  - polyarteritis nodosa
  - systemic lupus
  - erythematosis
  - gout
  - Still disease

Gilbert D. Clin Infect Dis. 2011

Non Bacterial Causes of Elevated PCT

1. neonates < 48 hours of life (physiological)
2. Major trauma, major surgical intervention, severe burns, treatment with OKT3 antibodies and other drugs stimulating the release of pro-inflammatory cytokines
3. Invasive fungal infections, acute malaria
4. Cardiogenic shock, prolonged severe organ perfusion anomalies
5. Small cell lung cancer, medullary C-cell carcinoma of the thyroid
6. Chronic Renal Disease (drops with RRT)

Use of OKT-3 and/or antithymocyte globulin treatment has been shown to result in a >10-fold increase in PCT levels despite the absence of infection

Grace et al. Clin Infect Dis. 2014; 59: 1761

Implementation of a Procalcitonir Requires Appropriate Stewardship t in Improved Antimicrobial U:

"An antimicrobial stewardship team that reviews rapid diagnostic testing results (ie, molecular diagnositc tests, PCT) and provides feedback to providers can help clinicians understand and act upon these results. Without this oversight, there may be little change in behavior of practitioners.7 Procalcitonin does not replace clinical judgment but can be a valuable tool"

Inf Dis Clin Pract. 2015

Procalcitonin (PCT): A Useful Tool YES

- PCT facilitates Decisions to reduce ABX use
  - De-escalation (discontinuation)
  - Duration
- Best if associated with ASP
  - For appropriate interpretation and intervention
- Other outcomes (time to clinical resolution, resistance, mortality, adverse effects) need further evaluation

MERCI POUR VOTRE ATTENTION

STUDY PROTOCOL Open Access

Stop Antibiotics on guidance of Procalcitonin Study (SAPS): a randomised prospective multicenter investigator-initiated trial to analyse whether daily measurements of procalcitonin versus a standard-of-care approach can safely shorten antibiotic duration in intensive care unit patients - calculated sample size: 1816 patients

Evelien Assink-de Jong[1], Dylan W de Lange[2], Jos A van Oers[3], Maarten W Nijsten[4], Jos W Twisk[5] and Albertus Beishuizen[1,6*]

2013

- Essai contrôlé randomisé multicentrique
- Protocole basé:

Advice to discontinue antibiotic treatment in case PCT has decreased by more than 80% of its peak level (relative stopping threshold) or decrease below a value of 0.5 ng/ml (absolute stopping threshold).