JAVA 2017

VAP, VAT & Co.

ENCORE ET TOUJOURS LE DIAGNOSTIC DES LRTI ?

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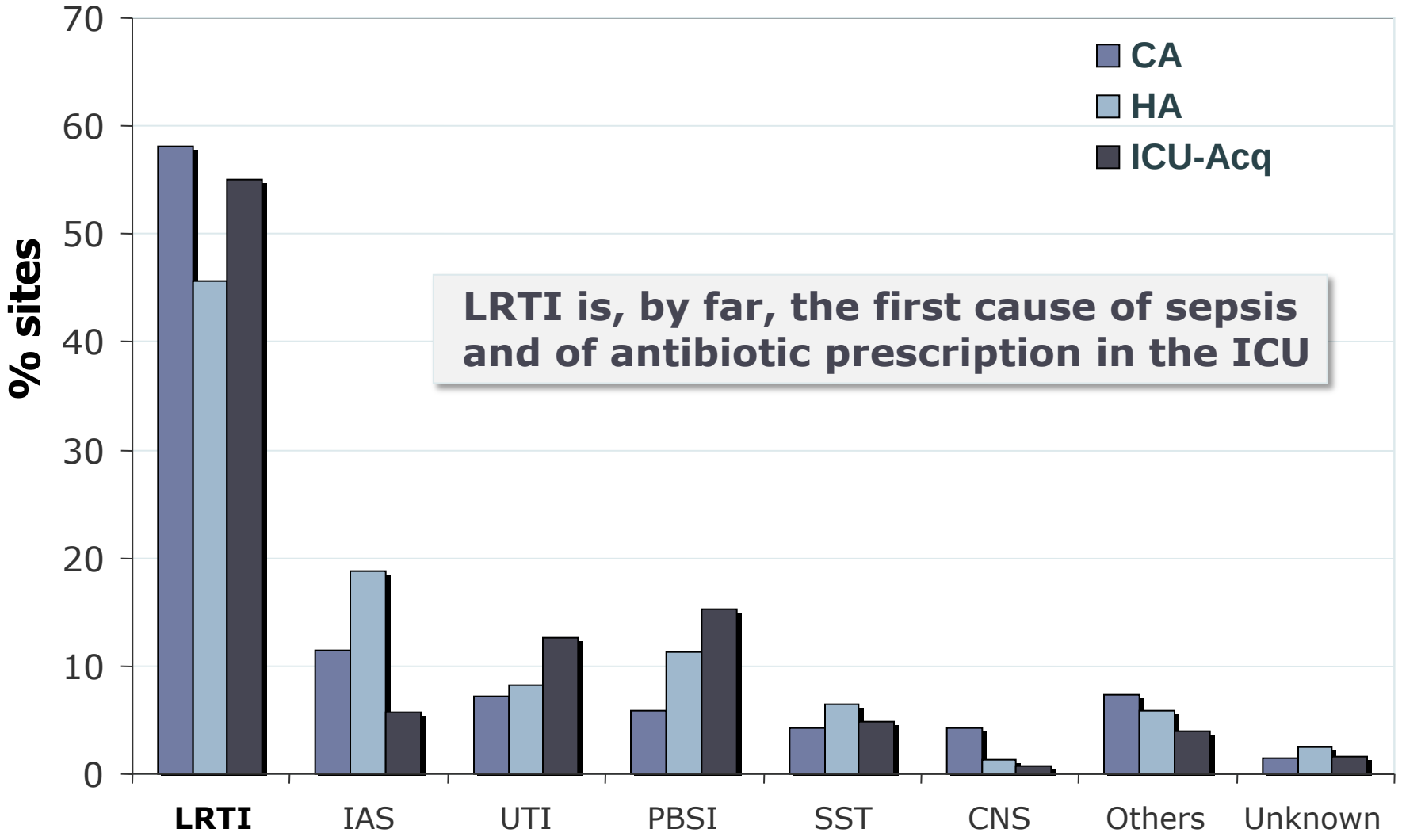
Agenda

- La problématique
- Le diagnostic d'infection respiratoire basse et la place de la VAT et autres VAC
- L'intégration clinico-microbiologique pour une prise en charge adaptée

The European Sepsis Study: Sources of infection

C. Alberti et al, *ICM* 2002



Quelles leçons de l'étude ALARM ?

Routine management of 1st episode of suspected VAP, 20 ICUs, 398 pts

M. Kollef & al, CHEST 2006; 129:1210–18.

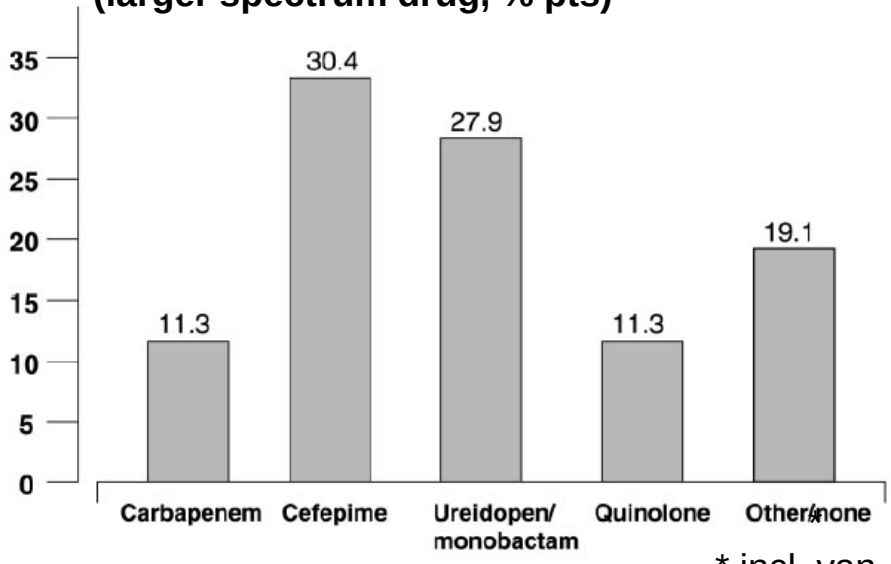
- 20 ICUs; 398 ICU patients meeting predefined criteria for suspected VAP
- Baseline CPIS: 8.4 ± 2.3 (1-14)
- APACHE II score: 22.8 ± 8.3 (2-52)
- Duration of MV prior to VAP diagnosis: 7.3 (0-44) days
- **162 (40.7%) pts receiving AbRx prior to or during VAP treatment** for non-VAP indications, including:
  - quinolone (14.6%), ureidopenicillin/monobactam (11.1%), cefepime (9.3%) or carbapenem (5.8%)
- **Diagnosis:**
  - ACCP criteria (*V. Baselski & al, Chest 1992*)
  - Cultures: TA (58.3%), BAL (33.7%), or both (1.8%);
    - **6.3% of patients had neither TA or BAL performed**
  - **Major pathogens identified in 197 patients (49.5%)**
    - MRSA 15%, PA 14%, Enterobacteriaceae 10%
    - **No PPMO in 37%; no growth in 6%**

Quelles leçons de l'étude ALARM ?

Routine management of 1st episode of suspected VAP, 20 ICUs, 398 pts

M. Kollef & al, Chest 2006; 129:1210–18

Initial coverage of GNB
(larger spectrum drug, % pts)



* incl. van

Range 0-25 0-73 0-70 2-38 0-65 %

No. Drugs prescribed
. 1 : 28%
. 2 : 48%
. 3+ : 23%
w. vancomycin: **52%** pts

Mean duration of therapy
11.8 ± 5.9 (0-51) days

Change in regimen
- **No pathogen identified 13%**
- Pathogen identified 57%

Definitive therapy
- Unchanged /same spectrum 289 (**72.6%)**
- Escalation 15.3% pts,
- **Deescalation 22.1% pts**

Deescalation
- major pathogen isolated 15.6%
- **No major pathogen identified 6.5%**
- **No pathogen identified 13%**

Les leçons de l'étude ALARM

- Trop d'antibiotiques
- Trop longtemps
- Trop peu de documentation et beaucoup de traitements empiriques
- Trop de traitements maintenus (indument) en l'absence de documentation
- Trop peu de désescalade thérapeutique

American Thoracic Society Documents

Guidelines for the Management of Adults with Hospital-acquired, Ventilator-associated, and Healthcare-associated Pneumonia

THIS OFFICIAL STATEMENT OF THE AMERICAN THORACIC SOCIETY AND THE INFECTIOUS DISEASES SOCIETY OF AMERICA WAS APPROVED BY THE ATS BOARD OF DIRECTORS, DECEMBER 2004 AND THE IDSA GUIDELINE COMMITTEE, OCTOBER 2004

Am J Respir Crit Care Med Vol 171. pp 388–416, 2005

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2004 ATS/IDSA Guidelines: Four Major Principles for Management

***ATS/IDSA Guidelines,* 2005**

- Avoid untreated or inadequately treated HAP
- Recognize the variability of bacteriology across hospitals, sites within the hospital, and time, and use this information to alter the selection of empiric antibiotic regimens
- **Avoid the overuse of antibiotics by focusing on accurate diagnosis, tailoring therapy to the results of LRT cultures, and shortening the duration of therapy**
- Apply prevention strategies aimed at modifiable risk factors

LRT samples culture: Principles of Interpretation for Diagnosing VAP

***ATS/IDSA Guidelines,* 2005**

- The incidence of colonization in hospitalized patients and even more in patients requiring endotracheal intubation, is high
- A positive **EA culture cannot differentiate** colonization from infection
- Antibiotic therapy of simple colonization is **strongly discouraged**
- A **sterile culture** of the lower respiratory tract (in the absence of recent change in therapy) is **strong evidence** that a pneumonia is **not present**

Clinical Infectious Diseases

IDSA GUIDELINE

IDSA Infectious Diseases Society of America

hivma hiv medicine association

OXFORD

Clinical Infectious Diseases Advance Access published July 14, 2016

Management of Adults With Hospital-acquired and Ventilator-associated Pneumonia: 2016 Clinical Practice Guidelines by the Infectious Diseases Society of America and the American Thoracic Society

Andre C. Kalil,[1,a] Mark L. Metersky,[2,a] Michael Klompas,[3,4] John Muscedere,[5] Daniel A. Sweeney,[6] Lucy B. Palmer,[7] Lena M. Napolitano,[8] Naomi P. O'Grady,[9] John G. Bartlett,[10] Jordi Carratalà,[11] Ali A. El Solh,[12] Santiago Ewig,[13] Paul D. Fey,[14] Thomas M. File Jr,[15] Marcos I. Restrepo,[16] Jason A. Roberts,[17,18] Grant W. Waterer,[19] Peggy Cruse,[20] Shandra L. Knight,[20] and Jan L. Brozek[21]

International ERS/ESICM/ESCMID/ALAT guidelines for the management of hospital-acquired pneumonia and ventilator-associated pneumonia

Eur Respir J 2017; 50: 1700582

Antoni Torres[1,16], Michael S. Niederman[2,16], Jean Chastre[3], Santiago Ewig[4], Patricia Fernandez-Vandellos[5], Hakan Hanberger[6], Marin Kollef[7], Gianluigi Li Bassi[1], Carlos M. Luna[8], Ignacio Martin-Loeches[9], J. Artur Paiva[10], Robert C. Read[11], David Rigau[12], Jean François Timsit[13], Tobias Welte[14] and Richard Wunderink[15]

1. Know what you treat: the HAP/VAP & co diagnostic issues

ATS-IDSA Guidelines 2016

- Cultures of respiratory secretions should be obtained from (virtually) all patients with suspected VAP
- Noninvasive sampling with semi-quantitative cultures to diagnose VAP, rather than invasive sampling with quantitative cultures and rather than noninvasive sampling with quantitative cultures (*weak recommendation, low-quality evidence*) *

ERS-ESICM-ESCMID Guidelines 2016

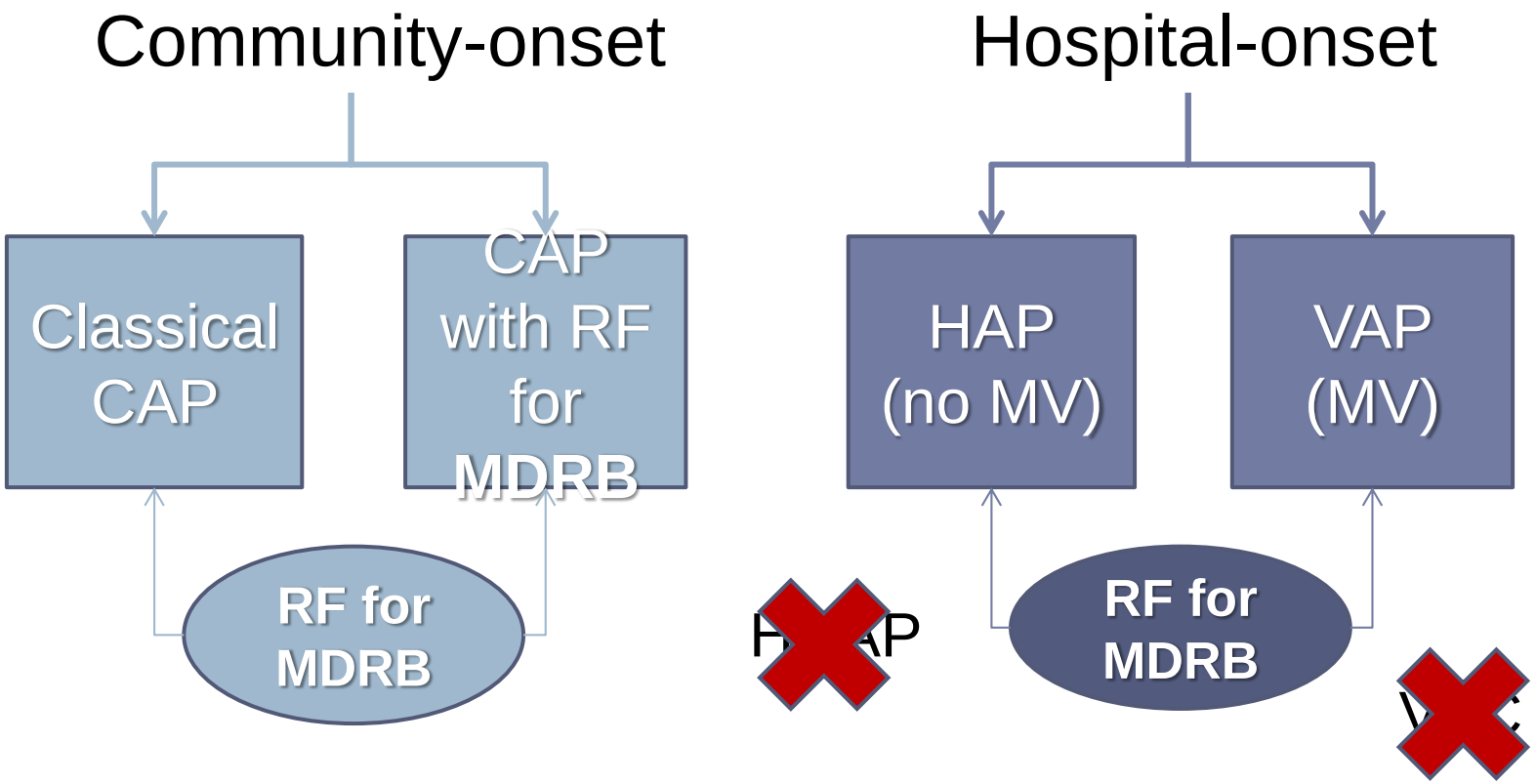
- We suggest obtaining distal quantitative samples (prior to any antibiotic treatment) in order to reduce antibiotic exposure in stable patients with suspected VAP and to

* For patients with suspected VAP whose invasive quantitative culture results are below the diagnostic threshold for VAP, we suggest that antibiotics be **withheld** rather than continued

2. Identify RF for MDRB

- Specific exposures
- Local epidemiology
- Classification schemes

Identify risk factors for MDRB: The new classification scheme for HAP/VAP



Risk Factors for Health Care-Associated Infections and for Infection with Drug-Resistant Bacteria

- Risk factors for **health care-associated infections (ATS-IDSA GL 2004)**
  - **Hospitalization for ≥ 2 days in preceeding 90 days**
  - Residence in a nursing home or long-term care facility
  - Home infusion therapy, including antimicrobial agents
  - Long-term dialysis within 30 days
  - Home wound care
  - Family member with multidrug-resistant pathogen

- Risk factors for infection with **drug-resistant bacteria**
  - **Antimicrobial therapy in preceeding 90 days**
  - Current hospitalization for ≥ 5 days
  - High frequency of antibiotic resistance in the community or in the specific hospital environment
  - Immunosuppression

AY. Peleg & DC. Hooper: Hospital-Acquired Infections Due to Gram-Negative Bacteria. *N Engl J Med* 2010; 362: 1804-13

Identify risk factors for difficult-to-treat (MDRB) pathogens

ATS-IDSA Guidelines 2016

Strongest predictive RF for MRSA and PA VAP

- **Use of iv antibiotics ≤ 90 days** (OR 12.3; [6.48-23.35])
- ≥ 5 days of hospitalization prior to the occurrence of VAP *
- Septic shock at time of VAP (OR 2.01; [1.12-3.61])
- ARDS before VAP (OR 3.1; [1.88-5.1])
- RRT prior to VAP (OR 2.5; [1.14-5.49]

* **Early-onset VAP** (5-7days) is associated with **community-based pathogens**, provided hospital admission is taken as the starting point, and no other RF for MDRB is present

VAP, VAC, iVAC, VAT & co.

Does this patient have VAP?

J.Chastre & CE Luyt. Intens Care Med 2016; 42:1159

- The clinical suspicion of VAP: all thr
  - (1) new or progressive persistent radiographic infiltrates;
  - (2) clinical observations suggesting infection, e.g. the new onset of fever, purulent sputum, leukocytosis, increased minute ventilation, arterial oxygenation decline and/or the need f
    vasopressor infusion to maintain bloo
  - (3) "positive" microbiological culture results for a potentially pathogenic microorganism isolated from endotracheal aspirates (ETAs), bronchoalveolar lavage fluid, pleural fluid and/or blood

New or just persistent ?

How much is « positive » ?

Does this patient have VAP?

J.Chastre & CE Luyt. Intens Care Med 2016; 42:1159

Criteria	VAP	VAT	VAT (CDC)	iVAC
New/progressive persitent infiltrate	(+)	(-)	(-)	NA
Clinical features of infection	Two of: New fever Purulent secretions Leukocytosis Decreased oxygenation Vasopressor need	Fever Purulent secretions leukocytosis	Fever Cough Wheezing Purulent secretions Leukocytosis	Worsening oxygenation (2 d) + Fever or Leukocytosis + New ab initiated
Microbiology	Blood/pleural fluid Positive quantitative culture (BAL, ETA)	Positive quantitative culture (BAL, ETA)	Positive culture (no threshold)	Positive quantitative (probable) or non-quantitative (possible VAP)

Ventilator-Associated Events: Prevalence, Outcome, and Relationship With Ventilator-Associated Pneumonia

Crit Care Med. **2015;** 43: 1798-806.

Lila Bouadma, MD, PhD[1–3]; Romain Sonneville, MD[3]; Maité Garrouste-Orgeas, MD, PhD[1,4];

- Outcomerea database (1996-2012); 3,028 pts
- Epidemiologie VAE et relation avec VAP
- 2,331 patients (77%) ≥ 1 VAC; 869 patients (29%) had one iVAC episode
- Confirmation VAP quantitative cultures
- Correlation avec VAP
  - VAC : 0.67 (*p < 0.0001)*
  - IVAC : *0.82* (*p < 0.0001),*
- Se/Sp for VAP
  - VAC 0.92 / 0.28
  - iVAC : 0.67 / 0.75

Definitions

L.Bouadma & al, Crit Care Med, 2015

Criteria	Ventilator-Associated Condition	Infection-Related Ventilator-Associated Complication
Sustained respiratory deterioration	Two successive sequences: A ≥ 2 d stable or decreasing range of PEEP (≥ 6, ≥ 10, and ≥ 16 mm Hg) and a stable or improved Pao_2/Fio_2 ratio A ≥ 2 d rise in range of PEEP or a decreasing Pao_2/Fio_2 ratio by > 50 mm Hg with the same level of PEEP or by > 100 mm Hg whatever the level of PEEP	Two successive sequences: A ≥ 2 d stable or decreasing range of PEEP (≥ 6, ≥ 10, and ≥ 16 mm Hg) and a stable or improved Pao_2/Fio_2 ratio A ≥ 2 d rise in range of PEEP or a decreasing Pao_2/Fio_2 ratio by > 50 mm Hg with the same level of PEEP or by > 100 mm Hg whatever the level of PEEP
Systemic inflammatory respiratory syndrome	No	At least 2 criteria within 2 calendar days before or after the onset of respiratory deterioration: Body temperature < 36°C or > 38°C Heart rate > 90 beats/min WBC count > 12,000 or < 4,000 cells/mm^3
Antimicrobial treatment	No	At least one new antimicrobial agent prescribed within 2 calendar days before or after the onset of respiratory deterioration and continued for ≥ 4 d or less in case of death, ICU discharge, or withholding or withdrawing life-sustaining medical treatment

Outcomes

L.Bouadma & al, Crit Care Med, 2015

	No VAC (n=697)	VAC (n=2331)	iVAC (n=869)
VAP	-	339 (14.5)	240 (27.6)
Tracheobronchitis	**-**	**23 (1)**	**12 (1.4)**
Days alive w/o ab	24 [2 – 26]	17 [4 – 23]	16 [4 – 23]
ICU LOS	9 [7 – 13]	18 [11 – 29]	22 (14 – 34]
30d ICU mortality	217 (31.1)	514 (22.1)	222 (25.6)
Hosp mortality	278 (39.9)	856 (36.7)	386 (44.4)

VAEs are common and associated with high morbidity, and the VAE rate seems to be a good indicator for quality-improvement purpose.

Multiple causes or the lack of identified cause were frequent.
IVAC episodes were strongly correlated to VAP; only 27.6% IVAC episodes were related to VAP and less than half to a nosocomial infection.
VAC and IVAC associated with poor outcome and correlated with an increase in ab use.

VAE, VAC, iVAC

ATS-IDSA Guidelines 2016

- “We note the new entities of **ventilator-associated events** (VAE, including ventilator-associated conditions, VAC, and infection-related ventilator-associated complications, IVAC) introduced by the US CDC&Prevention as potential metrics to **assess the quality of care provided to ventilated patients**.

- While the measurement of these events may be **a useful concept for trending and benchmarking quality**, these definitions were **designed for the purposes of surveillance and quality improvement at the population level** and not to aid in diagnosis and treatment decisions at the bedside. The panel therefore **did not consider these definitions for the purposes of these guidelines.**”

Treatment of Ventilator-associated Tracheobronchitis (VAT) ?

ATS-IDSA Guidelines 2016

- VAT : fever with no other recognizable cause, with new or increased sputum production, positive ETA culture (>10^6 CFU/mL) yielding a new bacteria, and no radiographic evidence of nosocomial pneumonia (*Nseir & al , Crit Care 2005)*

- In patients with VAT, we suggest not providing antibiotic therapy (*weak recommendation, low-quality evidence*).

Antimicrobial treatment for ventilator-associated tracheobronchitis: a randomized, controlled, multicenter study

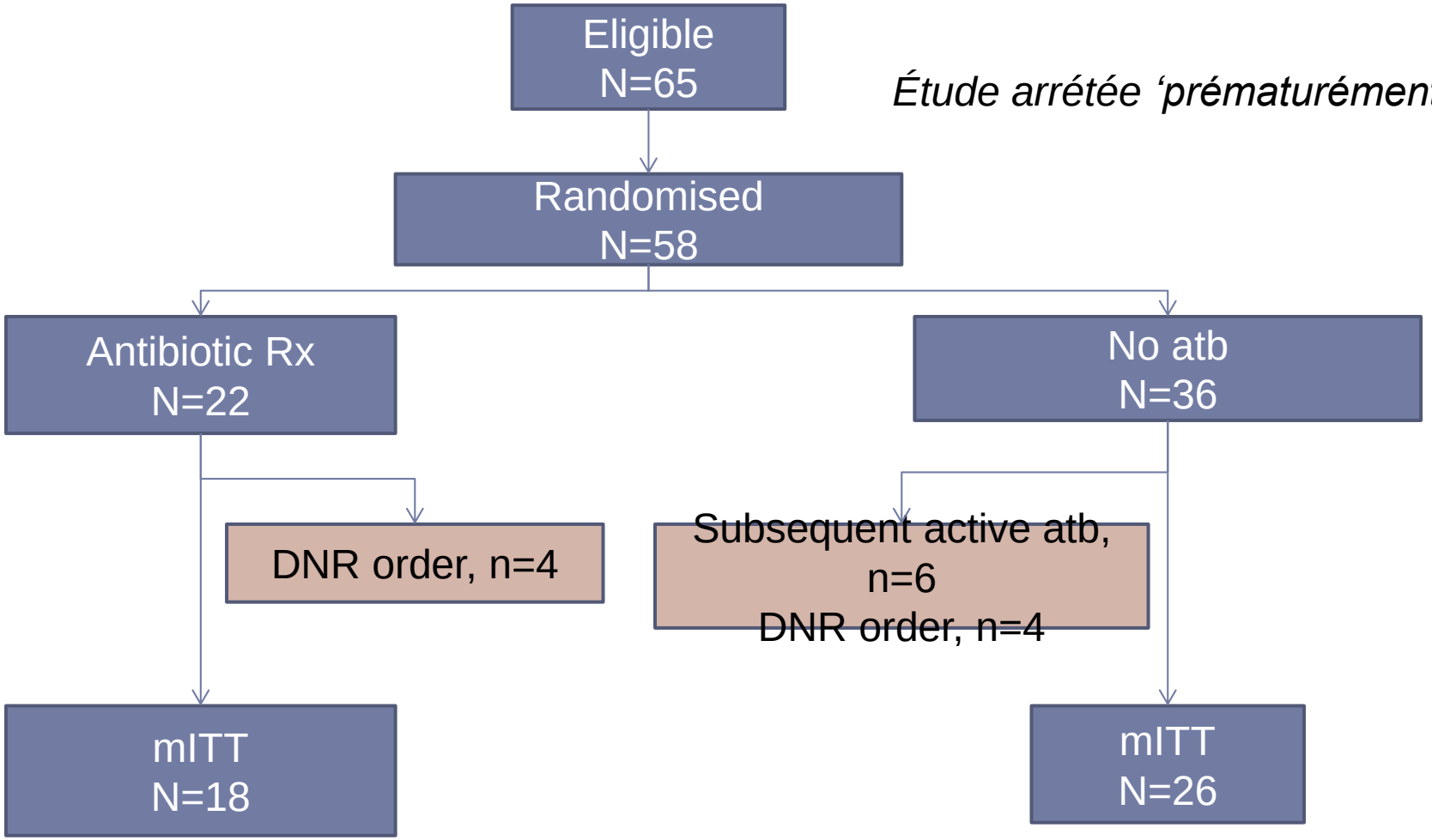
Saad Nseir[1,2], Raphaël Favory[1], Elsa Jozefowicz[3], Franck Decamps[4], Florent Dewavrin[5], Guillaume Brunin[6], Christophe Di Pompeo[2], Daniel Mathieu[1], Alain Durocher[1,2] for the VAT Study

Critical Care 2008, ***12:R62***

- 12 ICUs; June 2005-June 2007
- Excluded : severe ID, tracheostomy on admission; prior VAP; SAPS II >65
- Weekly Q-EA and on inclusion
- VAT : Fever >38°C, purulent secretions, Q-EA ≥10^6 , and ‘’no radiographic signs of new pneumonia”
- Randomisation avec ou sans traitement (ouvert)
- VAP: new or progressive radiographic infiltrate + 2 of : fever >38.5°C, leukocytosis (>10 000), purulent secretions and +ve Q-EA
- Analysis ITT and mITT (excl. pts : DNR, subsequent active ab Rx)

Antibiotics for VAT: a RCT

Nseir & al, Crit Care 2008



*Étude arrêtée '**prématurément**'*

Antibiotics for VAT: a RCT

Nseir & al, Crit Care 2008

	ATB (+), N=22	ATB (–) , N=36
Age	62	67
SAPS II	47	47
Medical	19 (86)	30 (83)
COPD	9 (40)	17 (47)
CAP	6 (27)	10 (27)
Cardiac failure	3 (13)	1 (2)
AE-COPD	3 (13)	14 (38)
Neurologic failure	2 (9)	5 (13)
Duration MV, d	17	13
Infection admission	18 (81)	25 (69)

Events & Outcome

Nseir & al, Crit Care 2008

	ATB +	ATB -
Tracheostomy	5 (22)	5 (13)
Septic shock	1 (4)	7 (19)
ICU-aquired inf		
Non-VAP	7 (31)	18 (50)
VAP within 8 d	0	15 (41)
ABT Rx	22 (100)	21 (58)
Duration MV	29 ± 17	26 ± 15
VAP (28d)	**3 (13)**	**17 (47)**
ICU death	**4 (18)**	**17 (47)**

Incidence and prognosis of ventilator-associated tracheobronchitis (TAVeM): a multicentre, prospective, observational study

Lancet Respir Med 2015; **3: 859–68**

*Ignacio Martin-Loeches, Pedro Povoa, Alejandro Rodríguez, Daniel Curcio, David Suarez, Jean-Paul Mira, Maria Lourdes Cordero, Raphaël Lepecq, Christophe Girault, Carlos Candeias, Philippe Seguin, Carolina Paulino, Jonathan Messika, Alejandro G Castro, Jordi Valles, Luis Coelho, Ligia Rabello, Thiago Lisboa, Daniel Collins, Antonio Torres, Jorge Salluh, Saad Nseir, on behalf of the TAVeM study**

- 114 ICUs, 1 yr
- 2960 eligible patients; 689 (23%) with VA-LRTI
- 320 pts VAT*, all treated
  - 39 progress to VAP
    - 19/250 ttmt approprié vs 20/70 ttmt inapproprié
- Deaths
  - VAP 146/369 (40%)
  - VAT 93/320 (29%)
  - None 673/2271 (30%)

	VAT (n=320)	VAP (n=369)	No VA-LRTI (n=2271)	p value for the difference between all three groups
Days on mechanical ventilation	13 (8–20)	13 (8–26)	7 (4–7)	<0·0001
Days in the ICU	21 (15–34)	22 (13–36)	12 (8–20)	<0·0001
Days in the hospital	42 (26–61)	38 (23–62)	28 (17–47)	<0·0001
Ventilator-free days	16 (11–20)	17 (10–21)	21 (17–24)	<0·0001

Data are median (IQR). VAT=ventilator-associated tracheobronchitis. VAP=ventilator-associated pneumonia. ICU=intensive care unit. VA-LRTI=ventilator-associated lower respiratory tract infections.

Table 5: **Clinical effects of ventilator-associated pneumonia and ventilator-associated tracheobronchitis**

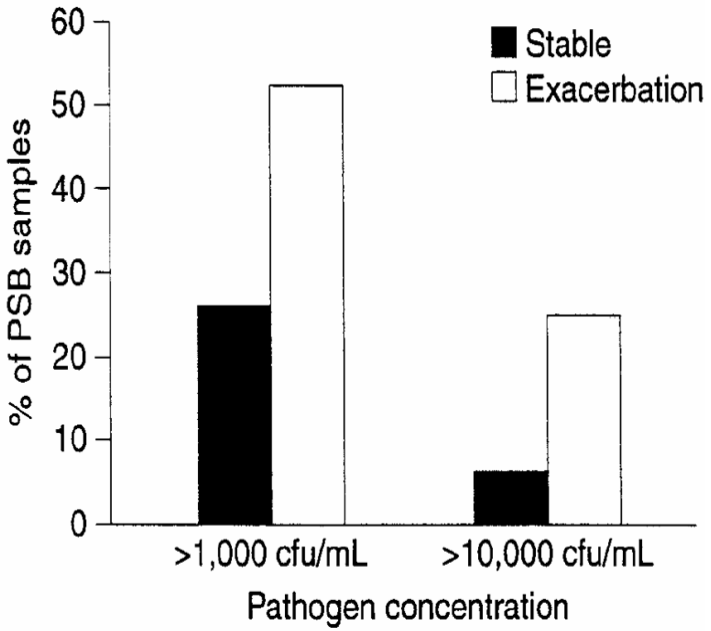
*fever, or leukocytosis and purulent secretions

• Positive Q culture LRT secretions (ETA, BAL, PSB)

Etudes fibroscopiques chez les BPCO

Auteur	Patients	Prelèvements	% positifs
Fagon	50 pts VM	PSB	50%
Monso	29 pts EABC	PSB	52%
Soler	50 pts VM	PSB LBA EA	46%
Pela	40 pts ambulatoires	PSB	52%
Zalachain	88 pts stables	PSB	41%

MO
- *H. influenzae/parainflu.*
- *S. pneumoniae*
- *M. catarrhalis*
- *P. aeruginosa*
- *Strep viridans*
- (autres BGN, CGP)



1. Know what you treat: the HAP/VAP, VAT, iVAC diagnostic issues ATS-IDSA Guidelines 2016

- In patients with VAT (ie, fever, purulent sputum, positive culture, no new infiltrate), we suggest NOT providing antibiotic therapy *

* In the presence of new respiratory signs of infection, such as an increased amount of purulent sputum and a **high-quality sample with positive Gram stain**, in conjunction with **new systemic signs of infection** plus **worsening oxygenation** and/or increasing ventilator settings, [and absence of other infectious focus], antibiotic treatment may be considered even in the absence of new or progressive persistent infiltrates

Signes radiographiques

	Patients [VAP (n, %)]	New radiographic Infiltrate, (%)
Fagon, 1993 (PSB)	84 [27, 32%]	31%
Meduri, 1994 (PSB or BAL, 22 ARDS)	50 [19, 38%]	42%
Wunderink, 1992 (Correlation X-Ray/Autopsy, 19 ARDS)	69 [24, 35%]	PPV=64% Air Bronchogram

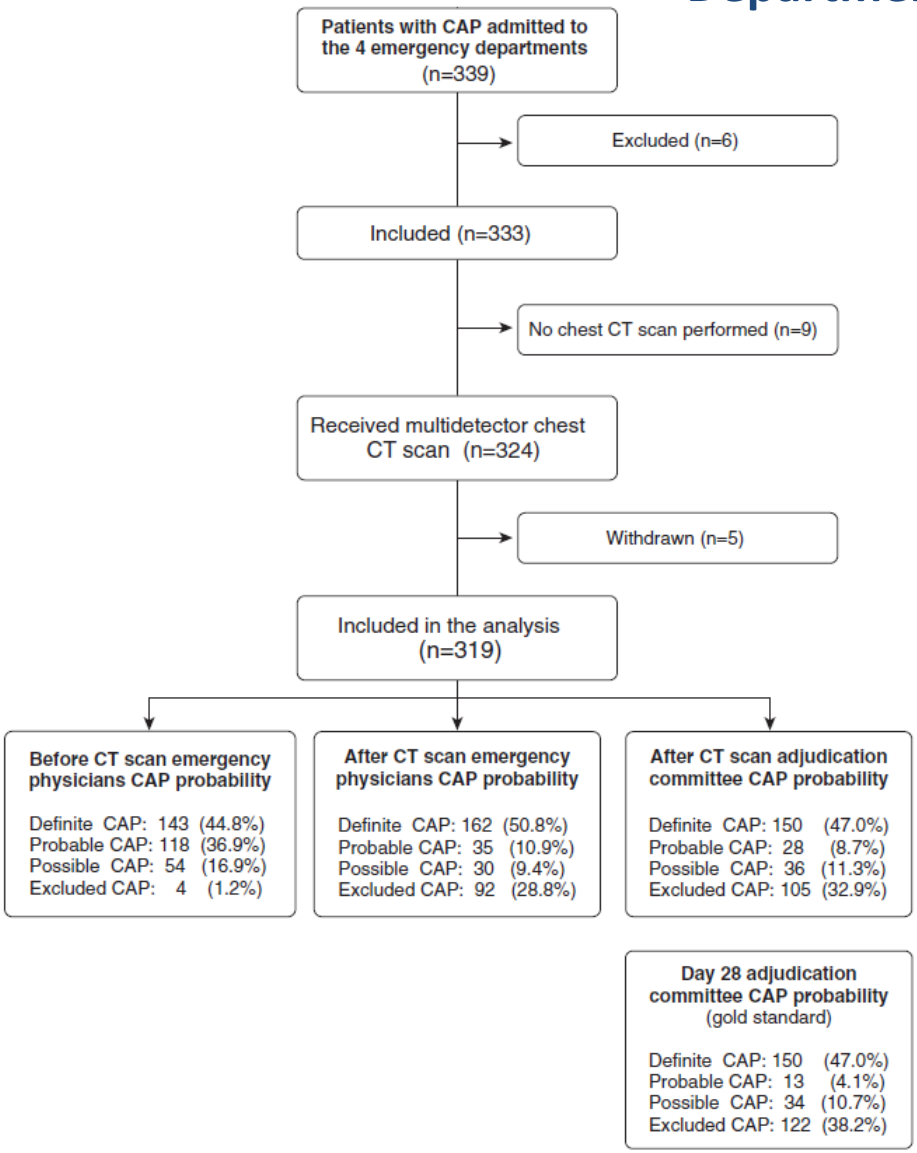
Fagon et al, *Am J Med 1993*
Meduri et al, *Chest 1994*
Wunderink et al, *Chest 1992*

Infection et SDRA: Diagnostic clinique et données autopsiques

Andrews et al, *Chest* 1981

Histology	VAP + (n=14)	VAP - (n=10)	All pts (n=24)
Fever	14 (100)	8 (80)	22 (92)
Leukocytosis	14 (100)	8 (80)	22 (92)
Asymmetry on CXR	8 (57)	3 (30)	11 (46)
Pathogens (Tracheal Aspirate)	12 (86)	7 (70)	19 (79)
Clinical Dg accurate	9 (64%)	8 (80)	17 (71%)
Clinical Dg inaccurate	5 (36%)	2 (20%)	7 (29%)

Early CT-Scan for Community-Acquired Pneumonia at the Emergency Department (ESCAPED)



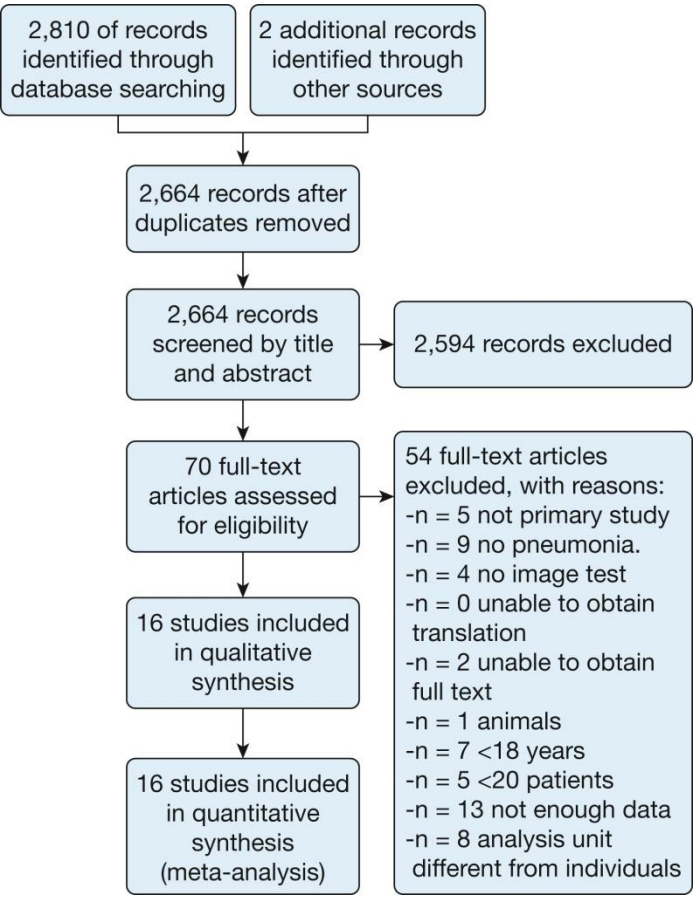
→ Discordance diagnostique entre Probabilité pré-test et

Probabilité post-test
Δdiagnostic = 58,6%

Comité d'adjudication (J28)
Δdiagnostic = 31,3%

Claessens YE. *Am J Respir Crit Care Med* **2015**; 192:974-82

Échographie



Study	No.	Setting	Age,[a] y (range)	Inclusion	Type of Pneumonia
Bataille et al[32]/2014	136	ICU	68 ± 15	RF	Not specified
Berlet et al[34]/2015	57	ICU	61.3 (47.9-71.3)	MV not for respiratory cause	VAP
Bourcier et al[33]/2014	144	ED	77.6 ± 15.2	PS	CAP
Busti et al[21]/2014	69	Stroke unit	77.6 ± 9.3	PS	Nosocomial
Corradi et al[39]/2012	35	ED	67.09 ± 20.84	PS	CAP
Cortellaro et al[16]/2012	120	ED	69 ± 18	PS	CAP
Fares et al[40]/2015	38	ICU	61.02 ± 11.24	PS	Not specified
Gallard et al[35]/2015	130	ED	79.0 ± 11.1; no LVF 81.9 ± 10.2; LVF	Acute dyspnea	CAP
Lichtenstein and Mezière[36]/2008	260	ICU	68 ± 16	RF	CAP and nosocomial
Liu et al[29]/2015	179	ED	71.5 (36-88)	PS	CAP
Nafae et al[41]/2013	100	ICU	≥ 50 at 76.25%	PS	Not specified
Nazemi et al[37]/2014	151	Ward	61.44 ± 17.40	PS	CAP
Nazerian et al[30]/2015	285	ED	71 ± 14	Unexplained respiratory symptoms needing CT	CAP
Reissig et al[22]/2012	362	ED and ward	63.8 (19-95)	PS	CAP
Unluer et al[31]/2013	72	ED	Women, 68.4 ± 11 Men, 64.2 ± 12.4	Dyspnea	CAP
Zagli et al[38]/2014	221	ICU	56 ± 20.9	Cases of VAP, control subjects without VAP	VAP

CAP = community-acquired pneumonia; LVF = left ventricular failure; MV = mechanical ventilation; PS = pneumonia suspected; RF = respiratory failure; VAP = ventilator-associated pneumonia.

[a]Age is expressed according to data extracted from each study as median ± SD, median (interquartile range), or percentage within a group.

Hu QJ. *Int J Clin Exp Med* **2014**; 7:115-121.

Llamas-Álvarez A.M. Chest **2017**; 151:374-382

3. Initiate antibiotic therapy promptly

- Initiation of therapy is based on clinical suspicion (and severity of presentation)
- (Serum PCT level is not an option to help decide whether or not to start therapy)

But:

- Therapy may be witheld in patients in whom invasive quantitative sampling shows growth below the threshold

Choosing the right moment to start antibiotic treatment

P.Ramirez & al. *Critical Care* (2016) 20:169

- 71 patients with VAP; 43 (61 %) with"gradual" VAP
- Nonquantitative EA and serum inflammatory biomarkers every 48–72 h.
- Clinical VAP defined as 2+ of: T° > 38 °C, WBC >12,000/mm3 or <4000/mm3, purulent respiratory secretions, and w. a new or progressive pulmonary infiltrate on the CXR
- VAP confirmed if Q-EA ≥ 10^5, BAL ≥10^4, or mini-BAL ≥10^3 cfu/ml
- 'Gradual VAP' : presence in the 96h pre-VAP of purulent respiratory secretions, plus one or both of the following: temperature > 38 °C and a WBC >12,000/mm3, and wo. new or progressive pulmonary infiltrate on CXR

At time of VAP	Acute onset (n=28)	Gradual (n=43)
MV days	4.5 [3 – 9]	**8 [6.5 – 11.5]**
SOFA	**10 [8 – 12]**	7 [5 – 11]
mCPIS	7 [6 – 8]	7 [6 – 8]

34 treated
51% adequate

No difference in outcome (28d mortality 61%)

Conclusions

- La bonne question: quand débuter le traitement ?
- Il y a des pneumonies précoces et tardives
- Il y a des trachéobronchites tardives, qui peuvent occasionnellement bénéficier d'un traitement
- Le diagnostic d'infiltrat « nouveau et/ou progressif » est hasardeux -> échographie ?
- A remplacer par altération des échanges gazeux ?
- La décision thérapeutique est clinique, et peut s'appuyer sur la microbiologie (ex. direct)
- Il faut se tenir à une approche diagnostique microbiologique standardisée
- Pour pouvoir poursuivre, modifier, arrêter le traitement empirique selon un protocole suivi.