

Pneumonies: classification

Pneumonies communautaires

Pneumonies associées aux soins

Non nosocomiales

Nosocomiales

Malade ventilé

précoces

tardives

Malade non ventilé

The concept of Health Care Associated Pneumonia (HCAP)

Kollef M Chest 2005, 128, 3854

← 4543 patients with pneumonia in a large US data-base (59 hospitals). ATLAS..

← 50% with CAP, 20% with HCAP, 30% with HAP or VAP.

← Mortality

CAP: 10%

HAP: 18,8%

HCAP: 19,8%

VAP: 29,3%

p<0,0001.

BACTERIOLOGY OF POSTOPERATIVE PNEUMONIA EOLE STUDY

Dupont H ICM 2003, 29, 179-88

E. Coli	46	H. influenzae	63
K. Pneumonia	12	Staphylococcus	
		Coag ⊕	88
Enterobacter	12	Coag ⊖	22
Serratia	15		
Pseudomonas	56	S. Pneumoniae	31
Acinetobacter	6	Streptococcus spp	34
Miscellaneous	80	Yeasts	23
G. Neg			

EARLY ONSET ICU ACQUIRED PNEUMONIA

- ← Represent 50% of the VAP. They are due to an aspiration happening often before, or just after the ICU admission.
- ← Not related to quality of care
- ← Susceptible strains carried by the normal host (MSSA, pneumococcus, haemophilus..)
- ← **The inoculum, the virulence of the bugs, the general and local (lung) defences will condition the occurrence of VAP.**
- ← **How long could it take ???**

Micro-organisms responsible for 408 episodes of ventilator associated pneumonia (VAP) confirmed by quantitative cultures of bronchoalveolar lavage

Giantsou E ICM 2005

	Early-onset VAP (n=191)	Late-onset VAP (n=217)	p
Potentially multiresistant Bacteria	219 (79%)	257 (85%)	0,06
Pseudomonas aeruginosa	116 (42%)	141 (47%)	0,26
MRSA	93 (33%)	90 (30%)	0,39
Acinetobacter baumannii	6 (2%)	12 (4%)	0,30
Stenotrophomonas maltophilia	4 (1%)	14 (5%)	0,04

UNUSUAL CAUSES OF NOSOCOMIAL PNEUMONIA

← Anaerobes.

← Ameba-associated microorganisms

Bergen et al Emerging ID 2006

10,5% of 210 patients.

Acanthamoeba polyphaga

minivirus: 8, Legionella:3, other L=4.

← Atypical microorganisms

chlamydia, *Mycoplasma pneumoniae*.

← Viruses Herpes 1, CMV, VRS:

Dambin C ICM 2005.

← *Aspergillus*, *Candida*.

VIRAL NOSOCOMIAL PNEUMONIA

← Herpes virus:

HSP 1 Bruynseels P Lancet 2003

CMV Papazian L Anesthesiology 1998

VRS in kids. Plenty of literature

← SARS.

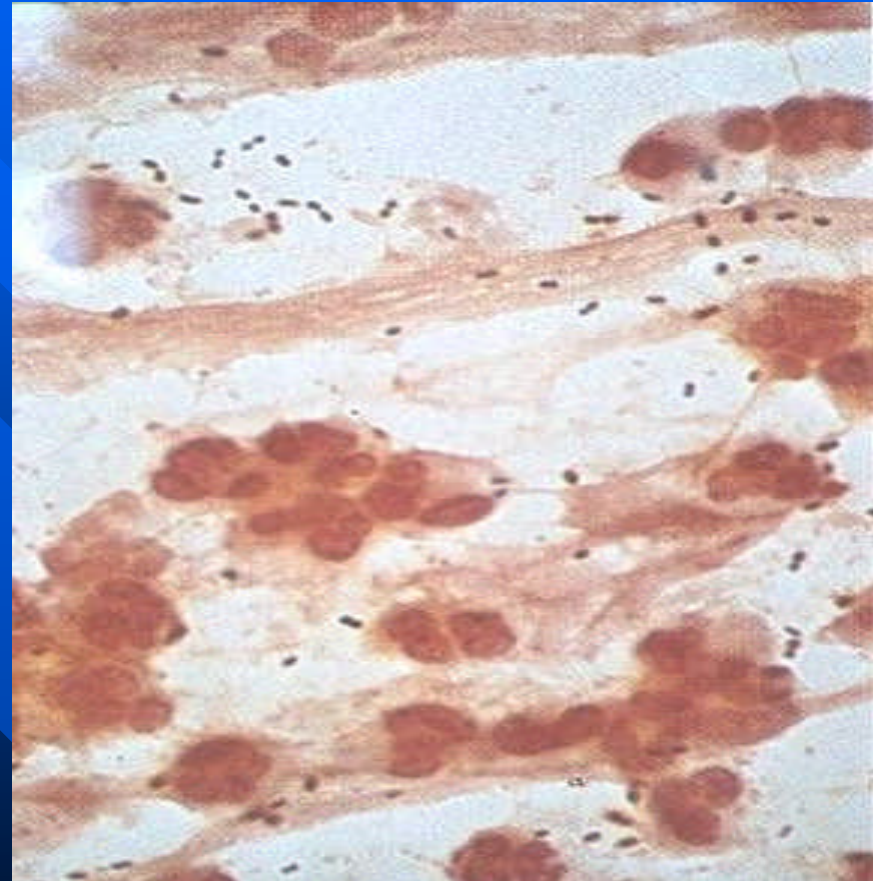
← Influenza: major cause in LTC Facilities

H5N1

← **Role of the vaccination of both elderly people and health care practitioners.**

Bacteriological diagnosis during severe sepsis

- Diagnostic studies should be performed promptly
 - history
 - physical examination
 - laboratory
 - imaging procedures as appropriate
- Cultures should always be obtained before antibiotic therapy



Invasive versus non Invasive strategies in the management of VAP

Fagon JY et al Ann Inter Med 2000;132:621-30

← Randomized study. Multicentric (n=31).

← 413 patients

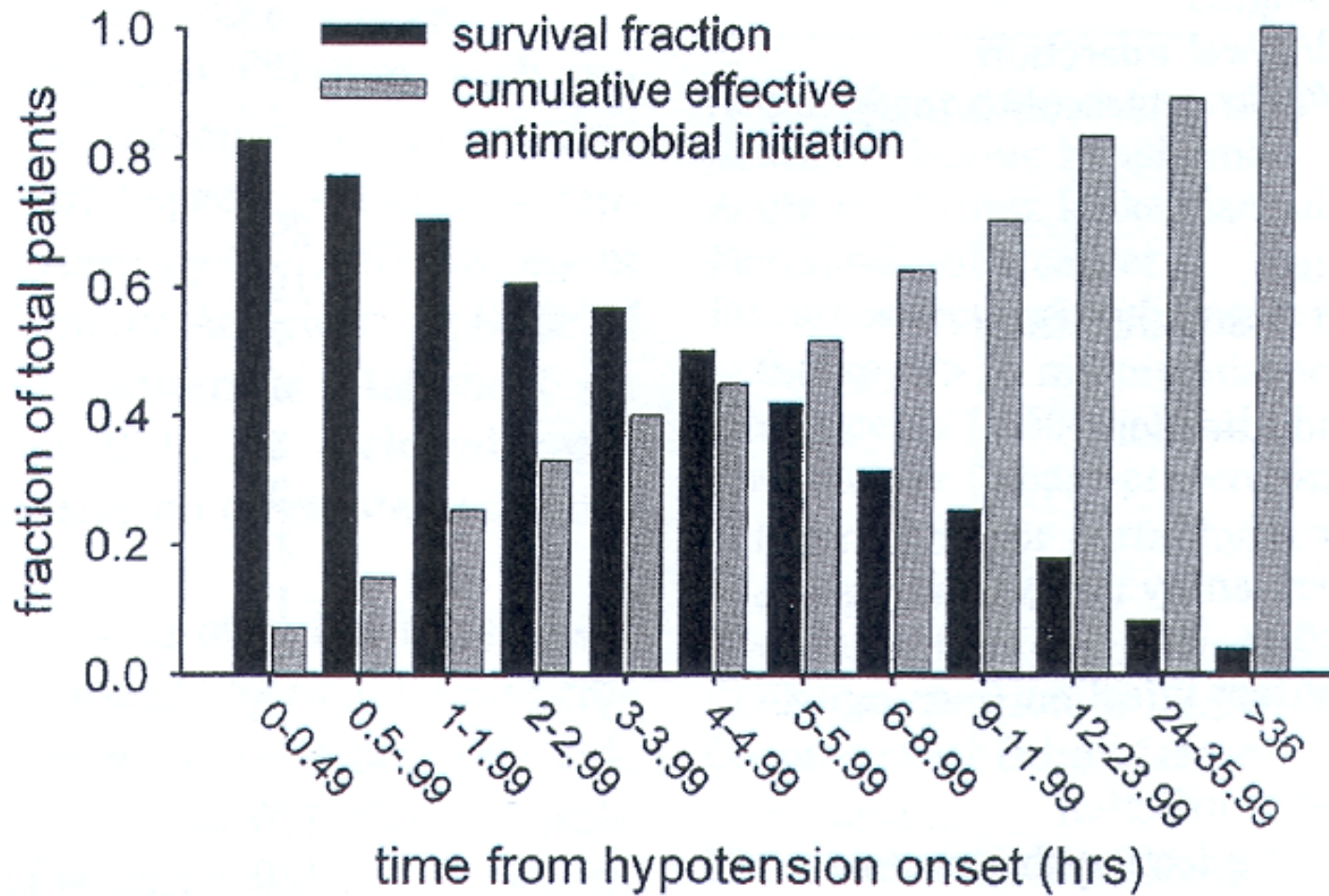
Empiric antibiotic therapy vs BAL or PSB including Gram Strain.

← Reduction in mortality 16,2 vs 25,8 (p=0.022)

Reduction in SOFA scores

Decrease antibiotic use : Antibiotic free days
11,5 vs 7,5 p < 0.001.

KUMAR A CCM 2006, 34, 1589-96



Why do we urgently need rapid diagnostic methods in ID?

- ← **Gain one or two days as compared to standard (culture) methods.**
- ← **Rapid access to the responsible bacteria and resistance profile.**
- ← **Detect bacterial components although classical techniques are negative (blood...).**
- ← **Avoid inappropriate broad spectrum antibiotic therapies.**

Different methods to detect micro-organisms or toxins

- ← Gram stain (urines, meningitis, BAL...).
- ← Toxins : (Clostridium difficile, TSST-1, PVL...)
- ← Antigen: (pneumococcus, Legionella, aspergillus...)
- ← Microorganism:
 - Blood cultures, at the periphery, and via the catheter lines, when needed
- ← Immunological tests: Staph (3M)
Real Time PCR
Fluorescent amplican length analysis
Micro-arrays.

Detection of bacterial or fungal antigens

← Pneumococcus in urines.

← Pneumococcus in liquides or pus.

← Legionella in urines.

← Aspergillus in blood.

←

Real time PCR to diagnose bacteremia and fungemia

- ← Directly done on the initial blood sample. **Could be difficult and a bit long for several organisms.**
- ← Performed within a few hours on a positive blood culture. Septifast, techniques perso..

Rapid diagnosis of aspergillus

← Cell wall components:

- Galactomannan (Elisa)
- β Glucan.

← PCR in blood, and BAL:

- Sensitivity and specificity of those test remain matter of controversy.

Rapid diagnostic methods and resistance

- ← Resistant pneumococcus.
- ← **MRSA.**
- ← VRE.
- ← **E. Coli with ESBL.**
- ← Cephalosporinases.
- ← **Carbapenemases.**
- ←

Detection of carriers

← MRSA (Huletsky CID 2005).

← **MSSA.**

← Streptococcal colonization in Neonates

Natarajan G Pediatrics 2006

Colonisation rate 17% with culture

51% with PCR

sensitivity 90% PPV 28%

specificity 80,3% NPV 98,9%.

← **Strepto test for pharyngitis.**

Identification of Methicillin-resistant staphylococcus aureus carriage in less than 1 hour during a hospital surveillance program

Huletsky A, Lebel P, Picard FJ, Bernier M, Gagnon M, Boucher N and Bergeron MG

Clin Infect Diseases 2005;40:976-81

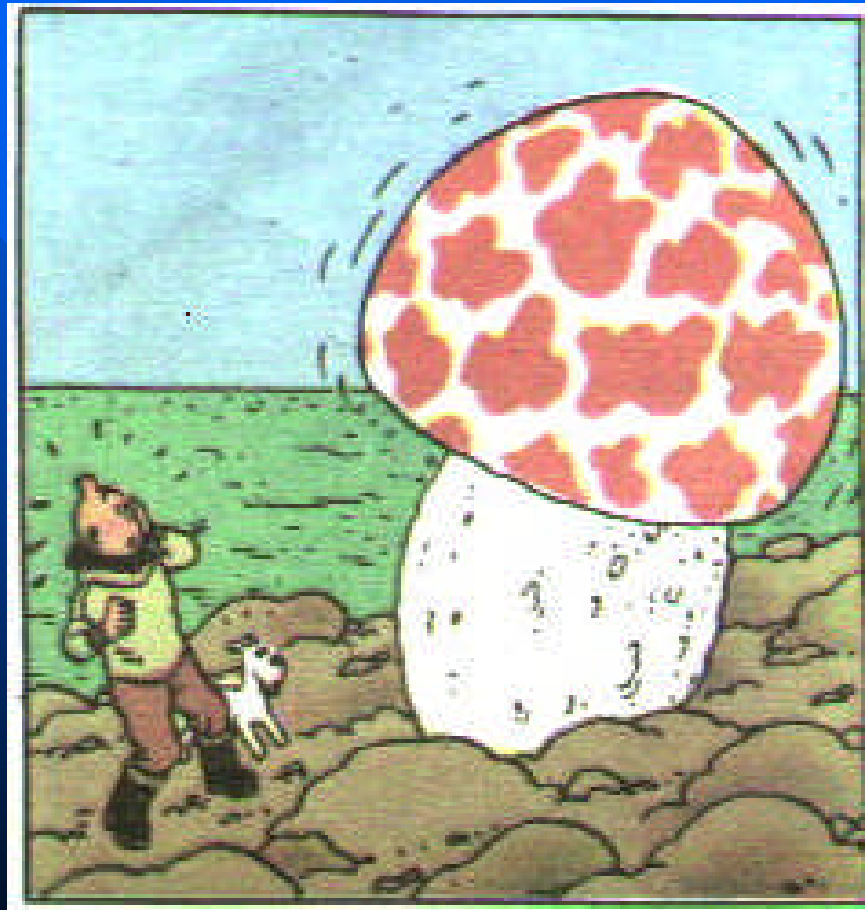
***Results* : The PCR assay MRSA in all 81 samples that were culture positive for MRSA. The PCR assay detected 4 additional MSA-positive specimens, for a specificity of 98,4%, a positive predictive value of 95,3%, and a sensitivity and negative predictive value of 100%.**

SMART cyder to detect MRSA Nasal carriage

N 'Guyen JC Path Biol 2006, 54:225-92

- **1117 specimens in 836 patients. ICU. Vascular Surg Geriatry. Diabetology**
- **Comparison between Real Time PCR and 3 culture media**
- **Sensitivity 97,8% - Specificity 99,9%.**
- **Positive predictive value: 89,1**
- **Negative predictive value: 99,8**
- **5% of the couples remained unresolved.**

Fungi are not fun guys



CLINICAL CASE OF CANDIDA PNEUMONIA

- **78 year old patient**

**Severe staphylococcus aureus (susceptible)
septicemia > 10 PBC**

**Multiples localisations (knees, right hip,
sternum, mediastinum....)**

Steroids for septic shock.

**Day 13 Pneumonia with clearcut new pulmonary
infiltrates. Many positive bronchial samples
including PSB $8-10^3$ and BAL $6-10^6$ with
candida albicans + candida glabrata
1 positive blood culture with candida albicans.**

**Treatment with either Ambisome or Micafungin
(Fujisawa Protocol). Recovery.**

Nosocomial *Aspergillus pneumonia*

- 69 year old woman

Biliary peritonitis. Severe septic shock

E. coli septicemia. Bronchial sample = ⊖

Admission SAPS II predicts a 69 % mortality

⊖ Treatment High dose epinephrin.

Corticosteroids.

Day 11 39°5. ARDS. BAL ⊖

Day 20 worsening of clinical status. BAL...

Day 21 Death. BAL and Winberley brush ⊕ with

Aspergillus fumigatus and *P. Aeruginosa*

Serology and antigenemia ⊕

⊖ Autopsy large vascular invasion with
Aspergillus in lung vessels.

Marqueurs de l'inflammation

- Permettent d'éviter de débiter un traitement antibiotique
- Permettent de suivre l'évolution thérapeutique, et de moduler la durée de traitement
- Le plus étudié, et le plus efficient est la procalcitonine

