JAVA

Creteil

23ème Journée d'Actualités en Ventilation Artificielle

GROUPE HOSPITALIER HENRI MONDOR

CARMAS

Pneumonie acquise sous ventilation: quand couvrir la BLSE ?

Keyvan Razazi
JAVA 2016

Conflit d'intérêt

aucun

Données épidémiologiques

Figure 10 : Densités d'incidence des SARM et des EBLSE pour 1 000 journées d'hospitalisation (densité d'incidence globale par année)

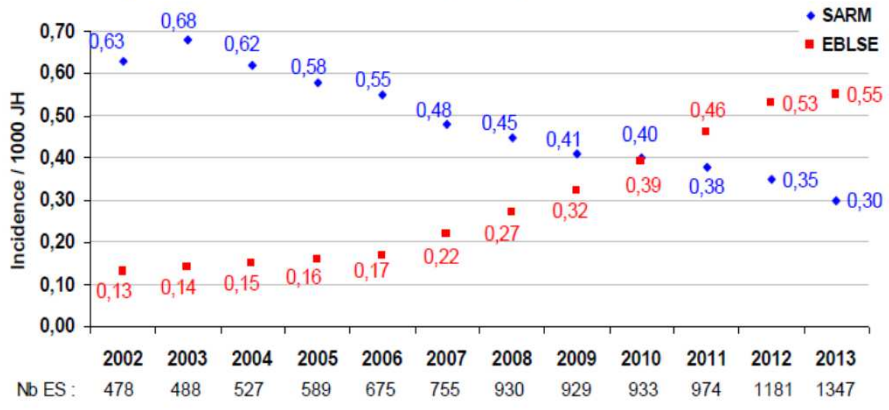
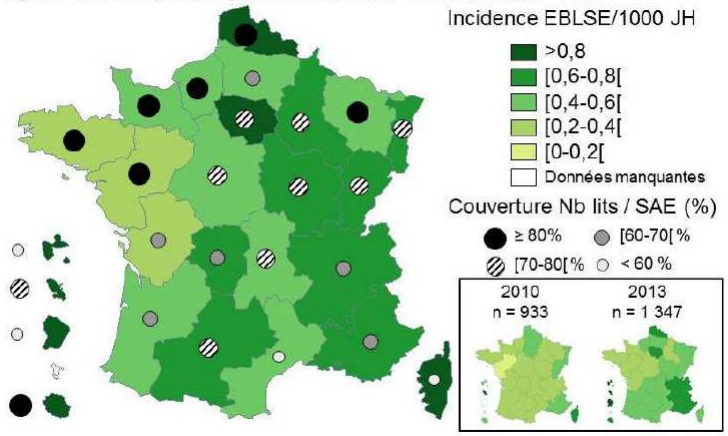
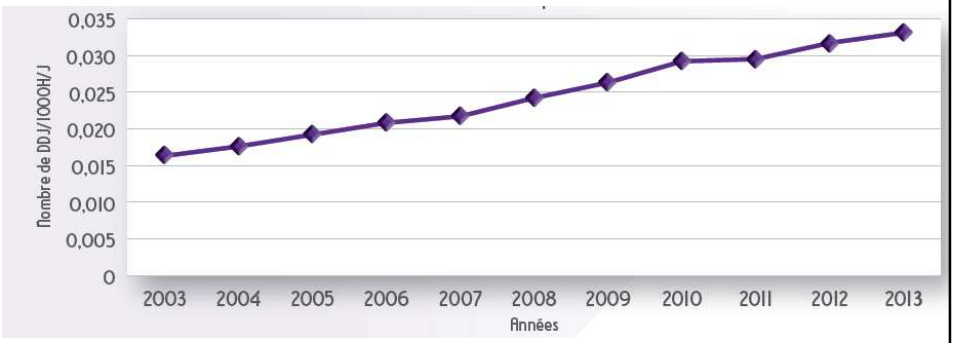


Figure 6 : Incidences globales régionales des EBLSE pour 1 000 JH (tous ES, n=1 441)



Evolution de la consommation de carbapenème en France



Consommation de carbapénèmes par secteur d'activité

I Tableau 22 I

Consommation de carbapénèmes en nombre de DDJ / 1000 JH (taux global) selon le secteur d'activité

Secteur	Doripénème*	Ertapénème	Imipénème	Méropénème	Total
Médecine	0,0	0,7	5,7	1,2	7,6
Hématologie	0,3	1,6	79,1	11,4	92,5
Maladies infectieuses	0,2	4,3	15,1	8,7	28,2
Chirurgie	0,1	0,7	4,6	0,9	6,3
Réanimation	2,2	3,5	58,4	15,7	79,7
Gynécologie-Obstétrique	0,0	0,1	0,2	0,0	0,3
Pédiatrie	0,0	0,5	3,5	3,1	7,2
SSR	0,0	0,4	1,2	0,3	1,9
SLD	0,0	0,2	0,2	0,0	0,4
Psychiatrie	0,0	0,0	0,0	0,0	0,0
Total établissement	**0,1**	**0,5**	**3,9**	**1,2**	**5,7**

Determinants of prescription and choice of empirical therapy for hospital-acquired and ventilator-associated pneumonia

J. Rello, M. Ulldemolins, T. Lisboa, D. Koulenti, R. Mañez, I. Martin-Loeches, J.J. De Waele, C. Putensen, M. Guven, M. Deja, E. Diaz and the EU-VAP/CAP Study Group

TABLE 4 Antibiotic prescription for ventilator-associated pneumonia (VAP) according to admission category

	Subjects n	Imip/ merop	Pip/ tazo	CFP/ CFZ	CFX/ CRO	A/C A/S	Amino- glycosides	Quinolones	Glyco- protein	Linezolid	Colistin	Others
Medical VAP												
Early onset	206	15.5	13.6	3.9	10.7	9.7	8.3	10.2	9.7	3.4	0.5	14.5
Late onset	296	20.3	12.8	6.4	4.7	3	12.2	11.5	10.1	5.4	4.7	8.8
Overall	502	18.3	13.1	5.4	7.2	5.8	10.6	11.0	10.0	4.6	3.0	11.0
Surgical VAP												
Early onset	54	13.0	22.2	5.6	3.7	3.7	1.9	11.1	7.4	3.7	0	27.7
Late onset	96	13.5	16.7	6.3	4.2	3.1	3.1	12.5	15.6	9.4	1.0	14.5
Overall	150	13.3	18.7	6	4	3.3	2.7	12.0	12.7	7.3	0.7	19.3
Trauma VAP												
Early onset	107	18.7	13.1	4.7	17.8	5.6	8.4	5.6	7.5	0.9	2.8	14.9
Late onset	158	24.0	7.0	5.1	7.6	1.9	8.9	7.6	6.3	7.6	9.5	14.5
Overall	265	21.9	9.4	4.9	11.7	3.4	8.7	6.8	6.8	4.9	6.8	14.7

Data are presented as %, unless otherwise stated. Imip/merop: imipenem/meropenem; Pip/tazo: piperacillin-tazobactam; CFP/CFZ: cefepime/ceftazidime; CFX/CRO: cefotaxime/ceftriaxone; A/C: amoxicillin-clavulanate; A/S: ampicillin-sulbactam.

EUROPEAN RESPIRATORY JOURNAL

TABLE 5 Top three antibiotic prescriptions per country for countries with more than one investigation site

	HAP	VAP	Early-onset VAP	Late-onset VAP
Spain				
First	Piperacillin-tazobactam	Carbapenem	Cefotaxime/ceftriaxone	Carbapenem
Second	Glycopeptides	Piperacillin-tazobactam	Carbapenem	Piperacillin-tazobactam
Third	Quinolones	Quinolones	Piperacillin-tazobactam	Quinolones
Greece				
First	Carbapenem	Carbapenem	Carbapenem	Carbapenem
Second	Piperacillin-tazobactam	Colistin	Glycopeptides	Colistin
Third	Quinolones	Glycopeptides	Piperacillin-tazobactam	Linezolid
Germany				
First	Piperacillin-tazobactam	Piperacillin-tazobactam	Piperacillin-tazobactam	Piperacillin-tazobactam
Second	Quinolones	Quinolones	Quinolones	Quinolones
Third	Cefotaxime/ceftriaxone	Carbapenem	Carbapenem	Glycopeptides
France				
First	Aminoglycosides	Cefotaxime/ceftriaxone	Cefotaxime/ceftriaxone	Cefotaxime/ceftriaxone
Second	Piperacillin-tazobactam	Aminoglycosides	Carbapenem	Aminoglycosides
Third	Carbapenem	Carbapenem	Aminoglycosides	Piperacillin-tazobactam
Belgium				
First	Carbapenem	Piperacillin-tazobactam	Piperacillin-tazobactam	Piperacillin-tazobactam
Second	Piperacillin-tazobactam	Amoxicillin-clavulanate/ampicillin-sulbactam	Carbapenem	Amoxicillin-clavulanate/ampicillin-sulbactam
Third	Amoxicillin-clavulanate/ampicillin-sulbactam	Carbapenem	Quinolones	Quinolones
Italy				
First	Glycopeptides	Carbapenem	Carbapenem	Carbapenem
Second	Carbapenem	Glycopeptides	Glycopeptides	Linezolid
Third	Quinolones	Linezolid	Amoxicillin-clavulanate/ampicillin-sulbactam	Glycopeptides
Turkey				
First	Carbapenem	Carbapenem	Carbapenem	Carbapenem
Second	Glycopeptides	Aminoglycosides	Aminoglycosides	Aminoglycosides
Third	Aminoglycosides	Glycopeptides	Piperacillin-tazobactam	Glycopeptides

HAP: hospital-acquired pneumonia; VAP: ventilator-associated pneumonia

Consommation de carbapénème selon le statut colonisés ou infectés à BLSE

Antibiotique en DDJ	Non colonisés à BLSE	Colonisés à BLSE et non infectés	Infectés à BLSE	p
Carbapénème	69	241	627	<0,001

Barbier Outcomerea JAC 2015

Risque de colonisation par un BGN résistant à l'imipénème

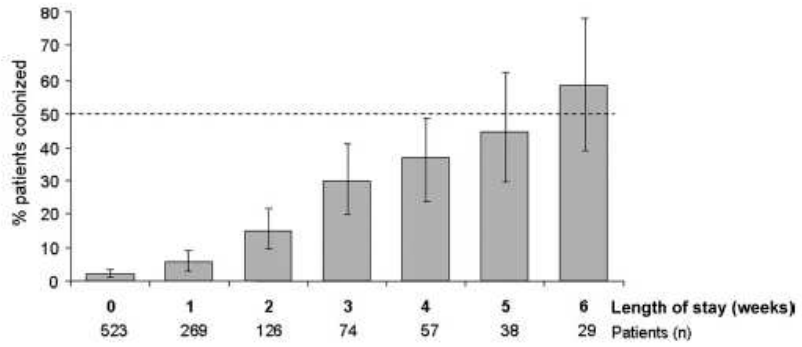


FIG 1 Rates of intestinal colonization by imipenem-resistant gram-negative bacilli in intensive care patients. Bars indicate observed rates ± standard deviation (SD) (error bars).

Armand Lefèvre AAC 2013

Peu d'alternative aux carbapénèmes pour traiter les infections à BLSE en réanimation

- Très peu de données dans la pneumonie
- Pip-Taz / Témocilline… relais (CMI, inoculum, gravité…)
- Le bénéfice écologique des alternatives est totalement hypothétique
- Etudes avec les nouveaux ATB

Table 1 Characteristics and outcome of our patients depending on empirical antibiotic treatment.

	Alternative empirical treatment n = 23	Carbapenem empirical treatment n = 33	p
Characteristics at ICU admission			
Male sex (%)	15 (65%)	25 (76%)	0.55
Age (years)			0.03
Immunodepression			0.99
SAPS II, median (IQR)			0.4
SOFA, median (IQR)			0.26
Characteristics upon PAVM onset			
Duration of mechanical ventilation (days), median (IQR)	12.0 (2–34)	16.0 (2–55)	0.28
Prior antibiotics, n (%)	23 (100%)	31 (96%)	0.51
SAPS II, median (IQR)	39.5 (22–79)	39.0 (24–115)	0.64
SOFA, median (IQR)	5.5 (1–12)	7.0 (1–19)	0.39
Shock	15 (65%)	20 (61%)	0.78
Prior antibiotic treatment	10 (43%)	14 (42%)	0.99
Microbiological data			
Prior ESBL-PE colonization	16 (70%)	31 (94%)	0.03
Bacteremia	3 (13%)	5 (15%)	0.99
Polymicrobial infection	9 (39%)	12 (36%)	0.99
Type of Enterobacteriaceae			
E. coli	5 (22%)	4 (12%)	0.46
K. pneumoniae	8 (35%)	19 (58%)	0.11
Enterobacter sp.	10 (43%)	9 (27%)	0.26
Citrobacter freundii	0	1 (3%)	0.99
Clinical evolution after VAP			
Clinical cure	21 (91%)	29 (88%)	0.99
Duration of ICU stay (days), median (IQR)	15 (1–79)	17 (1–96)	0.3
Duration of mechanical ventilation (days), median (IQR)	12 (11–79)	11 (1–69)	0.10
Death in ICU	11 (48%)	11 (33%)	0.41
Acute respiratory distress syndrome	2 (9%)	6 (18%)	0.44
Microbiological evolution			
Surinfection	3 (13%)	4 (12%)	0.99
Colonization	10 (43%)	13 (39%)	0.61
Relapse	3 (13%)	2 (6%)	0.39

ATB approprié 57%

ATB approprié 100%

Boucher Journal of infection 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]

IDSA GUIDELINE

XVIII. Which Antibiotic Should Be Used to Treat Patients With HAP/VAP Due to Extended-Spectrum β-Lactamase (ESBL)–Producing Gram-Negative Bacilli?

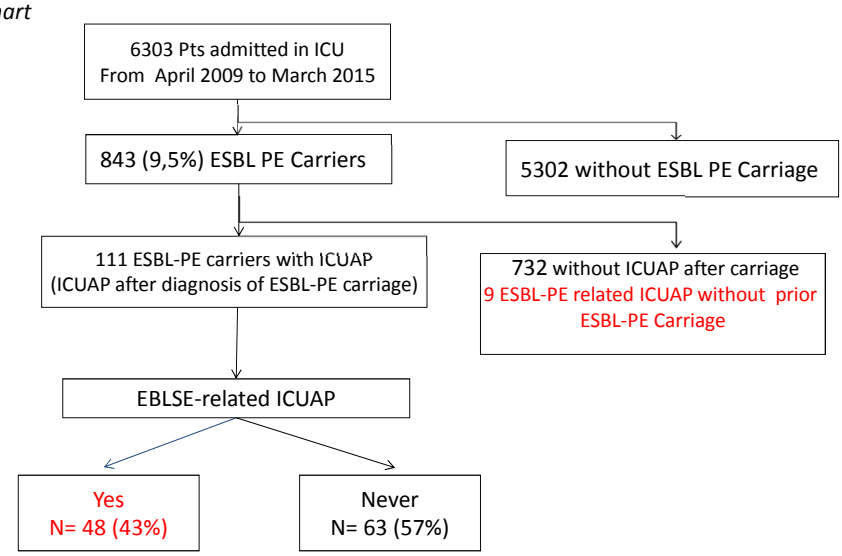
Recommendation

1. For patients with HAP/VAP due to ESBL-producing gram-negative bacilli, we recommend that the choice of an antibiotic for definitive (not empiric) therapy be based upon the results of antimicrobial susceptibility testing and patient-specific factors *(strong recommendation, very low-quality evidence).*

Frequency, risk factors and outcome of multi-drug resistant intensive-care acquired pneumonia among patients colonized with extended-spectrum β-lactamase producing Enterobacteriaceae

- Prévalence
- Facteurs de risques
  - Pneumonie à BLSE
  - Pneumonie à bactérie résistante aux carbapénèmes
- Pronostic

Flow Chart



= pneumonie à BLSE chez 7% des colonisés

L'infection est rare : y compris en réanimation

Author, year	Country	Patients	Organism	Screening method	*n* screened	*n* colonised with ESBL-E/EC: Total (% of screened)	On admission (% of screened)	Acquired during stay (% of initially ESBL-naive patients screened)	*n* with subsequent infection (% of colonised total)
Bert et al., 2012	France	Transplant	E	Rectal swabs pre-transplantation (same day)	710	29 (4.1)	n.a.	n.a.	13 (44.8)
Ko et al., 2013	Korea	ICU	E	Stool sample or rectal swab on admission	94	40 (42.5)	n.a.	n.a.	n.a.
Liss et al., 2012	Germany	HM	E	Stool samples within 72 hours of admission	513	90 (17.5)	36*	15*	6 (6.6)
Razazi et al., 2012	France	ICU	E	Rectal swabs on admission (within 24 hours) + 2x/week	531	110 (20.7)	82 (15%)	28 (13%†)	4‡ (4.9%)
Thiebaut et al., 2012	France	ICU	E	Rectal swab on admission + 2x/week + before β-lactam prescription + upon discharge	768	63 (8.2)	32 (4.2)	31 (4.2)	n.a.
Aman et al., 2011	Spain	NP	EC	Rectal swabs on admission + weekly	217	63 episodes (29.0)	29 (13.4)	34 (18.1)	2 (3.2)
Azim et al., 2010	India	ICU	E	Nasal, oral, rectal swab on admission	96	47 (49.0)	n.a.	n.a.	
Meyer et al., 2009	Germany	ICU	E	Stool samples on admission	755	35 (5.0)			9 (25.7)
Calatayud et al., 2008	Spain	NP	EC	Stool samples on admission + weekly till end of neutropenia	154	49 (31.8)	22 (14.3)	27 (20.5)	n.a.
Harris et al., 2007	USA	ICU	EC	Perianal swab on admission + weekly + upon discharge	1806	97 (5.4)	74 (4.1)	23 (1.3)	n.a.
Reddy et al., 2007	USA	ICU, HM, Transplant	E	Stool sample or rectal swab weekly + partly also on	17 872	413 (2.3)	n.a.	n.a.	35 (8.5)

Année	Auteur	Patients	% patients avec infection BLSE	% colonisés	% d'infectés parmi les colonisés
2005_11	Vodovar	5059	0,8%	3	26% /23 % acquis
96-2013	Barbier	16700	0,6%	3,5	16%/9% acquis

Prédiction du portage rectal à BLSE

- 9 patients avec pneumonie à BLSE avant colonisation (période de dépistage 1 fois/semaine),
- 6 patient avec pneumonie à BLSE le même jour que le dépistage rectal positif

Au total: colonisation connue avant infection à BLSE chez 42/57 (74%) patients

Prévalence

- 157 episodes of ICUAP diagnosed at the same time or after carriage: 54 (34%) due to ESBL-PE.
- 48 patients (43%) had ESBL-PE related ICUAP
  - 39 during the first episode after colonization
  - 9 during a later episode of pneumonia

At admission	All n (% ESBL)	Home or HCA-RF n (%)	Hospital n (%)	p
Pulmonary	14/176 (8,0%)	2/108 (1,9%)	12/68 (17,6%)	<0,001

Significance of Prior Digestive Colonization With Extended-Spectrum β-Lactamase–Producing *Enterobacteriaceae* in Patients With Ventilator-Associated Pneumonia*

Rémi Bruyère, MD, MSc[1]; Clara Vigneron[1]; Julien Bador, MD[2]; Serge Aho, MD[3]; Amaury Toitot, MD[1]; Jean-Pierre Quenot, MD, PhD[1]; Sébastien Prin, MD[1]; Pierre Emmanuel Charles, MD, PhD[1]

Critical Care Medicine
April 2016 • Volume 44 • Number 4

TABLE 4. Performance Characteristics of Extended-Spectrum β-Lactamase–Producing *Enterobacteriaceae* Active Surveillance Culture as a Predictor of Extended-Spectrum Β-Lactamase–Producing *Enterobacteriaceae* Ventilator-Associated Pneumonia

	Sensitivity (%) [95% CI]	Specificity (%) [95% CI]	Positive Predictive Value (%) [95% CI]	Negative Predictive Value (%) [95% CI]	Positive LR [95% CI]	Negative LR [95% CI]
All ventilator-associated pneumonia	17/20 (85.0) [62.1–96.8]	543/567 (95.7) [93.7–97.3]	17/41 (41.5) [26.3–57.9]	543/546 (99.4) [98.4–99.9]	19.8 [9.8–35.4]	0.15 [0.0–0.4]

LR = likelihood ratio.

Intensive Care Med (2013) 39:365–375
DOI 10.1007/s00134-012-2759-x

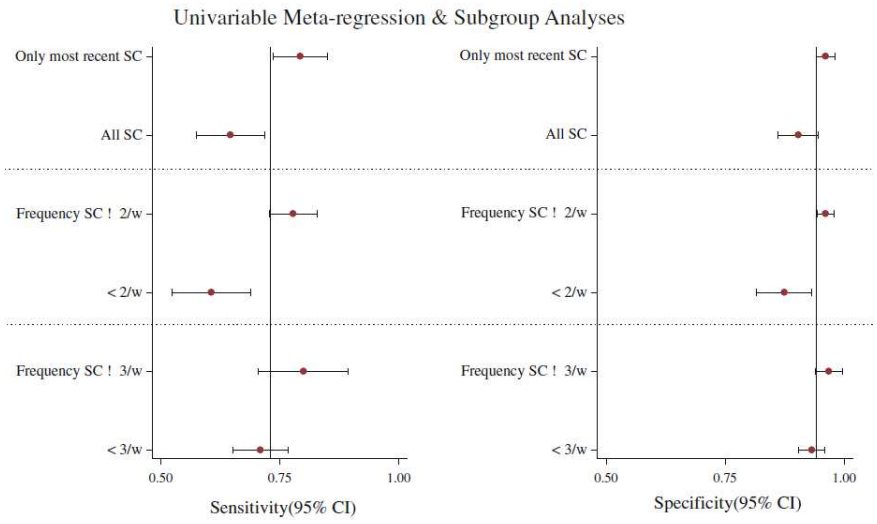
REVIEW

Nele Brusselaers
Sonia Labeau
Dirk Vogelaers
Stijn Blot

Value of lower respiratory tract surveillance cultures to predict bacterial pathogens in ventilator-associated pneumonia: systematic review and diagnostic test accuracy meta-analysis

Table 1 Accuracy of surveillance cultures to predict the pathogens in ventilator-associated pneur

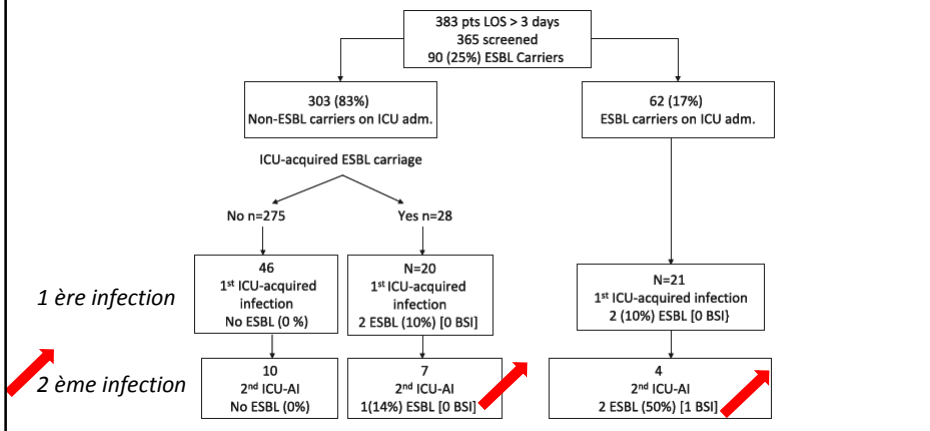
Accuracy of prediction for	No. sets	sROC–AUC	Pooled sensitivity	Pooled specificity
1. All unique sets of predictive variables	42	0.92 (0.89–0.94)	0.76 (0.70–0.81)	0.94 (0.91–0.96)
2. MDR pathogens (one set per study[a])	14	0.90 (0.87–0.92)	0.75 (0.65–0.83)	0.92 (0.85–0.96)
3. Overall MDR prediction (reported in 4 studies)	4	0.95 (0.93–0.97)	0.84 (0.69–0.93)	0.94 (0.89–0.96)
4. *MRSA*	4	0.83 (0.80–0.86)	0.72 (0.55–0.85)	0.98 (0.77–1.00)
5. *Pseudomonas* spp.	12	0.94 (0.92–0.96)	0.78 (0.64–0.87)	0.95 (0.89–0.98)
6. *Acinetobacter* spp. prediction	6	0.92 (0.89–0.94)	0.79 (0.57–0.91)	0.90 (0.77–0.96)
7. Predictions (3–6) combined	26	0.94 (0.91–0.96)	0.78 (0.70–0.85)	0.94 (0.91–0.97)



Microorganisms associated with ICU-acquired pneumonia among 111 patients with ESBL-PE colonization

Microorganisms	**ESBL- (n=63)**	**ESBL + (n=48)**
Enterobacteriaceae alone	17 (27%)	31 (65%)
ESBL *Enterobacter cloacae / E. aerogenes*	0 (0%)	13 (27%)
ESBL *Klebsiella pneumoniae*	0 (0%)	12 (25%)
ESBL *Escherichia coli*	0 (0%)	4 (8%)
Polymicrobial ESBL-PE	0 (0%)	2 (4%)
Non-fermenting gram-negative bacilli and enterobacteriaceae	6 (10%)	17 (35%)
Polymicrobial with ESBL *Enterobacter* or *K. pneumoniae* and non-fermenting gram-negative bacilli	0 (0%)	17 (35%)
Polymicrobial with ESBL *E. coli* and non-fermenting gram-negative bacilli	0 (0%)	0 (0%)
NF-GNB alone	37 (59%)	0 (0%)
Gram positive bacteria	3 (5%)	0 (0%)
Carbapenem-resistant microorganism	19 (30%)	6 (13%)
Carbapenem-resistant NF GNB	17 (27%)	6 (13%)

Variables	**ESBL - (n=63)**	**ESBL + (n=48)**	**OR (95%CI)**	**P Value**
Shock	24 (38%)	28 (58%)	2.28 (1.04 – 4.99)	0.035*
SAPS II >43	25 (40%)	29 (60%)	2.32 (1.0 – 5.10)	0.028*
Prior hospital admission				
Procedures before ICU admission				
Comorbidities				
Diabetes mellitus	8 (13%)	13 (27%)	2.55 (0.94 – 6.9)	0.055*
ESBL colonization				
Acquisition	32 (51%)	25 (52%)		>0.99
***E. coli* alone**	26 (41%)	3 (6%)	0.10 (0.03–0.34)	<0.001
E.cloacae/ K. pneumoniae	37 (59%)	45 (78%)	10.5 (2.95 - 37.6)	<0.001*
Others ESBL infections before ICUAP	3 (5%)	7 (15%)	3.4 (0.83 – 14.0)	0.07
Organe support before pneumonia				
ICU-acquired infection before pneumonia	21 (33%)	14 (29%)		0.64
ICU-acquired pneumoniae before >1	3 (5%)	10 (21%)	5.25 [1.29 – 21.4]	0.009
Mechanical ventilation	57 (92%)	48 (100%)	1.8 (1.5 – 2.2)	0.035
Dialysis	13 (21%)	19 (40%)	2.5 (1.09-5.8)	0.029
ECMO	0 (0%)	4 (8%)		0.032
Ab in ICU before pneumonia				
Penicillin + iBL >2j	23 (37%)	6 (12%)	0.25 (0.1 – 0.68)	0.003*
Miscellaneous				
Days after admission	12 [7-23]	13 [8-23]		0.94
Duration of MV before ICU acquired pneumonia	11 [7-21]	12 [7-20]		0.70



Intensive Care Med
DOI 10.1007/s00134-012-2675-0

Multivariable analysis of the risk for ESBL-PE pneumonia among 111 patients with ESBL-PE colonization

Predictor	**aOR**	**95% Conf. Interval**	**P**
SAPS2 > 43	2.81	1.16 - 6.79	0.022
>2 days amoxicillin/clavulanic acid in ICU	0.24	0.08 -0.71	0.010
Colonization with *E. cloacae* or *K. pneumoniae*	10.96	2.93 - 41.0	<0.0001

Helene Guet-Revillet AJIC 2012

Boyer Crit Care 2011
Venier Journal of Hospital infection 2014
Thuong Journal of Hospital infection 2003

Facteurs de risque de bactéries résistantes aux carbapenème Résistant (Logistic regression analysis).

Predictor	**Odds Ratio**	**95% Conf. Interval**	**P**
Chronic renal insufficiency	8.9	2.36 - 33.4	0.001
3CG within past 3 months	3.5	1.09 - 11.5	0.035
ARDS before pneumonia	1.7	1.30 - 8.73	0.026
Carbapenem in ICU	4.8	1.56 - 15.0	0.006

TABLE 2 Univariate and multivariate analysis of risk factors associated with intestinal colonization of imipenem-resistant Gram-negative bacilli[a]

Characteristic or outcome	No. of individuals or parameter value (%, unless range is specified)				
	Carrier patients (n = 36)	Controls (n = 36)	Univariate OR[b]	Univariate P[c]	Multivariate OR[d]
Days of imipenem exposure				<0.01	
0	8 (22.2)	22 (61.1)	1.0		1.0
1 to 3	10 (27.8)	6 (16.7)	4.4 (1.1–20.5)		5.9 (1.5–25.7)
4 to 21	18 (50.0)	8 (22.2)	6.0 (1.7–23.3)		7.8 (2.4–29.8)

Armand Lefèvre AAC 2013

Table 7. Resistance of *P. aeruginosa* strains to imipenem, ceftazidime, or ciprofloxacin, according to previous therapy with imipenem, a third-generation cephalosporin, or a fluoroquinolone.

Strain resistance	No. (%) of patients, by previous drug therapy received					
	Imipenem		Third-generation cephalosporin		Fluoroquinolone	
	No (n = 114)	Yes (n = 21)	No (n = 73)	Yes (n = 62)	No (n = 100)	Yes (n = 35)
To imipenem	19 (16.7)	11 (52.4)[a]	12 (16.4)	18 (29.0)	18 (18)	12 (34.3)[d]
To ceftazidime	17 (14.9)	7 (33.3)	6 (8.2)	18 (29.0)[b]	14 (14)	10 (28.6)
To ciprofloxacin	35 (30.7)	11 (52.4)	25 (34.2)	21 (33.9)	26 (26)	20 (57.1)[c]

Trouillet CID 2002

AAC Journals.ASM.org

Imipenem, Meropenem, or Doripenem To Treat Patients with *Pseudomonas aeruginosa* Ventilator-Associated Pneumonia

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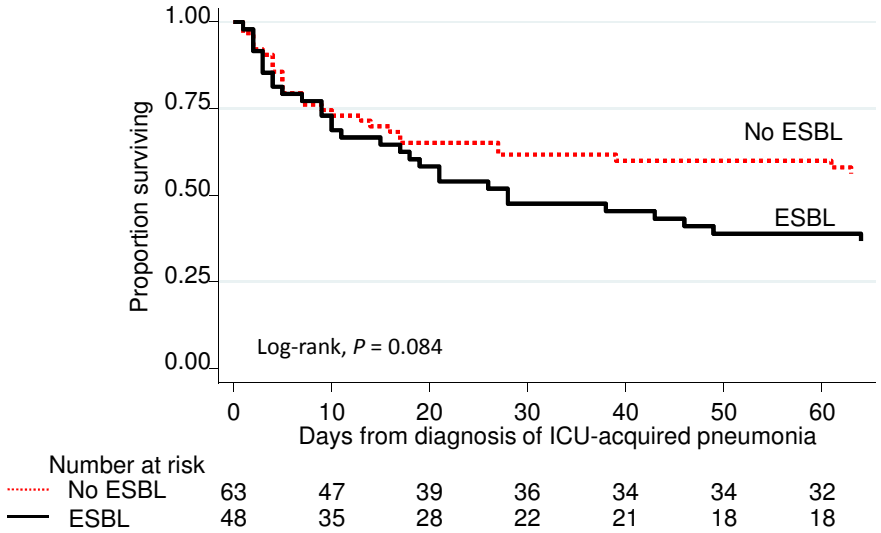
Pronostic

Outcome associated with nosocomial pneumonia, according to aetiology (n=111)

Variables	ESBL- (n=63)	ESBL + (n=48)	P Value
Septic shock	21 (33%)	25 (52%)	0.047
SOFA at ICU-AP onset	4 [2-9]	7 [4-10]	0.037
Bacteraemia	5 (8%)	7 (15%)	0.26
Appropriate empirical antimicrobial therapy *	48 (76%)	37 (77%)	0.91
Appropriate 1st beta-lactam	46 (73%)	31(65%)	0.34
Resolution of infection§	49 (78%)	35 (73%)	0.31
LOS in ICU, all patients Survivors only	25 [18-41] 25 [22-41]	33 [19-60] 40 [27–80]	0.09 0.017
LOS in hospital, all patients Survivors only	41 [23–70] 57 [40–75]	42 (20-84) 62 [46–121]	0.81 0.29
Death in ICU	24 (38%)	28 (58%)	0.034
Death in hospital	27 (43%)	32 (67%)	0.013

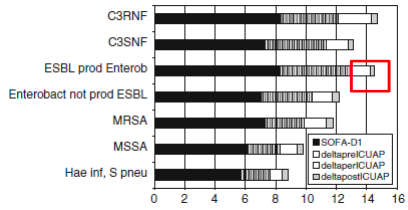
Kaplan-Meier survival estimates



Cox regression (bivariable and multivariable) analyses of variables associated with death at sixty days.

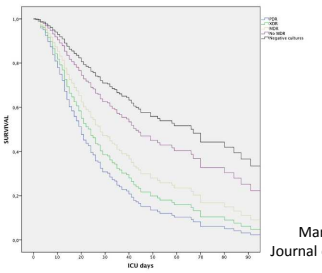
	Bivariable analysis		Multivariable analysis	
Variable	**HR (95% CI)**	**P Value**	**aHR (95% CI)**	**P Value**
SAPS2 >43	1.76 (1.03 – 3.00)	0.038	1.93 (1.12 – 3.34)	0.018*
Chronic pulmonary disease	1.68 (0.93 – 3.04)	0.086	-	
Liver cirrhosis	1.89 (0.86 – 4.17)	0.11	-	
Ab < 3 mo., broad-sp. >10 d	2.21 (1.31 – 3.71)	0.003	-	
C3G <3 mo	1.64 (0.93 – 2.90)	0.087	-	
Carbapenem <3mo	2.59 (1.11 – 6.06)	0.03	-	
Charlson >2	1.75 (1.04 – 2.95)	0.034	-	
ESBL colonization at admission	1.56 (0.92 – 2.63)	0.10	-	
Septic shock associated with nosocomial pneumonia	2.86 (1.68 – 4.85)	0.0001	2.81 (1.66 – 4.78)	<0.0001*
VAP	0.48 (0.24 – 0.96)	0.037	0.48 (0.24 – 0.98)	0.04*
ESBL PE ICUAP	1.57 (0.93 – 2.64)	0.091	1.15 (0.65 – 2.05)	0.64
ICU-acquired infection before ICUAP	0.51 (0.28 – 0.95)	0.033	0.52 (0.28 – 0.97)	0.04*
Others antibiotics between colonization and pneumonia	1.49 (0.89 – 2.52)	0.13	-	
Appropriate empirical antimicrobial therapy	1.05 (0.56 – 1.95)	0.88	0.66 (0.34 – 1.27)	0.22

Effet de la résistance sur le pronostic



Severity of ICU-acquired pneumonia according to infectious microorganisms

Intensive Care Med (2011) 37:1128–1135
DOI 10.1007/s00134-011-2255-8



Clinical outcomes of health-care-associated infections and antimicrobial resistance in patients admitted to European intensive-care units: a cohort study

Marie-Laurence Lambert, Carl Suetens, Anne Savey, Mercedes Palomar, Michael Hiesmayr, Ingrid Morales, Antonella Agodi, Uwe Frank, Karl Mertens, Martin Schumacher, Martin Wolkewitz

Martin-Loeches
Journal of infection 2015

Ratios of hazard ratios: resistant vs sensitive

Acinetobacter baumannii	0·7 (0·4–1·3)	1·0 (0·6–1·8)	..	1·43 (0·98–2·08)	1·41 (0·95–2·09)
Escherichia coli	1·8 (1·2–2·8)	1·4 (0·9–2·3)	..	1·03 (0·76–1·40)	0·97 (0·71–1·34)
Pseudomonas aeruginosa	1·2 (1·0–1·5)	1·2 (1·0–1·5)*	..	1·00 (0·88–1·13)	0·96 (0·84–1·09)
Staphylococcus aureus	1·6 (1·3–1·9)	1·3 (1·0–1·6)*	..	1·03 (0·92–1·15)	1·03 (0·92–1·10)
All four microorganisms combined	1·3 (1·1–1·4)	1·2 (1·1–1·4)	..	1·05 (0·97–1·13)	1·05 (0·97–1·13)

Exposed patients are compared with the rest of the cohort. A lower hazard ratio for discharge value (<1) shows a smaller hazard of being discharged and a longer excess length of stay. For the time-adjusted model, the length of stay before infection was implicitly adjusted for. For the fully adjusted model, adjustment was also made for baseline variables (age, sex, simplified acute physiology score II score on admission, type of admission [medical, scheduled surgery, or unscheduled surgery], origin of patients [other ward on same hospital, other ICU, long-term care facility, community], trauma, impaired immunity, antibiotics within 48 h of admission, and number of days with intubation and central venous catheter). ICU=intensive-care unit. C3G=third-generation cephalosporins. MSSA=meticillin-sensitive *Staphylococcus aureus*. MRSA=meticillin-resistant *Staphylococcus aureus*. *p<0·05.

Table 4: **Health-care-associated pneumonia: hazard ratios for ICU death and discharge (dead or alive), and excess length of stay**

Quand couvrir la BLSE?

- Tenir compte de:
  - l'écologie locale
  - De la connaissance de la colonisation (notamment kp/Enterobacter)
  - De la gravité du patient
  - Des traitements reçu (augmentin / carbapénème)
  - Intérêt des associations

Risque de BLSE
SAPS2 > 43
Pas >2 jours d'augmentin
Colonisé à *E.cloacae* ou *K.pneumoniae*

Risque de germe carbaR
I Rénale
C3G dans les 3 mois
SDRA
Carbapenème en réa

Table 2. Risk Factors for Multidrug-Resistant Pathogens

Risk factors for MDR VAP
Prior intravenous antibiotic use within 90 d
Septic shock at time of VAP
ARDS preceding VAP
Five or more days of hospitalization prior to the occurrence of VAP
Acute renal replacement therapy prior to VAP onset

Perspective

- βlacta test
- PCR
- NGS…

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Evaluation of the βLacta Test, a Rapid Test Detecting Resistance to Third-Generation Cephalosporins in Clinical Strains of *Enterobacteriaceae*

Original Article

Phenotypic and Genotypic Methods for Detection of Extended Spectrum β Lactamase Producing *Escherichia coli* and *Klebsiella pneumoniae* Isolated from Ventilator Associated Pneumonia

VEENA KRISHNAMURTHY1, VIJAYKUMAR G.S.2, SUDEEPA KUMAR M.3, PRASHANTH H.V.4, PRAKASH R.5, NAGARAJ E.P.6

Journal of Clinical and Diagnostic Research. 2013 Sept, Vol-7(9): 1975-1978

βlacta test

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Evaluation of the βLacta Test, a Rapid Test Detecting Resistance to Third-Generation Cephalosporins in Clinical Strains of *Enterobacteriaceae*

TABLE 3 Performances of the βLacta test for detecting resistance to third-generation cephalosporins[a]

		Susceptibility testing result (*n*) for:			% (95% CI)[d]	
Bacteria tested	βLacta result	3GC-R[b]	3GC-S[c]	Total	Sensitivity	Specificity
All strains	Positive	265	8	273	87.7 (83.0–92.5)	99.6 (99.3–100)
	Negative	37	2,020	2,057		
	Total	302	2,028	2,330		
E. coli	Positive	119	1	120	96.0 (91.6–100)	99.9 (99.7–100)
	Negative	5	1,258	1,263		
	Total	124	1,259	1,383		
K. pneumoniae	Positive	79	0	79	96.3 (91.2–100)	100 (100–100)
	Negative	3	240	243		
	Total	82	240	322		
P. mirabilis	Positive	0	1	1		99.4 (NA)
	Negative	0	171	171		
	Total	0	172	172		
Species naturally producing inducible AmpC beta-lactamase	Positive	60	1	61	67.4 (55.0–79.8)	99.6 (98.6–100)
	Negative	29	244	273		
	Total	89	245	334		
K. oxytoca and *C. koseri*	Positive	7	5	12	100 (100–100)	95.5 (90.7–100)
	Negative	0	107	107		
	Total	7	112	119		

Merci de votre attention