

The spectrum of invasive Pneumococcal infections (IPI) across various comorbid conditions: A multicenter observational study from the Outcomerea research group.

OUTCOME RÉA

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INTRODUCTION: Even though *Streptococcus pneumoniae* is a leading pathogen in severe community, hospital or nursing facility infections. Large and recent data are lacking in the ageing and increasingly comorbid ICU population. We sought to describe the characteristics of IPI and to report IPI outcomes across various comorbidities.

METHODS: We performed an observational multicenter study on the Outcomerea database (1997-2016). Included patients were adult, with a hospital stay <48 hours before ICU admission and a documented IPI within the first 72 hours of ICU admission. Patient's characteristics, admission diagnostic, comorbidities (Knaus and Charlson definitions), severity of illness, infection characteristics and outcomes were extracted from the Outcomerea database. After multiple imputation of missing data, a stepwise logistic regression was performed with day-28 mortality as the outcome variable. Secondly, two models were built by forcing comorbidities according to Knaus or Charlson definitions.

RESULTS: Of the 20 235 patients, 5310 (26.4%) presented with an invasive infection, including 572/5310 (10.8%) with an IPI (Figure 1). The most frequent IPI was pneumonia (n=504, 88.1%) and meningoencephalitis (n=65, 11.4%). **Bacteremia occurred in 203 (36%) of the cases.** Day 28 and hospital mortality were 43/325 (13,2%) vs 45/227 (19,8%), p=0,037 and 66 (20,3%) vs 74 (32,6%) p=0,001 in patients without and with comorbidities, respectively.

Figure 1: Flow chart

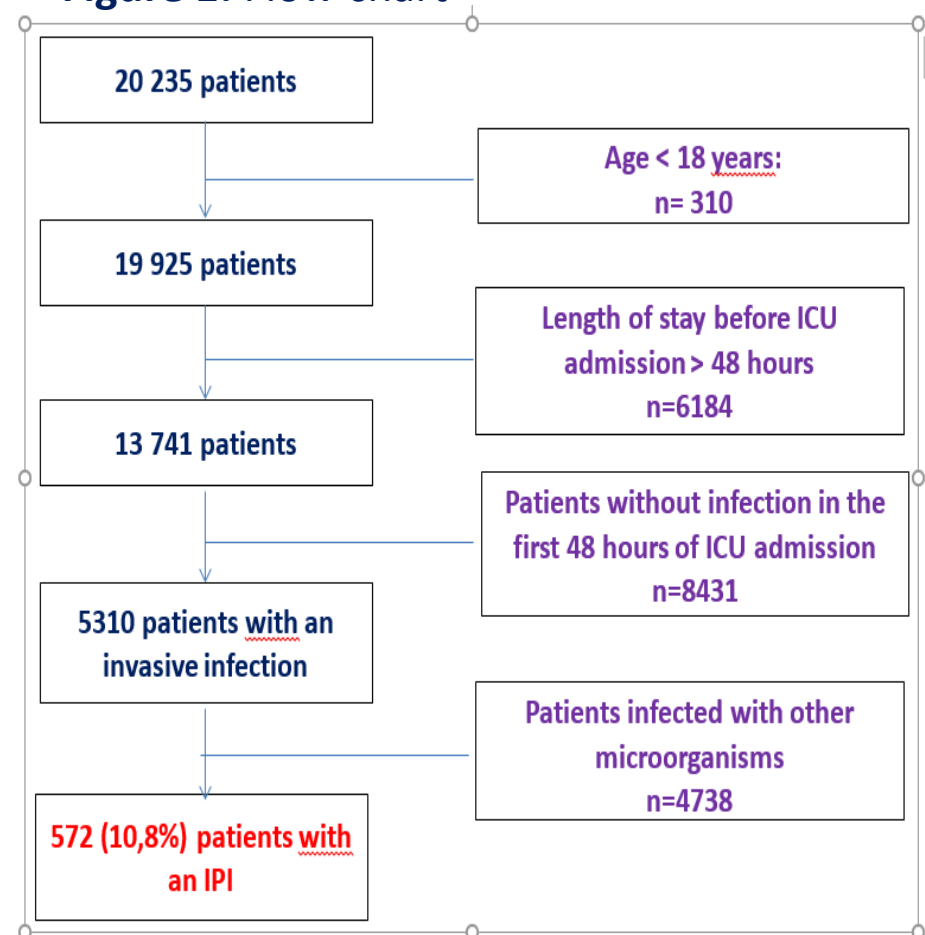


Table 1. Characteristics of patients with an IPI

Variables	Patients N (%)
N (%)	N=572
Age, years	59 (75-72)
Male gender	356 (62.2)
Severity on admission	
SAPS II	44 (33-59)
SOFA	6 (4-9)
Patient status	
Medical patients	551 (96.3)
Main symptom at admission	
Shock and multi-organ failure	114 (19.9)
Chronic obstructive respiratory disease	268 (46.9)
Acute renal failure	11 (1.9)
Coma	140 (24.5)
Monitoring/ Scheduled surgery/Trauma	39 (6.8)
Presence of a diabetes mellitus	72 (12.6)
Infection characteristics, day 1-2	
Leucopenia	71 (12.5)
Maximum lactate	2.4 (1.5-4)
Presence of sepsis	498 (85.1)
Presence of septic shock	276 (48.3)
Bacteremia	203 (36)
Intensity of care, day 1-2	
Endotracheal mechanical ventilation	360 (62.9)
Non-invasive mechanical ventilation	90 (15.7)
Epinephrine/Norepinephrine	245 (42.8)
Renal replacement therapy	42 (7.7)
Prone position	11 (1.9)
Presence of steroids	154 (26.9)

Table 2. Comorbidities according to Charlson or Knaus definitions

Variables	Patients N (%)
N (%)	N=572
Comorbidities (Knaus definition)	
Liver	25 (4.4)
Cardio-vascular	64 (11.2)
COPD	103 (18)
Renal	16 (2.8)
Immunosuppression	92 (16.1)
Comorbidities (Charlson definition)	
Cancer	72 (12.6)
Cardio-vascular	94 (16.4)
COPD	129 (22.6)
Renal	24 (4.2)

Table 3. Multivariate analysis to estimate day-28 mortality in patients with IPI

Variables	Adjusted* HR	p-value	HR**	p-value
	95% CI		95% CI	
SOFA day 1-2	1.15 (1.09-1.22)	<0.0001	1.14 (1.07-1.20)	<0.0001
Maximum lactate day 1-2	1.07 (1.02-1.12)	0.001	1.07 (1.03-1.12)	0.001
Diabetes mellitus	2.22 (1.33-3.67)	0.002	2.07 (1.23-3.34)	0.004

Table 4. Multivariate analysis to estimate the impact of comorbid conditions on day-28 mortality in patients with IPI.

Impact of comorbid conditions (Knaus model)				
Variables	Non-adjusted HR	p-value	Adjusted* HR**	p-value
	95% CI		95% CI	
Liver	3.14 (1.60-6.18)	0.0009	1.26 (1.62-2.60)	0.53
Cardio-vascular	1.71 (0.84-3.51)	0.14	1.19 (0.55-2.56)	0.67
COPD	1.18 (0.63-2.24)	0.60	1.30 (0.68-2.50)	0.42
Renal	0.99 (0.29-3.42)	0.99	0.60 (0.16-2.21)	0.44
Immunosuppression	1.18 (0.66-2.12)	0.57	1.24 (0.69-2.23)	0.48
SOFA day 1-2			1.13 (1.07-1.20)	<0.0001
Maximum lactate day 1-2			1.07 (1.03-1.12)	0.001
Diabetes mellitus			2.06 (1.20-3.52)	0.009
Impact of comorbid conditions (Charlson model)				
Cancer	1.30 (0.68-2.22)	0.49	1.31 (0.71-2.34)	0.38
Cardio-vascular	1.14 (0.59-2.20)	0.70	0.86 (0.44-1.67)	0.65
COPD	1 (0.55-1.79)	0.99	1.30 (0.71-2.37)	0.39
Renal	1.38 (0.50-4.28)	0.57	0.92 (0.29-2.91)	0.89
SOFA day 1-2			1.14 (1.07-1.20)	<0.0001
Maximum lactate day 1-2			1.07 (1.03-1.12)	0.001
Diabetes mellitus			2.06 (1.20-3.52)	0.009

CONCLUSIONS: In this large multicenter study of 512 patients with IPI, diabetic patients had increased mortality, independently of severity on admission.

Mortality was not different in patients with other comorbidities such as liver diseases, chronic renal insufficiency, COPD, cancer or other immunosuppression. Studies to evaluate preventive strategies in diabetic patients are warranted.

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