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**The spectrum of invasive pneumococcal infections (IPI) across various comorbid conditions: a multicentre observational study from the Outcomerea research group**

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**Background:** *Streptococcus pneumoniae* is a leading pathogen in community, hospital or nursing facility infections. Data are lacking in the ageing and comorbid ICU population. We sought to describe the characteristics of IPI and to report IPI outcomes across various comorbidities.

**Material/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. The most frequent IPI was pneumonia (n=504, 88.1%) and meningococcal meningitis (n=65, 11.4%). Bacteremia occurred in 203 (36%) of the cases.

Variables	Patients N=572	Survivors N=479	Decedents Day-28 N=93	p-value
Age, years	59 (75-72)	59 (45-71)	61(46-77)	0.88
Severity on admission SAPS II SOFA	44 (33-59) 6 (4-9)	42 (32-55) 6 (4-9)	62 (52-73) 10 (7-13)	<.001 <.001
Medical patients	551 (96.3)	462 (96.5)	89 (95.7)	0.82
Presence of a diabetes mellitus	72 (12.6)	51 (10.6)	21 (22.6)	.002
Comorbidities (Knaus definition)				
Liver	25 (4.4)	14 (2.9)	11 (11.8)	<.001
Cardio-vascular	64 (11.2)	49 (10.2)	15 (16.1)	0.16
COPD	103 (18)	86 (18)	17 (18.3)	0.79
Renal	16 (2.8)	13 (2.7)	3 (3.2)	0.93
Immunosuppression	92 (16.1)	76 (15.9)	16 (17.2)	0.91
Comorbidities (Charlson definition)				
Cancer	72 (12.6)	57 (11.9)	15 (16.1)	0.43
Cardio-vascular	94 (16.4)	77 (16.1)	17 (18.3)	0.64
COPD	129 (22.6)	109 (22.8)	20 (21.5)	0.99
Renal	24 (4.2)	19 (4)	5 (5.4)	0.45

Data are in median (95% CI) or n (%). P-value between survivors and decedents

By univariate analysis, factors associated with day-28 mortality were: diabetes mellitus (HR, 95% CI: 2.12 (2.31-3.45)); liver disease as defined by Knaus 2.89 (1.54-5.42). By multivariate analysis, only severity at admission (SOFA per point: 1.13 (1.07-1.20, p<.0001), maximum lactate at day1-2: 1.08/point (1.03-1.12, p=0.0013) and diabetes mellitus (2.06 (1.20-3.52, p=0.0086) were associated with day-28 mortality. Use of Charlson index instead of Knaus led to similar results. Diabetes mellitus was also independently associated with ICU or hospital mortality.

**Conclusions:** In this study, 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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