487. Severity, comorbidities and outcomes in community-acquired pneumonia

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Late-breaking abstract: CAP, HCAP and immunocompromised patients with pneumonia: Should we rethink the concepts?

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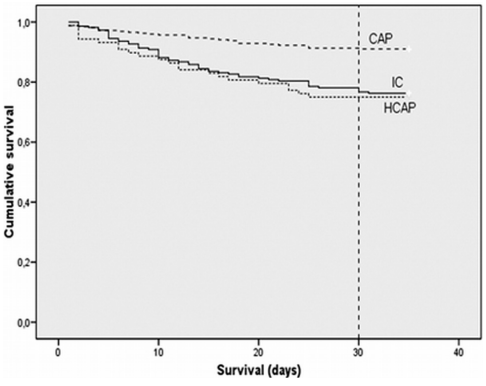
The entity of HCAP defined by the ATS/IDSA 2005 guidelines has been recently criticized for possible confusion create by too much heterogeneous population and "misleading microbiological data" that generate potential overtreatment. A reassignment of the criteria for HCAP to reconstruct the triad of CAP, HAP, and pneumonia in immunocompromised (IC) has been suggested.

The aim of this six-years prospectical cohort study is to compare demographics, aetiology and outcome of patients admitted with pneumonia and categorised as CAP, HCAP and IC.

In a tertiary care teaching hospital, 629 consecutive patients were classified as CAP (n=322), HCAP (n=88) and IC (n=219) according to the existing criteria. HAP, aspiration pneumonia and hemodialytic patients were excluded. The three groups patients' characteristics and 30-day mortality were compared.

The mean age was 75.0 for CAP patients, 77.8 for HCAP and 70.8 for IC. 48.8% of CAP, 83.0% of HCAP and 73.1% of IC patients were older than 80 yrs of age. Mortality rate was 9.0% in CAP, 25.0% in HCAP and 23.7% in IC. The 30-day mortality of HCAP and IC patients had a similar trend that was far different from the mortality of CAP patients ($p<0.001$).



In conclusion, these data suggest that our IC cohort seem not to be so different from the not-IC patients classified as HCAP by the 2005 ATS/IDSA guidelines. Further investigations are mandatory in order to redisign pneumonia categories.

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Weight of the IDSA/ATS minor criteria for severe community-acquired pneumonia

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Background: The 2007 Infectious Disease Society of America (IDSA)/American Thoracic Society (ATS) guidelines defined severe community-acquired pneumonia (CAP) when patients fulfilled three out of nine minor criteria. Whether each of the criteria is of equal weight is not clear. The purpose of this study was to determine the weight of the minor criteria.

Methods: 1230 adult patients admitted to our hospital from 2005 to 2009 for CAP were reviewed retrospectively. Patients who fulfilled any IDSA/ATS major criteria for severe CAP at the emergency department were excluded.

Results: Hospital mortality rose sharply from 0.3%, 1.0% and 3.3%, respectively, for patients with none, one and two minor criteria to 10.5% for patients with three minor criteria. Arterial oxygen pressure/fraction inspired oxygen (PaO_2/FiO_2) $\leq$250 mm Hg, confusion, and uremia had the strongest association with mortality (Odds ratio, 22.162, 22.148, 16.343; respectively). Leukopenia, hypothermia, and hypotension were not associated with mortality. Sequential organ failure assessment (SOFA) scores and costs increased significantly with the number of minor criteria present. Uremia and PaO_2/FiO_2 $\leq$250 mm Hg were most strongly associated with SOFA scores [rank correlation coefficient (r_s), 0.352, 0.336; respectively]. $PaO_2/FiO_2 \leq 250$ mm Hg and confusion were in closest relation to hospital length of stay (LOS) (r_s, 0.114, 0.114; respectively). PaO_2/FiO_2 $\leq$250 mm Hg and multilobar infiltrates were most strongly associated with costs (r_s, 0.257, 0.196; respectively).

Conclusions: The individual 2007 IDSA/ATS minor criteria for severe CAP were of unequal weight in predicting hospital mortality, SOFA scores, hospital LOS, and costs.

4708

The impact of cardiovascular events in hospitalized patients with community-acquired pneumonia (CAP): Preliminary results from the FAILCAP study

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Cardiovascular events (CVEs) could be detected during the management of hospitalized patients with CAP because of the concomitant hypoxemia and systemic inflammation. The aim of our study was to evaluate incidence, risk factors and outcomes of hospitalized patients with CAP undergoing CVEs. An international, multicenter, prospective, observational study was performed on consecutive CAP patients hospitalized from October 2009 to December 2010 in 8 Respiratory Dpts (ClinicalTrials: NCT01143155). CVEs were recorded both on hospital admission and during hospitalization. Among the 431 patients enrolled (56% males; mean±SD age:73±16 years), incidence of CVEs was 20%. The type of CVEs and their incidence is depicted in table.

CVEs	Total	On admission	During hospitalization
Acute myocardial infarction	14 (3)	11 (3)	3 (1)
Acute cardiogenic pulmonary edema	20 (5)	13 (3)	7 (2)
Serious arrhythmia	46 (11)	27 (6)	19 (4)
Long term worsening arrhytmia	6 (1)	5 (1)	1 (0)
Cerebrovascular accident	7 (2)	4 (1)	3 (1)
Pulmonary embolism	10 (2)	3 (1)	7 (2)

Risk factors independently associated with the presence of CVEs were age, ventilatory support, thrombocytosis and a low diastolic blood pressure on admission, as well as a clinical failure during hospitalization. Mortality among patients who experienced CVEs was higher in comparison to the rest of the population (21% vs. 10%, p=0.004), as well as mortality at 30 days (28% vs. 11%, p<0.001) and re-hospitalization at 30 days (20% vs. 10%, p=0.024). CVEs are common in hospitalized patients with CAP and their early identification and treatment may improve clinical outcomes of patients with CAP.

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Serum cortisol predicts death and critical disease independently of CRB-65 score in community-acquired pneumonia

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Rationale: The aim was to evaluate serum cortisol as biomarker for the prediction of adverse outcomes independently of the CRB-65 score und inflammatory biomarkers in a large cohort of hospitalised CAP-patients.
Methods: 984 hospitalised CAP-patients from the CAPNETZ study cohort were included. Serum cortisol was measured and its prognostic accuracy compared to the CRB-65 score, leukocyte count and C-reactive protein. Predefined endpoints were 30-day mortality and development of critical pneumonia.
Results: 64 patients died (6.5%) and 85 developed critical pneumonia (8.6%). Cortisol levels were significantly elevated in both adverse outcomes (p<0.001) and predicted mortality (AUC 0.70) and critical pneumonia (AUC 0.71) independently of all other measured variables including CRB-65 score after logistic regression analysis (p=0.005 and 0.001, respectively). Prognostic accuracy of CRB-65 was significantly improved by adding cortisol levels (combined AUC 0.81 for both endpoints). In Kaplan-Meier analysis, cortisol predicted survival within different CRB-65 strata (p=0.003). In subgroup analyses, cortisol independently predicted critical pneumonia when compared to procalcitonin and minor criteria of the 2007 ATS/IDSA-guideline.
Conclusion: Cortisol predicts mortality and critical disease in hospitalised CAP-patients independently of clinical factors and inflammatory biomarkers. It represents a promising biomarker to complete the available panel of inflammatory, cardiovascular and other biomarkers for risk prediction and should be incorporated into trials assessing optimal combinations of clinical criteria and biomarkers to improve high risk prediction in CAP.

4710

A population-based study of statin, ARB, and ACE inhibitor use on pneumonia-related outcomes

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Studies suggest that statins and/or angiotensin converting enzyme inhibitors (ACEI) might be beneficial for some infections. Our purpose was to examine the association of the use of statins, ACEI, and angiotensin–receptor blockers (ARBs) on pneumonia-related outcomes.
We conducted a 5–year national cohort study using US Department of Veterans Affairs data including patients >64 years hospitalized with pneumonia. Outcomes examined included 30-day mortality, need for mechanical ventilation and/or vasopressors. We performed propensity-score matching for all 3 of the medication classes simultaneously adjusting for 40 different potential confounders. Results reported as odds ratios and 95% confidence intervals.
Of 50,119 eligible patients, we matched 11,498 cases with 11,498 controls. Mortality at 30-days was 13%. Overall, 34% used statins, 30% ACEI, and 4% ARBs. After matching no clinically significant imbalances existed between cases/controls. In adjusted models, prior statin use was associated with decreased mortality (0.74, 0.68–0.82) and mechanical ventilation (0.81, 0.70–0.94). Inpatient statin use was associated with decreased mortality (0.68, 0.59–0.78) and mechanical ventilation (0.68, 0.60–0.90). Prior (0.88, 0.80-0.97) and inpatient use (0.58, 0.48–0.69) of ACEI were only associated with decreased mortality. Prior (0.73, 0.58–0.92) and inpatient use (0.47, 0.30–0.72) of ARBs were only associated with decreased mortality.
Use of statins, and to a lesser extent ACEI and ARBs, is associated with improved pneumonia-related outcomes. Additional studies are needed to determine whether the use of these medications in those with pneumonia may be beneficial.

4711

Dysnatremia, vasopressin, atrial natriuretic peptide and mortality in community-acquired pneumonia – Results from the German competence network CAPNETZ

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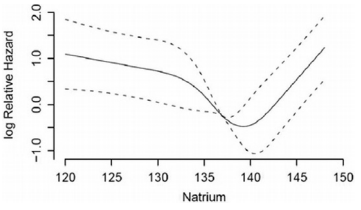
Background: Dysnatremia is frequent in pts with community acquired pneumonia (CAP). Associations between hyponatremia (HypoN), hypernatremia (HyperN) and other variables in CAP remain unclear.
Methods: We enrolled 2138 pts (60±18 y, 45% f) with CAP. Pro-atrial natriuretic peptide (proANP), pro-vasopressin (proAVP), serum sodium (Na) and CRB-65 score were determined on admission. Patients were followed up for 28d. Na on admission was examined as a function of mortality at 28d. HypoN was defined as Na <136 mmol/L, HyperN as Na > 145 mmol/L.
Results: HypoN was diagnosed in 680 (31.8%), HyperN in 29 (1.4%) pts. Pts with HypoN were older, had more comorbidities, higher CRB-65 and higher proAVP and proANP (all p< 0.05). When examined as a function of Na values, a U-shaped association was found between Na level and 28d mortality.



In multivariate Cox proportional hazards analysis, HypoN and HyperN were independent predictors of 28d mortality. Those with HypoN and more elevated proAVP and proANP had highest rates of 28d death. HypoN predicted only 28d mortality in those with an elevated proAVP and proANP.
Conclusion: HypoN is common in CAP and associated with mortality. HyperN is rare but also associated with mortality. However, the prognostic value of Na is mainly evident in those with more pronounced elevation of pro-vasopressin and proANP concentrations.

4712

How to recognize clinical stability in hospitalized patients with community-acquired pneumonia (CAP)?

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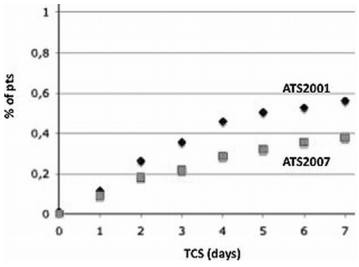
Clinical stability (CS) is the earliest outcome for patients with CAP. ATS guidelines suggested two different criteria in 2001 and 2007 to recognize patients' CS.

The aim of our study was to compare the predicting ability of these two criteria. An observational, retrospective study of consecutive CAP patients admitted to the Veterans Hospital of Louisville, KY, US, between June 2001 and March 2006 was performed. Time to CS (TCS) was calculated as the number of days from hospital admission to the date the patient met CS criteria. Comparison between the two scores was performed with regard to a combined outcome including failure or death either during hospitalization or up to 30 days after discharge. A total of 487 patients (98% males; mean±SD age: 69±12 yrs) were enrolled. Mean±SD TCS of the study population was lower using ATS2001 in comparison to ATS2007 criteria (3.05±2.2 vs. 3.55±2.5 days, respectively, $p<0.001$). CS was identified on the same day by both scores in 38% of the population. ATS2001 criteria predicted CS earlier in comparison to ATS2007 in 40% of the population. Patients who reached clinical stability are depicted in Figure according to the two scores.



The ROC curve area based on the combined outcome was similar for both scores (0.762 for ATS2001 and 0.799 for ATS2007). ATS2001 criteria seem to predict CS earlier in comparison with ATS2007, and their use could allow to shorten the hospital stay.

4713

Inhaled corticosteroids (ICS), systemic inflammatory response and mortality in community-acquired pneumonia (CAP)

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Background: It was suggested a possible protective effect of ICS in patients with pneumonia.Whether this would be related to modulation of the systemic inflammatory response is unknown. We assessed the relationship between systemic inflammation, ICS and outcome in hospitalised patients with CAP.

Methods: We determined serum levels of C-reactive protein (CRP), Procalcitonin, TNF-alpha, IL-1, IL-6, IL-8 and IL-10 at admission in patients with chronic outpatient treatment with ICS or not, and compared treatment with ICS, biomarkers and other factors potentially related with inflammatory response or mortality in survivors and non-survivors.

Results: We prospectively assessed 663 consecutive patients with CAP; 128 (19%) received outpatient ICS. Patients with ICS were older, had more frequently COPD and asthma, higher PSI and CURB-65 risk classes, less frequently *Legionella pneumophila* aetiology, and lower serum levels of TNF-alpha ($p<0.001$) and IL-6 ($p=0.015$) at admission. However, hospital mortality was lower for patients treated with ICS (2, 1.6% *vs* 34, 6.4%, OR 0.23, 95% CI 0.06-0.99, $p=0.048$). After adjusting for age and severity scales, the association of ICS with lower mortality became stronger (adj.OR 0.12, 95% CI 0.02-0.61, $p=0.010$), and persisted when even in non-COPD patients (adj. OR 0.07, 95% CI 0.01-0.74, $p=0.027$).

Conclusion: Chronic outpatient treatment with ICS was associated with improved survival of CAP possibly due to modulation of patients' inflammatory response. Whether ICS may improve or not the outcome of patients needs prospective investigation.

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