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A Molecular Biomarker to Diagnose Community-Acquired Pneumonia

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Introduction

Pneumonia is a viral and bacterial infection of the lower airways (distal bronchi and alveoli). Community-acquired pneumonia (CAP) is the clinical manifestations of pneumonia acquired outside of a hospital setting. 1 It is one of the most common serious childhood infections, accounting for more than 900,000 deaths among children under the age of five in 2015. 2 CAP continues to account for a significant proportion of health-care visits and hospitalizations in high-income countries, despite the fact that the rate of mortality is much lower in the developed world compared to the developing world. The focus of this review is on paediatric CAP in the United States and other industrialised countries.

Description

Study design and patient selection

The research was carried out in two tertiary referral centres in the Netherlands (Academic Medical Center, Amsterdam and University Medical Center Utrecht, Utrecht) as part of the Molecular Diagnosis and Risk Stratification of Sepsis project. Both participating centres' Medical Ethics committees approved an opt-out consent method (IRB no. 10–056C). The current study included two cohorts of patients who were admitted to the ICU with suspected CAP and were started on antibiotics by the attending physician[1]. CAP was diagnosed using the International Sepsis Forum Consensus Conference definition, as previously described in detail. Based on a post-hoc review of all available data, dedicated observers classified the plausibility of CAP as "definite," "probable," "possible," or "none."

The first (discovery) cohort included 101 CAP and 33 non-CAP patients and was enrolled between January 2011 and July 2012. The second (validation) cohort included 70 CAP and 30 non-CAP patients and was enrolled between July 2012 and June 2013. The online supplement contains exclusion criteria. The Acute Physiology and Chronic Health Evaluation (APACHE) IV score was used to determine severity [2]. Hypotension requiring noradrenaline (>0.1 g/kg/min) for at least 50% of the day was defined as shock. Within 24 hours of ICU admission, blood was collected in PAXgene tubes (Becton-Dickinson, Breda, the Netherlands) and ethylenediaminetetraacetic acid vacutainer tubes. After providing written informed consent, blood samples for PAXgene were obtained from 42 healthy control subjects (median age, 35 [interquartile range, yr; 57% male) [3-5].

Conclusion

CABP contributes to a significant healthcare burden, with a disproportionate impact on developing countries. The lack of appropriate and timely diagnostics adds to the negative outcomes. Geographical regions, climate, environmental factors, AMR, healthcare quality and test availability all influence aetiological variations. The emergence of resistant GNB infections complicates treatment options. Clinical and diagnostic decision support systems should be developed to help patients with risk stratification and to make the best use of laboratory tests. Knowledge of CAP endemic pathogens will help to clarify management pathways.

Acknowledgement

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Conflict of Interest

There are no conflicts of interest by author.

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