Understanding mortality in bacteremic pneumococcal pneumonia

Entendimento da mortalidade em pneumonia pneumocócica bacterêmica

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Community-acquired pneumonia (CAP) caused by *Streptococcus pneumoniae* is one of the major causes of morbidity and mortality in children and the elderly (adults over 60 years of age) worldwide.[1,2] Data from community-based studies show that the estimated overall annual incidence of pneumococcal bacteremia in the United States is 15-30 cases per 100,000 population; the rate is higher for persons ≥ 65 years of age (50-83 cases per 100,000 population) and for children ≤ 2 years of age (160 cases per 100,000 population), with an overall case fatality rate ranging from 20% (in young adults) to 60% (in the elderly). Associated comorbidities also play an important role.[3] Among adults, 60-87% of all cases of pneumococcal bacteremia are attributed to pneumonia; among young children, the primary site of infection is frequently unidentified.[4,5]

Bacteremic pneumococcal pneumonia is a severe form of invasive pneumonia that constitutes a subgroup with features of its own. Approximately 20% of patients with pneumococcal pneumonia develop bloodstream infection. Among adults with bacteremic pneumococcal pneumonia, mortality rates range from 10% to 30%.[6] Despite medical advances, including the wider availability of potent antimicrobial therapy, improved physician and nursing care, and even the establishment of ICUs, mortality in bacteremic pneumococcal pneumonia remains unacceptably high.[7] The current thinking is that mortality is higher among bacteremic cases than among nonbacteremic cases.[4] However, this is not borne out by data in the literature.

Since Austrian and Gold published their work in 1964,[8] a number of studies have compared CAP patients with and without pneumococcal bacteremia in terms of the clinical outcomes. Musher et al.[4] compared 52 cases of bacteremic pneumococcal CAP with 48 cases of nonbacteremic pneumococcal CAP and found that mortality within the first 7 days of hospitalization was significantly higher among the patients with bacteremic pneumococcal CAP. However, Marrie et al.[9] examined 56 subjects with bacteremic pneumococcal CAP and 394 subjects with nonbacteremic CAP (of any etiology). Those authors found that there were no significant differences between the two groups, in terms of overall mortality and length of hospital stay. More recently, Bordón et al.[10] provided data from the Community-Acquired Pneumonia Organization, confirming that pneumococcal bacteremia does not increase the risk of poor outcomes in patients with CAP.

In the current issue of the Brazilian Journal of Pulmonology, Palma et al.[11] present the results of a study regarding the impact that bacteremia has on outcomes among patients with CAP. The study cohort included 640 patients diagnosed with pneumococcal CAP over a 4-year period. The authors found that, in comparison with the patients who had nonbacteremic pneumococcal CAP, those with bacteremic pneumococcal CAP were older, presented more comorbidities (primarily cardiopathy and chronic renal failure), were more critically ill (according to their Acute Physiology and Chronic Health Evaluation II and pneumonia severity index scores), and were more often admitted to the ICU. However, in agreement with the findings of Marrie et al.,[9] there was no difference between the bacteremic and nonbacteremic groups in terms of all-cause mortality. The authors also demonstrated that bacteremia does not increase the length of the hospital stay in patients with pneumococcal CAP.[11]

Certain recognized factors might facilitate the understanding of mortality in bacteremic pneumococcal pneumonia: the time to the initiation of antibiotic therapy; the appropriateness of the initial therapy; and the treatment modality (monotherapy versus combination therapy). Garnacho-Montero et al.[12] evaluated 125 cases of bacteremic pneumococcal CAP and found that the most important factor related

to mortality is the speed with which antibiotic therapy is initiated (ideally within the first 4 h after admission). However, this information is lacking from many studies, and it is therefore quite difficult to understand why invasive disease (bacteremia) does not influence mortality. The appropriateness of the initial antibiotic therapy is another factor associated with mortality in bacteremic pneumococcal pneumonia, as demonstrated by Lujan et al.[13] Data regarding this factor are also lacking from many studies. In addition, there is considerable retrospective evidence that combination therapy increases survival in bacteremic pneumonia.[14] Unfortunately, the study conducted by Palma et al.[11] provides no data on any of these factors.

An additional factor associated with mortality and morbidity in bacteremic pneumococcal CAP is the causative *S. pneumoniae* serotype. For example, Garcia-Vidal et al.[15] found that serotype 3 is an independent risk factor for septic shock, which undoubtedly increases mortality. Again, Palma et al.[11] provided no data on this factor.

In conclusion, the results presented by Palma et al.[11] indicate that pneumococcal bacteremia is not an independent predictor of poor clinical outcomes in patients with CAP, despite the initial severity of patients with bacteremia. However, other important factors, such as the time to the initiation of antibiotic therapy and the appropriateness of the initial therapy, as well as the pneumococcal serotype, might play a crucial role and should be taken into account.

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