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Original Article

Community-acquired bloodstream infections caused by *Acinetobacter baumannii*: A matched case–control study☆

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Abstract *Background: Acinetobacter baumannii* is an important nosocomial pathogen worldwide. Its role in community-acquired infection remains controversial and has rarely been reported.
Methods: Patients with monobacterial bloodstream infections caused by genomic species identified *A. baumannii*, admitted to Taipei Veterans General Hospital between 1999 and 2010, were selected as cases. Controls were defined as patients acquiring infection in a healthcare setting and were matched for age and sex. The clinical, epidemiologic, and microbiological characteristics of cases and controls were compared.
Results: Cases presented with shock more frequently and had higher APACHE II scores (25 vs 19, $p = 0.005$). No significant differences between the two groups were noted in the sources

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of bloodstream infection and underlying diseases. Multidrug resistance rates were higher in nosocomial *A. baumannii* isolates then in those acquired in the community (81.5% vs 38.9%, $p = 0.002$). Patients infected in the community were more likely to receive appropriate antimicrobial therapy than those with hospital-acquired *A. baumannii* (10/18; 55.6% vs 11/54; 20.4%, $p = 0.011$). Acquisition in the community (odds ratio [OR] 5.716, 95% confidence interval [CI] 1.021–32.003, $p = 0.047$), respiratory tract as the infection source (OR 9.514, 95% CI 2.370–38.189, $p = 0.001$), and immunosuppressive therapy (OR 4.331, 95% CI 1.052–17.832, $p = 0.042$) were independently associated with increased 14-day mortality among patients with *A. baumannii* bacteremia in this cohort.

Conclusion: Community-acquired bacteremia caused by *A. baumannii* was rare but associated with a severe outcome. Further investigation of potential virulence factors of community-acquired *A. baumannii* is required.

Introduction

Bloodstream infections (BSIs) are serious clinical events associated with significant morbidity and mortality.[1,2] With progressive changes in the healthcare system, a new classification scheme for BSIs has been proposed. This differentiates between infections acquired (i) in the community, (ii) by outpatients having recurrent contact with the healthcare system, and (iii) by inpatients with hospital-acquired infections. The revised classification was driven by observations of an increased risk of antimicrobial resistance and a higher mortality rate among patients with healthcare-associated BSIs (HCABSIs) than among those with community-acquired BSIs (CABSIs).[3]

Acinetobacter baumannii, *Acinetobacter nosocomialis*, and *Acinetobacter pittii* have emerged as important nosocomial pathogens causing bloodstream infection in critically ill patients. They share similar phenotypic characteristics identified by clinical microbiological laboratories, and are collectively described as the *A. baumannii* complex (Abc).[4] *A. baumannii* is clearly distinct from the latter two species because it is resistant to more classes of antimicrobial agents and it is associated with a worse clinical outcome.[5,6] The inclusion of different *Acinetobacter* species in a study would complicate the interpretation of the results. Therefore, it is reasonable to separate *A. baumannii* from other *Acinetobacter* species in the studies, including those for outcome analysis.

A. baumannii is predominantly a nosocomial pathogen, although sporadic cases of community-acquired pneumonia caused by *A. baumannii* complicated with bacteremia, have been reported.[7,8] The differences in disease epidemiology and impact on clinical outcomes between HCABSIs and CABSIs caused by *A. baumannii* have not been previously examined. Therefore, we performed a retrospective matched case–control study to compare the clinical, epidemiologic, and microbiological characteristics of HCABSIs and CABSIs caused by genomically identified *A. baumannii*.

Methods

Study population

This retrospective matched case–control study was conducted at Taipei Veterans General Hospital, a 2900-bed, tertiary care teaching hospital in Taipei, Taiwan, during a 12-year period between 1999 and 2010. Patients with mono-bacterial bloodstream infections caused by genomic species identified as *A. baumannii* were selected and classified into two groups: the case group included patients who acquired infection in the community and the control group included patients who acquired infection in a healthcare setting, matched for age (within 5 years), sex, and the year of isolation of the causative pathogen. The clinical, epidemiological, and microbiological characteristics of cases and controls were compared.

Data collection and definition

Clinical information was retrospectively extracted from the medical records. The following data were collected at bacteremia onset: demographic profile (age and sex), admission date, initial clinical symptoms, antimicrobial treatment during hospitalization, the sources of bloodstream infection, the usage of immunosuppressive therapy, recent history of trauma, recent surgery, blood analysis, ventilator use, and comorbid illnesses. Immunosuppressive therapy was defined as treatment with corticosteroids at a dosage equivalent to or higher than 15 mg of prednisolone daily for one week within 4 weeks, cytotoxic agents within six weeks, or other immunosuppressive agents within two weeks before bacteremia onset. The severity of patient infection was evaluated using the Acute Physiology and Chronic Health Evaluation (APACHE) II score within 24 h of bacteremia onset.[9] Recent surgery was defined as surgery performed within four weeks of the onset of bacteremia. Renal impairment was defined as an estimated glomerular filtration rate <60 mL/min/1.73 m^2 and neutropenia was determined when an absolute neutrophil count was less

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