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A case of sepsis with multi-organ failure from a community-acquired *Acinetobacter junii* bacteremia in an immunocompetent patient

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ABSTRACT:

Background: The *Acinetobacter (A.)* genus is a group of Gram-negative bacilli which mainly cause nosocomial infections or infections in immunocompromised patients. *A. baumannii* is the most common agent of human infection, and *A. junii* represents less than 3% of isolates. We present a rare case of *A. junii* bacteremia and pneumonia in an immunocompetent patient with no recent hospital admissions or antibiotic exposure.

Case Presentation: We report the case of a 78-year-old man with a three-day history of shortness of breath, dry cough, and fever. Initial blood tests revealed leukocytosis and a raised C-reactive protein, while lung imaging showed right upper lobe consolidation. He was diagnosed with community-acquired pneumonia, rapidly evolving into respiratory failure and septic shock, necessitating mechanical invasive ventilation, vasopressor, and inotropic support. Blood cultures and cultures of tracheal aspirate were positive for *A. junii.* After the microbiology sensitivities were known, antibiotic therapy was changed to meropenem, resulting in a good clinical outcome and resolution of infection.

Conclusions: While *A. junii* is commonly a sensitive organism, there are reports of colistin and carbapenem resistance. It is important to document new presentations to expand our knowledge of this rare microorganism.

Keywords: *Acinetobacter*, Bacteremia, Pneumonia.

BACKGROUND

The *Acinetobacter* genus is a group of Gram-negative aerobic bacilli ubiquitously distributed in the environment, mainly in water and soil. It can colonize the skin and other human tissues, such as the oral cavity and the respiratory and gastrointestinal tracts. Whilst there are more than 50 species in the *Acinetobacter* genus, *A. baumannii* is the agent most associated with human infection[1]. *A. baumannii* has been a concern for the international community as it is a common agent of nosocomial infections with a high potential for multi-drug resistance[2]. Infections with other *Acinetobacter* species, such as *Acinetobacter junii*, have been less frequently reported.

There are very few reported cases[3] of infection by this microorganism acquired in the community, and they occur mainly in countries with tropical or subtrop-

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ical climates. There has only been one reported case[4] of septicemia from this agent in an immunocompetent patient in a hospital in India. Despite being commonly susceptible to antimicrobials, resistance to carbapenems through the production of carbapenemases has been reported[5,6]. The possibility of horizontal transfer of resistance genes between *Acinetobacter* species has also been raised by some authors[6,7]. To the best of our knowledge, we present the first case of bacteremia from *A. junii* in an immunocompetent patient reported in Europe. Reporting novel presentations from known organisms is essential to monitor changes in disease patterns across the world.

CASE REPORT

We report the case of a 78-year-old man from the Netherlands who was in Portugal for a one-week holiday. He presented with a three-day history of worsening shortness of breath, dry cough, and fever. He had a past medical history of asthma, atrial fibrillation, ischemic cardiomyopathy (with previous myocardial infarction requiring coronary artery bypass graft surgery more than ten years before admission), chronic kidney disease, obesity, and a right hip replacement, which was completed two years before presentation. He reported no recent hospitalizations or antibiotic use. His asthma was controlled with inhaled corticosteroids. On arrival at the Emergency Department, he was febrile, tachycardic, and tachypneic, with signs of respiratory distress. Auscultation revealed bronchospasm and rhonchi in the upper right lobe. Initial blood tests showed leukocytosis (12.13 x10^3/uL), an acute kidney injury (serum creatinine of 1.71 mg/dL), an increased C-reactive protein (1.25 mg/dL) and a raised lactate (2.7 mmol/L). Arterial blood gas was consistent with type 1 respiratory failure with a ratio of partial pressure of oxygen in arterial blood (PaO_2) to the fraction of inspiratory oxygen concentration (FiO_2) of 194.0. He had a negative SARS-CoV-2 nasopharyngeal rapid antigen test and negative *Legionella pneumophila* serogroup 1 and *Streptococcus pneumoniae* urinary antigen test. A rapid HIV test was also negative. Chest X-ray, performed with Fujifilm FDR DEVO III 43x43 (Tokyo, Japan), showed an extensive condensation in the upper right lobe (Figure 1), which was later confirmed by chest Computed Tomography (Figure 2), performed with Philips Ingenuity 5000 (Amsterdam, The Netherlands). He initiated empirical antibiotic therapy for community-acquired pneumonia with ceftriaxone and azithromycin. Within hours of admission, he grew increasingly symptomatic, with worsening respiratory failure and hypotension, developing septic shock with multiorgan failure, requiring endotracheal intubation with mechanical invasive ventilation, vasopressor, and inotropic support. Two sets of blood cultures were drawn before initiating antibiotic therapy and became positive after 12 hours of incubation. Gram stain revealed Gram-negative *coccobacilli*. After 24 hours of incubation at 35ºC in 5% CO_2, round colonies grew on Chocolate PolyViteX agar (bioMérieux SA, Marcy-l'Etoile, France). The isolate was subjected to automated mass spectrometry microbial identification using the VITEK® MS (bioMérieux, Inc., Durham, USA) and was identified as *Acinetobacter junii*. Following primary identification, the isolate underwent antibiotic susceptibility testing using the VITEK®2 Gram-negative Bacilli Identification Card (Table 1). Control of both suspensions was made on MacConkey agar (bioMérieux SA, Marcy-l'Etoile, France) and on Columbia CNA agar with 5% sheep blood (bioMérieux SA, Marcy-l'Etoile, France). Non-lactose fermenting colonies grew on

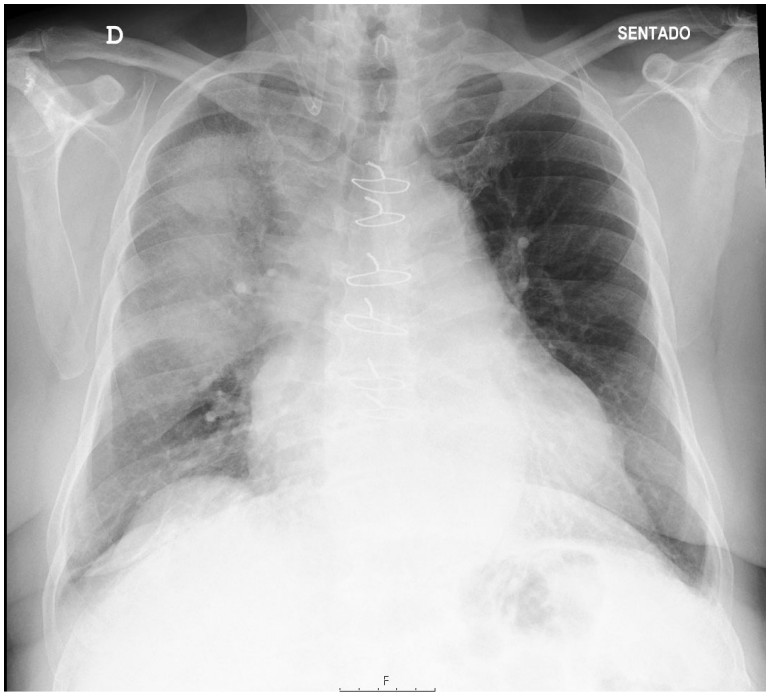

Figure 1. Chest radiography showing an extensive upper lobe opacity.

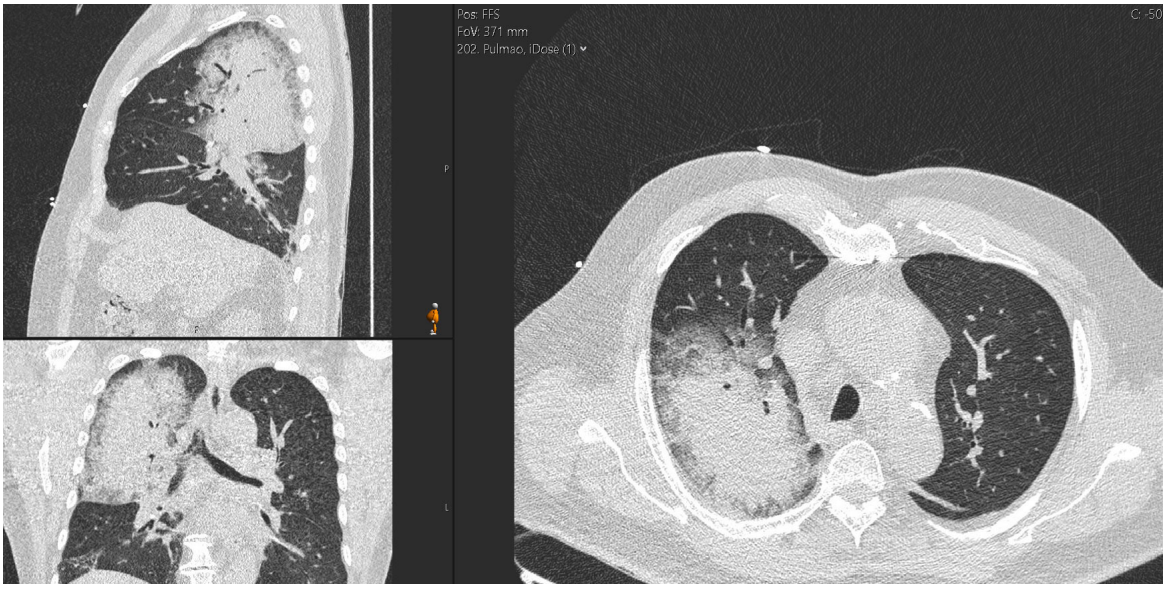

Figure 2. Chest CT showing extensive consolidation with air bronchogram in the upper right lobe, compatible with infectious lobar pneumonia.

MacConkey agar, and no growth was seen on Columbia CNA agar, which had 5% sheep blood. This organism was sensitive to trimethoprim/sulphamethoxazole, meropenem, gentamycin, levofloxacin, and colistin. The same microbiological results were found in a tracheal aspirate from the same day. After the results were communicated to the medical team on day 3 of admission, the antibiotic therapy was switched to meropenem. There was a good clinical response to meropenem, inotropes were weaned, and the patient was extubated on day 7. Repeat blood cultures on day 6 were negative, and he completed 10 days of targeted antibiotic therapy.

LITERATURE REVIEW

In a 7-year study conducted in The Netherlands, *A. junii* represented 3% of the Acinetobacter genus isolates[8]. Like other bacteria from this genus, *A. junii* is mostly associated with nosocomial infections and infections in immunocompromised patients. Notably, it has been reported[9] as a causative agent of septicemia in neonates and pediatric oncology patients. Other authors[4,10-12] have reported clinical forms of infection, including corneal perforation, cellulitis, cavitating pneumonia, and necrotizing fasciitis.

The largest study[13] of bacteremia due to *A. junii* was conducted in Taiwan and included 43 patients. Only one of these infections was acquired in the community, and most were related to the presence of central venous devices. Only 9% of the cases were associated with respiratory tract infection.

We present a severe presentation of *A. junii* infection acquired in the community in an immunocompetent person with no recent hospitalizations or antibiotic exposure. In previous case reports[3,13], this infection was treated with ceftazidime or meropenem with good results. Our patient completed 10 days of intravenous (IV)

Table 1. Antibiotic sensitivity, minimum inhibitory concentrations, MIC, and cutoffs for *Acinetobacter junii* using the VITEK® 2 Gram-negative Bacilli Identification Card.

	Acinobacter junii			
Antibiotics	**EUCAST**		**VITEK® 2**	
	S≤	**R>**	**MIC**	**Sensitivity**
Trimethoprim/sulphametoxazole†	2	4	≤20.0	S
Gentamicin	(4)‡	(4)‡	≤1.0	S
Meropenem	2	8	≤0.25	S
Colistin*	(2)‡	(2)‡	2	S
Levofloxacin	0.5	1	≤0.12	S

†Trimethoprim/sulphametoxazole in the ratio 1:19. Breakpoints are expressed as the Trimethoprim concentration.
*Colistin MIC determination was performed using broth microdilution.
‡In this circumstance, the value in brackets can be used to distinguish between wild-type organisms and organisms with acquired resistance mechanisms. For systemic infections, aminoglycosides should be used in combination with other active therapy.

meropenem, but therapeutic success after switching IV antibiotic therapy to oral alternatives like ciprofloxacin has been reported[3]. The emergence of *A. junii* containing plasmids that encode the production of carbapenemases and the possibility of horizontal transfer of resistance genes between members of the *Acinetobacter* genus is a global concern[6,7]. There are also reports[13-15] of emerging colistin resistance in China, and colistin resistance was identified in 35% of the cases of the above-cited study in Taiwan. As infections by this organism become more common, we must be alert to potential treatment failure secondary to resistance.

It is important to document novel presentations of this underreported organism so that we can be more aware of it in our clinical practice and be able to monitor changes in disease epidemiology.

CONCLUSIONS

To our knowledge, only one case report of *A. junii* bacteremia in an immunocompetent patient has been reported in a case report from India[4], and this is the first case reported in Europe. The severe presentation in an immunocompetent host with no recent hospital admissions or antibiotic exposure presented in this case report should serve as a reminder to infection specialists of the risks of this emerging pathogen. A clearer understanding of the epidemiology mechanisms of antibiotic resistance is greatly needed.

Conflict of Interest:
The authors declare that they have no conflict of interest.

Ethics Approval:
Not applicable.

Informed Consent:
Permission was obtained from the patient for the case's publication and respective images. No details or images allow for patient identification.

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Authors' Contributions:
Francisca Bartilotti Matos: conceptualization, gathering of data, writing - Original Draft, Revisions. All authors have read and approved the final version of the manuscript. Mafalda Ribeirinha: gathering of data, revision, writing of the original draft. Ana Rita Salgado: gathering of data, revision, writing of the original draft. Adriana Guedes: gathering of data, revision, writing of the original draft. Cristóvão Figueiredo: Supervision, Writing - Review & Editing.

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