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Bacteremia with *Turicella otitidis* in an institutionalized elderly patient with multiple hospital admissions: a case report.

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Abstract

***Coryneform* bacteria (with the exception of *Corynebacterium diphtheria*), is considered to be part of the normal flora of the skin. It was found, in the last twenty years, to be involved in human pathology by identifying pathogenic species such as *Turicella otitidis*. There are few descriptions in the literature regarding *T. otitidis* involvement in human pathology, especially in children under 3 years old. We report the first case of bacteraemia in an institutionalized adult patient. We present the case of a 75-years-old Caucasian institutionalized patient, recently hospitalized for two episodes of urinary tract infection, who was in treatment at the last admission for a *Proteus mirabilis* bloodstream infection, presented himself to the emergency room for fever 38.1°C, intense asthenia, adynamia, confusion, altered general condition, and he is admitted into the Internal Medicine Department. From the blood cultures harvested upon admission, the presence of Gram-positive bacilli has been confirmed; bacilli identified on API® Coryne system kits, as *Turicella otitidis*. The evolution was favourable under the initiated antibiotic treatment prior to obtaining blood count results, the patient was discharged from the hospital with the recommendation of performing a prevention of recurrent lower urinary tract infections by long-term administration of fosfomycin. Bacteremia with *Turicella otitidis*, due to previous ear colonization, is possible to occur secondary to local and general immune alterations.**

Keywords: *Turicella otitidis*, Bacteremia, Adult patient.

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Introduction

Coryneform bacteria (with the exception of *Corynebacterium diphtheria*), is considered to be part of the normal flora of the skin. It was found, in the last twenty years, to be involved in human pathology by identifying pathogenic species such as *Turicella otitidis*, being associated with otitis media, otitis externa, mastoiditis, and exceptionally with bacteraemia in paediatric patients with haematological diseases. We present the first case of bacteraemia in an institutionalized adult patient who also had multiple hospital admissions.

Case Presentation

We present the case of a 75-years-old Caucasian institutionalized patient, recently hospitalized for two episodes of urinary tract infection, who was in treatment at the last admission for a *Proteus mirabilis* bloodstream infection, presented himself to the emergency room for fever 38.1°C, intense asthenia, adynamia, confusion, altered general condition, and he is admitted in the Internal Medicine Department. The patient is known with type 2 diabetes, hypertension, mixed dementia, spastic paraplegia, urinary bladder tumour that was excised endoscopically and permanent urinary catheter. Upon admission, the clinical examination revealed the following: pale, dry skin, basal crackles, SaO_2 91%, hypotension (a systolic blood pressure of 88 mmHg), heart rate of 98/min, spastic paraplegia, and confusion.

From the laboratory tests we performed, the following were significantly altered: Leucocytes 17530/mm^3, Haemoglobin 11.6 g/dL, Platelets 550,000/mm^3, Serum total protein 4.6 g/dL, C-reactive protein 48 mg/dL, Erythrocyte sedimentation rate 36 mm/1 h. In the bacteriological exam of the urine the

presence of *Proteus mirabilis* was detected, antimicrobial susceptibility testing was performed using the European Committee on Antimicrobial Susceptibility Testing disk diffusion test methodology, method that is based on a confluent inoculum (McFarland 0.5) on Mueller-Hinton agar with or without 5% horse blood and 20 mg/L β-NAD, strain that was resistant to the following antibiotics: amoxicillin-clavulanic acid, ampicillin/sulbactam, cefotaxime, ceftazidime, ceftriaxone, cefuroxime, ciprofloxacin, gentamicin, imipenem, netilmicin, norfloxacin, nitrofurantoin, levofloxacin, and sensitive to aztreonam, meropenem, and piperacillin/ tazobactam. Treatment with meropenem 3 g/day and amikacin 1 g/day was initiated, leading to diarrhea confirmed to be related to a *Clostridium difficile* infection, for which oral Vancomycin was also introduced in therapy. *Clostridium difficile* infection being diagnosed according to the guidelines published by the European Society of Clinical Microbiology and Infectious Diseases using two highly sensitive tests: GDH EIA (glutamate dehydrogenase enzyme immunoassay) and toxin A/B EIA. Both tests being positive and no further testing was required [1]. After 10 days of treatment with oral Vancomycin and up to the critical period of 30 days, no clinical signs of recurrence were present. From the blood cultures harvested upon admission, there has been confirmed the presence of a Gram-positive bacilli identified on API® Coryne (bioMérieu) system kits, as *Turicella otitidis* without antibiotic susceptibility testing. *T. otitidis* appeared on Gram's stain as long unbranching Gram-positive bacilli, arranged irregularly, with creamy/whitish colony appearance, positive cAMP test and leucine arilamidase. *T. otitidis* forms non-haemolytic colonies of about 2 mm after a period of 24 h of incubation on blood agar. *T. otitidis* is catalase-, alkaline phosphatase- and pirazinamidase-positive, non-motile, does not reduce nitrates, lacks urease, and has an oxidative metabolism for carbohydrates. In the API Coryne system the numerical profile of *T. otitidis* is 210004, code that is shared with *Corynebacterium auris* and *Corynebacterium afermentans*. Although final identification still requires complex tests not performed regularly in the laboratory, a distinction between *T. otitidis*, *Corynebacterium auris*, and *Corynebacterium afermentans* was made on the basis of morphological and metabolical characteristics. Otoscopy made after bacteriological examinations revealed no significant changes locally, reason for which a tympanostomy tube was not inserted. The evolution was favourable under the initiated antibiotic treatment prior to obtaining blood count results the patient was discharged from the hospital with the recommendation of performing a prevention of recurrent lower urinary tract infections by long-term administration of fosfomycin.

Discussions

Turicella otitidis is part of *Coryneform* bacteria, being a Gram-positive bacillus, highly pleomorphic, non-sporulating, non-fermentative, catalase-positive, oxidase-negative, non-hemolytic, which distinguishes from other species by morphological characteristics and biochemical differences, including positive cAMP test. *T. otitidis* was identified in 1993 by two teams of researchers led by Funke [2] and Simonet [3]. *T. otitidis* is part of the normal flora of the external ear canal, especially in children, according to the study of Holzmann et al. [4], being isolated in 11.2% of the control cases. It is highly susceptible to beta-lactam: penicillins, cephalopsorins, carbapenems [5], as well as to chloramphenicol, linezolid, vancomycin, teicoplanin; it is considered to have a natural resistance to aztreonam, cotrimoxazole, nitrofurantoin, fosfomycin, and a high resistance to macrolides and clindamycin. There are few descriptions in the literature regarding *T. otitidis* involvement in human pathology, especially in children under 3 years old: mastoiditis [6], ear abscesses [7], cervical abscess [8], being frequently regarded as a causative agent in acute or chronic otitis media [2,3,9,10]. It is possible that, with the implementation of pneumococcal vaccination, to witness an increased incidence of *T. otitidis* in isolates of ear discharge as shown by recent studies [11]. There also has been described a case of bacteremia associated with B-cell acute lymphoblastic leukemia, in a 10-years-old children [12].

Conclusion

In conclusion, in a patient, like in our case, with multiple hospital admissions and repeatedly treated with antibiotics for urinary tract infections, immunocompromised by age, diabetes, and due to previous ear colonization with *T. otitidis*, bacteremia is possible to occur secondary to local and general immune alterations. To our knowledge, this is the first reported case of bacteremia with *T. otitidis* in adult patients.

Consents

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. The study was accepted by the Ethics Committee of the hospital and they encourage publishing the article.

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