Corynebacterium accolens-Associated Pelvic Osteomyelitis

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Corynebacterium accolens is a rare human pathogen. We encountered a case of C. accolens isolated from a thigh collection in a man with osteomyelitis of the adjacent pubic symphysis.

CASE REPORT

A previously healthy 69-year-old man presented to the Emergency Department with a 3-week history of an increasingly painful left hip. He had a history of having fallen when lifting furniture 3 months previously and had been treated with simple analgesics. Due to increasing pain, his general practitioner organized a pelvic X-ray 4 days prior to his hospital presentation. This showed a fracture involving the left pubic ramus. Since his pain was not controlled, he was referred to hospital for further management. He denied any fever or night sweats, and there had been no significant weight loss. He had a recent excision of basal cell carcinoma in the left preauricular region approximately a month previously and had had a partial left knee joint replacement in the past. Clinical examination was unremarkable, apart from tenderness around the pubic symphysis. His inflammatory markers were raised with C-reactive protein (CRP) of 288 mg/liter (normal value of <5 mg/liter) and erythrocyte sedimentation rate (ESR) of 23 mm/h (normal value of <20 mm/h). His white cell count and differentials were normal. A magnetic resonant imaging (MRI) scan showed insufficiency fractures of the left symphysis pubis and right sacral alar, with probable osteomyelitis of the left symphysis pubis, myositis, and a soft tissue collection within the left adductor brevis muscle measuring approximately 40 by 19 by 18 mm. An aspirate of this collection was performed under ultrasound guidance and was sent for cytology and microbiological analysis. He was given the provisional diagnosis of osteomyelitis and was started on empirical intravenous fluoxacinillin. The cytology report showed numerous neutrophils, some macrophages, and nonspecific birefringent particles, but no malignant cells. He was discharged on the 10th day of admission on home intravenous treatment with cephalozolin for 4 weeks. This was followed by 4 weeks of oral amoxicillin. He showed clinical improvement, with CRP and ESR declining to 6 and 9, respectively, over a period of 3 weeks.

Gram staining of the aspirate from the adductor brevis collection revealed numerous leukocytes with occasional Gram-positive cocobacilli seen both intracellularly and extracellularly. The aspirate was received in a sterile, screw-top bottle and was plated onto Columbia sheep blood agar, chocolate agar, MacConkey agar, and blood neomycin agar and incubated aerobically and anaerobically. After 48 h of incubation, small, nonhemolytic, gray-white pinpoint colonies were seen on the sheep blood agar. The isolate was recovered in pure culture. The colonies were slow growing, but their growth was enhanced by Tween 80 on repeat culture. One drop of Tween 80 was instilled onto a lawn of C. accolens on sheep blood agar. After overnight incubation, colonies covered by Tween 80 showed significantly enhanced growth compared to areas without it. On subculture, visible colonies could be seen after 24 h. The API CORYNE (version 3.0), with an API code of 1100315 (as interpreted according to API Web; bioMérieux), identified the isolate as Corynebacterium macginleyi.

16S rRNA sequencing (1,445 bp) and partial rpoB sequencing (394 bp) identified the isolate as Corynebacterium accolens. The primers used for the amplification and sequencing of the 16S rRNA partial gene were as described by Wilbrink et al. (15), and aligned with the 16S rRNA sequence database at http://blast.ncbi.nlm.nih.gov/Blast.cgi. The partial rpoB gene was amplified and sequenced using primers C2700F and C3130R (9) and analyzed by web-based alignment at http://umr5558-sud-str1.univ-lyon1.fr/lebib/lebib.cgi. The 16S rRNA gene showed a 99.8% match to C. accolens ATCC 49724 (GenBank accession number AJ439346). The rpoB gene showed a 100% match to C. accolens strain CIP 104783 (accession number AY492242), with the next closest sequence being a 92% match to C. macginleyi CIP104099 (accession number AY492276). Both the 16S rRNA (accession number GQ338419) and rpoB (accession number GU223370) sequences were submitted to GenBank. A repeat API CORYNE analysis gave a profile of 1000315 and 95.6% identification for C. accolens. The key reactions were positive nitrate reduction, D-glucose, D-ribose, mannitol, and sucrose fermentation and a negative alkaline phosphatase reaction. Two sets of blood cultures were taken prior to starting antibiotics and were incubated with BacT/Alert 3D (bioMérieux). These showed no growth after 5 days.

The initial susceptibility testing was performed using disk diffusion. An inoculum with a 0.5 McFarland standard was prepared and swabbed in three different directions on Mueller-Hinton agar supplemented with 5% sheep blood. The isolate was susceptible to penicillin (10 μg), erythromycin (15 μg), vancomycin (30 μg), ciprofloxacin (5 μg), ceftriaxone (30 μg), and tetracycline (30 μg), using Clinical Laboratory Standards Institute (CLSI) interpretive criteria set for Staphylococcus.
Corynebacterium accolens (previously CDC Corynebacterium group G-1) was first described by Neubauer et al. in 1991 (7, 11). It is a Gram-positive bacillus considered to be an inhabitant of the upper respiratory tract. It has been isolated from human clinical specimens from sites including wound drainage, endocervix, sputum, throat swab, breast abscess, and valvular vegetations (1, 4, 7, 8, 11). It has also been isolated from cases of sepsis, otitis media, keratoconjunctivitis, sinusitis maxillaris, and meningitis (4, 11).

C. accolens forms small, gray, transparent, nonhemolytic colonies on sheep blood agar. Its growth is enhanced by lipids and mannitol. It reduces nitrate and does not utilize esculin or produce urease. Among the corynebacteria, it is biochemically closely related to C. macginleyi, except that it is negative for alkaline phosphatase. It is included in the database of API CORYNE and RapID CB Plus systems (8). In our case, our isolate was initially misidentified as C. macginleyi by API CORYNE, and 16S rRNA gene sequencing failed to resolve identification (hence, the use of rpoB as a secondary target was required). As C. macginleyi has been exclusively isolated from eye specimens, the identification was doubted, and the isolate was forwarded for sequencing. Rigorous efforts to confirm identification are important when these bacteria are isolated from previously unreported sites.

To our knowledge, an association of C. accolens with osteomyelitis and myositis has not been previously described. Bone and joint infections caused by Corynebacterium species have been described with C. aurimucosum, C. amycolatum (14), C. striatum (6), C. jeikeium (2, 12), C. urealyticum (3), and C. diphtheriae (13). Ang and Brown described C. accolens isolated from a breast abscess sample following mild trauma (1). Our case also had a history of trauma secondary to a fall 3 months prior to the patient’s hospital presentation. This man disclosed a history of excision of a skin cancer in the left preauricular region about a week prior to onset of his hip pain. It is possible that this could be a portal of entry of the infection. It is unclear if C. accolens may also colonize other mucosal sites.

The MIC breakpoints for our isolate obtained by the broth microdilution method are within the susceptible range for penicillin, and this is consistent with the other reports in which patients clinically responded to amoxicillin (1, 4). MICs obtained with Etest had been reported to be as reliable as those obtained with broth microdilution and disk diffusion in susceptibility testing of coryneform bacteria (10).

Corynebacterium is a common skin commensal (7). However, when repeatedly isolated, or isolated from a sterile site, or in pure culture, it is very likely to be clinically significant. C. accolens was the sole organism isolated from this man. It was seen on the initial Gram stain and subsequently isolated in pure culture from his left adductor brevis collection situated in close proximity to the left symphysis pubis.

In our case, despite the bacteria being seen on a Gram stain, it took over 24 h for the initial isolate to grow. This is consistent with other reports (1, 4) that C. accolens is a slow-growing bacterium species. The patient in our case was also given empirical flucloxacillin upon admission, which may have slowed the rate of recovery. Despite having a knee prosthesis in situ on the same side as the osteomyelitis of the pubic rami, there is no clinical evidence of disease involving this site. It is probable that for some unknown reasons, C. accolens may favor previously traumatized sites. Infection of prothetic material with C. accolens has not yet been reported.

In conclusion, our case represents the first reported case of osteomyelitis associated with C. accolens. The risk factors for this remain unclear, but the patient in our case developed osteomyelitis of the left pubic symphysis and soft tissue collection in the adjacent adductor brevis muscle following trauma and fracture of the pubic symphysis.

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REFERENCES