SEPTIC ARTHRITIS DUE TO ARCANOBACTERIUM HAEMOLYTICUM

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Abstract

Diphtheroids or “coryneform” bacilli are usually considered to be nonpathogenic “normal flora” of human skin and mucous membranes. Because bacterial cultures are frequently contaminated with these organisms the correct diagnosis and treatment may be delayed by the failure to recognize serious infections caused by them. Few confirmed cases of orthopaedic infections due to Arcanobacterium haemolyticum infection have been reported, partly because of inadequate identification of this bacterium. We report a case of septic arthritis due to A. haemolyticum.

Key words: Arcanobacterium haemolyticum, septic arthritis

Arcanobacterium haemolyticum, formerly known as Corynebacterium haemolyticum was first isolated from nasopharynx and skin of American soldiers in the south pacific in 1946. It was elevated to the genus Arcanobacterium on the basis of genetic analysis in 1982, and has been associated with pharyngitis, recurrent throat infections, wound infections, septicemia, endocarditis and osteomyelitis.1 Although it is the etiological agent of distinct human infections, the organism is frequently overlooked, probably because of tendency of microbiology laboratories to report diphtheroid organisms of Corynebacterium spp. as contaminants or normal flora, resulting in missed or delayed diagnosis.1,2 We present a case of septic arthritis caused by Arcanobacterium haemolyticum. The purpose of this report is to increase the awareness of the pathogenic potential of this organism in bone and joint infections.

Case Report

A 44-year-old male presented with a two day history of severe pain in left knee joint along with hot swollen knee and fever. There was no history of trauma and the patient was a known case of osteoarthritis for last two years for which he was receiving analgesics. In view of the increasing pain and knee stiffness he was advised three doses of weekly intra-articular triamcinolone (40 mg) injection. His joint symptoms improved after first injection but he developed severe pain in left knee along with fever after the second intra-articular steroid injection.

On physical examination his temperature was 40°C. He had a markedly oedematous, tender and hyperaemic left knee with decreased range of motion. The peripheral blood leukocyte count was 12,000/mm³ with 84% neutrophils and 16% monocytes. ESR (69 mm/hour) and CRP (8.9 mg/dL) values were elevated. Knee radiograph showed soft tissue swelling with joint narrowing and osteophyte formation. Synovial fluid aspirated from the affected joint revealed total leukocyte count of 98,000/mm³ with 98% segmented neutrophils and 2% monocytes. Gram stain of the aspirated fluid showed gram positive bacilli along with pus cells. No fungal elements were seen. Ziehl Neelsen staining was negative for acid-fast bacilli. Empiric therapy with intravenous amikacin (intravenous, 500 mg, 12 hourly) and augmentin (amoxycillin - clavulanate, intravenous, 1.2 gm, 8 hourly) was started.

The culture of the aspirated fluid revealed small pinpoint colonies on 5% sheep blood agar after 24 hours of incubation, which increased in size to 0.5mm with a narrow zone of β hemolysis after 48 hours of incubation. The isolate was identified as Arcanobacterium haemolyticum on the basis of biochemical tests.3,4 Blood cultures and throat swab cultures did not grow A. haemolyticum. The organism was sensitive to penicillin, augmentin, erythromycin, ciprofloxacin, cefotaxime and vancomycin. After antimicrobial susceptibility report amikacin was withdrawn and intravenous augmentin (intravenous, 500 mg, 12 hourly) and augmentin (amoxycillin - clavulanate, intravenous, 1.2 gm, 8 hourly) was continued.

Discussion

A. haemolyticum is a gram positive to gram variable pleomorphic rod, non-motile and non-sporeulating. In fresh cultures (<48 hours) organisms are strongly gram-positive but in older cultures (>48 hours) organisms
appear both gram positive and gram negative. Optimum growth is obtained on blood or serum enriched medium at 37°C and is enhanced by culturing the organism in the presence of 5-10% CO₂. On horse or sheep blood agar, colonies are circular, discoid, opaque and whitish with a rough surface and friable consistency and averages 0.1 mm with little or no hemolysis after 24 hours incubation. At 48 to 72 hours, colonies reach 0.5 mm with a narrow 1 mm zone of β haemolysis. However, on 5% human blood agar prominent haemolysis is seen within 24 hours. The organism is catalase, oxidase, indole and urease negative, and produces acid but not gas from glucose, lactose, trehalose, salicin and maltose but does not ferment mannitol or xylose. Sucrose fermentation is variable. It hydrolyses starch, produces opalescence on lecithovitellin agar, gelatin is not liquefied within 14 days and nitrate is not reduced. It grows poorly on tellurite agar, gives no hemolysis in CAMP test (reverse CAMP test positive) and produces deoxyribonucleases. A. haemolyticum closely resembles Actinomyces pyogenes that is also gram-positive, catalase negative and produce β hemolytic colonies. However, the two organisms are easily differentiated as Actinomyces pyogenes hydrolyses gelatin rapidly, produce acid from xylose and produce β-glucoronidase.

A. haemolyticum has recently been accepted as an important human pathogen but has been reported infrequently, as a cause of well defined infections, probably because of failure to correctly identify the pathogen in the clinical specimens. A. haemolyticum has been implicated as an important cause of pharyngitis in adolescents and young adults, frequently causing an exanthema that may mimic a viral exanthema, toxic erythema or drug eruption which usually resolves in a few days with or without therapy. Serious infections such as brain abscesses, meningitis, septicaemia, endocarditis and osteomyelitis occur less frequently but are fatal if not treated early. Other less serious infections include chronic skin ulcers, cellulitis and otitis media.

The role of this organism in orthopaedic infections is not clearly established and is limited to few reports (Table).

<table>
<thead>
<tr>
<th>Reference</th>
<th>Year</th>
<th>Age/Sex</th>
<th>Site of infection</th>
<th>Associated factors</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1961</td>
<td>A/M</td>
<td>Osteomyelitis</td>
<td>Fracture</td>
<td>Treated</td>
</tr>
<tr>
<td>7</td>
<td>1977</td>
<td>71/F</td>
<td>Foot ulceration with vertebral osteomyelitis</td>
<td>Diabetes</td>
<td>Treated</td>
</tr>
<tr>
<td>8</td>
<td>1990</td>
<td>24/F</td>
<td>Ankle joint infection</td>
<td>Trauma</td>
<td>Treated</td>
</tr>
<tr>
<td>10</td>
<td>1995</td>
<td>16/M</td>
<td>Subperiosteal abscess</td>
<td>–</td>
<td>Treated</td>
</tr>
<tr>
<td>9</td>
<td>2003</td>
<td>45/M</td>
<td>Chronic osteomyelitis</td>
<td>–</td>
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</tr>
</tbody>
</table>

A. haemolyticum has been isolated from pus drained from ankle joint, which had resulted probably due to spread of infection from abrasion over medial malleolus. Ceilley reported A. haemolyticum from a woman with diabetic ulcer who developed vertebral osteomyelitis and the organism was isolated from blood and first lumbar vertebrae and he has also mentioned of a case who developed osteomyelitis following a fracture. Recently, Biswas et al. reported a case of chronic osteomyelitis due to A. haemolyticum and the patient responded to clindamycin. Subperiosteal abscess has been reported as a complication of orbital cellulitis but the organism was not isolated from abscess itself. The pathogenesis of the present case is not entirely clear, probably the patient acquired A. haemolyticum infection from his colonized skin or contaminated needle during intra-articular steroid injection.

In view of increasing recognition of the pathogenic potential of diphtheroids in clinical disease, all the aerobic nonspore forming gram positive bacilli obtained in pure culture from sterile sources should be identified. The correct identification and antibiotic sensitivity testing of such isolates is essential for the proper management of infected individuals.
References


