Sepsis due to group G *Streptococcus* after a total hip arthroplasty

A case report

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Summary. *A patient with a total hip arthroplasty developed an aggressive infection with group G Streptococcus. Very few similar cases have been reported, but they all resolved with antibiotics or drainage. A Girdlestone resection was necessary in our case because of loosening and extensive bony destruction. The true incidence may be greater than that reported and the prognosis may be worse.*

Résumé. *Nous présentons un patient avec une arthroplastie totale de la hanche infectée par un Streptococcus du groupe G avec une évolution agressive qui demanda une résection prothétique. Dans la littérature revue nous avons trouvé un nombre très réduit de cas, et dans tous, l'évolution fût favorable avec traitement antibiotique ou drainage, sans nécessité de la procédure de girdlestone. L'incidence réelle est probablement plus grande que celle publiée et le pronostique peut être pire que celui que nous pouvons espérer en accord avec la littérature.*

Introduction

The Lancefield Group G *Streptococcus* is a pathogen capable of causing serious infection [1, 2, 4, 6, 7, 8, 11, 12, 13], but it rarely affects bones and joints [2, 4, 5, 6, 7, 8, 11, 13]. Such infections usually occur in patients with debilitating conditions [1, 2, 4, 5, 6, 11]. Septic arthritis due to this *Streptococcus* is often associated with joint replacements [2, 6, 8, 11, 12].

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Case report

A woman, 72 years of age, was admitted to hospital with purulent drainage from a Charnley total hip arthroplasty (THA) which had been carried out 14 years previously. There was a history of poliomyelitis, type II diabetes mellitus and recurrent urinary tract infections.

In September 1992, aseptic loosening was diagnosed and a revision was undertaken. In May 1994, she presented with pain and the wound was red, warm and tender. She was treated with diclofenac.

When she was admitted in April 1995, the hip was painful and a discharging sinus had been present for 2 months. Her temperature was 36.3 °C, the white cell count was 5100/cmm with 61% neutrophils and 0% band cells, the erythrocyte sedimentation rate was 28 mm/hour and the blood glucose was 1.57 g/l.

Radiographs showed osteolysis, mainly in the femur (Fig. 1). This was confirmed by scintigraphy with technetium-99m methylene diphosphonate and Tc-99 hexamethylpropylene-amineoxine labelled cells. Culture and Gram stain from the discharge was negative.

At operation, both the femoral and acetabular components were loose and there was so much bone destruction that a Girdlestone resection was necessary. The sinus continued to discharge for 2 weeks.

Tissue cultures in blood agar, chocolate agar, McConkey's agar (CO₂ incubation), thioglycolate broth, Schaedler supplemented with 5% sheep blood (anaerobic incubation) and Sabouraud agar were incubated at 35 °C. β-haemolytic colonies >0.5 mm in diameter were observed in blood agar after 24 hours. Gram's stain showed gram-positive coagulase-negative cocci which suggested the presence of *Streptococcus ssp* [3].

Biochemical identification was made by the API-20 STREP (BioMérieux). Serological tests were performed by extracting cell wall antigens with anti-serum which was produced previously by hyperimmunising rabbits with fixed cells of the appropriate serogroup (Slidex Strepto-Kit, BioMérieux) [3]. Definitive identification of group G *Streptococcus* was made because bacitracin sensibility, hippurate hydrolysis, bile-esculin agar and Voges-Proskauer tests were negative and because cell wall antigens of group G were identified [3].

Fig. 1. Anteroposterior radiograph on admission. There is translucency at the bone-cement interface with bony destruction mostly around the femoral component

The patient was treated initially by intravenous potassium penicillin 12 million units daily for 3 weeks, followed by amoxicillin 4 g daily for 5 weeks.

Discussion

β -haemolytic streptococci are the causative organisms in from 3 to 17% of all cases of septic arthritis [2]. This was first described in 1972 [9], and the first late haematogenous infection of a total joint replacement was recorded in 1980 [1]. Four patients with bone or joint infection were reported and an additional 24 cases found in the literature in 1985 [11]. A further review in 1991 found 13 patients with group G *Streptococcus* infection in joint replacements [2]. Other cases have been recorded [6, 8], and a patient with a history of leprosy with neuropathic arthropathy has been described with this type of septic arthritis [5].

The portal of entry in our case was probably the urinary tract because of the history of recurrent infections, but operative infection cannot be ruled out.

Group G *Streptococcus* typically is very sensitive to penicillin G potassium [1, 2, 4, 8, 11, 12] with minimum inhibitory concentrations of the

drug which usually range from 0.025–0.05 $\mu\text{g/ml}$ [4, 5, 6, 8, 11, 12]. Other antibiotic combinations have been used, such as penicillin with aminoglycoside, cefazolin, vancomycin or erythromycin [2, 6, 8, 11, 12].

Vartain described 8 patients with infected joint prostheses and none required to be removed [11]. Burkert reported 13 cases of infected joint prostheses; in one, a total knee arthroplasty needed an above-knee amputation [2]. Apart from these patients, none of his other 12 cases needed removal of their prostheses; 5 were treated by antibiotics, 2 with repeated aspirations, one by surgical drainage and the treatment was not known in one [2]. Lam treated one infected total hip arthroplasty with penicillin, gentamicin and operative drainage [6]. Nakata reported 2 cases with a knee and a hip prosthesis treated by penicillin and repeated aspiration.

The true incidence may be greater than reported and the prognosis may be worse than has been suggested. Our patient needed a Girdlestone resection because of septic loosening with osteolysis.

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