SALMONELLA OSTEITIS AND SEPTIC ARTHRITIS

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We reviewed 16 patients with salmonella osteitis or septic arthritis. All patients were immunologically normal and none had a history of typhoid fever. We discuss the importance of obtaining a bacteriological diagnosis and provide guidelines on the duration of antibiotic treatment.

Typhoid fever is endemic in the province of Natal and approximately 2 000 cases per annum are treated at King Edward VIII Hospital (Muckart and Angorn 1988). Osteomyelitis occurs in less than 1% of patients with typhoid fever (Murphy 1916); it often develops in immunocompromised hosts and in patients with sickle cell anaemia (Ebong 1986). The duration of antibiotic therapy for salmonella osteitis remains empirical, because of its rarity. Too short a course may lead to chronic infection (Ortiz-Neu et al 1978).

PATIENTS AND METHODS

In all, 16 patients with Salmonella typhimurium osteitis and septic arthritis were treated at King Edward VIII Hospital between 1984 and 1986 (Table I). Of these, 12 came from endemic areas, but no patient had a history of typhoid fever or had been treated for typhoid in the past. Six patients with septic arthritis were under 20 years of age; the duration of symptoms in these cases had varied from three to eight days.

The seven patients with spinal or sacro-ilial joint involvement presented with unremitting low backache or buttock pain respectively (Fig. 1). One patient who had been paraparetic for five weeks and one with sacro-ilial involvement had been initially treated for tuberculosis by the referring hospital (Fig. 2).

Diaphyseal involvement was seen in three patients (Fig. 3). One patient with chronic osteomyelitis of both femora was initially treated with chloramphenicol for six days after incision and drainage on the right side. Seven months later the left femur required drainage and on this occasion a three-week course of antibiotics was given.

There was a quiescent period of four years during which the ESR was less than 40 mm/hr, but the Widal titre remained elevated at 1:640. There were three exacerbations in the following two years, during which both the ESR and the Widal titre were significantly raised.

Fig. 1

Hazy appearance of the right sacro-iliac joint.

Fig. 2

Tomograms of L1/L2 showing disc space narrowing and involvement of the adjacent bodies.

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In all patients, immunological tests were normal and tests for sickling were negative, but the ESR was increased (range 58 to 76 mm/hr). *Salmonella typhi* was cultured from the pus in 14 patients and in the other two, with sacro-iliac involvement, the diagnosis was confirmed by a positive blood culture and a high Widal titre. Blood cultures were positive in 12 patients.

Aspiration of the affected hips and knees yielded thin, yellowish pus. A closed needle biopsy confirmed the diagnosis in three patients with lumbar spine involvement: the patient with paraparesis had an anterior decompression. In case 10 an open biopsy of the sacro-iliac joint was performed. All patients were treated with chloramphenicol (28 g) for one week and thereafter with

![Figure 3a](image1)

![Figure 3b](image2)

**Figure 3a** – Infection of the distal tibia. **Figure 3b** – Appearance 18 months after incision, drainage and antibiotics.

<table>
<thead>
<tr>
<th>Case</th>
<th>Sex</th>
<th>Age (yr)</th>
<th>Site</th>
<th>Tests for Salmonella typhi</th>
<th>Duration of antibiotic treatment (wk)</th>
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<tr>
<td></td>
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<td>Blood culture</td>
<td>Pus swab Widal</td>
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<tr>
<td>1</td>
<td>F</td>
<td>49</td>
<td>Right and left femora</td>
<td>Not done +</td>
<td>1:1280 13</td>
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<tr>
<td>2</td>
<td>M</td>
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<td>Lumbar spine</td>
<td>+</td>
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<tr>
<td>3</td>
<td>M</td>
<td>14</td>
<td>Knee</td>
<td>No growth +</td>
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<td>4</td>
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<td>7</td>
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1 g of ampicillin daily for a period ranging from four to 13 weeks. The duration of antibiotic therapy depended on the clinical response and on the ESR.

RESULTS
All six patients with joint involvement had full range of pain free movement at four months. Case 16 with paraparesis recovered within three weeks of surgical decompression and each of the other three patients with spinal lesions made an excellent recovery after three months in a plaster jacket. The three patients with sacroiliac joint involvement were asymptomatic after six to eight weeks of antibiotics. Two of the diaphyseal lesions healed without sequelae after drainage. The ESRs returned to normal levels (less than 40 mm/hr) after treatment, but the Widal titres remained elevated for two to four months in 15 patients.

DISCUSSION
The most commonly reported predisposing factor for salmonella infection is sickle cell disease (Ebong 1986). It is thought that microvascular bone infarcts are the sites at which osteomyelitis develops after a bacteraemia. In non-endemic areas cases have been reported both in immunologically normal patients (Miller, Fogel and Dunham 1988) and in those who were immunologically compromised by collagen disease, diabetes or malignancy (Ralston 1955; Han, Sokal and Neter 1967). In endemic areas gastro-intestinal symptoms usually precede infection by one to 12 weeks (Warren 1970). Although all our patients denied significant gastro-intestinal symptoms within the preceding few years, it is possible that the clinical course had been mild. Bacteraemia can occur without symptoms of gastro-intestinal involvement; it may be manifest as malaise and fever only (Black, Kunz and Swartz 1960).

In children the lesion may occur either in the metaphysis (Ebrahim and Grech 1966) or as multiple lesions in the diaphysis (Hendrickse and Collard 1960). In our catchment area, where typhoid fever is endemic and tuberculosis is common, it is important to obtain a bacteriological diagnosis since salmonella osteomyelitis is clinically and radiologically indistinguishable from that due to other organisms. Both of our patients who were initially treated for tuberculosis at the referring hospital had been treated for pulmonary tuberculosis in the past. Schweitzer et al (1971) also reported a case of salmonella spondylitis, presenting 15 months after gastro-intestinal symptoms, which was initially treated as tuberculosis.

The importance of appropriate antibiotic therapy in salmonella osteomyelitis is underscored by the frequency of relapse and of the development of chronic osteomyelitis. Ortiz-Neu et al (1978) reported that seven of their 15 patients with acute salmonella osteomyelitis developed chronic infections; inadequate antibiotic therapy was thought to be a contributing factor. This was probably true of our patient with chronic osteomyelitis of both femora; she was immunologically normal and not a typhoid carrier. Our protocol for the treatment of salmonella infection was similar to that for acute pyogenic osteomyelitis. Antibiotics were continued until a good clinical response and an ESR of less than 40 mm/hr were obtained. We found that the Widal titre was not helpful in assessing the duration of treatment. Our study confirms the opinion of Ortiz-Neu et al (1978) that joint infections healed rapidly with no long-term sequelae.

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

REFERENCES