HIP INVOLVEMENT IN CHILDHOOD BRUCELLOSIS

B. BENJAMIN, M. R. H. KHAN

From King Saud University, Abha, Saudi Arabia

We reviewed 190 children with brucellosis admitted over a 7.8-year period. Seventy of these had articular involvement (36%) and the most common site was the hip (18%). All but one patient had unilateral infection. The hip was the only joint infected in 20 patients (57%). The next most common articular site was the knee. All patients had painful limitation of movement and this was the only articular sign in 28 (80%). Extra-articular signs included fever and hepatospleno-megaly.

_BruceIa_ infection should be considered in every child from an endemic area who presents with fever and joint symptoms. The insidious onset and a normal or low leucocyte count help the differentiation from acute septic arthritis.

Children with hip involvement had a slower response to treatment, longer hospital stays and a higher incidence of complications and relapse than those without. Complications included dislocation (n = 4) and avascular necrosis of the femoral head (n = 1). Treatment by combination chemotherapy for 6 to 12 weeks usually achieves cure and prevents relapse. A multidisciplinary team approach to management is recommended.

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Brucellosis is a zoonosis transmitted to man from farm animals and is endemic in Saudi Arabia (Bital et al 1991). It may present as a mild febrile illness with few localising signs, or as a severe multisystem disease. Osteoarticular problems are common in both adults and children (Mousa et al 1987). The latter commonly develop acute or subacute peripheral oligoarthritis involving predominantly the large joints of the lower limb (Benjamin, Annobil and Khan 1992).

We gained the impression that hip involvement contributed considerably to the morbidity of the disease in children, but this has not been adequately documented in the literature. We therefore studied this group of patients in more detail, reporting our experience from Abha, in southwestern Saudi Arabia.

PATIENTS AND METHODS

We reviewed the cases of all children under 12 years of age admitted with brucellosis to the Abha General and Asir Central Hospitals from August 1985 to May 1993. We recorded any history of contact with farm animals or of ingestion of unpasteurised milk or other animal products, and the results of complete physical examinations of all patients. We defined arthritis as painful limitation of the range of movement or the presence of signs of inflammation around the joint. Arthralgia was defined as pain referred to a joint with no objective signs.

The firm diagnosis of brucellosis was based on the finding of a significantly positive titre of 1 in 160 or above (Talukder, Abomelha and Higham 1984) on the standard tube agglutination test (STAT) or a fourfold or greater rise in titre. Other tests done as indicated included blood culture for _Brucella_, full blood counts and ESR, C-reactive protein and rheumatoid factor levels, and antistreptolysin O titre. Plain radiographs were taken. A few patients had diagnostic aspiration of an involved joint with analysis and culture of the synovial fluid.

Treatment was by varying combinations of oral drugs including co-trimoxazole (trimethoprim 10 mg/kg/day), rifampicin (20 mg/kg/day) and tetracycline (40 mg/kg/day) for 3 to 12 weeks, and parenteral drugs such as streptomycin (30 mg/kg/day) for two weeks or gentamicin (5 mg/kg/day) for seven days. Tetracycline was used only in children over seven years of age. Some patients had non-steroidal anti-inflammatory drugs. Arthrolysis or aspiration was occasionally done to relieve joint pressure. Skin traction, splintage or spica casts were used to

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immobilise and rest an involved joint and prevent weight-bearing.

We recorded the response to treatment as time to defervescence, time to achieve a full range of painfree movement of the hip, and time to achieve a normal gait. Follow-up was continued to monitor clinical cure and relapse.

Data were analysed by the chi-squared and Student’s t-tests; the chosen level of significance was 5%.

RESULTS

Seventy of 190 children (37%) with brucellosis had arthritis during the study period. A hip was involved in 35 children, 18% of the whole group and 50% of those with arthritis. A knee was involved in 31 patients (16%) and an ankle in 11 (6%). Other areas were less commonly affected: the foot in four, the sacroiliac joint in three, the elbow in three and the shoulder, wrist and spine in two each.

The 35 children with brucellar hip arthropathy included 21 boys and 14 girls. All but one had unilateral involvement; the left to right ratio was 1.3:1. Patients presented at all ages after the first year of life, but there was a higher proportion of young children. Twenty-four were from 1 to 7 and 11 from 7 to 11 years of age.

Presentation was acute or subacute (duration of illness up to four weeks) in 29 patients (83%), with a median duration of illness of two weeks (0.5 to 17). The modes of presentation and the age and sex distribution were similar in the groups with and without hip involvement.

Table I. Clinical features of 35 children with brucellar arthritis of the hip

<table>
<thead>
<tr>
<th>Feature</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of fever</td>
<td>32</td>
<td>91</td>
</tr>
<tr>
<td>Animal contact or ingestion of raw animal milk or products</td>
<td>32</td>
<td>91</td>
</tr>
<tr>
<td>Positive family history of brucellosis</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Associated arthralgia in other joints</td>
<td>9</td>
<td>26</td>
</tr>
<tr>
<td>Associated arthritis in other joints (see text)</td>
<td>14</td>
<td>40</td>
</tr>
<tr>
<td>Splenomegaly</td>
<td>16</td>
<td>46</td>
</tr>
<tr>
<td>Hepatomegaly</td>
<td>6</td>
<td>17</td>
</tr>
<tr>
<td>Lymphadenopathy</td>
<td>9</td>
<td>26</td>
</tr>
</tbody>
</table>

The clinical features are shown in Table I. The presumptive source of infection for most patients was farm animals. Systemic signs of brucellar infection such as fever, hepatosplenomegaly and lymphadenopathy were variably present, and there was associated arthralgia in other joints in a quarter of the group.

The hip was the only joint involved in 21 patients (60%); the most common associated site was the knee (Table I). There was monoarthritis in 20 patients; two joints were involved in 11 and three joints in four. All patients had limitation of range of movement and inability to bear weight on the affected hip. These were the only signs in 28 patients (80%), but seven also had local tenderness and one had a palpable swelling in the groin. Hip symptoms had usually started at the same time as the systemic symptoms (n = 20) or later (n = 9). In two patients they were the first symptoms, predating the systemic illness by days or weeks. Four patients had no evidence of hip involvement at first, but symptoms developed two to ten days after starting treatment (n = 2) or suffering a relapse (n = 2).

The STAT titre was significantly elevated or showed a significant rise in all patients. In the seven patients tested, blood culture was negative for Brucella. Eighteen of 34 patients (53%) had anaemia (Hb < 100 g/l).

The leucocyte count was normal (5 to 10 × 10⁹/l) in 21 patients and low (< 5 × 10⁹/l) in seven. The ESR was elevated to > 20 mm/hr in 90% of 29 patients.

Plain radiography showed a joint effusion in two patients, subluxation or dislocation (Fig. 1) in four and avascular necrosis of a femoral head in one (Fig. 2). No
other radiological complications were seen. Three patients with acute presentations, large effusions and subluxation had synovial aspiration. The fluid was viscid and straw-coloured in two and purulent in the third. Gram staining and culture were negative in all three.

In three patients, it was difficult to differentiate sacroiliitis from arthritis of the hip. One other patient had a migratory pattern of arthritis, and pauciarticular juvenile rheumatoid arthritis was considered in the differential diagnosis in two others. Five patients were initially diagnosed as having irritable hips. Acute septic arthritis was excluded by synovial fluid culture in three children.

Details of specific chemotherapy are given in Table II. Co-trimoxazole with rifampicin was the most commonly used combination. Seventeen hip patients (49%) required chemotherapy for six or more weeks and patients with hip involvement had a longer mean duration of chemotherapy than those without (5.7 v 3.9 weeks, p < 0.05). Ten hip patients had traction for 10 to 30 days and three required a spica cast to continue immobilisation.

The response to chemotherapy is shown in Figure 3. Defervescence occurred in 89% of patients within one week of starting chemotherapy, most responding within three days. Arthritis responded more slowly: 43% of cases took over two weeks to resolve (slow responders). Clinical resolution was complete by eight weeks in all except the child with avascular necrosis. Of children with brucellar arthritis, those with hip involvement had a significantly higher proportion of slow responders (43% v 13%, p < 0.05). Patients with hip involvement also had longer periods in hospital (means 17.4 v 12 days, p < 0.05).

Of the 26 hip patients followed for 8 to 176 weeks, there were five episodes of relapse in four patients (Table II). The only patient who received a single drug (tetracycline for three weeks) relapsed, as did two other patients treated at home with unsupervised combination chemotherapy for three weeks. One of these relapses was within two weeks of stopping treatment; the other three patients had late relapse or re-infection at 3 to 15 months. In two patients the hip was not involved in the primary illness; signs at this joint developed only at the time of the relapse. The relapse rate was much the same in children with hip involvement (15%) as in those with brucellar arthritis in other joints (14%), but significantly higher than that for non-articular brucellosis (2%).

Case report. A seven-year-old girl presented with a two-month history of irregular fever and a painful limp. She had moderate limitation of movement of the left hip and there was a history of animal contact. The STAT was positive at 1 in 320. Traction for two weeks and a combination of rifampicin and co-trimoxazole for eight weeks resulted in moderate improvement but there was a residual limp and limitation of movement.

Fifteen months later her hip problem became worse and radiography showed progressive flattening and destruction of the femoral head. The STAT titre was 1 in 1280, and this late relapse was treated with co-trimoxazole and doxycycline for six months. Her hip was treated by a subtrochanteric varus derotation osteotomy fixed by a plate, with a good result two years after the initial presentation.

Table II. Initial chemotherapy regime and duration in 35 children with brucellar arthritis of the hip by number of patients, with number relapsing in parentheses

<table>
<thead>
<tr>
<th>Regime</th>
<th>Duration in weeks</th>
</tr>
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<tbody>
<tr>
<td>Co-trimoxazole and rifampicin</td>
<td>11 (2) 4 14 (1)</td>
</tr>
<tr>
<td>Co-trimoxazole and streptomycin</td>
<td>1 - -</td>
</tr>
<tr>
<td>Tetracycline and rifampicin</td>
<td>- - 2</td>
</tr>
<tr>
<td>Co-trimoxazole and gentamicin</td>
<td>- 1 1</td>
</tr>
<tr>
<td>Tetracycline alone</td>
<td>1 (1) - -</td>
</tr>
<tr>
<td>Total</td>
<td>13 5 - -</td>
</tr>
</tbody>
</table>

DISCUSSION

Our study has shown that osteoarticular complications in general and involvement of the hip in particular are important causes of morbidity in childhood brucellosis. We have confirmed that the hip is the most commonly affected joint (Mousa et al 1987), and that this may be monoarticular or part of an oligoarthritis often also involving the knee (Gomez-Reino et al 1986; Lubani, Sharda and Helin 1986).

The precarious blood supply of the hip makes it vulnerable to various disease processes. Septic arthritis of the hip has a poor prognosis, but complications have rarely been reported after brucellar involvement of the hip (Mousa et al 1987; Gedalia, Howard and Einhorn...
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1992). In contrast we found a significant incidence of hip complications.

Dislocation of the hip in association with brucellosis has, to our knowledge, not been previously reported. Our four patients all had large effusions; from Kuwait Mousa et al (1987) found no clinically significant effusions or cases of dislocation in 90 patients with brucellar hip disease.

Avascular necrosis of the femoral head may be primary or secondary, but an association with brucellosis has been reported only once before. Gedalia et al (1992) described a patient similar to ours in age, presentation and persistence of hip symptoms. In the absence of bacteriological proof of local infection it is uncertain, however, whether the avascular necrosis in our patient was a direct sequel of brucellosis or a coincidental finding. Early arthroscopy or aspiration of a tense joint may help to prevent this complication.

Brucellar arthritis of the hip can simulate other childhood problems affecting the joint, and a period of observation may be required before the diagnosis becomes clear. A migratory pattern of arthropathy (Shahar et al 1983) may cause confusion with rheumatic fever and chronic synovitis may mimic oligoarticular juvenile rheumatoid arthritis. Radionucleide bone scans may be useful in differentiating sacroiliitis from hip arthritis (Mousa et al 1987). Lyme arthritis, which has a presentation similar to brucellar arthritis, has not been reported from Saudi Arabia and none of our patients had skin lesions suggestive of erythema migrans.

Brucellar arthritis can usually be differentiated from acute septic arthritis by its more indolent presentation, moderate local signs of inflammation and normal or low leucocyte counts (Lubani et al 1986). An acute severe monoarthritis, however, may require early aspiration and culture so that specific antibiotic therapy can be given promptly.

Rapid defervescence followed by slower resolution of joint symptoms in response to chemotherapy has been reported (Mousa et al 1987; Benjamin et al 1992). Involvement of the hip appears to be associated with a longer morbidity and slow responders may require chemotherapy for longer than the recommended six weeks (Gomez-Reino et al 1986), until resolution is complete.

The late appearance of arthritis has been reported before (Mousa et al 1987) and may involve the hips or the knees. This delay, and the failure to isolate an organism from the joint in these cases, suggests that the hip arthritis of brucellosis is often reactive in nature.

The true relapse rate of our patients is uncertain because of lack of adequate follow-up, but others have also found this to be associated with single drug therapy, shorter duration of chemotherapy, and poor compliance in a more prolonged course (Samra et al 1983; Mousa et al 1987; Al-Eissa et al 1990; Hall 1990). Co-trimoxazole, however, has been reported to be effective when used alone for a three-month course (Gomez-Reino et al 1986). It may be difficult to differentiate late relapse from reinfection in endemic areas (Mousa et al 1987).

Brucellosis should be considered as a possible cause of hip symptoms in a febrile child who comes from, or has visited, an area endemic for the disease. A detailed history of animal contact or the ingestion of unpasteurised milk or other products is required and appropriate serology and cultures should be done. Plain radiographs are useful in detecting complications and supervised combination chemotherapy for at least six weeks is required. Longer treatment may be warranted in slow responders.

Localised brucellosis poses special problems in management (Hall 1990) and hip disease should be managed by a multidisciplinary team including a paediatrician, an orthopaedic surgeon and a physiotherapist.

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


