PYOGENIC INFECTION OF THE SACRO-ILIAC JOINT

A REPORT OF 11 CASES

M. D. G. SHANAHAN, C. E. ACKROYD

From Southmead Hospital, Bristol

We report 11 patients who, over a five-year period, were treated for pyogenic infection of the sacro-iliac joint. This condition is uncommon and difficult to assess, so that diagnosis is liable to be delayed and morbidity increased. Skeletal scintigraphy, with perfusion phase imaging, is usually positive in early lesions and prompt antibiotic treatment reduces complications.

The general incidence of pyogenic infection of the sacro-iliac joint is not known, but it has been said to account for 1.5% of joint infections in children (Schaad, McCracken and Nelson 1980). Fewer than 120 cases have been reported in the English literature. Before antibiotics were available abscess formation was common and surgical drainage was the treatment (Avila 1941). Operation is now rarely needed and the mortality, once 30%, is very small. In contrast to sepsis of peripheral joints, infection of the sacro-iliac joint may be difficult to detect and diagnosis may be delayed (Delbarre et al. 1975; Coy et al. 1976; Gordon and Kabins 1980; Jajić et al. 1983).

PATIENTS AND METHODS

During the five-year period from 1977 to 1981 11 patients were treated for infective sacro-iliitis in Bristol. The onset was acute in 10 patients and chronic in one. Investigation of all patients included a full blood count, blood culture, plain radiography and skeletal scintigraphy using technetium-99m methylene diphosphonate; two patients had gallium-67 citrate scans. Two aspirations were performed and three joints were explored. The diagnosis was made on clinical findings and a positive bone scan; bacteriological confirmation was obtained in nine cases.

Treatment was by systemic antibiotics, adjusted if necessary when the bacterial sensitivities became available. Bed rest was followed by cautious mobilisation, with a change to oral drugs as the symptoms settled. Antibiotics were continued for at least six weeks after discharge from hospital.

CLINICAL FINDINGS

These are summarised in Table I. Acute cases presented with a febrile illness (in 8 of 10 patients), pain in the loin, buttock or hip and a reluctance to bear weight on the affected side. Pain on hip movement or limitation of passive straight leg raising was recorded in all acute cases but specific examination of the sacro-iliac joint had often been omitted. Lumbosacral root symptoms or signs were found in two patients and iliac fossa tenderness in two others led to an exploratory laparotomy which was negative. Five patients gave a history of recent infection elsewhere.

All patients had elevation of the plasma viscosity or an increased erythrocyte sedimentation rate; five had a marked leucocytosis. Four developed a transient hyperbilirubinaemia of 50 to 240 µmol/l. Blood cultures were positive in 8 of the 10 acute cases and one other patient had significantly elevated levels of antistaphylococcal antibodies. Of the organisms isolated from nine patients, seven were Staphylococcus aureus, one a Lancefield Group A streptococcus and one a Salmonella schwarzengrund.

In seven cases plain radiographs taken within three weeks of onset were available and all seven were normal (Fig. 1); but all films taken later showed pathological changes (see Fig. 5). Skeletal scintigraphy gave one early negative result, a delayed image recorded six days after onset; this had become positive when it was repeated 32 days after onset. A delayed image scan in Case 1 after 12 days showed a “cold” area, which became “hot” in subsequent examinations (Figs 2 to 4).

Delay in diagnosis was frequent; it ranged from 2 to 100 days, averaging 17 days. Only three patients (Cases 6, 7 and 9) were correctly diagnosed on admission to hospital; mistaken diagnoses included prolapsed intervertebral disc, irreparable hip, acute appendicitis and renal

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abcess. One patient’s pain was attributed to a longstanding incarcerated inguinal hernia.

Delay in diagnosis often resulted in initial treatment being inadequate, and in unnecessary invasive procedures. Systemic disturbance was severe in seven patients: four developed jaundice after receiving parenteral fucidic acid, two developed lung abscesses, one showed evidence of disseminated intravascular coagulation; two had local abscess formation. Two patients developed concurrent infection in other joints; in one of these patients asymptomatic infection of a thoracic disc space was shown on a bone scan, and in the other infection of the hip joint on the same side was detected only when symptoms developed during follow-up. Retrospective review of the scans of this last patient show that there had been diffuse involvement of the ilium, from the sacro-iliac joint to the acetabulum (Figs. 3 and 4).

Patients were in hospital from 12 to 120 days, averaging 34 days. The only death was that of a 24-year-old patient on dialysis for chronic renal failure, who was also on steroid therapy; infection of the sacro-iliac joint followed a protracted staphylococcal septicaemia.

Patients were followed-up for from six months to three years. Of the two patients who had recurrent pain, one settled with antibiotic treatment while the other, even after a second exploration and curettage, remained asymptomatic. Two patients had spontaneous bony fusion. The patient with secondary involvement of the hip developed painful osteoarthritis of this joint (Fig. 6). Six patients followed up for one year or more remained without symptoms.

**DISCUSSION**

Infection of the sacro-iliac joint is frequently associated with diagnostic delay, increased morbidity and unnecessary, often invasive, investigations.

<table>
<thead>
<tr>
<th>Case</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Side</th>
<th>Presentation</th>
<th>Previous infection</th>
<th>Organism</th>
<th>Clinical features</th>
<th>Management other than antibiotics</th>
<th>Follow-up (months)</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>28</td>
<td>F</td>
<td>R</td>
<td>Acute</td>
<td>Vulval abscess</td>
<td>Staph. aureus</td>
<td>Septicaemia, jaundice, abdominal pain Sepsis right hip</td>
<td>Spontaneous fusion Degenerative changes in right hip</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>67</td>
<td>F</td>
<td>L</td>
<td>Acute</td>
<td></td>
<td>Staph. aureus</td>
<td>Septicaemia, jaundice Gluteal abscess</td>
<td>Exploration</td>
<td>24</td>
<td></td>
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<tr>
<td>3</td>
<td>14</td>
<td>M</td>
<td>L</td>
<td>Acute</td>
<td>Tonsillitis</td>
<td>Group A Strept.</td>
<td>Rapid resolution</td>
<td>Asymptomatic</td>
<td>6</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>4</td>
<td>21</td>
<td>M</td>
<td>L</td>
<td>Acute</td>
<td></td>
<td>Staph. aureus</td>
<td>Septicaemic purpura, jaundice, paralytic ileus Lung abscesses</td>
<td>Laparotomy 1V feeding</td>
<td>36</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>F</td>
<td>R</td>
<td>Acute</td>
<td>Tonsillitis</td>
<td>Group A Strept.</td>
<td>Septicaemia, jaundice, thrombocytopenia iliac fossa pain</td>
<td>Laparotomy</td>
<td>24</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>6</td>
<td>63</td>
<td>F</td>
<td>L</td>
<td>Chronic</td>
<td></td>
<td>Staph. aureus</td>
<td>Minimal pain</td>
<td>Exploration</td>
<td>24</td>
<td>Persistent pain Re-exploration at 1 year Pain on walking</td>
</tr>
<tr>
<td>7</td>
<td>24</td>
<td>M</td>
<td>L</td>
<td>Acute</td>
<td>Chronic renal failure with sepsicaemia</td>
<td>Staph. aureus</td>
<td>Lung abscesses, endocarditis and occult sacro-iliac abscess</td>
<td>Died during haemodialysis</td>
<td>1</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>8</td>
<td>58</td>
<td>M</td>
<td>L</td>
<td>Acute</td>
<td>Pustular psoriasis, trauma</td>
<td>Staph. aureus</td>
<td>Rapid resolution</td>
<td>Asymptomatic</td>
<td>12</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>9</td>
<td>19</td>
<td>M</td>
<td>L</td>
<td>Acute</td>
<td>Enteritis</td>
<td>Salmonella</td>
<td>Septicaemia, cachexia and bed sores</td>
<td>Exploration</td>
<td>12</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>10</td>
<td>33</td>
<td>M</td>
<td>R</td>
<td>Acute</td>
<td></td>
<td>? Staph.*</td>
<td>Rapid resolution</td>
<td>Asymptomatic</td>
<td>12</td>
<td>Asymptomatic</td>
</tr>
<tr>
<td>11</td>
<td>71</td>
<td>M</td>
<td>L</td>
<td>Acute</td>
<td>Varicose ulcers</td>
<td>Staph. aureus</td>
<td>Septicaemic purpura Disseminated intravascular coagulation Thoracic disc infection</td>
<td>Residual pain</td>
<td>6</td>
<td>Asymptomatic</td>
</tr>
</tbody>
</table>

* Elevation of antistaphylococcal antibodies: Anti-α haemolysin Anti-β haemolysin Anti-micrococal nuclease

<table>
<thead>
<tr>
<th>Antibody</th>
<th>Value (IU/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-α</td>
<td>512 (n = 2)</td>
</tr>
<tr>
<td>Anti-β</td>
<td>16 (n = 4)</td>
</tr>
</tbody>
</table>

Table I. Clinical details of 11 patients with pyogenic infection of the sacro-iliac joint, all treated with antibiotics.
The afferent innervation of the sacro-iliac joint may be from L5, S1 or S2 levels and its anterior capsule is related to the lumbosacral trunk, the superior gluteal and obturator nerves, the ureter, the psoas muscle and the parietal peritoneum. Sepsis in this joint typically gives pain in the same buttock, but this may be poorly localised. Symptoms may therefore suggest commoner lesions of the hip, lumbosacral spine or lower abdomen.

The sacro-iliac joint is relatively inaccessible and has a limited range of movement (Frigerio, Stowe and Howe 1974; Bowen and Cassidy 1981) so that many of the signs of infection in peripheral joints are easily missed, particularly if the patient is examined only in a supine position. Pain at the extremes of hip movements, reduced passive straight leg raising, psoas spasm, radicular signs or tenderness in the iliac fossa may reinforce an incorrect diagnosis. Specific examination of the sacro-iliac joint is essential and should include palpation of the joint with the patient in a prone position, lateral compression of the pelvis and a manoeuvre to stress the sacro-iliac joint indirectly by hyperextension of the ipsilateral hip (Gaenslen 1927) or by forced medial rotation of the hip to produce distraction (Finneson 1973).

Blood tests may reveal a leucocytosis and elevation of the plasma viscosity. Four patients in our series had transient hyperbiliirubinaemia which may have been a toxic phenomenon or due to drugs. Plain radiography within the first three weeks did not help the diagnosis, but Morgan, Schlegelmilch and Spiegel (1981) report early detection by computerised axial tomography. Skeletal scintigraphy with $^{99m}$Tc-MDP, although non-specific, is very sensitive (Ailsby and Staheli 1974; Trauner and Connor 1975; Horgan et al. 1983). To detect infection at an early stage it is essential that an immediate "perfusion" phase image be recorded, since at this stage the delayed "bone phase" scan, obtained at three to four hours, may be equivocal or even show a photon-deficient or "cold" area (Horgan et al. 1983).

Bacteriological confirmation of the diagnosis is desirable. Blood culture was positive in 80% of our patients, but aspiration was difficult. Others have reported that aspiration gave less than 50% positive results (Coy et al. 1976; Gordon and Kabins 1980) although with experience and using radiographic control greater accuracy may be possible (Miskew, Block and Witt 1979). The most frequently isolated organisms are staphylococci and streptococci although in patients who use parenteral routes for drug abuse Pseudomonas may be more common (Miskew, Block and Witt 1979; Gordon and Kabins 1980).

Initially, high doses of antibiotics should be given parenterally, followed by a prolonged course of oral
treatment to prevent recurrence. Immobilisation of the joint appears to be unnecessary (Coy et al. 1976). Operation is indicated for drainage of an abscess or for sequestrectomy, for biopsy when there is a poor clinical response to antibiotics, or when accurate bacteriology is felt to be essential.

A rapid response can be expected to prompt and appropriate antibiotic therapy (Delbarre et al. 1975; Coy et al. 1976; Gordon and Kabins 1980). Delay in the presentation or the diagnosis was associated with marked toxaemia in seven of the patients in this series. Multiple lesions may be present, including occult skeletal foci (Delbarre et al. 1975); the simultaneous occurrence of infection in a hip and in a sacro-iliac joint has not previously been reported. Diffuse iliac involvement on scintigraphy, as seen in one patient (Figs 3 and 4), should be viewed with suspicion.

Long-term effects of uncomplicated infection are rare, although most patients have persisting radiographic change (Coy et al. 1976; Schaad et al. 1980; Jajić et al. 1983). A reduction in the mobility of the sacro-iliac joint is a normal feature of ageing (MacDonald and Hunt 1952) so few patients can have detectable loss of function.

Failure to institute effective treatment for pyogenic infection of the sacro-iliac joint may result in life-threatening complications. Skeletal scintigraphy with perfusion phase imaging will detect early lesions, but the possibility of the diagnosis has first to be considered. Clinical awareness of the condition is therefore the most important factor in early diagnosis and the prevention of delay.

We are grateful to our colleagues for allowing us to review the patients under their care and to Mrs S. Allwood for typing the manuscript. The radiographic features of four of the patients in this series (Cases 4, 5, 6 and 9) are discussed in a recent publication from the Department of Radiology, Bristol Royal Infirmary (Horgan et al. 1983).

REFERENCES


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