ACUTE IDIOPATHIC CHONDROLYSIS AND PRIMARY ACETABULAR PROTRUSIO MAY BE THE SAME DISEASE

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The case histories and investigations for five adolescent girls with a presumed diagnosis of either primary acetabular protrusio or acute idiopathic chondrolysis are presented. The follow-up ranged from three to nine years. All were treated by extensive soft-tissue release but in no case did this improve movement of the affected hip and permanent stiffness was the inevitable result. The literature is reviewed and methods of treatment are discussed in the light of the CT findings.

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Acetabular protrusio and loss of joint space in an adolescent patient with pain and stiffness in the hip may be secondary to Marfan’s syndrome (Clement et al 1985), infection (gonococcal, tuberculous or pyogenic), trauma or rheumatoid arthritis. If these causes have been excluded the diagnosis of ‘primary acetabular protrusio’ (PAP) may be made. Severe pain and loss of joint space are the most prominent features of acute idiopathic chondrolysis (AIC) of the hip, but acetabular protrusio is also commonly present in this condition.

The cases of five adolescent girls with stiff painful hips, acetabular protrusio and joint-space narrowing are reported. None had a family history or features of Marfan’s syndrome, or of any generalised joint disorder. Three of them had been diagnosed as having primary acetabular protrusio and two as acute chondrolysis. CT showed marked similarities in all cases suggesting that primary protrusio and chondrolysis may be the same disease.

PATIENTS

Details of the five patients are given in Table 1. Radiography showed bilateral narrowing of hip joint spaces, acetabular protrusio more obvious on the more painful side, and early physeal closure (Figs 1 and 2). Routine haematological investigations and the ESR were normal as were serological tests for rheumatoid factor, antinuclear factor, typhoid, anti-streptolysin O and Brucella. Mantoux tests were also negative. In the early stages, bone scans showed no increase in uptake of technetium but all patients later developed a slight diffuse increase in uptake.

The initial treatment was by rest and traction and the use of crutches, physiotherapy and non-steroidal anti-inflammatory drugs. This produced no improvement in pain or hip movement, and surgery was advised in all five cases.

Extensive soft-tissue release was performed on the worst hip, with biopsies taken of the capsule and articular cartilage margin. Histological examination showed mild non-specific chronic inflammatory changes in the capsule and areas of focal necrosis in the femoral head. All cultures of joint aspirate and biopsied tissues were negative, including those for tubercle bacilli and Brucella. The operation failed to improve hip movement or pain in four of the five patients, despite traction and vigorous postoperative physiotherapy, but two of the five hips attained an improved functional position.

Table 1. Clinical details of five girls, originally diagnosed as having AIC (cases 2 and 5) or PAP (cases 1, 3 and 4)

<table>
<thead>
<tr>
<th>Case</th>
<th>Age at onset (yr)</th>
<th>Pain</th>
<th>Initial Fixed flexion (degrees)</th>
<th>Final</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13.5</td>
<td>Moderate</td>
<td>45</td>
<td>45</td>
<td>Stiff painful hips bilaterally L R</td>
</tr>
<tr>
<td>2</td>
<td>10.5</td>
<td>Severe at times</td>
<td>80</td>
<td>80</td>
<td>Stiff painful hips bilaterally L R</td>
</tr>
<tr>
<td>3</td>
<td>12.5</td>
<td>Moderate</td>
<td>40</td>
<td>60</td>
<td>Painless ankylosis L hip</td>
</tr>
<tr>
<td>4</td>
<td>10.5</td>
<td>Severe at times</td>
<td>70</td>
<td>10</td>
<td>Painless ankylosis R hip</td>
</tr>
<tr>
<td>5</td>
<td>13</td>
<td>Severe at times</td>
<td>65</td>
<td>10</td>
<td>Stiff painless L hip</td>
</tr>
</tbody>
</table>

CT was performed when there were clear abnormalities on plain radiography. All five sets of scans showed joint-space narrowing with acetabular protrusio; they also revealed degenerative changes in the acetabulum and areas of osteonecrosis within the femoral head (Fig. 3). Particularly in case 2, but also to a less extent in the other cases, the femoral head appeared to be grasped by the border of the acetabulum when there were areas of reciprocal erosion. This grasping appeared to prevent the head from sitting deeply within the acetabulum, but it was not possible to show whether the intervening space contained fibrous tissue or fluid (Fig. 4).
Plain radiographs of case 1 aged 14 and case 5 aged 15 showing pelvic tilting, acetabular protrusio, early physeal closure and joint-space narrowing.

CT of case 4 aged 12 and case 2 aged 12, showing acetabular protrusio with joint-space narrowing, focal femoral necrosis and 'grasping' of the femoral head.
The radiological findings in the five patients are listed in Table II (Macdonald 1971). Acetabular depth is difficult to quantify, especially when measurement of the centre-edge (CE) angle of Wiberg (1939) is complicated by the pelvic tilt secondary to the flexion contractures. We diagnosed protrusio when the CE angle was greater than 45° and the line of the teardrop had been crossed by the edge of the femoral head (Overgaard 1935).

**DISCUSSION**

Primary acetabular protrusio (PAP) and acute idiopathic chondrolysis (AIC) of the hip are usually described as distinct conditions, although Hughes (1985) and Le Bastard et al (1987) have postulated that they are closely related. Our patients provide further evidence that both may be due to the same disease process.

AIC was first described in relation to slipped upper femoral epiphysis (Waldenström 1930). Lowe (1970) noted AIC in the 'normal' hip of two patients with slipped upper femoral epiphyses. Acute chondrolysis in the absence of other pathology was described by Jones (1971), Moule and Golding (1974) and Wenger, Mickelson and Ponseti (1975). It is characterised by pain and progressive stiffness of a hip associated with radiographic narrowing of the joint space. Some acetabular protrusio is common, as is premature closure of the capital physis (Bleck 1983). The end-result varies from full recovery to painless or painful ankylosis of the hip.

PAP was first described by Otto in 1824 as a necropsy finding. It may present in adolescence as a painful hip with progressive restriction of movement, or later in life (Gilmour 1938-9; Friedenbarg 1963; Hooper and Jones 1971; Shore, Macauley and Ansell 1981). The radiological features include joint-space narrowing, acetabular protrusio and premature closure of the capital physis. A familial incidence was reported by Macdonald (1971) and by D’Arcy, Ansell and Bywaters (1978), but none of our patients had such a history. The diagnosis of primary protrusio is made by exclusion of all possible causes of secondary changes. Alexander (1965) postulated that it was caused by failure to remodel the normal medial acetabular bulge of childhood, but this theory fails to explain the presentation in adolescence with pain, joint-space narrowing and inflammatory changes of the synovium and articular cartilage.

The above descriptions of AIC and PAP confirm several similarities between the two conditions. Pain is usually more prominent in AIC, and acetabular protrusio more definite in PAP, but investigations show only non-specific inflammatory changes in both. We could not distinguish between the CT findings in the two conditions and there seems to be a common pathological process in which the articular cartilage of the hip is destroyed by an inflammatory process, probably autoimmune in origin.

The capital femoral and triradiate physes are also involved. In the femur, physeal damage may produce premature closure (as in PAP) or mechanical failure (as in chondrolysis associated with a slipped capital femoral epiphysis). In the acetabulum the degree of protrusio is decided by a race between premature closure and mechanical failure. Protrusio may be less when there is severe pain (in cases labelled AIC) which prevents the patient from weight-bearing. Despite the postulated common origin acetabular protrusio and slipped capital femoral epiphysis are not seen together, perhaps because mechanical failure in one part of the hip relieves the forces which could cause failure elsewhere.

The management of both conditions is directed at relief of symptoms and attempts to restore the range of movement. CT showing the femoral head grasped closely by the acetabular margins makes it difficult to envisage success for conservative methods or limited surgery. The Smith-Petersen anterior acetabuloplasty (1936) is designed to remove such bony obstruction to movement, but its possible influence on a permanent increase in movement or the long-term outcome is not known.

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**Table II. Radiological findings in the five patients**

<table>
<thead>
<tr>
<th>Case</th>
<th>Centre-edge angle (degrees)</th>
<th>Teardrop line</th>
<th>Intrapelvic protrusion (mm)</th>
<th>Acetabulum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>L 80</td>
<td>Crossed</td>
<td>2</td>
<td>Protrusio</td>
</tr>
<tr>
<td></td>
<td>R 65</td>
<td>Crossed</td>
<td>0</td>
<td>Deep</td>
</tr>
<tr>
<td>2</td>
<td>L 65</td>
<td>Crossed</td>
<td>7</td>
<td>Protrusio</td>
</tr>
<tr>
<td></td>
<td>R 60</td>
<td>Crossed</td>
<td>2</td>
<td>Protrusio</td>
</tr>
<tr>
<td>3</td>
<td>L 65</td>
<td>Crossed</td>
<td>9</td>
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</tr>
<tr>
<td></td>
<td>R 45</td>
<td>Crossed</td>
<td>2</td>
<td>Protrusio</td>
</tr>
<tr>
<td>4</td>
<td>L 95</td>
<td>Crossed</td>
<td>8</td>
<td>Protrusio</td>
</tr>
<tr>
<td></td>
<td>R 95</td>
<td>Crossed</td>
<td>10</td>
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</tr>
<tr>
<td>5</td>
<td>L 55</td>
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<td>1</td>
<td>Protrusio</td>
</tr>
<tr>
<td></td>
<td>R 42</td>
<td>Not crossed</td>
<td>0</td>
<td>Normal</td>
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REFERENCES


