OSTEOCHONDRITIS DISSECANS OF THE PATELLA

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We reviewed 13 cases of osteochondritis dissecans of the patella followed-up for 18 months to 19 years. Two were treated conservatively with excellent results, and 11 by operation with six excellent, four good and one fair result. There was complete radiographic healing of the defect in 10 cases and partial healing in three. The size of the osteochondritic lesion appeared to be of prognostic significance.

Osteochondritis dissecans of the patella is the result of repeated minor injuries to the articular surface. Operation is indicated for persistent pain, intra-articular loose bodies and subchondral sclerosis; excision of the fragment and curettage of the crater, with or without drilling, is recommended.

Osteochondritis dissecans has been defined as partial or total separation of an area of articular cartilage with its underlying subchondral bone, due to avascular necrosis (Lavner 1947; Aichroth 1971). It was first described in the knee by Sir James Paget in 1870 and the term osteochondritis dissecans was coined in 1888 by König (Nagura 1960).

Osteochondritis dissecans of the patella was first reported by Rombold in 1933; since then less than 50 cases have been reported in the English literature (Hutchinson 1943; Lavner 1947; Kleineberg 1949; Hay 1950; Roberts and Hughes 1950; Watson-Jones 1952; Green and Banks 1953; DePalma 1954; Burns and Kelly 1959; Nagura 1960; Heywood 1961; Rideout, Davis and Navani 1966; Aichroth 1971; Pantazopoulos and Exarchou 1971; Stougaard 1974; Edwards and Bentley 1977; Guhl 1979; Roberts 1979; Smillie 1980; Ireland, Trickey and Leyshon 1981). We have studied 13 cases of osteochondritis dissecans of the patella in 11 patients with a view to better understanding of the aetiology, diagnosis and management of this uncommon condition.

MATERIALS AND METHODS

Of the 11 patients, nine, including two with bilateral involvement, were male. The youngest patient was 10 years old and the oldest was 26, the average age at the time of presentation being about 16 years (Table I).

Symptoms had been present for 3 to 10 months before treatment. None of the patients had a history of major trauma to the involved knee, but all except one gave a history of repeated minor trauma related to activities such as school sports and athletics (six patients), wrestling (one), gymnastics (one), ballet (one) and active military service (one patient).

Of the 13 lesions, 12 gave symptoms; one of the patients with bilateral involvement had symptoms only on one side. The presenting symptom in all 12 knees was vague pain in the patellar region of gradual onset, becoming progressively worse before consultation. Pain was aggravated by activities involving knee flexion, especially ascending and descending stairs, and relieved by rest. Four patients also complained of intermittent swelling, especially after exertion and two patients had a vague sense of knee instability. Only two patients reported locking; both had intra-articular loose bodies.

On examination, the commonest finding was retro-patellar tenderness and patellofemoral crepitus when the patella was pressed against the femur. Both patients who complained of locking had knee effusion at the time of presentation. No patient had restriction of the range of movement or evidence of ligamentous laxity. Most had some quadriceps wasting but this atrophy never exceeded 2.5 cm, and no patient had a positive "apprehension" test for patellar dislocation or any other evidence of abnormal lateral tracking of the patella.

All patients had anteroposterior, lateral, skyline and intercondylar radiographs on which the diagnosis was made (Table I). The lesion of osteochondritis dissecans
Table 1. Details of patients, lesions, treatment and results

<table>
<thead>
<tr>
<th>Case number</th>
<th>Age (years)</th>
<th>Sex</th>
<th>Duration of symptoms (months)</th>
<th>Possible causal factor</th>
<th>Osteochondritic defect</th>
<th>Loose body</th>
<th>Treatment</th>
<th>Follow-up</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>15</td>
<td>F</td>
<td>5</td>
<td>Gymnast</td>
<td>Centre medial</td>
<td>10 x 5</td>
<td>+</td>
<td>Open curettage and drilling</td>
<td>5 8</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
<td>M</td>
<td>4</td>
<td>Athlete</td>
<td>Central</td>
<td>10 x 5</td>
<td>+</td>
<td>Arthroscopic curettage</td>
<td>2 0</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
<td>M</td>
<td>6</td>
<td>Athlete</td>
<td>Infero-medial</td>
<td>5 x 5</td>
<td>-</td>
<td>Arthroscopic curettage</td>
<td>2 0</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
<td>F</td>
<td>4</td>
<td>Ballet dancer</td>
<td>Supero-lateral</td>
<td>5 x 5</td>
<td>-</td>
<td>Conservative</td>
<td>4 6</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>M</td>
<td>6</td>
<td>Basketball player</td>
<td>Central</td>
<td>10 x 10</td>
<td>+</td>
<td>Open curettage and drilling</td>
<td>19 0</td>
</tr>
<tr>
<td>6</td>
<td>15</td>
<td>M</td>
<td>3</td>
<td>None</td>
<td>Infero-medial</td>
<td>10 x 10</td>
<td>+</td>
<td>Arthroscopic curettage</td>
<td>2 5</td>
</tr>
<tr>
<td>7</td>
<td>26</td>
<td>M</td>
<td>4</td>
<td>Soldier</td>
<td>Central</td>
<td>10 x 10</td>
<td>+</td>
<td>Open curettage and drilling</td>
<td>5 0</td>
</tr>
<tr>
<td>8</td>
<td>15</td>
<td>M</td>
<td>3</td>
<td>Wrestler</td>
<td>Centre medial</td>
<td>10 x 5</td>
<td>-</td>
<td>Arthroscopic curettage and drilling</td>
<td>1 8</td>
</tr>
<tr>
<td>9</td>
<td>15</td>
<td>M</td>
<td>5</td>
<td>Basketball player</td>
<td>Centre medial</td>
<td>10 x 10</td>
<td>+</td>
<td>Open curettage and drilling</td>
<td>2 0</td>
</tr>
<tr>
<td>10</td>
<td>17 (R)</td>
<td>M</td>
<td>6</td>
<td>Athlete</td>
<td>Centre medial</td>
<td>10 x 10</td>
<td>+</td>
<td>Arthroscopic curettage</td>
<td>1 6</td>
</tr>
<tr>
<td>11 (L)</td>
<td>M</td>
<td>None</td>
<td></td>
<td></td>
<td>Centre medial</td>
<td>10 x 5</td>
<td>-</td>
<td>Conservative</td>
<td>1 6</td>
</tr>
<tr>
<td>11 (R)</td>
<td>M</td>
<td>10</td>
<td></td>
<td>Basketball player</td>
<td>Infero-lateral</td>
<td>10 x 5</td>
<td>+</td>
<td>Open curettage and drilling</td>
<td>7 0</td>
</tr>
<tr>
<td>13 (L)</td>
<td>M</td>
<td>8</td>
<td></td>
<td></td>
<td>Supero-lateral</td>
<td>20 x 15</td>
<td>+</td>
<td>Arthroscopic curettage and drilling</td>
<td>5 6</td>
</tr>
</tbody>
</table>

was most clearly seen in the lateral view, but the skyline view helped to localise it in relation to the medial or lateral patellar facets.

Two patients were treated conservatively by the restriction of activities which could be considered stressful to the patellofemoral joint, namely ballet in Case 4 and athletics in Case 10. No form of knee immobilisation was used in either. Case 4, a 10-year-old girl, had complete relief of symptoms and radiographic healing in three months. Case 10, a 17-year-old boy with bilateral involvement, had complete healing of the lesion in his asymptomatic left knee on the 18-month follow-up radiographs.

Eleven lesions in 10 patients were treated surgically, six arthroscopically, and five by arthrotomy. All the patients treated by arthroscopy had partial separation of the lesion and none had intra-articular loose bodies. The extent of the lesion was determined by probing the softened articular cartilage; this was then excised together with the attached fragment of subchondral bone. The resulting crater was curetted and drilled in two, and only curetted in four.

Operative treatment was therefore by excision and curettage in four cases and excision with curettage and drilling in seven, no attempt being made to reattach any osteochondral fragment. Patients treated arthroscopically were allowed to walk, taking their full weight, on the second postoperative day; those who underwent an arthrotomy remained partially weight-bearing on crutches for three weeks. No form of immobilisation was used after operation. Rehabilitation included isometric quadriceps exercises for both the operated and the conservatively managed patients.

Of the nine patients who were treated by operation, two (Cases 9 and 11) had recurrence of symptoms after eight months and two years respectively. Radiographs showed a persistent defect in the articular surface in both cases. Recurrence of symptoms was attributed to the large size of the lesion in Case 11, but no cause was apparent in Case 9. Both patients had repeat curettage and drilling of the base of the crater with complete relief of symptoms in Case 9 and partial relief in Case 11.

RESULTS

All the patients were reviewed and examined by one of the authors (SSD) after follow-up ranging from 18 months to 19 years (average 4 years 8 months). The results were evaluated by a modification (Table II) of Bentley's criteria for the subjective and objective clinical assessment of the patellofemoral joint (Bentley 1970;
Edwards and Bentley 1977). No arthroscopic review was made of the condition of the articular cartilage at the time of follow-up.

There were eight excellent, four good, one fair and no poor results. The patients with good results were so rated because of occasional pain over the patellofemoral joint, but all had normal findings on physical examination. The single fair result was recorded for the left knee in a patient with a bilateral involvement (Case 11). His right knee had a good result, but his left knee gave pain, especially after activities involving knee flexion, and on examination there was patellofemoral crepitus and 2.0 cm of quadriceps atrophy but a full range of movement.

Ten lesions showed complete radiographic healing and the three lesions which showed partial healing included the two which had had repeat curettage and drilling. A partially healed defect was smaller than the lesion seen before treatment with a smooth base and non-sclerotic rounded margins. Two of the partially healed defects were associated with excellent results while the third had a fair result, but none showed sclerosis, osteophytes or any other evidence of patellofemoral osteoarthritis, though there was minimal irregularity of the patellar surface on the radiographs (after 19 years) of the patient with the longest follow-up (Fig. 1).

DISCUSSION

In 1974 Stougaard reported the long-term follow-up of nine patients with osteochondritis dissecans of the patella, eight of them treated by excision of the fragment and curettage of the crater. More than half of these patients had patellofemoral pain at final follow-up, with persistence of a radiographic defect in eight of the nine cases, and patellar osteophytes in seven cases. Stougaard therefore expressed the opinion that osteochondritis dissecans of the patella often gives rise to persistent radiographic change and possibly leads to osteoarthritis. Edwards and Bentley (1977), reporting six cases with excellent or good results after 6 months to 15 years, felt that the main aetiological factor was repetitive shearing stress on the patellar surface; they recommended treatment by excision of the fragment and drilling. Smillie (1980), reporting 10 surgically treated cases, had
two satisfactory results after repair of the articular surface by drilling and internal fixation of the loose fragment and eight with good relief of symptoms after simple excision of the affected area.

The age and sex distribution of our series confirm other reports that osteochondritis dissecans of the patella is usually seen in the second and third decades of life, predominantly in male patients. The clinical features were similar to those of the patellofemoral pain syndrome (Goodfellow, Hungerford and Woods 1976) and the diagnosis was radiographic. None of our patients had either diagnostic arthrography (Almgård and Wikstad 1964) or a radionuclide bone scan (Orava, Weitz and Holopainen 1979).

The fragments were from 5 to 10 mm in diameter in 12 cases, with slightly larger craters in the bone. One lesion was 20 mm in diameter (Case 11, left side), and in this case recurrence of pain two years after the initial curettage and drilling necessitated a repeat operation, but even this provided only a fair result with partial healing (Fig. 2). Pantazopoulos and Exarchou (1971) also reported persistent discomfort after treatment of a lesion almost 20 mm in diameter, so the size of the lesion may affect the end result. Edwards and Bentley (1977) felt that large lesions are unlikely to heal because they lack the support of intact surrounding articular cartilage.

In our series most lesions were in the middle and lower thirds of the medial facet and on the median ridge (Fig. 3). Three of the lesions involved the lateral facet, two of them in the upper half. Involvement of the lateral facet has been previously documented (Pantazopoulos and Exarchou 1971; Stougaard 1974; Edwards and Bentley 1977), but it has not been previously reported in the upper half of the bone. No lesions involved the margins of the bone or the medial "odd facet".

A number of possible aetiologies for osteochondritis dissecans have been suggested. These include: anomalies of ossification (Sontag and Pyle 1941; Ribbing 1955; Caffey et al. 1958), constitutional and endocrine factors (Smillie 1960), genetic and familial factors (Stougaard
osteocondral and poor position dissecans or body about osteochondritis Sonstegard flexion, middle flexion surface knee moral Lindholm is reach, patella, Ralston flexed (Edwards results flexion, or is is probably when walking 7.6 shows 130° (Stougaard contrast results 1974; Edwards results 1976; Hungerford and Barry 1979). Reilly and Martens (1972) found that patellofemoral joint forces rise to half the body weight in midstance (10° to 15° of knee flexion) during walking on level ground, increase to 3.3 times body weight while ascending and descending stairs, and reach 7.6 times body weight during deep knee bending. Similar findings have been reported by Mathew, Sonstegard and Henke (1977). Since these forces are proportional to knee flexion, it may be that most lesions are in the lower two-thirds of the patella because the knee is flexed only to about 130° (Goodfellow, Hungerford and Zindell 1976; Hungerford and Barry 1979). The sparring of the medial odd facet is probably because it articulates only in extreme knee flexion, a position not often utilised during sporting or normal daily activities.

We treated two patients successfully by simple restriction of activities, but these had the only two lesions which showed no sclerosis of their margins. All the other pre-treatment radiographs showed subchondral sclerosis. We consider that symptomatic osteochondritis dissecans of the patella requires operative treatment if there is subchondral sclerosis or an intra-articular loose body. Subchondral sclerosis can be treated by curettage with or without drilling to open up new channels for vascular ingrowth, which will allow healing and reconstitution of the articular surface by metaplasia to fibrocartilage (Edwards and Bentley 1977). We found no correlation between the separation of the fragment and the end result, in contrast to Ireland et al. (1981) who reported poor results in two of their three patients with separation and loose-body formation. Though fixation of the osteochondral fragment with either bone pegs or pins has been reported (Smillie 1980; Herzberger, Schuler and Rossak 1982) we found no indication for reattachment.

On the basis of the satisfactory results we have observed we recommend treatment by simple excision of the fragment and curettage with or without drilling of the underlying crater. The many advantages of arthroscopic management include the avoidance of open operation and a large scar, less time in hospital, earlier walking and a shorter period of rehabilitation. Arthroscopic treatment is technically more difficult and should be attempted only by an experienced surgeon.

REFERENCES


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