ACUTE DISLOCATION OF THE PATELLA WITH OSTEOCHONDRAL FRACTURE

A REVIEW OF EIGHTEEN CASES

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Eighteen patients with acute dislocation of the patella had associated osteochondral fractures. This fracture complicates approximately 5 per cent of all acute dislocations of the patella occurring in children. Three types of fracture patterns were noted. All patients who were treated by immediate arthrotomy and excision or replacement of the osteochondral fragment and repair of the acute dislocation of the patella made an uneventful recovery with no recurrence of the dislocation. In those patients in whom the osteochondral fragment was removed but with no repair the dislocation recurred.

The recognition of an osteochondral fracture of the knee in association with acute dislocation of the patella may be difficult (Coleman 1948; McDougall and Brown 1968). The combined injury is uncommon; so unless it is suspected and carefully looked for it may easily be overlooked.

The purpose of this paper is to review eighteen cases of these associated injuries, which represent the combined experience of orthopaedic surgeons at the Hospital for Sick Children during twenty-two years (1952-74).

HISTORICAL BACKGROUND

Kroner (1905) is given the credit for first recording the association of an acute dislocation of the patella with an osteochondral fracture. Since that time other authors have reported this uncommon association (Kleinberg 1923; Krida 1924; Meekison 1937; Milgram 1943; Harmon 1945; McDougall and Brown 1968). Milgram (1943) described six cases treated surgically and gave a detailed description of the mechanism of injury. Coleman (1948) described five cases of what he called recurrent osteochondral fracture of the patella and advised early arthrotomy, excision of loose osteochondral fragments and medial capsular plication. Macnab (1952) reviewed sixty-four cases of recurrent dislocation of the patella and described one case with an associated osteochondral loose body, which was excised at the time of repair. Smillie (1951) noted that only "rarely" does an osteochondral fracture of the lateral femoral condyle, either alone or in combination with a medial tangential fracture of patella, occur from acute dislocation of the patella. A review of the literature has not revealed any other reference to this combination of injuries.

CLINICAL STUDY

Between the years 1952 and 1974 eighteen cases of acute dislocation of the patella associated with intra-articular

osteochondral fracture of the knee were treated at this hospital. There were ten girls and eight boys, aged from eleven to eighteen years (Fig. 1). Adults were not included in this study.

FIG. 1
The ages of the patients.

The exact incidence of the injury relative to acute dislocation of the patella was difficult to ascertain, because acute dislocations of the patella are often treated in the Emergency Department and followed as out-patients, with the consequence that they are not coded in our Medical Records Department. When compared with cases of recurrent dislocation of the patella seen during the same period (1952-74), we found an incidence of associated osteochondral fracture of 8.4 per cent. However, this figure is likewise open to question because of differing methods of coding. Suffice to say that the true incidence of this condition is somewhere in the order of 5 per cent of all dislocations of the patella. The injury is probably not as rare as previously reported (Coleman 1948; Smillie 1951).

MECHANISM OF INJURY

This injury occurs when the patella slides back tangentially over the surface of the lateral femoral condyle with the knee in a flexed position. This results in scoring of the articular cartilage both of the medial facet of the

FIG. 2

FIG. 3

Case 1. Figure 2—A skyline view of the patella showing a typical osteochondral fragment from the medial part of the patella. Figure 3 is a photograph at operation. Note the scoring of the articular cartilage of the lateral femoral condyle and the fracture of the medial facet of the patella.

FIG. 4

FIG. 5

FIG. 6

Case 2. Figure 4—Radiograph of the knee of a 16-year-old boy showing a small osteochondral fragment from the lateral femoral condyle. Figures 5 and 6—The osteochondral fragment, which is mainly cartilaginous and can easily be missed radiologically. The small amount of bone present makes reattachment impossible.

patella and of the lateral femoral condyle. With the knee still in the flexed position the infero-medial border of the patella is sheared off by the lateral femoral condyle as a result of the tangential force exerted by the quadriceps with the patella in the dislocated position. An osteochondral fracture of the lateral femoral condyle may also occur either alone or in combination with a fracture of

the infero-medial portion of the patella. In our series three distinct fracture patterns have emerged (Table I).

This does not imply that with an infero-medial patellar fracture (Fig. 2) some degree of cartilage damage does not occur in the lateral femoral condyle: in all the cases reviewed there was at least some scoring or fibrillation of the cartilage (Fig. 3). However, only two knees

showed an osteochondral fracture of the lateral femoral condyle as well as of the patella (Figs. 4 to 6). Similarly, in two cases in which there was only a fracture of the lateral femoral condyle some degree of damage to the

TABLE I
THE THREE TYPES OF OSTEOCHONDRAL FRACTURES

Type of fracture	Number of patients
Infero-medial patellar fracture .	14
Lateral femoral condyle fracture	2
Combined fracture	2

articular surface of the infero-medial portion of the patella was present.

DIAGNOSIS

The diagnosis of an acute dislocation of the patella is simple if the patient is seen with the patella in the dislocated position. But this is not usually the case, and hence the diagnosis may be difficult. All our patients gave a history of the knee "giving way" or "going out of joint", and examination of the knee invariably showed a tense effusion, with exquisite tenderness along the medial border of the patella and the insertion of vastus medialis. A detailed radiographic examination including antero-posterior, lateral, oblique and true skyline views of the patella is essential in making the diagnosis of an osteochondral fracture. If the films are over-penetrated an osteochondral fracture may be missed. The importance of a thorough complete radiological examination in all cases of suspected acute dislocation of the patella cannot be over-emphasised.

TREATMENT

The initial management of this injury was identical in seventeen of the eighteen patients. After the diagnosis had been established the haemarthrosis was aspirated and the leg was wrapped in some form of compressive dressing and elevated. All seventeen patients were diagnosed and operated upon within two weeks of the injury, the timing of the operation varying with the preference of the surgeon and the delay in diagnosis. In one case, diagnosed at the time of acute injury, non-operative treatment in a plaster cylinder for six weeks was preferred. The nature of the operation in the seventeen patients treated surgically varied considerably (Table II). Five patients underwent excision of the osteochondral fragment alone with no attempt to deal with the capsular damage. Of these five, two subsequently developed a recurrent dislocation within six months and were subjected to a second operative procedure to realign the patella. Ten patients underwent excision of the osteochondral fragment combined with repair of their dislocated

patella. The repairs performed consisted of lateral capsular release, medial capsular plication and advancement of vastus medialis in six cases; semitendinosus tenodesis (Baker, Carroll, Dewar and Hall 1972) in three; and a Hauser procedure in one. All were immobilised in a plaster cylinder after operation for about six weeks followed by mobilisation and quadriceps strengthening exercises. In these ten patients there was no recurrence of dislocation.

Only one of the eighteen cases had the osteochondral fracture replaced and fixed with Smillie pins. The fragment, 3.5 by 1.5 centimetres in size, and sliced off the weight-bearing portion of the lateral femoral condyle, had sufficient bone within it to make replacement practical. No attempt was made to repair the acute dislocation and, at follow-up two years later, there had been no episodes of recurrent dislocation.

TABLE II
NATURE OF OPERATION AND RESULT IN EIGHTEEN PATIENTS

Method of treatment	Number of patients	Recurrent dislocation
Excision alone	5	2
Excision and repair	10	0
Replacement alone	1	0
No treatment	1	1
Patellectomy	1	0

Two patients had large osteochondral fractures of the lateral femoral condyles and of the infero-medial portion of the patellae. Both were treated by excision of the fragments, repair of the capsule and mobilisation with slings and springs (Salter 1974) immediately after operation in order to achieve active knee flexion. When there was 90 degrees of flexion and full extension (at ten and fourteen days respectively) non-weight-bearing on crutches was maintained for three months. One of the last two patients in this series had no operation initially; two months later the osteochondral fragment from the infero-medial pole of the patella was removed but no other repair done. Six months later it was necessary to do a semitendinosus tenodesis for recurrent subluxation of the patella. The last patient had the patella removed for indications which were questionable upon reviewing the case history; a large osteochondral fracture, measuring 3 by 4 centimetres, involving most of the medial facet of the patella was found. Eighteen months later this patient still had an extensor lag of 10 degrees with flexion from 10 to 130 degrees and some quadriceps wasting.

DISCUSSION

Three of the eighteen patients developed a recurrent dislocation within six months of removal of the osteochondral fragment. In none of these patients had a primary

repair been undertaken. Ten patients treated by excision of the fragment and repair had no recurrent dislocation. This suggests that excision of the osteochondral fragment combined with a form of repair to prevent further dislocation is the best treatment.

Isolated infero-medial fractures of the patella need not be replaced because they are usually small extra-articular fragments. When possible, osteochondral fractures of the lateral femoral condyle should be fixed back

in place, but often this is impractical although the fragments are usually much larger (2 by 4 centimetres) than the infero-medial patella fragments; also they involve the weight-bearing surface of the knee (Figs. 5 and 6). Nevertheless, in our experience, such fragments are mostly cartilaginous with very little attached bone making fixation with Smillie pins impossible. Such cases should be treated by excision and early movement with non-weight-bearing on crutches for three months.

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