Acta Orthop Scand 57, 331–333, 1986

Acute dislocation of the patella

Clinical, radiographic and operative findings in 64 consecutive cases

The clinical, radiographic and operative findings in 64 consecutive acute dislocations of the patella were analyzed. Both patellofemoral joints were symptomless before dislocation in 58 patients. The sulcus angle of the femur on the affected side was larger than on the contralateral side in one half, and a fresh marginal patellar fracture was demonstrated in one third of the cases. The stability of the patella could not be reliably estimated in tangential views taken with the knee in 20 degrees flexion; especially false negative findings were numerous.

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As etiologic factors of patellar dislocation, various authors have mentioned the shape of the patella (Wiberg 1941, Baumgartl 1966), the size of the sulcus angle of the patellofemoral joint (Brattström 1964), dysplasia of the femoral condyle (Knutsson 1941), position of the patella (Smillie 1970, Thestrup Andersen 1955), and lateral location of the tibial tuberosity (Smillie 1970).

We have analyzed clinical, radiographic, and operative findings in patients with acute patellar dislocation.

Patients and methods

During 1981 and 1982, 64 patients with primary patellar dislocation were operated. Thirty-nine patients were women and 25 were men, with a median age of 16 (12–54) years; 42 were school children or students. Their median height was 169 (152–190) cm. The left patella was involved 38 times, the right one 26 times. In 34 patients the injury occurred in connection with athletic performances. In the clinical examination of the knee, effusion, condition of the skin, subcutaneous edema, tenderness of the medial retinaculum, pain caused by lateral displacement of the patella, and stability and range of movement of the knee were recorded and compared with the unaffected knee (Table 1).

The radiographic examination included AP, lateral, and tangential views at 20° of flexion of the patella (Laurin et al. 1978). The ratio of the diagonal length of the patella (LP) and the length of the ligamentum patella (LT) was calculated (normal range 0.8–1.2; Insall & Salvati 1971). The lateral angle of the patellofemoral joint (Laurin et al. 1978; Figure 1) and the lateral displacement of the patella (Laurin et al. 1979; Figure 1) were recorded. The sulcus angle was measured according to Brattström (1964, Rünow 1983), and the shape of the patella was determined according to Wiberg (1941), Types 1–3, and according to Baumgartl (1966), Type 4. Marginal fractures of the patella, narrowing of the patellofemoral joint space, and other pathology were recorded.

The operations were carried out through a medial parapatellar incision. Any subcutaneous hematoma or hemarthrosis, retinacular tears, and the bone and cartilage lesions were recorded. Chondromalacia was classified according to Outerbridge (1961). In a pilot study of 12 patients, we noted that measurement of the Q angle was not reliable in acute patellar dislocation.

Table 1. Clinical and operative findings in 64 patients with patellar dislocation

Finding		Number
Hemarthrosis		64
< 50 ml	32	
> 50 ml	32	
Lesion of medial retinaculum		64
ruptured	54	
stretched	10	
Pain and tenderness		64
slight	33	
moderate	31	
Subcutaneous hematoma		61
Required crutches		48
Medial marginal fracture of patella		29
Loss of extension > 10°		17
Flexion < 90°		16
Excoriations		3

The contralateral limb was symptomless in 58 cases with no signs of instability of the patellofemoral joint. In these cases the radiographic findings in the injured and intact limbs were compared using the paired t test (continuous) and McNemari's test (not continuous); $P > 0.05$ was considered not significant.

Results

The patella was dislocated by an indirect force in 53 cases and by direct force in six. The traumatic mechanism remained obscure in five cases.

Radiographic observations. The sulcus angle was larger in the injured knee in 37 cases and smaller in 19 cases ($P = 0.03$). Fracture of the medial margin of the patella was observed in 22 cases, and in eight of these a detached fragment was found intraarticularly. The amount of lateral displacement of the patella was larger in 30 cases in the injured knee and smaller in 24 cases. Patella alta was observed in 15 injured knees and in 12 controls. A negative Laurin angle (Figure 1) occurred in 19 injured patellae and in 12 contralateral ones. The distribution of patellar shapes was almost uniform in injured and healthy knees. Thus, statistical significance could be demonstrated only for changes in the sulcus angle.

Operative findings. The medial retinaculum was ruptured in 54 cases and stretched in 10. In these 10 cases, the dislocation was complete, judged from history and clinical findings; two of them were still dislocated on arrival at the hospital. Subcutaneous hematoma was detected in 61 cases. Hemarthrosis exceeding 50 ml was found in 32 knees. Medial marginal fractures of the patella were observed in 29 knees; the fracture involved the cartilage only in 20 cases and was osteochondral in 9. Of the 29 fractures, 22 were observed radiographically on tangential views. Osteochondral fragments of the patella exceeding 15 × 15 mm were fixed using biodegradable polyglycolic acid sutures (Dexon^{R}) through drill channels (2 cases) and bone spikes from the tibia (1 case). Grade-II chondromalacia of the patella was found in two previously asymptomatic knees. One patient had a superficial ragged lesion of the patellar surface, comprising one third of the cartilaginous surface, and the patellar ligament was in part detached from the patella. One osteochondral fracture of the lateral femoral condyle (14 × 20 × 30 mm) was fixed using bone spikes.

Discussion

Dislocation of the patella was diagnosed on the basis of history and clinical findings and was verified at operation in all cases. In lateral views, patella alta was observed in 15 injured knees and in 12 unaffected ones. However the position of the patella in the knee joint measured according to Insall & Salvati (1971) is less reliable in the injured knee with hemarthrosis than in the intact one. Rupture of the medial retinaculum may allow the patella to turn so that its upper pole is located laterally. In addition, effusion raises the patella and medial subcutaneous hematoma pushes it again more laterally. Therefore, the measured diagonal length of the patella is shorter than the true length.

In the tangential views, statistical significance could be demonstrated only for changes

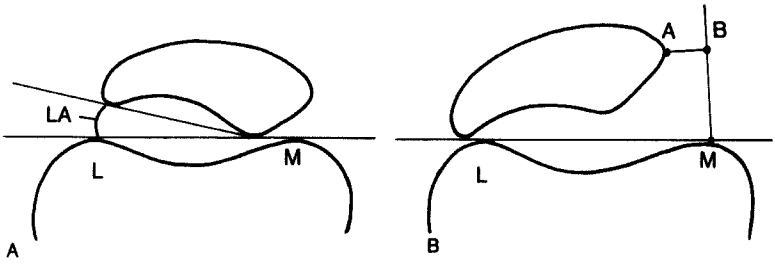

Figure 1. Radiographic measurements of patellar displacement. A. Lateral patellofemoral angle (LA) was measured according to Laurin et al. (1978). L = lateral side, M = medial side. B. Lateral patellar displacement (AB) was assessed by drawing line B at 90 degrees to line LM, which joins the tops of the femoral condyles. L = lateral side, M = medial side (Laurin et al. 1979).

in the sulcus angle. No significance could be shown between the sides concerning the lateral displacement of the patella or the lateral patellofemoral angle. There was no particular patellar shape with dislocation.

Why, then, did only one radiographic parameter prove to be reliable as an indicator of instability? Good tangential views are not readily obtained after acute knee trauma. The injured knee has often a light loss of extension due to pain, and the knee tends to be rotated outwards. In general, reproducible tangential views of the patella are difficult to obtain. Martinez et al. (1983) compared computed tomography (CT) and axial radiography in patients with recurrent patellar dislocation using different knee flexions. They showed that instability of the patella was best demonstrated in CT views with the knee in full extension. At 20° of flexion the patella returned to the femoral condylar groove, and axial views gave often false negative findings. When Wiberg's classification was applied to the shape of patella as seen in tangential views, a correlation with the shape as demonstrated by the CT method was obtained in only 50 per cent of the cases (Boven et al. 1982). Our results are similar to those of Boven et al. (1982) and Martinez et al. (1983).

Are the tangential views of the patella, then, of any use at all in acute patellar dislocation? We could not demonstrate the instability but, on the other hand, a fresh fracture of the medial margin of the patella was seen in one third of the cases as an indication of recent patellar dislocation.

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