FRAGMENTATION OF THE PROXIMAL POLE OF THE PATELLA

ANOTHER MANIFESTATION OF JUVENILE TRACTION OSTEOCHONDritis?

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Six boys with fragmentation of the proximal pole of the patella are reported; the condition was bilateral in one. Four of the six presented with symptoms of Osgood-Schlatter's disease or Larsen-Johansson disease of the same or of the contralateral knee, but they had no symptoms or signs relating to the proximal pole of the patella; one also had features suggesting minimal chondromalacia patellae. Two boys had no objective abnormality in either knee.

It is suggested that the fragmentation may be a further form of traction osteochondritis of the attachments of the quadriceps mechanism. Attention is drawn to its characteristic radiographic appearance, its association with other forms of juvenile traction osteochondritis (which are commonly symptomatic), and to its occurrence in boys aged 10 or 11 years.

It is well recognised that osteochondritic changes may occur at either the upper or the lower attachments of the ligamentum patellae, and it is inferred that the radiographic appearances result from traction exerted through the ligament. Of six boys who presented with fragmentation of the proximal pole of the patella, four had osteochondritic changes of the upper or lower insertions of the ligamentum patellae, of the same or of the contralateral knee. Furthermore the radiographic appearances resembled those seen in the tibial tuberosity in Osgood-Schlatter's disease and in the lower pole of the patella in Larsen-Johansson disease (Larsen 1921; Johansson 1922); the age of our patients (10 and 11 years) and the male preponderance was the same as for these conditions. Two patients had no objective abnormality in either knee and one had features suggesting minimal chondromalacia patellae. One patient (Case 2), who was followed up for two years, showed radiographic resolution of the lesions in both his knees, similar to that seen in other forms of osteochondritis. Two other patients showed some healing over a period of eight and nine months. It thus appears likely that the fragmentation seen in the proximal pole of the patella is a further form of traction osteochondritis which is generally asymptomatic.

CLINICAL FEATURES

All the patients were aged 10 or 11 years. All presented with anterior knee pain, although in two patients (Cases

2 and 4) the fragmentation of the proximal patella was in the opposite knee and appeared only in radiographs taken for purposes of comparison. In no patient could the lesion of the proximal pole be directly shown to be the origin of the pain. The duration of symptoms before referral to the orthopaedic surgeon varied from six weeks to two years.

CASE REPORTS

Case 1. A healthy, active 11-year-old boy gave a 12-month history of pain in front of his left knee. The pain was aggravated by sporting activities and relieved by rest. Examination revealed swelling and tenderness over the left tibial tubercle with minimal local swelling. Radiographs showed fragmentation of the upper pole of the left patella (Fig. 1). He was diagnosed as having Osgood-Schlatter's disease. Management consisted of reassurance, and advice to restrict those sporting activities which produced symptoms. At review eight months later his symptoms and signs remained localised to the

Fig. 1

Fig. 2

Case 1. Figure 1—Lateral radiograph of the left knee at presentation. Figure 2—Appearance eight months later.

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Fig. 3

Fig. 4

Fig. 5

Fig. 6

Case 2. At presentation. Figure 3—The right knee. Figure 4—The left knee. Two years after presentation. Figure 5—The right knee. Figure 6—The left knee; note the pointed shape of the proximal pole.

tibial tubercle. He still had to restrict his sporting activities. Radiographs revealed some healing of the fragmentation of the proximal pole and a separate fragment of bone in the tibial tubercle (Fig. 2).

Case 2. A 10-year-old boy presented with a two-year history of right anterior knee pain which was aggravated by sport and relieved by restriction of activity. The cause of his symptoms was not clear to the physician he had consulted soon after the onset of the condition and who had suggested rest and analgesia. Because of persistence of symptoms he had ceased all sporting activities. There was no history of swelling or of mechanical derangement in either knee. At presentation to the orthopaedic surgeon there was swelling and tenderness of the right tibial tuberosity, but no clinical features relating to the proximal pole of either patella. Whatever might have been the cause of his earlier symptoms he now had symptoms due to Osgood-Schlatter's disease. Radiographs showed irregularity of the proximal poles of both patellae (Figs 3 and 4). At review after two years he had no symptoms, and radiographs showed restoration of the normal architecture of both patellae, but with a more pointed contour of the superior pole on the left (Figs 5 and 6).

Case 3. An 11-year-old boy presented with bilateral anterior knee pain. On the right he had the clinical features of Osgood-Schlatter's disease, and on the left there were features suggesting minimal chondromalacia patellae, but there was no localisation of symptoms or signs to the upper pole of the left patella. Radiographs,

Fig. 7

Case 3. The radiographic appearance of the left patella at presentation.

however, showed irregularity of the texture and contour of the superior pole of the left patella (Fig. 7); this appearance was regarded as an incidental finding.

Case 4. A healthy, active 10-year-old boy sustained an indirect injury to his left knee but was able to continue with most sporting activities. His symptoms were aggravated by activity and relieved by rest, but failed to settle over a period of six weeks. Clinical examination at that time showed localised tenderness over the distal pole of the left patella. His right knee was asymptomatic and was normal to examination. Radiographs of the right (asymptomatic) knee showed fragmentation of the proximal pole of the patella (Fig. 8). Radiographs revealed fragmentation of the distal pole of the left patella (Fig. 9) consistent with Larsen-Johansson

Fig. 8

Fig. 9

Fig. 10

Case 4. Figure 8—The right knee at presentation. Figure 9—Lateral radiograph of the left knee at presentation; note the Larsen-Johansson disease represented by a large fragment of bone at the lower pole of the patella. Figure 10—The right knee nine months after presentation, showing a more normal contour to the proximal pole of the patella and bone of more normal architecture.

disease, and the symptoms were attributed to this condition. Management for the left knee consisted of observation, rest and a slow return to activity. At review nine months later he had returned to full sporting activity and had no symptoms in either knee. Radiographs revealed some healing of the lesion in the proximal pole of the right patella (Fig. 10). There was no significant change in the radiographic appearance on the left.

Cases 5 and 6. Both were 10-year-old boys who presented with a short history of ill-defined discomfort in the left knee. Examination of their knees did not show any abnormality. Radiographs revealed fragmentation of the proximal pole of the patella in Case 5 (Fig. 11) and irregularity of the same region in Case 6 (Fig. 12); the pattern of this irregularity was very similar to that in the left patella of Case 2.

DISCUSSION

The lesions described in this paper may represent: an abnormality of ossification of the proximal pole of the patella; avascular necrosis related to the poor blood supply of this portion of the patella (as described by Scapinelli in 1967); the result of traction on the superior pole of the patella; or a combination of these factors. The strong association with Osgood-Schlatter's disease or Larsen-Johansson disease suggests that traction on the bony attachments of the quadriceps mechanism is at least a major factor in the production of these proximal patellar lesions. The association, in the same patient, of Larsen-Johansson disease and Osgood-Schlatter's disease has been previously noted (Wolf 1950); another association, of a proximal patellar lesion, was seen in the patients described in this report.

The proximal pole lesions described do not correspond to any of the avascular, traumatic, endocrinal or neoplastic conditions which have been described as occurring in the patella (Linscheid and Dahlin 1966). Nor do they appear to represent a stage in the formation of bipartite or tripartite patella, because complete or partial coalescence of the fragments has taken place in three of the seven affected knees (Cases 1 and 2). As none of the patients have been followed through to maturity, we have not excluded the possibility that one sequel of this condition might be a bipartite or tripartite patella in adulthood (Green 1975; Ogden, McCarthy and Jokl 1982). Fragmentation of the distal pole of the patella commonly occurs in association with cerebral palsy (Kaye and Freiburger 1971; Rosenthal and Levine 1977) but there is no such association with proximal pole lesions.

The only reference we can find to this condition is by Smillie (1980). He reported a patient with bilateral fragmentation of the proximal pole of the patella and commented that Larsen-Johansson disease may occur at the proximal pole. It is certainly curious that lesions at the lower pole of the patella should be the site of well-

Fig. 11

Fig. 12

Lateral radiographs of the left knee at presentation. Figure 11—Case 5. Figure 12—Case 6.

localised symptoms and signs whereas similar pathology at the upper pole is generally asymptomatic. The radiographic characteristic of the lesion is irregularity of the contour of the proximal pole with loss of the normal trabecular pattern and varying degrees of fragmentation. In the patient who was followed for two years (Case 2) there was restoration of a normal tubercular pattern and only minimal alteration in the contour of the bone at the end of the pathological process. The changes take place in the substance of what appears to be a unipartite patella; however, in some it might represent osteochondritis taking place in an accessory ossific nucleus, as may occur in the lower pole of the patella (Lopez and Lewis 1968). The appearances do not suggest calcification or ossification in a partially avulsed tendon insertion and thus do not parallel Medlar and Lyne's (1978) description and interpretation of Larsen-Johansson disease.

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