OSTEOMYELITIS OF THE PATELLA

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Pyogenic osteomyelitis of the patella is uncommon. Thirion was the first to report a case in 1829, and in the next hundred years only fifty cases were reported (Rocher 1923). The total was increased to sixty by Moore (1938). Although a few cases have been described in continental publications the last reference in the British or American literature was a case reported by Kirby-Smith (1942).

This paper reports five more cases, together with a description of the presenting features, and the pitfalls in diagnosis.

ACUTE INFECTION

The acute case seen before an abscess has formed is typical and little difficulty is experienced in arriving at a correct diagnosis. Well localised signs of an acute infection are present. Such an early acute case was the only one of this small series correctly diagnosed.

Fig. 1
Case 1—On admission. Rarefaction is localised to the patella. A sequestrum appears to be forming in its centre.

Fig. 2
Four months later. The bony texture is returning to normal.

Case 1—Boy aged seven years. One day before admission an area of inflammation had developed over the front of the right patella; pain had been complained of in this area for a week previously. His temperature was 101 degrees Fahrenheit. The right knee was held in 60 degrees of flexion and a hot, red, tender swelling was present exactly over the front of the patella. The swelling was not fluctuant. A small effusion was present in the joint itself. The Mantoux reaction was negative. The limb was placed on a Thomas's splint and albamycin given. Subsidence was rapid and within a month slight tenderness over the patella was the only abnormal sign. The first radiographs (Fig. 1) showed localised rarefaction in the patella with an apparent sequestrum. Figure 2 shows the state of the bone four months later when the knee was clinically normal.
Comment—When suppuration occurs in the acute case the pus usually points anteriorly. The resulting prepatellar abscess is then mistaken for infection in the prepatellar bursa. Subsequent radiographs reveal the true source.

Case 2—Girl aged seven years. This child presented in June 1956 with pain, swelling and redness over the front of the right knee of five days’ duration. There had been no injury and no recent focal sepsis. The temperature was 101 degrees Fahrenheit, the sedimentation rate was 33 millimetres in the first hour, and the white cell count was 11,000 per cubic millimetre. The Mantoux reaction was negative. The knee joint was aspirated and sterile turbid fluid obtained. Pus containing a coagulase-positive staphylococcus aureus was obtained from the prepatellar region. A diagnosis of acute prepatellar bursitis was made and penicillin was given for three weeks. Subsequent radiographs revealed changes localised to the patella (Figs. 3 to 5). Seven months later the knee was clinically normal, but there was slight quadriceps wasting. Radiographs still suggested a possible sequestrum in the centre of the patella (Fig. 6).

SUBACUTE INFECTION

The disease runs a subacute course if resistance is high, if the virulence of the organism is low, or if antibiotics have been inadequately administered. In such cases the joint is diffusely tender and the effusion into it may lead to a wrong diagnosis of chronic arthritis. This sympathetic effusion is constantly present. The patient in Case 3 was treated for tuberculous arthritis for over a year, and Case 4 was thought to be an example of monarticular brucellar arthritis in view of the lack of specific features, together with the intermittent pyrexia.

Case 3—Girl aged five years. This child developed an effusion in her right knee in June 1942. The effusion was sterile. Although the chest radiograph showed normal lung fields and the Mantoux reaction was negative on three occasions, the knee was immobilised on a Thomas’s splint for ten months for supposed tuberculosis. (Antibiotics were not available.) Radiographs showed rarefaction with some destruction of the patella (Fig. 7). A sequestrum eventually separated (Figs. 8 and 9) and after this was removed healing was rapid. The sequestrum was not cultured, but the typical radiographic developments, the persistently negative Mantoux reaction and the fact that the knee is now clinically normal (Fig. 10) are considered sufficient evidence that this was a pyogenic infection of the patella rather than a tuberculous infection of the knee.
Resolution in the second subacute case was likewise hastened by the removal of a sequestrum.

**Case 4**—Boy aged eleven years. This boy was admitted to hospital in August 1956, having suffered pain in the left knee for five weeks. He had received a three-day course of a sulphonamide drug with temporary improvement. On his admission the left knee was diffusely swollen, the joint contained fluid, and tenderness was present about the patella. There was intermittent pyrexia of up to 101 degrees Fahrenheit. Radiographs showed normal lung fields and an irregular bony fragment in front of the patella (Fig. 11). The Mantoux reaction was negative. The knee was treated by immobilisation on a Thomas's splint, and penicillin was given for two weeks. Subsequent "skyline" radiographs of the patella showed the origin of the bony fragment (Fig. 12). The sequestrum was removed and recovery was thereafter rapid. A growth of coagulase-positive staphylococcus aureus was obtained from culture of the sequestrum. Four months later the knee was clinically normal and radiographs showed complete healing of the patella (Fig. 13).
CHRONIC INFECTIONS

Here tuberculosis is the most likely provisional diagnosis.

Case 5—Man aged twenty-eight years. This patient presented in April 1955 with a painful swollen knee which had been struck by a falling slate the previous day. The joint effusion was sterile; the white cell count was 8,000 per cubic millimetre and sedimentation rate 18 millimetres in the first hour. Radiographs showed a large cavity in the patella close to the articular surface (Fig. 14). A tentative diagnosis of tuberculosis was made, and the patella was excised. Histological examination showed a central abscess cavity filled with subacute inflammatory cells and surrounded by regenerating bone. There was no evidence of tuberculosis. Recovery from the operation was uneventful and when the patient was last seen a year and a half later full knee movement had been regained.

DISCUSSION

Age incidence—Four of these five patients were aged between five and eleven years. In Rocher's (1923) series half the patients were between five and fifteen years: only one of his patients was
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An infant. Moore (1938) suggested that the rarity of the disease under the age of five was explained by the fact that before that age the patella is cartilaginous. Röpke (1904) showed by injection experiments that until the age of about four years the patella is largely a cartilaginous mass with very little blood supply. Vascularisation then proceeds with ossification, small vessels passing into the patella from a plexus on its anterior surface. Vascularisation reaches a maximum at twelve. At sixteen ossification is complete with relatively less blood supply than at twelve. The circulation is sluggish. Röpke regarded the patellar circulation as a small shunt on the larger system of the limb. Infective emboli are unlikely to be carried into this vascular sidetrack. Haematogenous osteomyelitis is thus most common between the ages of five and twelve.

**Spread of infection**—Complicating suppurative arthritis is commoner in adults than in children. This is explained anatomically by the supposition that the thick cartilage layer behind the ossifying focus in the child resists penetration. Patellectomy is seldom necessary in children provided antibiotics are available.

**Responsible organisms**—The usual organism found is the staphylococcus aureus. This was present in two of the five cases here reported. Less commonly a streptococcus is found. Appropriate antibiotics hasten resolution and lessen the risk of spread into the joint. Before antibiotics were available, drainage of abscesses and of the joint was often necessary. Sequestration occurred in nearly every case. With antibiotics it seems that sequestra can be reincorporated (Cases 1 and 2).

**Injury**—Injury has been a feature of the history in half of the reported cases. In two of the present series (Cases 1 and 4) a previous recent fall was remembered. The patient in Case 5 had an injury to the knee but this could not have been related to the obviously longstanding condition of the patella.

**Diagnosis**—Suppuration in the prepatellar region in children is suggestive of an infective focus in the patella, because primary suppurative prepatellar bursitis in children is unusual. Radiographs of the patella are essential in such circumstances. Radiographs early in the course of the disease may not reveal bony changes (Fig. 3, Case 2). They should be repeated in ten days or so to make sure that developing destructive changes in the patella are not overlooked. The "skyline" view of the patella is valuable in clarifying unusual radiographic appearances (Figs. 11 and 12, Case 4). Osteomyelitis of the patella should be considered in the differential diagnosis in a child suffering from a subacute cellulitis over the front of the knee, or with a persistent effusion in an irritable knee.

**Summary**

1. Five new cases of pyogenic osteomyelitis of the patella are reported.
2. The clinical features are reviewed and the diagnostic pitfalls enumerated.

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**References**


