TORSION OF LOCALISED PIGMENTED VILLONODULAR SYNOVITIS OF THE KNEE

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Torsion and subsequent ischaemia is a well-recognised cause of symptoms and morbidity in general surgery. We present three cases of solitary pigmented villonodular tumours of the knee which were found to have undergone torsion. We believe these to be the first intra-articular tumours in which torsion has been reported.

Localised or solitary pigmented villonodular synovitis of the knee is an uncommon entity often presenting with a prolonged history of intermittent pain, swelling and locking (Granowitz and Mankin 1967). On examination there may be a localised tender mass in the knee and an associated effusion. When aspirated the fluid may be straw-coloured or serosanguineous. Pre-operatively, the condition is usually diagnosed as mechanical derangement of the knee.

At operation there is often a nodule, 1 cm or more in size, either sessile or pedunculated, arising from an area of abnormal synovium. Histologically, the lesion is characterised by proliferation of fibroblasts and histiocytic cells, many of which contain iron pigment (siderophages) or lipid (foam cells). Giant cells with up to 50 nuclei may be present in large numbers together with a varying degree of fibrosis, clefts and foci of vascular congestion and haemorrhage (Jaffe, Lichtenstein and Sutro 1941; Granowitz, D'Antonio and Mankin 1976; Schajowicz 1981; Rao and Vigorita 1984).

We present three cases of solitary pigmented villonodular synovitis all of which were seen and treated during an acute exacerbation, and all of which showed evidence of torsion.

CASE REPORTS

Case 1. A 50-year-old woman presented with a 72-hour history of anteromedial knee pain which had been sudden in onset. She gave a two-year history of intermittent

pain at the same site; the onset was always sudden and was associated with a palpable lump, swelling and occasional locking which could be relieved by massaging the lump around the knee. There had been no locking with the present attack. On examination a small mobile lump could be felt anteromedially and there was a slight effusion.

Fourteen hours after admission an arthroscopy was performed, followed by an arthrotomy. A reddish-brown kidney-shaped lesion ($4 \times 0.5 \times 2.5$ cm) was found suspended from a pedicle (0.2×4 cm) arising from the medial side of the joint, above the coronary ligaments (Fig. 1). There were four complete twists in the pedicle.

Histologically, the lesion was largely infarcted and composed mainly of a necrotic, congested, hyalinised, collagenous stroma with a patchy acute inflammatory cell infiltrate and areas of haemorrhage (Fig. 2). The peripheral rim of residual viable tissue included regular fibroblastic and histiocytic cells interspersed with coarse collagen and a scattering of small multinucleate giant cells and siderophages. The synovium adjacent to the lesion contained small numbers of multinucleate cells and siderophages, but no evidence of necrosis.

Case 2. A 17-year-old girl presented with a four-hour history of anterior knee pain. The pain, which had come on suddenly as she rose from a sitting position, was worse on flexion. There was no history of locking or instability. On examination there was a tender swelling anteromedially, with a slight effusion but no block to extension.

Twelve hours after admission arthroscopy and arthrotomy were performed. A lobulated polypoid lesion measuring $1.5 \times 1.5 \times 0.5$ cm was identified (Fig. 3) arising from the infrapatellar fat pad. This focally haemorrhagic brownish-yellow polyp was twisted on its pedicle.

Histologically, the lesion was divided into lobules by irregular cleft-like spaces, some lined by synoviocytes and others by a non-continuous layer of fusiform cells admixed with collagen fibres (Fig. 4). Cytologically, the lesion had a pleomorphic appearance, being composed of oval and round mononuclear cells, foam cells and

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Fig. 1

Fig. 2

Case 1. Figure 1—Longitudinal section of the pedunculated villonodular tumour showing interstitial haemorrhage. Figure 2—Photomicrograph of the lesion showing hyalinisation of the stroma, dilated congested blood vessels and interstitial haemorrhage (haematoxylin and eosin, $\times 120$).

small numbers of osteoclast-like giant cells. Several lobules of the lesion showed severe vascular congestion, necrosis and areas of haemorrhage, together with an infiltrate of somewhat fragmented neutrophil polymorphs and a few multinucleated giant cells of the foreign-body type. Marked hyalinisation of the connective tissue stroma was present in all these infarcted areas.

Case 3. A 33-year-old man presented with a 24-hour history of locking of his left knee, brought on by kneeling; this was associated with posterolateral pain, swelling and clicking. On examination he had lost 20° of extension, was tender along the lateral joint line and had a moderate effusion.

At arthrotomy a smooth, brown pear-shaped flat polyp 1.5 cm in length was found suspended from a narrow pedicle arising from the intercondylar notch.

Histologically, the polyp consisted of benign synovial cell proliferation among which there was cleft forma-

tion, foam cells and siderophages. Almost two-thirds of the lesion was infarcted, and in the non-viable area there was considerable haemorrhage and scattered multinucleate giant cells.

DISCUSSION

It appears that torsion of pigmented villonodular synovitis has not been previously described, yet all these lesions had undergone infarction and were visibly twisted at operation. Torsion and infarction may explain some of the intermittent symptoms and reactive swelling reported in solitary pigmented villonodular tumours of the knee, in particular the variable nature of the effusion (that is, serous or serosanguineous) and the disassociation between locking and pain.

The variable histological picture of solitary pigmented villonodular tumours is consistent with derivation from synoviocytes, since these cells are known to

Fig. 4

Fig. 3

Case 2. Figure 3—Operative photograph showing a lobulated polypoid lesion arising from the infrapatellar fat pad. Figure 4—Photomicrograph showing a region in which foam cells predominate (A), separated by two synovium-lined clefts from an infarcted zone (B) (haematoxylin and eosin, $\times 120$).

exhibit ultrastructural features closely akin to both fibroblasts and histiocytes (Ghadially and Roy 1967). The occurrence of an acute inflammatory reaction, with areas of haemorrhage and necrosis, in two of our cases, can be explained by torsion and infarction.

The presence of foam cells, haemosiderin-laden macrophages and fibrosis, which are a common feature of pigmented villonodular synovitis, are in keeping with organisation of old infarcts precipitated by previous episodes of torsion. It has been noted elsewhere (Fisk 1952) that some of the histological features may be due to nipping of the lesion between the femoral condyle and the tibial plateau causing interference with its blood supply; in our cases the changes were almost certainly due to torsion.

It is of interest to speculate that while episodes of torsion and infarction may contribute to the evolution of solitary pigmented villonodular synovitis of the knee, separation of part or the whole of a necrotic lesion may

represent an additional mechanism in the generation of loose bodies.

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