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UNUSUAL GANGLION CYSTS IN THE NEIGHBOURHOOD OF THE KNEE JOINT

A Report of Six Cases–Three with Involvement of the Peroneal Nerve

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Ganglion cysts in the neighbourhood of the knee joint do not generally cause any diagnostic difficulties. Problems may, however, sometimes arise because of signs or symptoms that mislead the examiner so that the true nature of the lesion is not realized. This will be illustrated here by the description of six cases observed in our clinic from July 1965 to June 1967. Two patients, referred for a suspected primary muscle tumour, had a ganglion with its major part located intramuscularly; in one patient a subcutaneous parapatellar tumour proved to be due to a ganglion cyst of the lateral meniscus extruding between the patellar tendon and the ilio-tibial tract; in one patient in whom a prolapse of an intervertebral disk had been suspected the symptoms were found to be caused by a ganglion cyst of the lateral meniscus exerting pressure on the peroneal nerve; and in two patients with the clinical diagnosis of a Schwannoma of the peroneal nerve the operation revealed an intraneural ganglion.

Case 1

A 54-year-old man was referred for a suspected muscle tumour. For several months he had noticed a swelling on the outside of the left calf. At examination a firm mass more than 10 cm long was palpated lateral to the fibula. Angiography showed no pathological vessels. The mass seemed to fluctuate and at operation it proved to be a ganglion situated in the peroneus longus muscle. The surgical specimen, with the ganglion surrounded by a thin layer of muscle, is shown in Figure 1.

Figure 1. Case 1. Intramuscular ganglion in the peroneus longus. The ganglion has been removed together with a thin layer of surrounding muscle tissue. Actual size.

The proximal end of the ganglion was in close relation to the proximal tibiofibular joint.

Case 2

A 23-year-old woman was referred for a suspected muscle tumour. For a month or two she had noticed a slowly growing lump in the distal antero-lateral part of the left thigh. A round, firm mass the size of a plum was palpated at examination. It proved to be fixed if the quadriceps was contracted and mobile if the thigh muscles were relaxed. Angiography showed that vessels were rather scarce at the site of the mass. At operation a cystic tumour was found in the vastus lateralis (Figure 2). A thin extension of the cyst reached almost to the patella along the

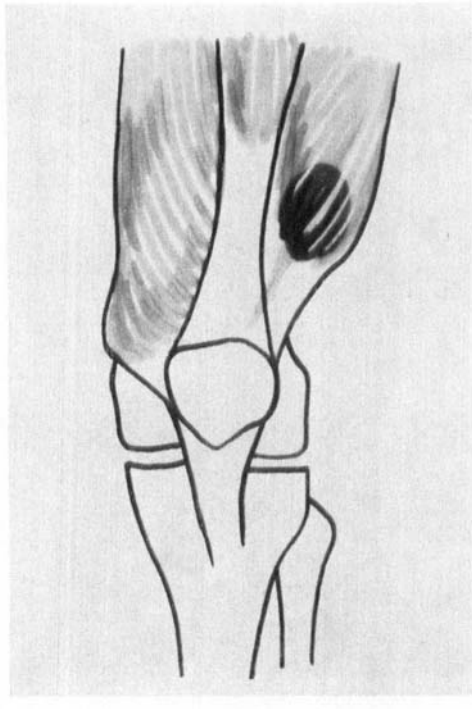

Figure 2. Case 2. Intramuscular ganglion in the vastus lateralis. A thin pedicle of the ganglion extends into the tendon of the muscle.

tendon of the muscle. The content of the cyst was clear and gelatinous and histological examination showed the characteristic picture of a ganglion.

COMMENT

In both these cases the ganglion had an intramuscular location and was so far from the knee joint that the correct diagnosis did not present itself; both patients were referred for a suspected primary muscle tumour.

Case 3

A 40-year-old man had for about six months noticed a slowly growing lump distal and lateral to the left patella (Figure 3). He had not experienced any trauma and had no discomfort in the knee joint. The lump felt firm and became less mobile and more prominent during contraction of the quadriceps. Operation disclosed a large ganglion cyst of the lateral meniscus, extruding subcutaneously. The ganglion emanated from the anterior part of the ruptured meniscus (Figure 4) and largely occupied the site of the infrapatellar fat-pad. The clinically observed, subcutaneous part of the ganglion was continuous with the larger, deeper part via a flattened, rather narrow portion (between arrows in Figure 4) located in the natural gap between the patellar tendon and the ilio-tibial tract.

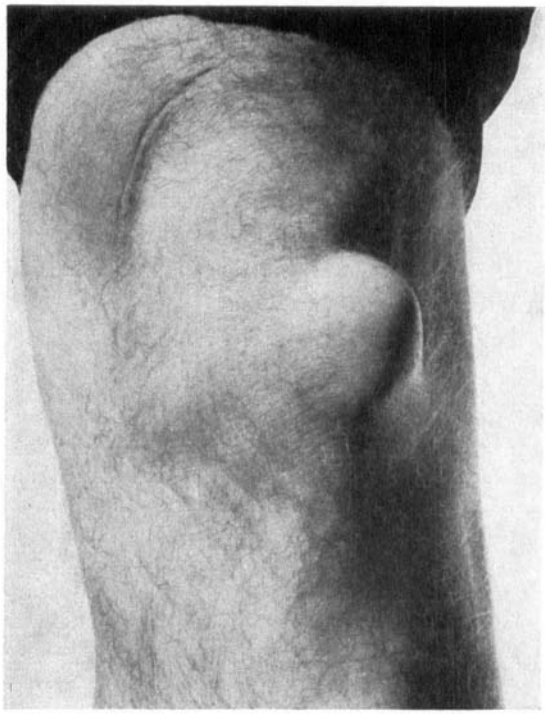

Figure 3. Case 3. Subcutaneous tumour lateral to the apex of the patella of the left knee joint.

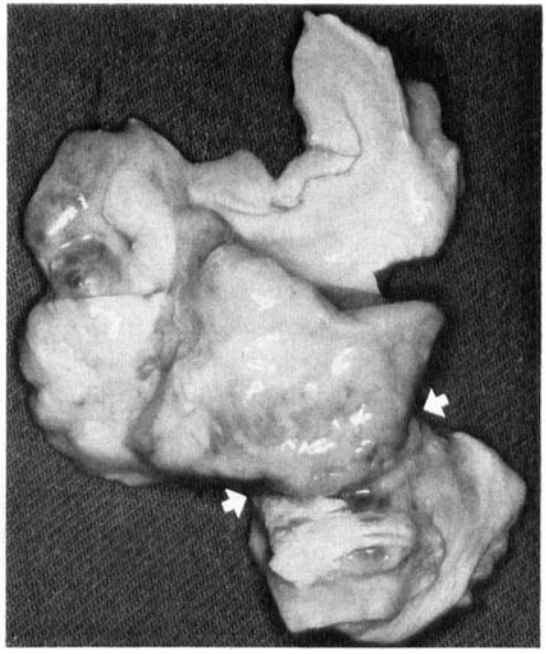

Figure 4. Case 3. Large multilocular ganglion cyst of a ruptured lateral meniscus. Between arrows, the isthmus connecting the subcutaneous part of the ganglion (cf. Figure 3) with the major, more deeply located part.

COMMENT

It is unusual for a ganglion cyst of the lateral meniscus to emerge subcutaneously between the patellar tendon and the ilio-tibial tract. This phenomenon was observed in "several" of the 283 cases of ganglion cyst of the lateral meniscus reported by *Smillie* (1962). In the present case it is remarkable that the patient experienced no discomfort at all in the knee joint in spite of the large size of the ganglion and the ruptured meniscus. It was the growing subcutaneous lump which caused him to seek medical advice.

Case 4

A 40-year-old man was referred for a suspected prolapse of an intervertebral disk. The records by other examiners indicated that an L5 syndrome had been diagnosed three years earlier and that this diagnosis had been confirmed on subsequent visits. The straight leg-raising test had been positive on each occasion and the strength of the extensors to the big toe had been reduced. In addition to these symptoms, palpation of the knee joint disclosed a mass in such a position—in the posterior region on a level with the lateral joint line—that it could conceivably exert pressure on the peroneal nerve and hence be the cause of the patient's symptoms. This seemed still more likely after myelography had shown no sign of a prolapsed disk. Operation revealed a ganglion cyst of the lateral mensicus and a protruding posterior part of it was seen to stretch the peroneal nerve at full extension in the knee joint (Figure 5), while at flexion the tension was reduced; the nerve appeared macroscopically intact. The lateral meniscus had ruptured (Figure 6) and was removed together with the ganglion. The leg-raising test was negative the first post-operative day and the extension of the big toe was then almost as strong as in the other foot. The improvement has remained for one year and three months.

COMMENT

It is probably unusual for a ganglion cyst of the lateral meniscus to exert pressure on the peroneal nerve. At all events, this cause of symptoms from the peroneal nerve is not mentioned in current textbooks and manuals of orthopaedic surgery. *Hertz* (1955) reports that a patient with a ganglion cyst of the lateral meniscus displayed a slight hypersensitivity in the peroneal region, which disappeared immediately after the operation, and concluded that the ganglion had probably caused these paraesthesias by compressing the nerve. However, the exposure used for removal of the ganglion did not permit the demonstration of any such compression. Recently *Coker & Kent* (1967) described two cases in which symptoms from the peroneal nerve were ascribed to a ganglion cyst of the lateral meniscus. In one of these the

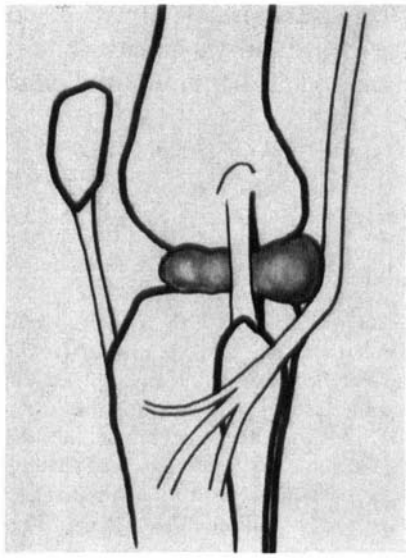

Figure 5. Case 4. Ganglion cyst of the lateral meniscus protruding in a dorsal direction and exerting pressure on the peroneal nerve.

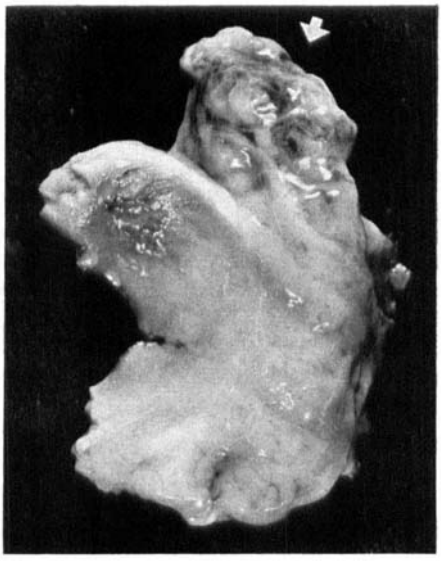

Figure 6. Case 4. The removed lateral meniscus, showing a transverse rupture, together with ganglion cyst. Arrow points to the dorsal part of the ganglion that exerted pressure on the peroneal nerve (cf. Figure 5).

ganglion protruded posteriorly and, although involvement of the nerve was not observed directly (the nerve was not exposed), an area of hyperaesthesia in the first web space dorsally on the foot, present before the operation, disappeared after. In the other case, the patient had a sensory disturbance in the innervation field of the peroneal nerve before the operation, at which a ganglion cyst of the lateral meniscus was found "adjacent" to the nerve. The sensory disturbance gradually disappeared after the operation. It is noteworthy that the cyst could not be palpated at the clinical examination in either of these two cases.

Coker & Kent were unable to determine whether it was pressure from the cyst or some other mechanism that resulted in irritation of the nerve. During the operation in the present case, the nerve was seen to be stretched over the ganglion at full extension in the knee joint, while at flexion the tension was reduced. The positive leg-raising test before the operation was no doubt a result of this test being made with the

knee joint extended. Since the big toe extensors practically regained their normal strength the day after the operation, their pronounced weakness before must have had a functional cause (inhibition elicited by pain?).

Case 5

A 61-year-old man with pain periodically for two years in the left leg had during the last two months noticed a swelling on the outside of the left knee joint. Examination showed a mass, located over the postero-lateral aspect of the upper portion of the fibula, and there was marked peroneal paresis with foot drop and impaired sensibility on the outside of the leg and foot. The clinical diagnosis was a Schwannoma. Operation, however, disclosed a ganglion largely located within the peroneal nerve, whose fibre bundles were split and flattened (Figure 7). The intraneural part of the ganglion had a thin connection with an extraneural part located anterior to the proximal tibio-fibular joint. The ganglion was removed, leaving part of its wall which contained bundles of nerve fibres. Its content was clear and gelatinous; the histological picture was that of a ganglion. No signs of recurrence were found at an examination one year after the operation. A considerable improvement was observed in the motor function of the perioneal nerve (active dorsal extension 10°) and its skin area was sensitive to touch, though this elicited paraesthesias in the foot and the distal third of the leg.

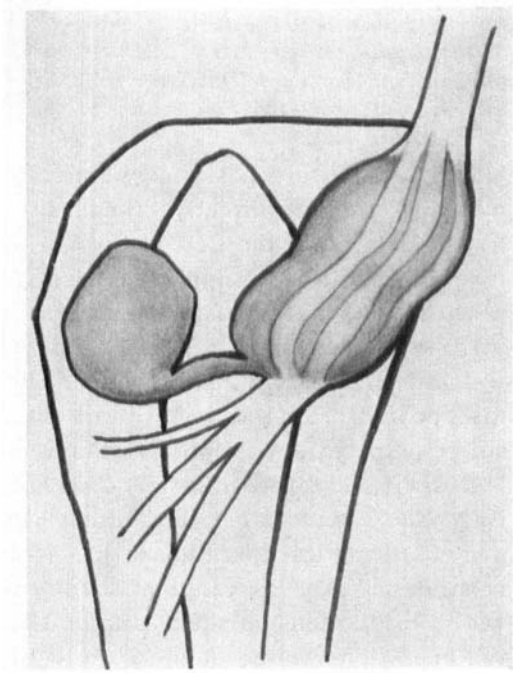

Figure 7. Case 5. Intraneural ganglion in the left peroneal nerve. Part of the ganglion is located near the proximal tibio-fibular joint.

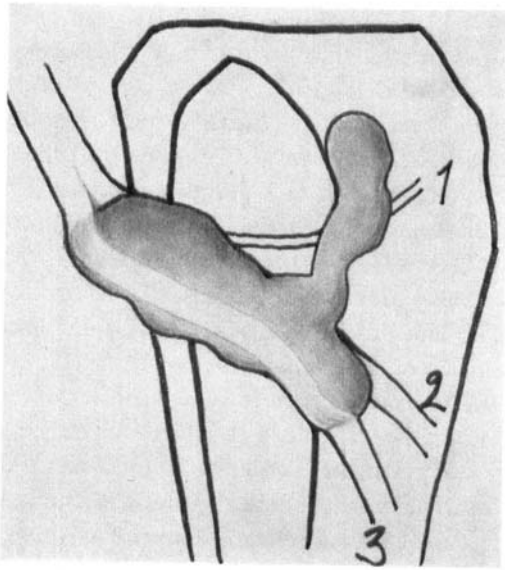

Figure 8. Case 6. Intraneural ganglion in the right peroneal nerve. The ganglion has a pedicle extending to the proximal tibio-fibular joint. 1) Nerve branch to the tibialis anterior muscle. 2) The deep peroneal nerve. 3) The superficial peroneal nerve.

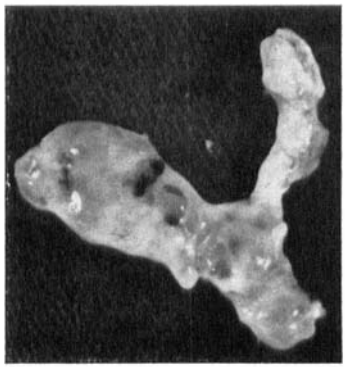

Figure 9. Case 6. The extirpated ganglion.

Case 6

A 46-year-old man had had pain on the outside of the right leg for five months. During the last few weeks he had also felt weakness in the foot and numbness in the big and second toes. Examination revealed marked paresis of the big toe extensors and impaired sensibility on the outside of the leg and down the anterior surface of the ankle to the big toe and the medial side of the second toe. Furthermore, a firm, tender mass was palpated at the place where the peroneal nerve passes round the neck of the fibula. At operation the mass was found to be a ganglion located in the peroneal nerve (Figure 8). The deep portion of the nerve was flattened between the ganglion and the neck of the fibula, whereas the superficial portion was embedded in the postero-lateral wall of the ganglion. A thin extension of the ganglion reached the anterior side of the proximal tibio-fibular joint, being crossed at a deeper level by a fairly small nerve branch to the tibialis anterior muscle. The entire ganglion could be removed (Figure 9) without severing any nerve fibres. Histological examination confirmed the diagnosis and showed that the ganglion was multilocular. No signs of recurrence were detected at an examination four months after the operation. The strength of the extensors of the big toe had been recovered but the sensibility was still impaired. The pain had not returned since the operation.

COMMENT

An intraneural ganglion in the peroneal nerve is unusual. Cases have been reported by *Wadstein* (1932), *Ellis* (1936), *Ferguson* (1937), *Warren* (1946), *Brooks* (1952), *Tupman* (1957), *Clark* (1961), *Parkes* (1961), *Barrett & Cramer* (1963) and *Stack, Bianco & MacCarty* (1965). Cases similar to the two in this paper with the ganglion having an extraneural part in close relation to the proximal tibio-fibular joint have been described by *Warren* (1 case), *Brooks* (1 case), *Parkes* (7 cases), *Barrett & Cramer* (1 case) and *Stack et al.* (2 cases). According to *Parkes* the ganglion arises from the proximal tibio-fibular joint and then, by tracking along the sheath of the small recurrent articular branch which is given off from the peroneal nerve to this joint, it comes to lie within the sheath of the main nerve where it is free to enlarge and extend. Working on this assumption, he argues that the essential step at operation is to find and extirpate the pedicle, while it is enough just to evacuate the intraneural part of the ganglion. *Barrett & Cramer*, however, suggest that the ganglion originates in the main nerve and that an extension into the articular branch of the proximal tibio-fibular joint may give the false impression that the ganglion has arisen from this joint. Their view is supported by the fact that completely intraneural ganglia without any connection to joint or bursa do occur (*Friedlander* 1967).

SUMMARY

Six cases of unusual ganglion cysts in the neighbourhood of the knee joint are described.

In two cases the main part of the ganglion was located within muscle, suggesting a primary muscle tumour.

In one case a large ganglion cyst of the lateral meniscus protruded between the patellar tendon and the ilio-tibial tract, giving rise to a subcutaneous lump in front of the knee.

In one case a ganglion cyst of the lateral meniscus protruded in a posterior direction to such an extent that it exerted pressure on the peroneal nerve, with neurological symptoms as a result.

In two cases the main part of the ganglion was located within the peroneal nerve, a smaller part being found outside the nerve near the proximal tibio-fibular joint. Twelve cases of peroneal intraneural ganglion with a pedicle to the proximal tibio-fibular joint have been found in the literature. The origin of such a ganglion is discussed.

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