Ultrasound diagnosis of an intraneural ganglion cyst of the peroneal nerve

Case report

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The authors present the case of an intraneural ganglion cyst of the peroneal nerve. The cyst was diagnosed by means of ultrasound, which also gave an exact definition of its size and location, confirmed at operation. Some controversial aspects of these lesions are discussed.

KEY WORDS • foot drop • peroneal nerve • ganglion cyst • ultrasound

Ganglion or synovial cysts are an infrequent finding within peripheral nerves. A recent review article collected approximately 60 cases from the literature. Most patients were male, ranging in age from 9 to 74 years. While ganglion cysts are common near joint spaces and tendon sheaths, their possible intraneural origin is still a matter of debate. Some authors found that they arose from an articular site and followed the nearby nerve along its course. Others described the cyst as being entirely within the epineurium. This led to the theory of their being extra-articular embryonic synovial remnants.

Nerve ganglion cysts give rise to motor dysfunction and pain due to compression. Their most frequent site by far is the peroneal nerve. Differential diagnoses include “crossed-leg palsy,” mononeuritis, and neurofibroma. It is difficult to make a reliable clinical diagnosis, because there may not be a palpable mass. We report a patient in whom the diagnosis was made pre-operatively by means of ultrasound.

Case Report

This 12-year-old boy was referred to our neurological department because of foot drop. Two weeks before admission, he first noticed pain at the lateral side of the right knee, radiating along the lower leg and dorsal aspect of the foot to the first toe. There was no preceding trauma, no back pain, and no provocation of pain by pressing or coughing. He had not been sitting with crossed legs, nor had he worn tight boots; no other cause of external compression to the knee could be identified. His medical record was unremarkable.

Examination. At examination, the patient appeared healthy, but with an apparent paralysis of the extensor and eversion muscles of the right foot and toes. There was anesthesia of a circumscribed area at the dorsal base of the hallux and hypesthesia of the medial aspect of the foot. Tendon reflexes were present symmetrically. A string-like structure could be palpated over the head of the fibula. Pressure elicited the pain described at admission with the aforesaid radiation (Tinel’s sign).

A plain x-ray film of the knee region was normal. Electromyography showed no signs of denervation, but revealed marked conduction slowing near the head of the fibula. Examination was limited by an extreme reaction to pain by the patient. Real-time ultrasonography was performed using a 7.5-MHz linear array transducer, comparing left and right peroneal nerves. Where the string-like structure was palpated, a fusiform echolucent structure was seen within the course of the right common peroneal nerve, with a maximum transverse diameter of 5 x 7 mm (Fig. 1 right). This could be followed for 8 cm from the lateral aspect of the popliteal space over the head of the fibula (Fig. 1 left).

*Ultrasound system, Model SSD-280 LS, manufactured by Aloka Co. Ltd., Tokyo, Japan.
Ultrasound diagnosis of neural ganglion cyst

excised. About 40% of the nerve fascicles had to be sacrificed. The cyst contained a glue-like substance such as is seen in ganglion cysts. There appeared to be no connection with extraneural tissues, and microscopic studies were consistent with an intraneural origin (Fig. 2). The cyst's length and diameter were as indicated by ultrasonography.

Postoperative Course. After 4 weeks there were no signs of functional improvement and the patient was fitted with a foot-extension device. His pain gradually subsided after the operation.

Discussion

We would classify this ganglion cyst of the common peroneal nerve as truly intraneural considering the operative findings and microscopy. The cyst was fully within the epineurium and there was no relationship with the knee joint. S-100 protein staining showed neural tissue around the linings of the cyst (Fig. 2 right). When foot drop is accompanied by either local pain at the head of the fibula or a palpable mass, a diagnosis of intraneural ganglion cyst must be considered, and exploration is advised. Although its natural history is not known, a progressive course can be expected from symptomatic cysts. Incision of the cyst probably suffices in some cases, but a recurrence rate of 30% is noted. Radical excision with the aid of the operating microscope should be selected if damage to the nerve can be limited. At least partial restoration of function is usual.

It is essential to make a sound diagnosis in these cases. The physical examination should raise the suggestion of a peroneal nerve cyst. Especially when no palpable mass is found, the decision whether to undertake surgical exploration is a difficult one. Imaging techniques may be helpful in establishing the diagnosis and the extent of the lesion. Computerized tomography

Fig. 1. Ultrasound images (upper) and explanatory schematic drawings (lower) of the right fibular head region. Longitudinal (left) and transverse (right) views reveal a marked spindle-shaped echolucent structure, following the course of the peroneal nerve at the level of the fibular head. On the transverse section (right), the largest cyst dimensions are 5 x 7 mm. Scales on the left edges are in cm.

Operation. At surgery, fusiform dilatation of the common peroneal nerve was found. With the help of the operating microscope, the epineurium was split longitudinally and the cystic structure could be radically

Fig. 2. Left: Photograph of a full section from the excised intraneural ganglion cyst of the common peroneal nerve. The section is curled because of fixation, showing the collagen contours of the cyst (C). Cyst length is 7 cm, mean diameter 0.5 cm. Azan stain. Right: Detail of area indicated in box (left) showing neural tissue (arrows) and dark nuclei. The epineurium (e) is seen. Nerve fibers are dispersed in the mucinous substance of the cyst (X). S-100 protein immune peroxidase stain, x 7.5.
and magnetic resonance imaging have been used, and ultrasound has been suggested as the alternative. The present case is the first report of an ultrasonographic diagnosis of an intraneural ganglion cyst. The use of this technique has several advantages. Ultrasonography is harmless, widely available, and can be obtained rapidly. Moreover, we were able to obtain information on the exact location and dimensions of the lesion preoperatively.

Conclusions

Our single experience indicates that ultrasound imaging should be advised in any case presenting with painful foot drop. It is a potentially useful screening technique in the diagnosis of intraneural ganglion cysts of the common peroneal nerve.

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References


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