



External Popliteal Sciatic Intraneural Cyst. Case Report

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Abstract

Intraneural cysts are rare, benign tumors of the peripheral nerves that were first described by Zum-Bush in 1895. Its origin is characterized by the infiltration of the neural sheath by a mucoid substance that forms an intraneural tumor, compressing the nerve fascicles towards the periphery. There is no epithelial lining and the pathogenesis is controversial. A 58-year-old male with a history of health reported increased volume in the upper and lateral area of the right leg, without pain on palpation or mobilization, signs of present tincl, inability to dorsiflexion and eversion of the foot manifested by steppage gait and hypoesthesia area at the level of the lateral aspect of the ankle and dorsum of the foot. Pain in the lateral area of the leg during walking and relieves during rest. Evolution of 3 months.

Keywords: External Popliteal; Sciatic; Intraneural Cyst

Introduction

Intraneural cysts are rare, benign tumors of the peripheral nerves [1,2], that were first described by Zum-Bush in 1895. ⁽¹⁾ Its origin is characterized by the infiltration of the neural sheath by a mucoid substance that forms an intraneural tumor, compressing the nerve fascicles towards the periphery. There is no epithelial lining and the pathogenesis is controversial. ⁽¹⁾ Although most ganglion cysts are asymptomatic, cysts arising on peripheral nerves can cause pain, paresthesias, pressure, and decreased mobility [3].

Case

A 58-year-old male patient with a history of apparent health reported an increase in volume in the upper and lateral area of the right leg, approximately 7 centimeters long by 1.5 to 2 centimeters wide, which did not hurt on palpation or mobilization, but pre-

sented with signs of tincl, inability to dorsiflexion and eversion of the right foot, manifested by steppage gait and the right foot area. Hypothesis at the level of the lateral aspect of the ankle and dorsum of the right foot, presents pain at the level of the lateral area of the leg during walking and relieves during rest. Evolution of 3 months.

Imaging results

Diagnostic means

Soft Tissue Ultrasound.

Soft tissue study is performed with a linear transducer. Mode B in the external posterolateral region of the right knee where an increase in volume was observed, which corresponded to a polylobed cystic mass, elongated with thin and scarce septums, avascular to the study with color Doppler and longitudinal extension of +- 5 cm, surrounding from the posterolateral and anterior region the proxi-

mal end of the fibula, in the path of the external popliteal sciatic nerve, which showed a sign of the tail and displaced the adjacent myotendinous and vascular structures (Figure 1 A-C).

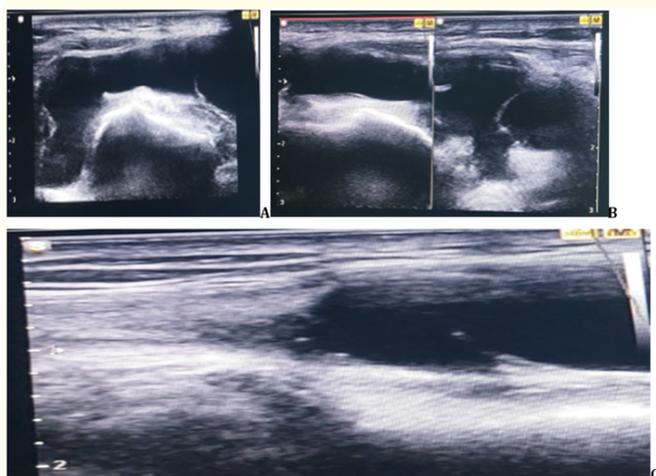


Figure 1: Longitudinal sections of Ultrasound Mode B Soft Part.

A: cystic mass is observed surrounding the head of the fibula from the posterolateral region to the anterior region. B: Demonstrates the polylobed appearance with thin septa and tail sign. C: Shows the nerve thickened by a cyst of intraneural origin.

Right Knee MRI Study

- **Sequences:** T1, T2 and Stir.
- **Planes:** axial, sagittal and coronal.

The presence of hypointense cystic mass in T1 and hyperintense cystic mass in T2 and STIR is confirmed in relation to the signal intensity of the muscle, elongated, polylobed with thin walls and septa along the path of the external popliteal sciatic nerve dependent on its anterior wall, thickening it with a longitudinal diameter of +5 cm from the posterolateral region with extension to the anterior region, Surrounding the head and neck of the fibula (upper end of the fibula), there is evidence of fat infiltration of the muscles of the anterior compartment compared to the posterior compartment figure 2,3.

Nerve conduction study results

Signs of severe axono-myelinated involvement of the motor fibers of the right deep peroneal nerve.

Signs of mild to moderate axono-myelinic involvement of the motor fibers of the right superficial peroneal nerve.

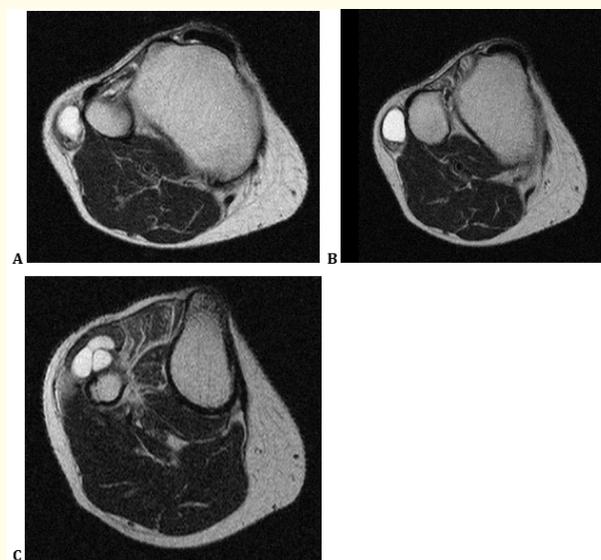


Figure 2: RM of right knee sequence T2, axial planes.

In A and B, the external popliteal sciatic nerve appeared, thickened and affected by the intraneural cyst. C fat atrophy of the anterior compartment musculature.

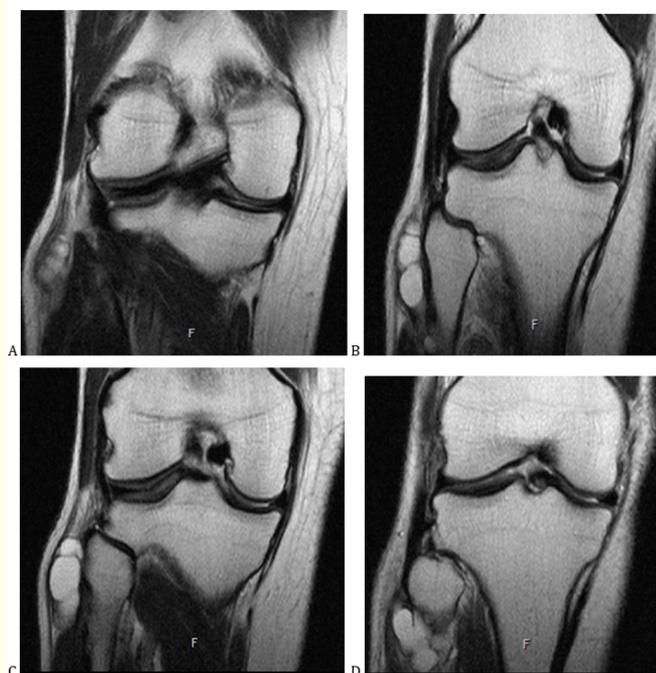


Figure 3: Right knee MRI, T2 sequence, coronal planes in A, B, C, and D, showing the trajectory of the external popliteal sciatic nerve affected by the intraneural cyst surrounding the proximal end of the fibula.

The study denotes compromise of motor fibers of the right deep and superficial peroneal nerves of moderate to severe intensity, more evident and marked in the deep peroneus.

Anatomical pathological findings

Macroscopically, the tumor presented as a single or several translucent areas on the nerve trunk. The contents looked like clear jelly. The injury had no connection to the knee joint. After evacuation of the cyst, it was confirmed that the nerve fibers were in continuity and not strangled or compressed. Histological examination showed no evidence of epithelial lining.

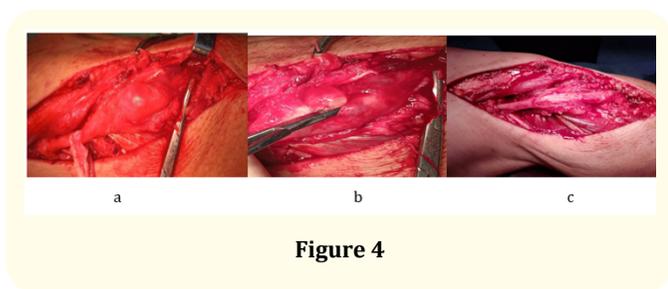


Figure 4

Discussion

Intraneural cysts are rare, benign tumors. There is a preponderance of reported cases in the legs [1], they are found in the radial, ulnar, median, tibial, and posterior interosseous nerves, and most often affect the common peroneal nerve [1-6].

Injuries can occur in motor or sensory nerves, but mainly in mixed nerves. They are rare in the peripheral nerves of the upper limb. Although they usually affect the ulnar nerve of the elbow [1-3].

Intraneural cysts often affect men [1,5] and usually present with pain or symptoms of nerve compression. The appearance of clinical signs after exertion is characteristic. A history of acute minor trauma is often observed [1]. Peripheral nerve injuries may be caused by direct trauma (crushing or transection), traction, mechanical or functional compression, or repetitive local friction [6].

The pathogenesis of intraneural cysts has been the subject of speculation for two centuries; The most well-known theory is that of de novo formation within the peripheral nerve layers. In 2003, Spinner, *et al.* They proposed the unifying articular theory. Intraneural cysts follow predetermined dynamic phases of propagation: Phase I, primary ascent, in which a cyst spreads from a synovial joint to its articular branch and then proximally along the main nerve; Phase II, crossing, a point at the level of the main

trunk where the cyst takes on a more circumferential configuration in the common epineural sheath and can ascend further (or descend) down the trunk Phase III, descends through the main nerve [5-10].

The time between symptom onset and diagnosis is shorter than in other nerve tumors, ranging from 3 to 7.4 months. Perhaps this is due to the rapid growth with associated nerve deficits, which are alarming to the patient, and the superficial nature of the tumors. The pain is usually intermittent, and a positive Tinel sign is uncommon.⁽¹⁾ A swelling or nodule may be found in the path of the nerve [1].

Although ultrasound can identify the location and nature of the cyst, MRI is more useful. It makes it possible to differentiate between an adjacent articular synovial cyst and a cystic schwannoma [1,4,6]. EMG and nerve conduction studies should be performed to document any neurological deficits and help locate lesions. A conduction block suggests a favorable prognosis [1].

Treatment is always surgical [1,9,11,12]. No resection or nerve grafting should be performed even if the lesions appear to be extensive [1,9]. When popliteal sciatic nerve palsy is present, surgical decompression of the nerve with neurolysis should be performed as soon as possible. The prognosis of functional recovery in patients with NCP palsy depends on the severity of the neurologic deficit and the time of surgical neurolysis. In general, the prognosis of a demyelinating lesion is much more favorable than that of an axonal loss lesion. The outcome is usually favorable if surgery is performed within four months of the first onset of neurologic deficits, and less favorable in patients who have neurological symptoms for more than a year [13].

Other authors argue that intraneural cysts are not rare. They are increasingly being diagnosed and reported more frequently now that imaging of the nerves is being done at a higher rate. Joint connections are increasingly being identified, especially in cases where MRI is used. Intraneural recurrences are increasingly recognized. We believe this is due to the increased awareness of joint connections, the increasing use of MRI, and the better follow-up of these patients. Failure to disconnect the articular branch or treat joint pathology has been found to be a statistically significant risk factor for cyst recurrence [14].

In the case of our patient, it was not possible to demonstrate a history of trauma, and the clinical picture corresponds to that of the

intraneural cyst, with that of ultrasound and magnetic resonance a correct diagnosis was made, the initial diagnostic impression was schwannoma, and electromyography allowed us to define the magnitude of neurological compromise and will allow adequate follow-up. Surgical treatment was performed within 4 months of the onset of symptoms, a factor that offers greater options for recovery of the affected neurological functions.

Conclusion

Intraneural cysts are very unusual and atypical tumors, they are benign and should be considered as a differential diagnosis of tumor lesions affecting the peripheral nerves. The vast majority affect the common peroneal nerve at the level of the neck of the fibula and mainly involve mixed nerves. USG is a satisfactory method for diagnosing a cystic peripheral nerve lesion; however, MRI allows for a more objective characterization. Treatment is always surgical.

Conflict of Interest

None to declare.

Bibliography

- Chick G., et al. "Intraneural mucoid pseudocysts: a report of ten cases". *The Journal of Bone and Joint Surgery British Volume* 83.7 (2001): 1020-1022.
- Öztürk U., et al. "Intraneural ganglion cyst of the ulnar nerve in an unusual location: A case report". *International Journal of Surgery Case Reports* 31 (2017): 61-64.
- Mayer SL., et al. "A rare case of tibial intraneural ganglion cyst arising from the tibiofibular joint". *Cureus* 13.2 (2021).
- Patel P and Schucany WG. "A rare case of intraneural ganglion cyst involving the tibial nerve". In *Baylor University Medical Center Proceedings* 25.2 (2012): 132-135.
- Robla-Costales J., et al. "Intraneural cysts of the external popliteal sciatic nerve in pediatrics: presentation of 2 cases and review of the literature". *Neurosurgery* 22.4 (2011): 324-331.
- Silveira CRS., et al. "Cystic degeneration of the tibial nerve: magnetic resonance neurography and sonography appearances of an intraneural ganglion cyst". *Skeletal Radiology* 46.12 (2017): 1763-1767.
- Laumonerie P., et al. "Degenerative subtalar joints complicated by medial plantar intraneural cysts: cutting the cystic articular branch prevents recurrence". *The Bone and Joint Journal* 100.2 (2018): 183-189.
- Alsaygh EF., et al. "Cubital Tunnel Syndrome Due to Multiple Intraneural Cysts at Elbow: A Case Report and Review of Literature". *Cureus* 15.3 (2023).
- Lisovski V and Minderis M. "Intraneural ganglion cyst: a case report and a review of the literature". *Acta Medica Lituanica* 26.2 (2019): 147.
- García FG., et al. "Intraneural ganglion cyst of the external popliteal sciatic nerve: a possible cause of foot drop". *Neurologia* 33.7 (2018): 486-489.
- Uriel-Lavín R., et al. "C0524-intraneural cyst of the external popliteal sciatic nerve". *Neurosurgery* 30 (2019): 2
- Tigre JY., et al. "Recurrent Peroneal Intraneural Ganglion Cyst: Management and Review of the Literature". *Cureus* 15.5 (2023).
- Schmidt I. "Common peroneal nerve palsy caused by an initially misdiagnosed extraneural and intraneural benign ganglion cyst of the peroneal nerve in a 11-year-old child: A rare but severe condition". *International Journal of Case Reports and Images* 8.9 (2017): 623-626.
- Desy NM., et al. "Intraneural ganglion cysts: a systematic review and reinterpretation of the world's literature". *Journal of Neurosurgery* 125.3 (2016): 615-630.