Case study

Foot drop by ganglion cysts : uncommon etiology of a common peripheral neuropathy

Abstract:-

AIM : Common tumours like ganglion cysts can have rare and serious presentations, as was in our case. This case report aims to elaborate upon the use of imaging in diagnosis of peripheral neuropathies, which may have varied causes.

CASE PRESENTATION : We report a case with unilateral common peroneal nerve palsy with incidentally detected bilateral intramuscular ganglion cysts. Even an extensive literature search did not reveal any such case report. The patient underwent high resolution ultrasound imaging for the possible cause of compression of common peroneal nerve. Incidentally, cystic lesions were identified in the intramuscular plane causing nerve compression in the right leg with similar lesions at the same location in the left leg. On the left side, patient was free of neuropathic symptoms as the nerve was seen passing between the cystic lesions, not getting compressed. The patient then underwent MR imaging with contrast and intramuscular ganglion was kept as the provisional diagnosis of the cystic lesion. Operative management was planned to relieve the compressive neuropathy and excision biopsy of the lesion proved it to be a ganglion cyst.

DISCUSSION AND CONCLUSION : Ganglion cysts are pseudocysts with no epithelial lining of their own. These are non- neoplastic lesions filled with gelatinous material and originate from tendon sheath, ligament, bursa, joint capsule or subchondral bone. Rarely, they may present in an intramuscular location, away from the joint with no synovial communication [1,2]. Upper limb involvement is more common and such lesions are usually found on the hand, wrist and ankle [1]. Despite their common occurrence, peripheral nerve

compression due to these cysts is rare with cases of ulnar and median nerve compressions infrequently reported in the literature [3,4,]. In lower limb, dorsal surface of the foot is reported to be the most common site. [2,5]. Occurrence of ganglion cysts in lower limb causing compressive neuropathy is an even rarer combination. Through this case report we bring to notice the importance of imaging in diagnosis of an uncommon cause of foot drop, managed surgically with remarkable outcome.

Foot drop, Common peroneal nerve palsy, Imaging findings, Intermuscular ganglion cysts

INTRODUCTION:

Ganglion cysts are the most common tumours of the upper limb [6] with no definite aetiology. These cysts have no true epithelial lining and are filled with gelatinous material comprising mainly of hyaluronic acid, possibly occurring due to degenerative and local chronic inflammatory changes. Ganglia rarely result in compressive neuropathy of the peripheral nerves and have an uncommon occurrence in the lower limb [7,8]. We present a rare case of a middle-aged Asian female with unilateral foot drop who was incidentally diagnosed as having bilateral intramuscular ganglion cysts causing common peroneal nerve compression. This was an uncommon location of a common benign tumour presenting with uncommon symptoms of nerve compression, which in itself is very rare [9]. Even after extensive literature search we did not find any such case previously documented.

CASE REPORT:

A middle-aged Asian female presented with right lower limb weakness and foot drop which was gradual in onset. She had complaint of burning pain in right lower limb for the past three months and visible swelling in the anterolateral part of the proximal right leg. On examination she had weakness of tibialis anterior and peroneus longus with lump in the

proximal part of anterolateral aspect of the right leg (figure 1). The swelling was soft, partially compressible with restricted mobility. Positive tinel's sign could be elicited by tapping the swelling. Gentle tapping over the neck of fibula elicited mild pain and a tingling sensation which radiated towards the toes. Incidentally, a similar swelling was also observed on the contralateral leg at the same site. Based on clinical symptoms and examination, common peroneal nerve palsy was kept as a provisional diagnosis. The patient then underwent imaging studies for the possible cause of common peroneal nerve compression [10]. Findings at high resolution ultrasound were suggestive of multi-loculated anechoic cystic lesion with posterior acoustic enhancement distal to the level of neck of fibula lying in the intramuscular compartment of the right leg . The common peroneal nerve was hypoechoic with loss of normal fascicular architecture and was noted to lie stretched over the cystic lesion (figure 2). The contralateral leg showed similar cystic lesions which were found to be more numerous but the common peroneal nerve was seen lying between the cystic lesions. The patient then underwent MRI with contrast for proper characterisation of the cystic lesion and to look for communication with joint.

MR imaging of right leg depicted a well-defined multi-loculated lesion which was hyperintense on T2 (Figure 3) and isointense to muscle on T1 weighted image with a thin rim of peri-lesional fat. The lesion measured 42*31*18mm, lying just anterior and inferior to neck of fibula between the tibialis anterior, extensor digitorum longus and peroneus longus with extension into the tibialis anterior. The common peroneal nerve was hyperintense at level of lateral tibial condyle and noted to pass over the cystic lesion on distal tracing on proton density sequence. Peri-lesional high signal intensity in tibialis anterior, extensor digitorum longus and peroneus longus on T2 weighted and PD sequence suggestive of peri-lesional oedema was noted with streaky hyperintensities on T1 weighted image suggesting fatty infiltration. These findings imply muscle denervation secondary to common peroneal

nerve compression by ganglion cyst. Post contrast images depicted thin rim enhancement of the lesion with no internal vascularity suggesting cystic nature of the lesion (figure 4). No joint extension was found on cranial tracing of the lesion. Diffusion weighted image showed no diffusion restriction with corresponding ADC fall.

Contralateral leg MR imaging corroborated ultrasound findings depicting a similar lesion of size 50*26*19mm. As the common peroneal nerve was traversing through the lesion on left side, it helped in the salvation of nerve from compressing effect of cyst. Imaging diagnosis of bilateral ganglion cysts in muscle plane with common peroneal nerve compression on right side was made.

The patient underwent surgical resection of the cyst in the symptomatic leg under spinal anaesthesia and excisional biopsy confirmed the imaging diagnosis. Excision was done by an oblique incision over the anterolateral region of fibular head. The common peroneal nerve was identified and safeguarded. Blunt dissection was done with longitudinal splitting between tibialis anterior and extensor digitorum longus. The cystic lesion was identified and removed en-masse with surrounding tumour bed excision to ensure complete removal to prevent recurrence. The common peroneal nerve was identified and was noted to be intact intra-operatively (Figure 5). The lesion was a multi-loculated cyst with thick gelatinous fluid. The post-operative period was uneventful and the patient was discharged on antibiotics. At 1 month follow up, patient had substantial improvement in pain and heaviness of the legs. Her foot drop gradually improved to near normal with physical rehabilitation over a period of 3 months.

Histopathological examination of the cystic lesion confirmed clinic-radiological diagnosis of intramuscular ganglion cyst.

DISCUSSION:

Common peroneal nerve is one of the two terminal branches of sciatic nerve which originates at the level of distal femur and enters the lateral compartment of leg where it winds around neck of fibula, lying deep to the peroneus longus muscle. This is the most common site of common peroneal nerve involvement which may be post traumatic, compressive or due to entrapment [11].

As the nerve is superficial in the proximal leg, blunt trauma and fibular neck fractures are a common cause of common peroneal neuropathy. Compressive neuropathy due to ganglion cysts is however a very rare occurrence. Evaluation of neuropathic symptoms begins with clinical examination and is aided by electrodiagnostic and imaging studies. Clinical examination reveals weakness of dorsiflexors and evertors of foot - tibialis anterior and peronei muscles respectively. Imaging includes high resolution ultrasound which helps in anatomical delineation of the nerve with identification of the possible cause of neuropathy, which in this case was due to stretch of the nerve over the ganglion cysts. MR imaging helps in characterisation of the lesion, assessment of joint status and muscle denervation. The differential diagnosis that were considered in this case were ganglion cysts, myxoma, peripheral nerve sheath tumour (PNST) and synovial cyst. The clear cystic nature of the lesion was confirmed on ultrasound and MRI , thus ruling out myxoma which is hypoechoic on grey scale with some degree of internal enhancement on contrast imaging. The nerve was identified to be separate from the lesion on high resolution ultrasound which was also confirmed on MRI, excluding PNST. Synovial cysts have joint communication which was not present as confirmed by cranial tracing of the lesion on MRI. [10] Thus, a provisional diagnosis of ganglion cyst in muscular plane involving the lateral compartment of leg was made.

Indication of surgery in our case was to relieve symptoms due to nerve compression. Intra-operatively it is necessary to remove the complete bulk of tumour with surrounding normal

soft tissue excision in order to ensure complete removal of the cyst with its coverings to prevent recurrence. Excisional biopsy is deemed necessary to confirm diagnosis and to rule out any chances of malignancy. The contralateral leg had similar ganglion cysts but as the nerve was passing between the cystic lesions, the patient did not have any complaints in the left leg. On follow up after 6 months, the patient has significant relief in pain and has partially regained her motor power.

With this case report, we demonstrate a rare cause of common peroneal neuropathy due to an uncommon location of a very common benign tumour. Ganglion cysts should be kept as a differential diagnosis in similar clinical scenarios and appropriate imaging and histopathological correlation is necessary for the final diagnosis.

DISCLOSURE:

There are no conflicts of interest and no disclosures.

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Clinical image of patient showing swelling in anterolateral compartment of both legs. The swelling was soft and compressible with restricted mobility.

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159 Fig-1

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161 Fig-2

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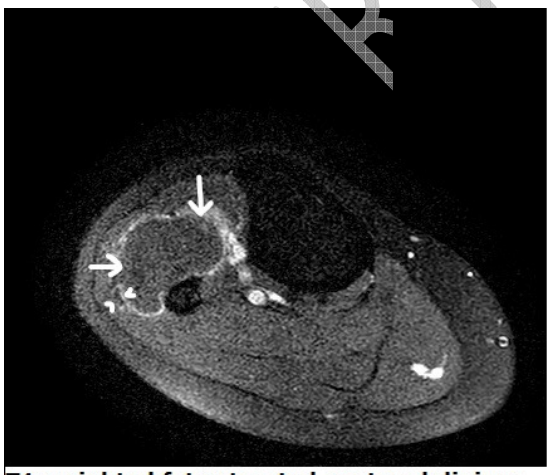

T1 weighted fat saturated post gadolinium axial image showing thin rim enhancement of lesion with no internal enhancement (arrow) suggestive of cystic nature of lesion. Also seen is enhancement of the nerve sheath of the common peroneal nerve (arrowhead) lying in close proximity to the lesion.

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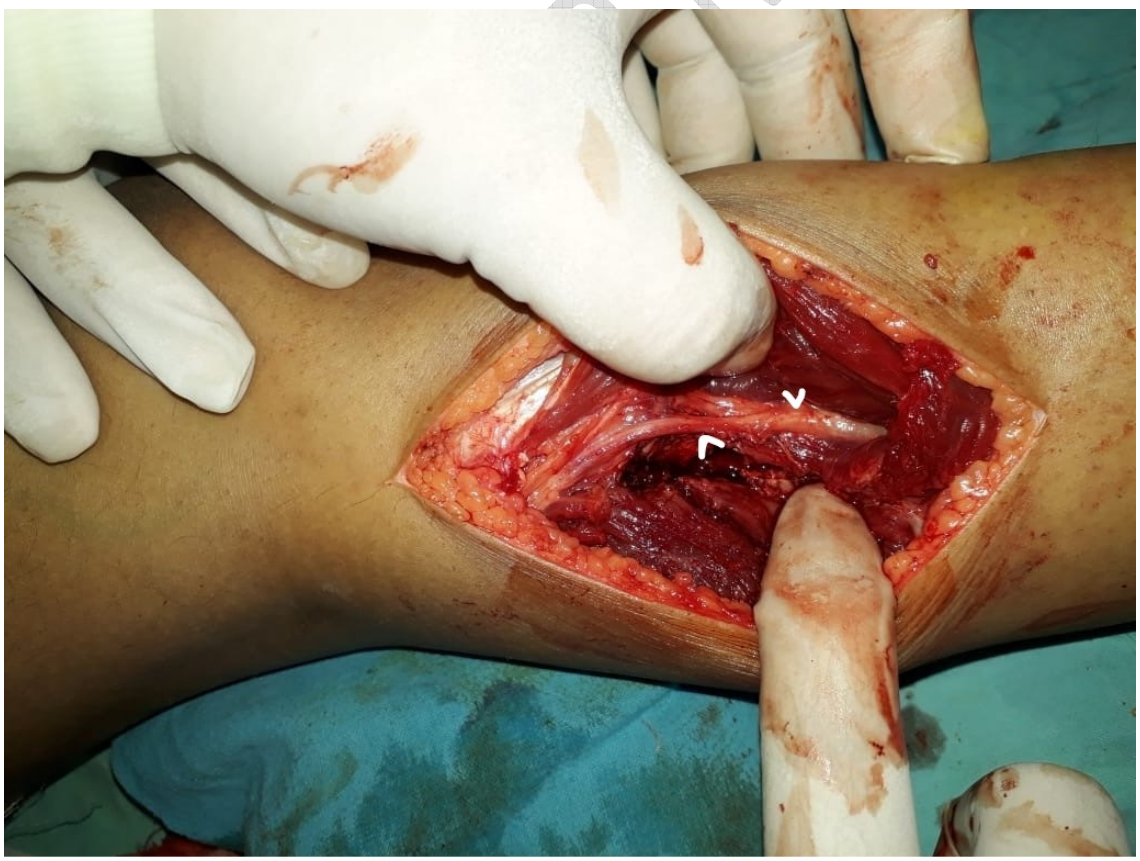
164 Fig-3

165 Multiplanar reconstruction of proton density sequence showing multiloculated clear cystic lesions at level of neck of fibula in the muscular plane with no communication with joint cavity.

166 Fig-4



167 **Intra-operative picture showing intact common peroneal nerve (arrow heads) after excision of the cystic lesions.**

168 Fig-5