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Common Peroneal Nerve Neuropathy Caused by Proximal Fibular Osteochondroma in an Adolescent - A Rare Case Report

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Abstract:
Introduction: Osteochondroma is the prevailing noncancerous bone tumour. The tumours originate from the metaphysis and commonly affect the proximal tibia, distal femur, and proximal fibula in the lower extremities. An osteochondroma situated near the fibula can disrupt the typical path of nerves and could result in vascular compression syndromes or paralysis of the peroneal nerve.
Case report: We are presenting a case of a 15-year-old male with proximal fibular osteochondroma causing compression of common peroneal nerve leading to neuropathy.
Conclusion: We attempt to inform the surgeons on the importance of carefully identifying the entire course of the nerve at the lesion site before removing an osteochondroma located at the proximal fibula to prevent permanent injury to the patient. We recommend that rushing the procedure can result in irreversible damage to the patient.

Keywords: Osteochondroma, Fibular head, Common peroneal nerve, Compressive neuropathy

1. INTRODUCTION:

Osteochondroma is the prevailing noncancerous bone tumour. [1] The tumours originate from the metaphysis and frequently affect the proximal tibia, distal femur, and proximal fibula in the lower extremities.[1] Osteochondromas typically occur frequently in children under the age of 20, and it is uncommon for substantial osteochondroma growth to continue into maturity. Osteochondromas show progressive growth during the developmental phase, ceasing only with the closure of the epiphyseal plates.[2] Fibular tumours account for 2.5% of all primary bone tumours. The osteochondroma located in the proximal fibula is in close proximity to the neurovascular bundle, which might result in compressive neuropathy of the peroneal nerve.[2] Typically, it is an asymptomatic lump that does not cause any pain. When symptoms are present, they may be caused by the compression of adjacent tendons, major vessels, or nerves, as well as contusions or, in rare cases, fractures.[3] In this instance, we are presenting a unique occurrence of proximal fibular osteochondroma in a 15-year-old male patient. The osteochondroma is causing compression of the common peroneal nerve, producing neurological impairment.

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Case Report

A 15-year-old male adolescent patient presented with pain and swelling over the anterolateral aspect of the left proximal leg and was also unable to dorsiflex his left foot for the last six months. (Figure 1) Initially, the swelling was small and did not cause any pain, but over 3 months, it progressively grew bigger and began to cause pain. The pain was characterized by a persistent, throbbing sensation that intensified with movement and subsided with rest. There was no history of trauma or fever. On examination, we observed a substantial swelling measuring around 6.5 × 4 × 3.5 cm on the upper one-third of the left leg, which is on its anterolateral side. The swelling was uneven in shape, with a rigid and bony texture, and was firmly attached to the underlying bone. It was non-tender. The range of motion (ROM) of the knee was similar to that of the unaffected side. A plain X-ray (anterior-posterior and lateral view) was taken as part of the pre-operative assessment, which showed a massive, eccentric stalk-like growth originating from the proximal fibula (Figure 2). Nerve conduction study was done and it showed compressive neuropathy of left common peroneal nerve. A provisional diagnosis of Solitary osteochondroma resulting in compressive neuropathy was made. Following a thorough assessment, the patient was planned for surgical excision of an osteochondroma located in the left proximal area.

The surgical procedure planned was surgical decompression of common peroneal nerve and excision of osteochondroma. The patient was positioned in a supine position, with a sandbag positioned beneath the left buttock. A tourniquet was used to stop bleeding by elevating the distal limb for 3-5 minutes. A linear incision was made just posterior the fibula, along the course of the biceps femoris tendon. A superficial surgical dissection was performed, and the common peroneal nerve was identified. Upon mobilization of common peroneal nerve, it was observed that the osteochondroma was compressing the nerve [Figure 3]. The Peroneus longus and Soleus muscles were detached from the fibula, and an osteochondroma was removed from its base without disrupting the cartilage cap attached to it. A long leg slab was placed with the ankle in a neutral position to minimize early muscle contraction and aid in pain control for one week. The histopathological evaluation of the excised tumour showed that the osteochondroma was benign, with no evidence of malignant change [Figure 4]. Post operative X-ray was taken after excision of osteochondroma was shown in Figure 5.

Figure 1: The patient was unable to dorsiflex his left foot

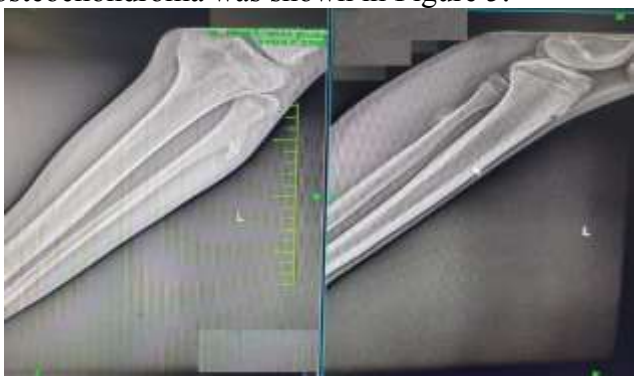

Figure 2: Pre operative X-ray (AP and lateral view) of the left leg with knee showing stalk-like growth arising from proximal fibula.

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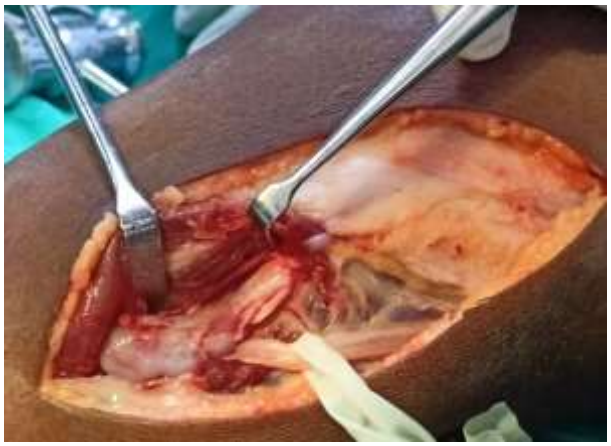

Figure 3: Intra-operative picture showing compression of common peroneal nerve.

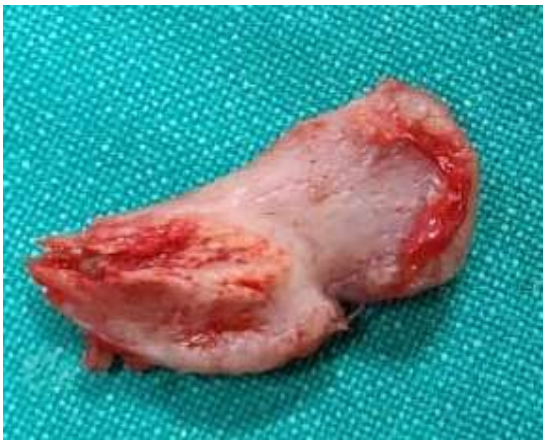

Figure 4: En bloc excised tumor proximal fibula.

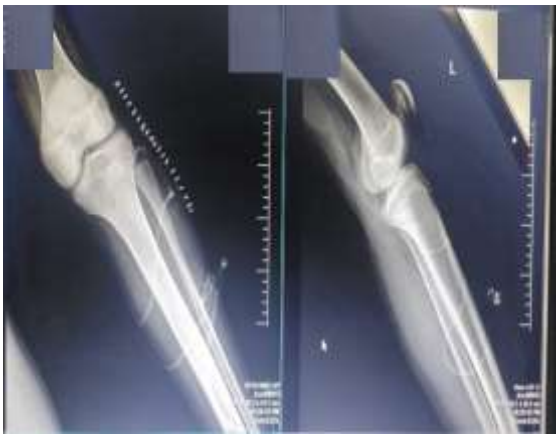

Figure 5: Post-operative X-ray

2. DISCUSSION:

Osteochondroma, the most common benign developmental tumour of the appendicular skeleton, was initially identified by Sir Astley Cooper in 1818.[4] It is distinguished by an unusual, ectopic, endochondral ossification occurring around the physeal zone. Osteochondroma occurs in roughly 2-3% of the general population and accounts for around 36-41% of all non-cancerous bone tumours and 8% of all bone tumours.[5,6] The average incidence of primary bone tumours involving the fibula is 2.5%.[7] These growths consist of bone tissue that is surrounded by a layer of cartilage. While the exact cause of osteochondromas is unknown, it is believed that whether they are caused by tumours or injuries, people with solitary osteochondromas usually have painless, gradually enlarging lumps.[8]

Osteochondromas can exist in either a sessile or pedunculated form, and in 90% of cases, they are solitary. The tumour is often enveloped by a hyaline cartilage cap measuring 1-3 mm, exhibiting no cellular atypia. Osteochondromas with gradual enlargement can lead to compression of tendons, blood vessels, and nerves, as well as skeletal deformities.[4] The bony protrusion of the fibular neck is posterior to the location of the peroneal nerve, it is covered mostly by skin and subcutaneous tissue [5]

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The anatomical course and high fascicle density in this area render the nerve highly susceptible to damage. The primary causes of peroneal palsy are injuries resulting from fractures, dislocations, surgical procedures, or the use of skeletal traction or a tight cast. However, nontraumatic conditions can also lead to peroneal nerve neuropathy, such as idiopathic peroneal palsy, mononeuritis, nerve tumours (both intrinsic and extrinsic), compression by synovial cysts, ganglion cysts, soft tissue tumours, and bone masses. [6] Nerve compression resulting from osteochondroma is an exceptionally uncommon occurrence, found in less than 1% of all cases and usually associated with hereditary multiple exostoses syndrome.[7] Furthermore, the occurrence of an osteochondroma causing compression, resulting in paralysis, is an even more uncommon event, as described in our case.[10] A significant proportion of peroneal nerve injuries typically occur at the fibular head, before the nerve branches into its deep and superficial divisions. Consequently, most peroneal nerve lesions at this location affect both branches, with motor deficits being more common than sensory deficits. The observed phenomenon can be attributed to the arrangement of the fascicles inside the common peroneal nerve. The motor fascicles are positioned in a more medial arrangement, whereas the sensory fascicles are situated laterally. The exostosis expands outwardly, resulting in early compression of the motor fibres, as observed in our case. [8]

3. CONCLUSION

An osteochondroma is a benign growth characterized by bone protrusion covered by cartilage. These tumours can exist either as a single tumour or as many tumours, as seen in hereditary multiple exostoses syndrome. The coexistence of this condition with peroneal nerve paralysis has been seldom seen in both children and adults, typically associated with hereditary multiple exostoses syndrome. Timely surgical intervention is crucial in these circumstances since it can potentially lead to neurological improvement. Delaying surgery may result in irreversible neurological damage.

This article reports the presence of an osteochondroma in the proximal part of the fibula, which was observed during surgery to extend into the common peroneal nerve, causing compression. In presenting this rare case, our aim is to inform surgeons that the problem can arise, and care should be taken in identifying the complete nerve before extracting the osteochondroma.

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