CASE REPORT

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Distal tibial osteochondroma causing fibular deformity and deep peroneal nerve entrapment neuropathy: a case report

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Osteochondromas are the most common benign bone tumors, comprising 9% of all bone tumors and 35% of benign bone tumors. They are frequently diagnosed incidentally. Osteochondromas are mostly asymptomatic, but may cause mechanical findings depending on the location and size of the tumor. Rarely, they may originate from the interosseous surface of the tibia and affect the fibula. We report here a case of a rare osteochondroma originating from the distal tibial metaphysis and causing deep peroneal nerve entrapment syndrome with clinical and radiological findings. To our knowledge, this is the first case in the literature.

Key words: Deep peroneal nerve; entrapment neuropathy; magnetic resonance imaging; osteochondroma.

Osteochondromas are frequently encountered in direct radiographs. Depending on their location, they may be either asymptomatic for a lifetime or cause signs of compression leading to severe vessel and nerve injury. They commonly arise from the metaphysis of the long bones but they may also originate from the flat bones. The cartilage cap surrounding the lesion rarely shows malignant transformation.[1,2]

We report a case of solitary distal tibial osteochondroma causing edema in the tibialis anterior muscle by compressing the deep peroneal nerve. Clinical and radiological findings of the case are presented in the light of current literature.

Case report

A 17-year-old male patient presented to our hospital with ankle swelling, exercise-induced pain and numbness on the anterior aspect of the leg and great toe. Physical examination revealed foot deformation and ankle swelling which had gradually grown for 3 years. Pain and numbness was exacerbated with foot dorsiflexion and great toe movements. The pain was continuous and the patient reported waking up at nights with intense pain.

Electromyography (EMG) findings supported axonal involvement of the peroneal nerve. Other findings in physical examination and laboratory examinations were in normal limits. Direct radiographs showed an osteochondroma at the distal tibial metaphysis pushing the fibula laterally (Fig. 1). Magnetic resonance examination revealed a cortical-based hyperostosis located at the distal tibial metaphysis, growing laterally and interosseously and filling the tibiofibular space to push and markedly

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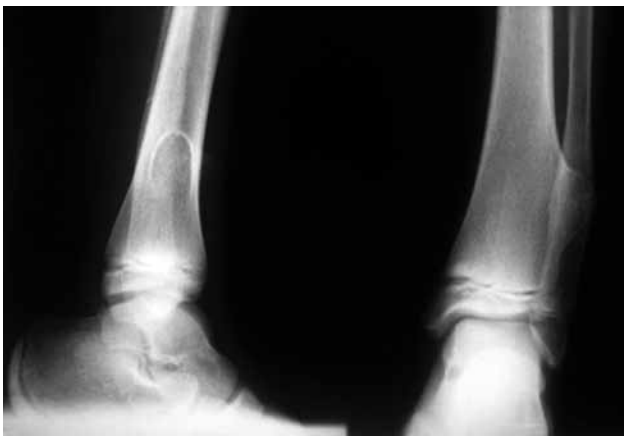

Fig. 1. The osteochondroma with lateral growth is observed on the two-sided direct radiograph.

taper the fibula (Fig. 2a). There was a hyperintense cartilage cap on the osteochondroma in T2-weighted imaging (Fig. 2b). There was no pathologic finding suggestive of malignancy. T2-weighted axial sections showed hyperintense signal changes consistent with focal edema at the localization corresponding to the tibialis anterior muscle (Fig. 2c). Postcontrast examinations revealed that the focal area with contrast uptake at the ventral part of osteochondroma was consistent with peroneal nerve course and was considered as edematous nerve (Fig. 2d). The osteochondroma was totally resected at operation (Fig. 3). The patient's complaints were resolved in the postoperative period.

Discussion

Osteochondromas are considered developmental lesions rather than neoplasm. They commonly originate from the metaphysis of the tubular bones and grow in the opposite direction of the nearest joint. Hereditary multiple exostoses (HME) is an autosomal dominant syndrome characterized with multiple osteochondromas.[1] While risk of malignant transformation of osteochondromas is very low, it is 3 times greater in HME cases than solitary lesions.[2] The lesion in our case was one-sided. The tumor may cause deformation of the bone in which it is located or in the neighboring bone, as well as compressive signs in the adjacent neurovascular structures.[3,4] Rarely, it can form a swelling at the ankle by tapering the fibula and making it springy if it is located at the distal tibial metaphysis.[5] Lesions grow quite slowly and almost stop growing once the epiphysis plate has been

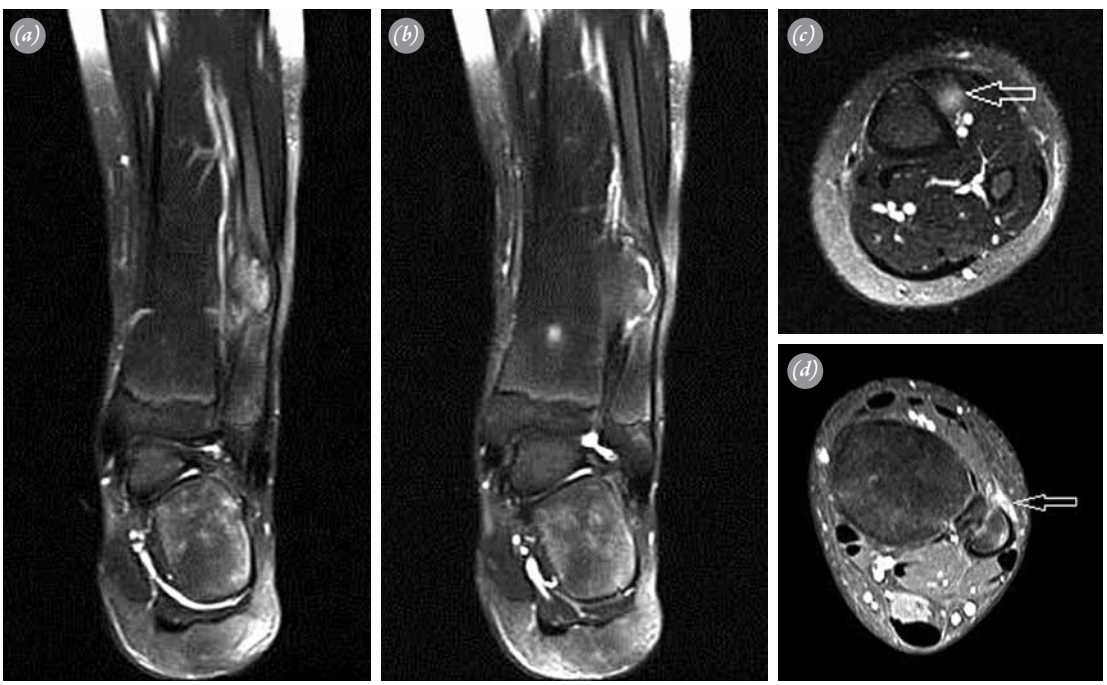

Fig. 2. **(a)** Osteochondroma which makes the fibula stringy, thinner, and deformed is observed on the fat-suppressed, T2-weighted coronal section. **(b)** The fibula, made springy and pushed laterally by the osteochondroma, is observed on the fat-suppressed, T2-weighted coronal section. **(c)** The increased signal is observed in the tibialis anterior muscle due to focal edema in sections traversing proximal to the osteochondroma. **(d)** Contrast uptake is observed at the area indicated by the arrow in fat-suppression, axial, postcontrast sections. Chronic-progressive compression affects the vasa nervorum supplying the nerve and cause contrast uptake by the nerve. The posterior peroneal nerve, normally very difficult to observe, is pushed to the anterolateral and becomes prominent due to contrast uptake (white arrow).

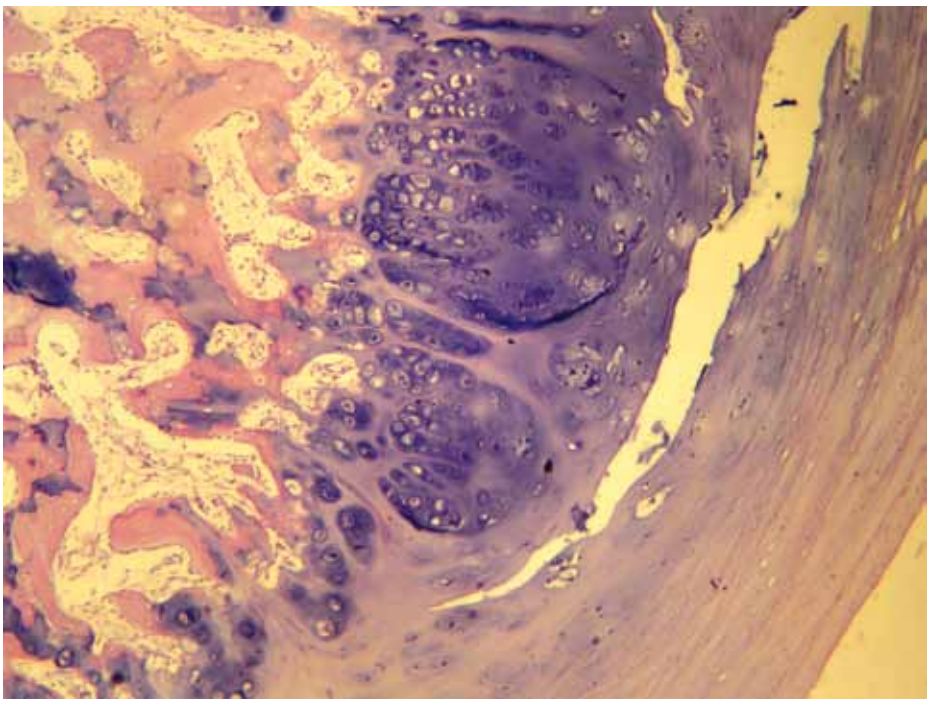

Fig. 3. In the pathologic specimen, the cartilaginous cap showing columnar array at the upper part lining the lesion, and the osteoid tissue beneath it are seen. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

closed. Therefore, treatment is recommended at a stage after the epiphysis plate has been closed. However, treatment should be commenced as early as possible in cases involving fracture risk of the neighboring bone, severe compression of neural structures, vascular compression, or syndesmosis. Complete resection must be performed whenever possible to prevent recurrences.[2-4] Total resection at an early period can be performed in case of neural compression, as in our case.

Our patient had cruris and foot pain intensified by exercise. The presence of edema in the tibialis anterior muscle on MRI, when considered along with EMG findings, was suggestive of deep peroneal nerve pathology. Contrast uptake in the deep peroneal nerve was consistent with edema in the nerve. The deep peroneal nerve was pushed towards the anterior and chronically compressed. As the compression worsens, the vasa nervorum supplying the nerve becomes compressed and leads to contrast uptake.[5,6] In this way, the nerve which is normally invisible becomes visible thanks to the contrast uptake.

The peroneal nerve bifurcates into superficial and deep branches at the level of the fibular head. The superficial peroneal nerve courses laterally along the cruris and terminates at the level of the ankle. Anterior to the cruris, the deep peroneal nerve is located ventral to the tibiofibular interosseous membrane and traverses cruris, reaching the level of the ankle and innervates the tibialis anterior and extensor hallucis longus muscles. The tibialis anterior muscle grows thicker even with minor exercise and compresses the peroneal nerve at the anterior compartment, which is narrowed by the osteochondroma. Denervation edema in addition to neural compression and muscular edema initiates a cycle of ever worsening pain and compression (anterior compartment syndrome).[4-6]

Cases of distal tibial osteochondroma causing fibular fracture have been reported in the literature; however, we did not encounter any cases of osteochondroma causing entrapment neuropathy of the deep peroneal nerve.[5] In distal tibial fractures, deep peroneal nerve injury and entrapment syndrome have been reported, similar to our case.[7] However, vascular injury accompanies neural damage in these cases.

In conclusion, entrapment neuropathy is characterized by pain and numbness at the region innervated by the compressed nerve and may occur at different sites in the upper and lower extremities. Deep peroneal nerve entrapment neuropathy is a rare clinical entity. Differential diagnosis must include entrapment neuropathy in cases where there is no history of severe trauma to the edematous muscle and pain and numbness are present at

night. Magnetic resonance imaging both shows muscular edema and allows tracking of the neural course. In this way, the region where the nerve has been compressed can be located and timely therapy can be instituted before nerve-muscle atrophy occurs. Our patient's complaints were relieved following resection of the osteochondroma, supporting the diagnosis of entrapment neuropathy.

Conflicts of Interest: No conflicts declared.

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