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Case Report

Peroneal nerve palsy due to synovial cyst: An unusual cause of foot drop in a nine-year-old child

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ABSTRACT

Foot drop is the inability to dorsiflex the foot, and peroneal nerve palsy, a common cause of foot drop, is a rare condition in pediatric patients. Herein, we present a nine-year-old patient with foot drop due to peroneal nerve palsy verified by electrophysiologic examination. A cystic mass was observed in ultrasonography and magnetic resonance imaging, and hyaluronic acid was detected in the cystic material by histopathological examination. The patient was referred to surgery, and one month after surgery, an increase in muscle strength was observed. It should be kept in mind that peroneal nerve palsy due to synovial cysts may cause foot drop in pediatric patients.

Keywords: Children, foot drop, peroneal nerve palsy, synovial cyst.

Foot drop is the inability to dorsiflex the foot, and peroneal nerve palsy is a common cause of foot drop.[1] Peroneal nerve courses around the fibular head and this course of the peroneal nerve facilitates it to compression neuropathies.[2] Synovial cysts are soft tissue tumors that arise from synovial joints and usually settle on the dorsum of the hand and popliteal fossa.[3] Synovial cysts are usually asymptomatic but may rarely cause compression neuropathy. Synovial cysts located in the upper extremity cause compression neuropathy more frequently than synovial cysts in the lower extremity. Compression neuropathy of the peroneal nerve due to synovial cysts had been reported in only seven pediatric patients.[4] Herein, we report another case of foot drop due to this rare cause in a pediatric patient.

CASE REPORT

A nine-year-old male patient was admitted to our outpatient clinic with complaints of pain radiating from his right knee to his ankle that started one month ago and inability to pull his ankle to his face, which was noticed by his relatives. The patient had no history of trauma or any other neurological diseases. Swelling was observed in the posterior of the right knee, and physical examination revealed no atrophy in the peroneal muscles and tibialis anterior muscle. In neurological examination, tibialis anterior and extensor hallucis longus muscle strength was 2/5 without concomitant weakness in plantar flexion of the ankle.

Magnetic resonance imaging (MRI), ultrasonography (USG), and electroneuromyography (EMG) were performed. Ultrasonography revealed an anechoic cystic lesion in the lateral proximal epiphysis of the tibia. Magnetic resonance imaging showed a 28×12×25 cystic mass in the posterolateral side of the fibular head (Figure 1). In EMG, sensory nerve action potential wasn't obtained in the right superficial peroneal nerve, and no compound

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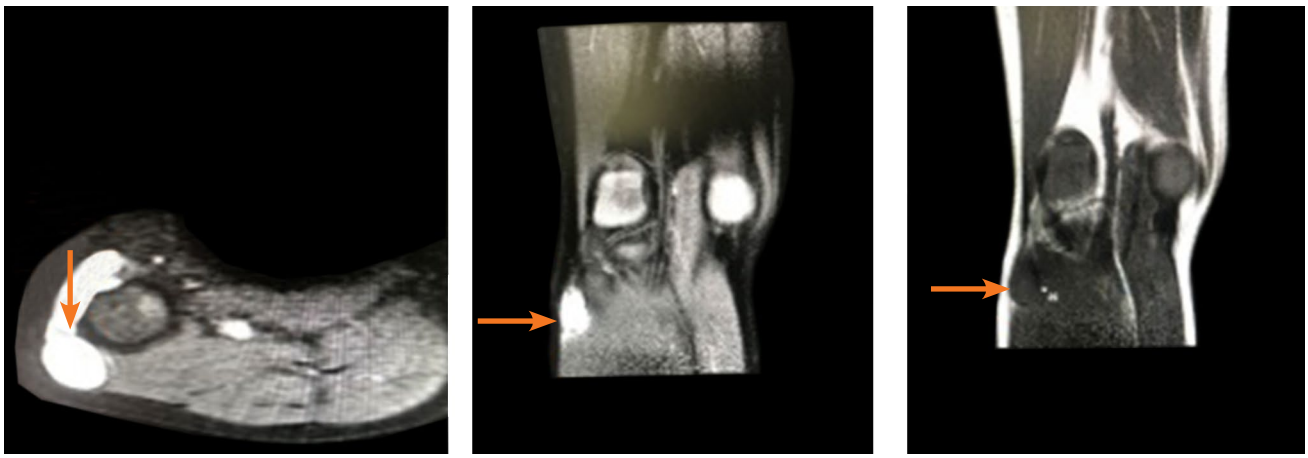

Figure 1. Magnetic resonance imaging views of the cystic mass in the posterolateral side of the fibular head.

muscle action potential (CMAP) was detected in the stimulation of the right common peroneal nerve recording from the extensor peroneus brevis muscle. Conduction block was found between the area above and below the fibular head during the stimulation of the common peroneal nerve recorded from the tibialis anterior muscle. No pathologic findings were determined in the right sural sensory conduction study and the right tibial motor conduction study. In needle EMG, spontaneous activity, reduced interference pattern, and motor unit potentials with longer durations and higher amplitudes were identified in the right tibialis anterior and right extensor hallucis muscles. Normal motor unit potentials and normal interference patterns were detected in the right gastrocnemius and gluteus medius muscles.

A histopathologic examination was planned by considering the clinical, electrophysiological, and imaging findings for the differential diagnosis. Hyaluronic acid was detected in the aspiration fluid obtained by a radiologist under USG guidance.

After confirming the cause of the foot drop as a synovial cyst with histopathological examination, the patient was referred to the surgery department of our hospital. After surgery, a detailed home program including range of motion exercises, Achilles stretching, and strengthening exercises was recommended. In the neurological assessment performed one month after surgery, the muscle strength of ankle dorsiflexion increased from 2/5 to 4/5, and the muscle strength of toe dorsiflexion increased from 2/5 to 3/5. It was observed that the gait pattern of the patient improved, and no orthosis was required for walking.

DISCUSSION

Synovial cysts may originate within perineural tissue or in joint space or bursa and extend toward the nerve. These cysts consist of an outer fibrous coating and an inner synovial lining and contain a clear, colorless, gelatinous fluid.[5] There are two types of synovial cysts: intraneural and extraneural. In intraneural cysts, synovial fluid is localized within the neural sheath, while in extraneural cysts, they settle outside the nerve sheaths in connection with the joint due to the damage to the joint capsule. Most of the intraneural cysts that cause peroneal nerve palsy have been described in the literature.[6]

The clinical presentation or findings of these cysts are variable. Although they are usually asymptomatic, synovial cysts can cause slow-growing swelling, pain, and compression neuropathies.[3] In our case, pain, swelling in the posterior of the right knee, and weakness in foot dorsiflexion developed within one month.

Compression neuropathies due to synovial cysts are rare in the lower extremity compared to the upper extremity. It has been reported that they are located in the carpal tunnel and cause median nerve neuropathy or cause ulnar nerve neuropathy by settling in the cubital tunnel more frequently.[5] Compression of the peroneal nerve in an adult patient was first described by Sultan in 1921.[5] In an article published in 2015, authors reported that until that date, there were only seven pediatric patients who developed peroneal nerve compression neuropathy due to synovial cysts.[4]

In our report, we presented a nine-year-old patient with foot drop due to the compression

of the peroneal nerve with a synovial cyst. Foot drop may be a symptom of many neuromuscular diseases in children. Electrophysiological studies are crucial for accurate localization and diagnosis. Conduction block or decreasing velocity between the area above and below the fibular head is the electrophysiological finding of peroneal nerve compression neuropathies.[7]

Prolonged squatting, infection, varicose veins, rapid and marked weight reduction, schwannoma, nerve herniation through a facial defect, neurofibromatosis, pneumatic compression, high tibial osteotomy, synovial sarcoma, extraskeletal chondrosarcoma, and venous aneurysm are other pathologies that can cause peroneal nerve compression neuropathies.[5] Ultrasonography and MRI are important imaging methods to distinguish the synovial cyst from other causes of peroneal nerve palsy.[5] Ultrasonography, although not sensitive enough, is an inexpensive and easy method that may be helpful for the follow-up of the patient.[3,5]

Magnetic resonance imaging is a useful imaging method for the diagnosis, differential diagnosis, localization, and anatomical relationship of synovial cysts.[3] Synovial cysts can be demonstrated as fluid-filled cystic lesions that are hypointense on T1-weighted and hyperintense on T2-weighted images.[5] Therefore, we performed EMG, USG, and MRI for the diagnosis.

Surgery is the more accepted treatment method for synovial cysts with neurologic symptoms.[6] Aspiration of the cyst or steroid injection is usually preferred in patients without neurological symptoms; however, these methods have higher recurrence rates. A recurrence rate of less than 10% has been reported for marginal excision.[3] In two cases in the literature, it was stated that motor and sensory recovery were achieved within two months after surgery and they did not encounter recurrence in two-year follow-up.[5,6]

Although there are different opinions about the timing of the surgery, the authors reported that surgery should be planned as soon as possible after neurological symptoms are detected to reduce symptoms and prevent neuron damage.[3,6] Our patient was admitted to our clinic with weakness in foot dorsiflexion. Therefore, after the diagnosis of the synovial cyst, we immediately referred our patient to surgery.

Although we found motor improvement in the patient's examination one month later, the patient could not be followed up for a longer period since they were a refugee in our country.

In conclusion, synovial cysts are one of the rare causes of foot drop and pain in pediatric cases. Magnetic resonance imaging, USG, and EMG are useful in the diagnosis and localization. Early surgery is the best treatment option for motor recovery and the prevention of relapse.

Patient Consent for Publication: A written informed consent was obtained from the patient.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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