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Case Report

Acute onset common peroneal nerve palsy in a child due to fibular head osteochondroma: a case report

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ABSTRACT

A 7-year-old patient presented with acute onset spontaneous common peroneal nerve (CPN) palsy due to osteochondroma of fibular head. Osteochondroma was excised resulting in complete neurological recovery. As per our knowledge, this is the first case of an acute onset CPN palsy in a child due to osteochondroma. 14 studies reporting patients with CPN palsy due to osteochondroma were analyzed. Of 24 patients reported with this condition in literature, 19 (79%) recovered completely from CPN palsy. Incomplete recovery after surgery was associated with a longer mean duration between symptoms and surgery (26 months versus 5 months for complete recovery).

Keywords: Acute, Common peroneal, Osteochondroma, Nerve palsy, Foot drop, Pediatric

INTRODUCTION

Osteochondroma, considered as most common bone tumor, represents 8% of all bone tumors and 34% of benign cartilaginous tumors.[1,2] They are frequently asymptomatic and have low malignant potential when sporadic and solitary. It usually arises from the metaphyseal or metadiaphyseal zones of long bones of the appendicular skeleton and are most commonly seen around the knee.[3] Osteochondromas grow during childhood through adolescence, but usually growth ends when the epiphyseal plate closes. Nerve compressions due to osteochondromas are rare and occur in less than 1% of all cases.[4,5] They are more likely to occur with bulky osteochondromas and multiple hereditary osteochondromatosis.

Common peroneal nerve (CPN) is the most commonly involved nerve in compressive neuropathy in the lower extremity and 3rd most common in body after median and ulnar nerve entrapment.[6,7] The most common location of compression of CPN is neck of fibula followed by popliteal fossa and tibial plateau. In terms of etiology of CPN palsy, the most common is trauma and tumor as a cause is responsible in 6% of cases.[8] Acute onset peroneal nerve palsy due to proximal fibular osteochondroma is extremely rare and only one case of this kind has been reported in an adult. To the best of our knowledge, no previous study has reported an acute onset CPN palsy in a child due to osteochondroma.

The purpose of this study was to report the clinical presentation and outcomes after surgical treatment in a child with CPN palsy due to fibular head osteochondroma. A secondary aim was to review the literature for similar studies.

CASE REPORT

A 7 year-old girl presented with a left foot drop with a high stepping gait since 8 days. While there was no history of trauma, patient gave a history of sleeping over a hard surface in left lateral position on the night preceding her symptoms. On examination, there was grade 0 power for ankle dorsiflexion. There was no sensory loss.

Plain radiographs showed a sessile bony growth at the proximal fibula (Figure 1A and 1B).

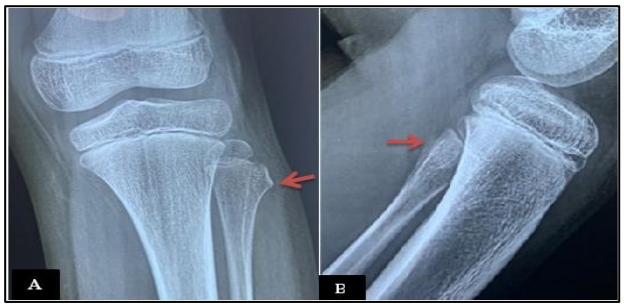

Figure 1: Plain radiograph of knee showing osteochondroma (arrows) in (A) anteroposterior and (B) lateral views.

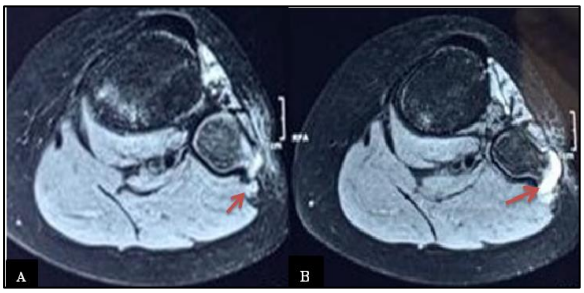

Figure 2: MRI pictures showing osteochondroma (A) tenting of the common peroneal nerve due to tumor (arrow). (B) cartilage cap (arrow).

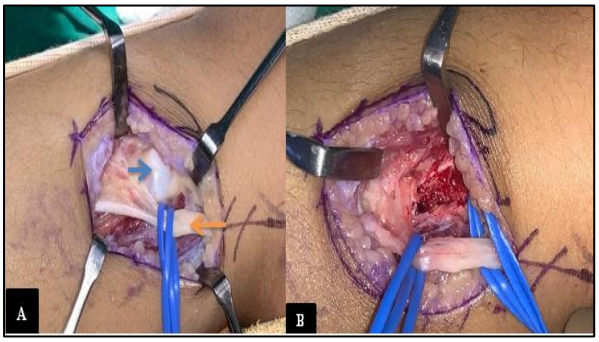

Figure 3: Intraoperative dissection showing (A) osteochondroma (blue arrow) and common peroneal nerve (orange arrow) and (B) decompression of CPN after removal of osteochondroma.

Magnetic resonance imaging (MRI) showed a focal osseous outgrowth at the fibular head neck region laterally which had cortical and medullary integrity with the native bone. The surrounding cartilage gap had a thickness of approximately 3.1 mm. MRI images also showed tenting of peroneal nerve at fibular neck by the lateral edge of the osteochondroma (Figure 2A and 2B).

The electrophysiological study reported that the CPN action potential was absent above the knee. Electromyography (EMG) revealed active and severe denervation in left tibialis anterior. Sensory conduction findings were normal.

The patient was operated 15 days after onset of symptoms. The peroneal nerve was surgically decompressed by excising the osteochondroma. Intraoperatively, the tenting of CPN by lateral edge of osteochondroma was found (Figure 3A). The osteochondroma measuring 2.5×2×1.5 cm was excised. The excision surgery was performed by senior author (SK) wherein CPN was further decompressed by perineural neurolysis (Figure 3B).

Postoperatively the patient was given a static ankle foot splint and advised passive range of motion and encouraged for active movements of ankle joint. Patient began regaining ankle dorsiflexion at 4 weeks after surgery. At 3 months, patients regained full power of ankle dorsiflexion. At the final follow up of 1 year, patient was able to perform all daily living and recreational activities.

DISCUSSION

For literature review on the topic, a search was done in Medline database on June 9, 2021. Our search was conducted using the following search words: “proximal fibular osteochondroma” OR “proximal fibular exostosis” OR “fibular head osteochondroma” OR “osteocartilagenous exostosis of fibula” AND “peroneal nerve palsy” OR “foot drop” OR “drop foot” OR “common peroneal nerve palsy” OR “paresis of peroneal nerve” OR “extension loss of great toe”. Inclusion criteria were studies which reported a CPN palsy due to proximal fibular osteochondroma with a diagnosis established through clinical and radiographic findings and reported final status of neurological recovery. Studies were excluded if the studies were unrelated to topic, patients were treated nonoperatively, unavailability of full article text, and incomplete data on clinical presentation and recovery of patients.

The data noted from the previous similar studies were the study design (case report/case series), year of publication, demographics of the patients (age and sex), symptoms and their duration, osteochondroma/s elsewhere in the body, radiographic findings, electrophysiological study findings, intraoperative findings, extent of neural recovery, and duration of final follow up. The demographic variables, symptoms, treatment, and neurological recovery of patients reported in the included studies were presented in a table (Table 1) and as descriptive statistics.

Table 1: In line with these findings, previous studies indicate that the surgical decompression of CPN with osteochondroma excision should be performed within 3 months of symptoms to optimize chances of complete neurological recovery.[13,14,23-25.]

Author	Age in year	Sex	Symptom	Duration of symptoms in months	Multiple lesions in body	radiographic finding	Preoperative EMG/NCS	Size (cm)	Operative findings	Nerve recovery	Final Follow up
Cherrad et al[9]	14	M	Difficulty walking, gradual weakness of foot dorsiflexion, tingling and numbness over the back of left foot.	3	No	Osteophytic protuberance from neck of fibula	Prolonged distal latency and severely decreased CMAP (>50%)	NS	exostosis of the fibular head, compressing and displacing the CPN	Complete	3 months
Cardelia et al (6 cases)[6]	10	M	Pain Weak toe extension	18	No	Sessile lesion at fibular head	Peroneal conduction delay	2×3×2	Lesion distal to nerve	Complete	6 weeks
	8	M	Pain	7	Yes	Tibiofibular diastasis, sessile lesion	Peroneal palsy	2×2×3	Nerve running through groove in lesion	Complete	NS
	7	M	Pain, paresthesia	8	Yes	Tibiofibular diastasis, shortened fibula	Anterior tibial nerve denervation	5×4×3	Enbloc fibular head excision	Complete	NS
	13	F	Weak foot and toe dorsiflexion, parasthesia	24	No	Pedunculated lesion at fibular head	Conduction delay of peroneal nerve at fibular head	NS	Fibrous tunnel and nerve tenting	Incomplete	5 years
	14	F	Weakness after ambulation	0.5	No	Sessile lesion	Abnormal peroneal transmission	5×3×2	Nerve entrapement by muscle	Complete	NS
	7	M	Weakness	1.5	No	Sessile lesion	Peroneal neuropathy	2×1×1	Attenuated nerve	Complete	NS
Mnif et al[10]	11	M	Foot drop	3	Yes	Osteochondroma of the fibular head	Denervation Of the muscles supplied by the right Peroneal nerve	NS	Osteochondroma compressing the peroneal nerve	Complete	3 years
Yoo et al[11]	10	F	Extension Loss of the right great toe	2	No	Sessile exophytic Bony growth at the proximal fibula	Abnormal spontaneous potential with a polyphasic pattern observed in tib ant & per. Longus	1.3×1.8×1	Exophytic overgrowth displaced and stretched the peroneal nerve	Complete	3 months
Montella et al[12]	19	M	Recurrent ankle sprains	11	No	Osteochondroma arising from the posterior	NS	NS	Peroneal nerve stretched over the top of lesion	Complete	6 months

Continued.

Author	Age in year	Sex	Symptom	Duration of symptoms in months	Multiple lesions in body	radiographic finding	Preoperative EMG/NCS	Size (cm)	Operative findings	Nerve recovery	Final Follow up
						Surface of right fibular metaphysis					
Cinar et al (5 cases)[13]	2.5	M	Limp after walking	12	No	Posterolateral exostosis on the fibular neck	Denervation of peroneal muscles	NS	Hourglass sign of the peroneal truncus	Complete	14 months
	15	M	Inability to dorsiflex right toe	5	No	Osteochondroma of the proximal fibula	Denervation of the extensor hallucis longus	NS	Hourglass sign of the peroneal truncus	Complete	24 months
	11	F	Weak foot dorsiflexion	4	No	Osteochondroma of the proximal fibula	degeneration of the peroneal nerve	NS	Hourglass sign of the peroneal truncus	Complete	50 months
	14	M	Weak foot dorsiflexion	5	No	Osteochondroma from proximal fibula	degeneration of the peroneal nerve	NS	Bursitis due to Osteochondroma around the peroneal trunk	Complete	36 months
	10	F	Foot drop	3	No	Osteochondroma from proximal fibula	degeneration of the peroneal nerve	NS	Bursitis due to Osteochondroma around the peroneal trunk	Complete	40 months
Flores et al[14]	15	M	Right foot and toe extension weakness	4	No	Tumor arising from proximal fibula	denervation of the muscles supplied by the right peroneal nerve	NS	exostosis of the fibular head compressing and displacing the common peroneal nerve	Complete	1 months
Demiroglu et al[15]	13	M	Foot drop	6	Yes	Multiple bony exostosis arising from proximal tibia and fibula, distal femur, proximal humerus, and the left forearm.	Denervation of the nerve muscle supplied by the deep peroneal	NS	Peroneal nerve looks edematous and inflamed with tibial osteochondroma at the level of fibular neck.	Incomplete	6 weeks
Gokkus et al[16]	6	M	Pain over the anterolateral aspect of the right proximal leg.	NS	No	Cauliflower-like growth arising from proximal Fibula	NS	5×3×3	Peroneal nerve adjacent to the lesion	Complete	NS
Kim et al[17]	20	F	Extension weakness of	9	No	Stalked	decrease in the SNAP of the sacral peroneal nerve and a moderate	2 × 2.1 × 1.2	Common peroneal nerve compressed by tumor	Complete	1 year

Continued.

Author	Age in year	Sex	Symptom	Duration of symptoms in months	Multiple lesions in body	radiographic finding	Preoperative EMG/NCS	Size (cm)	Operative findings	Nerve recovery	Final Follow up
			foot and great toe			Osteochondral tumor protruding outward on the fibula head	decrease in the CMAP of deep peroneal nerve				
Manoharan et al[18]	21	F	Foot drop, burning sensation in leg	Immediate post caesarean section (spinal anesthesia was given in lateral position)	Yes	Multiple exostosis over the Medial aspect of the proximal tibia, over the medial and posterior Aspect of the proximal fibula	nonstimulatible right common peroneal nerve	NS	osteochondroma was found displacing the CPN	Complete	6 months
Paprottka et al[19]	19	F	Weakness of toe dorsiflexion, Pain and loss of sensitivity in first web space	6 years	No	4-cm long brace-like Exostosis 6 cm underneath her left fibular head	NCV :not detectable, distal motor latency:delayed, distal amplitude: reduced	4×1	chronic pressure damage to the deep peroneal nerve with prestenotic swelling	Incomplete	1 week
Watson et al[20]	12	M	Weakness of toe and foot extension Tingling and numbness over first web space	3 months	No	Ostochondroma of proximal fibular metaphysis	Motor units unavailable for tibialis anterior 4+ insertional activity, 2+ fibrillation potential	2.5×1.5	Hourglass configuration of the nerve caused by fascial bands from the origin of peroneal muscles compressing nerve againt the mass	Incomplete	4 months
Oxner et al[21]	8	F	Foot drop	3 months	No	Bony growth from proximal fibula	Peroneal nerve palsy With conduction block in the region of the right fibular head	NS	Peroneal nerve Noted to be thinned and stretched over the lesion	Complete	NS
Current study	7	F	Foot drop	8 days	No	Sessile Osteochondroma from proximal fibula	Active and severe denervation in tibialis anterior muscle, left CPN CMAP attenuated distally and above the knee	2.5×2×1.5	Osteochondroma tenting the common peroneal nerve	Complete	12 months

The age of COHORT of patients from previous and current study were presented as mean and standard deviation. Initial search yielded a total of 2006 articles. The title and abstract of these articles were screened independently by two authors for their relevance to subject. 1990 articles were not related to the topic of interest.

Full text of 16 studies were assessed based on exclusion criteria. Out of 16 studies, two were excluded; one due to unavailability of full text and another due to lack of information regarding age, sex, chronicity of symptoms, intraoperative findings and duration of final follow up. Finally, 14 studies were included in the analysis. Of the 14 included studies, 12 were case reports and 2 were case series (Table 1).[6,9-21] A total of 24 patients (including one from this study) were included in the analysis. Mean age and standard deviation of patients were 12 years and 4.7, respectively. There were 14 male (58%) and 10 female (62%) patients. There were 20 children and 4 adults. One adult patient (previous study) and one child (current study) had acute, and rest 22 patients had gradual onset of symptoms. 16 patients complained of only motor symptoms, 3 patients complained of only sensory symptoms, and 5 patients had both. Upon radiography, all the patients had bony overgrowth from proximal fibula either as a sessile or pedunculated lesion. 5 out of 24 (21%) patients had multiple osteochondromatosis.

All the patients underwent surgical removal of osteochondroma. Out of 24 patients (including the one patient of this study), 20 patients (83%) had complete neurological recovery. Incomplete recovery of nerve function after surgery was associated with the duration of symptoms as mean of onset of duration of symptoms was 5 months in patients who had complete recovery as compared to 26 months in patients who had incomplete recovery. This is the first report in literature of a child with acute onset CPN palsy due to osteochondroma. Based on literature review, complete neurological recovery rate after surgical decompression is 83%. This report also highlights the importance of early surgical intervention to decompress the CPN in the setting of compressive neuropathy due to osteochondroma.

An acute onset of CPN palsy without trauma and due to osteochondroma as reported here is an unusual presentation. The reason of acute onset CPN palsy in the child we reported is unclear. We speculate that the possible reason of acute onset of symptoms could be due to patient's dependent position of the leg while sleeping causing CPN compression similar to saturday night palsy.[22] The authors of previous study who reported similar case of acute onset CPN palsy, but in an adult, stated that the palsy developed after the patient was given spinal anaesthesia in dependent lateral position. The size of the osteochondroma in this report was of one of the smallest dimensions among the searched literature (2.5×2×1.5 cm). A relatively smaller sized lesion causing compressive neuropathy of CPN could be explained by the fact that the patient in this report was a child with seemingly less space for the lesion to grow before it starts compressing the CPN.

One of the reasons for complete recovery of CPN after compressive neuropathy in this case was early intervention after presentation. Our analysis of 24 patients included from this and previous studies showed that the patients who recovered completely after surgery had surgery at a mean of 5 months from symptoms compared to those with incomplete recovery who were operated at a mean of 26 months after onset of symptoms. In line with these findings, previous studies indicate that the surgical decompression of CPN with osteochondroma excision should be performed within 3 months of symptoms to optimize chances of complete neurological recovery.[13,14,23-25] This study has several limitations. First, similar to most of the previous relevant studies, the design here is a case report. This limits the ability of our review to suggest conclusive evidence to diagnose and treat this rare condition.

CONCLUSION

We report the first case in literature of acute onset CPN palsy in a child due to osteochondroma who recovered completely after surgical decompression of the nerve. Our own experience and that from the limited available literature suggests that an early surgical decompression of CPN with osteochondroma excision at least 5 months from onset of symptoms is key for complete neurological recovery.

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