Osteochondroma Presenting Clinically with Carpal Tunnel Syndrome in a 12-Year-old Boy

Sachin Yashwant Kale¹, Aditya Rajendra Gunjotikar¹, Rohit Mahesh Sane¹, Sushmit Singh¹, Sanjay B Dhar¹, Raju Laxmanrao Patil¹

Learning Point of the Article:
When presented with a case of osteochondroma of the distal radius in children, carpal tunnel syndrome can also occur.

Abstract

Introduction: An exostosis is a benign growth of bone, which when capped with cartilage is called osteochondroma, which can appear as solitary or multiple, mostly affecting the long bones, pelvis, and shoulder region. The prevalence of known solitary exostosis is 1–2% in the general population. They are slow growing lesions with rare malignant transformation. In patients with a solitary exostosis, the chance of developing a chondrosarcoma out of an exostosis is around 1%.

Case Report: A 12-year-old boy presented to our outpatient department with complaints of pain, and swelling at the right wrist since 1 year and tingling numbness on and around palmar aspect of index and middle finger since 6 months. The swelling was of size 3 cm × 2 cm, Tinel’s sign was positive. His blood parameters were normal. X-ray showed exostoses. Magnetic resonance imaging was suggestive of osteochondroma. Nerve conduction study was normal. Excision biopsy confirmed the diagnosis and also relieved all symptoms.

Conclusion: Our case report is unique in its own way as it reminds us that when presented with a case of osteochondroma of the distal radius in children, carpal tunnel syndrome can also occur.

Keywords: Osteochondroma, carpal tunnel syndrome, exostosis.

Introduction
An exostosis is a benign growth of bone, which when capped with cartilage, is called osteocartilaginous exostoses (osteochondroma) [1]. Osteochondromas can appear as solitary or multiple, mostly affecting the long bones, pelvis, and shoulder region [1]. The prevalence of known solitary exostosis is 1–2% in the general population [2]. Osteochondromas are slow growing lesions with rare malignant transformation but can raise cosmetic concerns and impinge on local structures, including nerves, vessels and tendons, and leading to symptomatic [3, 4, 5]. In patients with a solitary exostosis, the chance of developing a chondrosarcoma out of an exostosis is around 1% [6, 7, 8]. Single resection of the exostosis with or without further treatment for deformity is the treatment of choice [9, 10, 11]. Here, we present a case report of a 12-year-old boy, with a solitary mass (exostoses), present on the volar aspect of distal radius, presenting clinically with carpal tunnel syndrome. Surgical intervention led to complete resolution of the patient’s symptoms. The current case report was written according to the published SCARE criteria [12].

Case Report
A 12-year-old boy with his mother presented to our outpatient department with complaints of pain, and swelling at the right wrist since 1 year. Patient also had complaints of tingling numbness on and around palmar aspect of index and middle
finger since 6 months. Patient had no history of trauma/fall on the affected wrist. Patient was apparently alright 1 year back, when he started complaining of pain and started noticing a firm swelling on the volar aspect of his right wrist. Pain was insidious in onset, dull aching in character, not associated with any other symptoms, aggravated by movements and reduced by rest. Swelling was initially the size of a small pea (1 cm × 1 cm), which later increased to the current size of 3 cm × 2 cm. Patient also complained of finding it difficult to hold a pencil/pen for long, as he would then start experiencing tingling numbness on and around palmar aspect of index and middle. Patient had no associated symptoms and family history was non-significant.

On examination of the right wrist joint, swelling (3 cm × 2 cm) was noted on the volar aspect of distal radius (Fig. 1). Skin over the swelling was normal and pinchable. Patient had localized tenderness over and around the swelling. Swelling was firm and bony in consistency. Swelling was non-translucent and non-mobile. Patient had a restricted range of flexion due to pain. Tinel’s sign was positive. Phalen’s test could not be elicited due to pain. Radial pulse was regular, normal in volume, rhythm, and consistency.

On investigating, his blood counts were within normal limits, erythrocyte sedimentation rate and C-reactive protein too were within normal limits. X-ray showed an exostosis of 3 cm × 2 cm on the volar aspect, arising from the metaphysis-diaphyseal area of the wrist (Fig. 2). Magnetic resonance imaging showed a well-defined, bony excrescence (3 cm × 2 cm × 2 cm) with a STIR hyperintense cartilaginous cap of maximum thickness of 4 mm involving the antero-medial aspect of radial diaphysis (Fig. 3). Growing away from the joint, indenting the posterior aspect of flexor digitorum superficialis and flexor carpi radialis. The lesion was also minimally displacing the neurovascular bundle on the radial side. The distance between the cartilaginous cap and the neurovascular bundle was around 1.5 mm. The findings were suggestive of osteochondroma.

Electromyogram nerve conduction study revealed a normal study.

An excision biopsy was planned. The whole mass was excised leaving behind fresh healthy bone, which was sent for histopathology (Fig. 4). Carpal tunnel release and median nerve decompression were done. Post-surgery, the tumor was cleared off the bone (Fig. 5). Histopathology confirmed the diagnosis of osteochondroma. Post-operative management was as regular and the patient was discharged on post-operative day 5. Postoperatively wrist range of motion (ROM) was started on day 1 and continued throughout the stay. Patient’s symptoms of pain and tingling numbness disappeared after surgery. Patient was then followed up at 1 month with full wrist ROM, showing no recurrence.

**Discussion**

Osteochondroma can appear as a solitary or multiple exostoses, mostly affecting the long bones, pelvis, and shoulder region, with a prevalence of 1–2% in the general population [1]. Osteochondroma generally originates from the metaphysis of longitudinally growing bones as the site of defects in the periosteum and/or tendon insertion [13]. Osteochondroma first appears during the growth period. Symptoms related to the tumor have been reported in patients aged from their teens to around 50 years who seem to use their hand and fingers

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**Figure 1:** Clinical picture of right wrist (Antero-posterior and lateral).

**Figure 2:** Pre-operative X-ray of right wrist (Antero-posterior and lateral).

**Figure 3:** Magnetic resonance imaging right wrist.

**Figure 4:** Excised tumor picture.

**Figure 5:** Post-operative X-ray of right wrist (Antero-posterior and lateral).
Osteochondroma of the distal radius, which causes carpal tunnel syndrome, is extremely rare. In our literature research, only three cases have been noted so far. The first was described by Nather and Chong in 1986 [15], when a 47-year-old woman presented with a visible volar lump associated with shooting pain in her thumb and index finger. Intraoperatively, the authors described a ganglion cyst originating from the flexor pollicis longus tendon's synovial lining; within the cyst, a bony lump was excised and was pathologically consistent with a tendon sheath osteochondroma [15]. In the second case, Hofmann et al. described a 75-year-old diabetic patient who presented with carpal tunnel syndrome and a palpable hardening on the volar distal radius [16]. Moreover, in the third case described by Wong et al., a 78-year-old female presenting with clinically carpal tunnel syndrome and a volar mass over the carpal bones [17].

Moreover, presentation of carpal tunnel syndrome in children is extremely rare, with most of them presenting due to a genetic causes leading to lysosomal storage diseases [18]. In our case report, the patient had no symptoms until a year back, and his symptoms were due to compressive causes rather than organic causes.

Carpal tunnel syndrome has presented in a case of osteochondroma of the distal radius, of a 12-year-old boy without any evidence on nerve conduction studies, which makes this report rare.

Conclusion

Our case report is unique in its own way as it reminds us that when presented with a case of osteochondroma of the distal radius in children, carpal tunnel syndrome can also occur.

Clinical Message

When presented with a case of osteochondroma of the distal radius in children, carpal tunnel syndrome can also occur. The latter is a possibility and should be looked into in spite of investigations like nerve conduction study being normal.

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Conflict of Interest: Nil
Source of Support: Nil

Consent: The authors confirm that informed consent was obtained from the patient for publication of this case report

How to Cite this Article
Kale SY, Gunjotikar AR, Sane RM, Singh S, Dhar SB, Patil RL. Osteochondroma Presenting Clinically with Carpal Tunnel Syndrome in a 12-Year-old Boy. Journal of Orthopaedic Case Reports 2021 May;11(5):109-112.