

## Tumors of Hand and Forearm

Nakarmi KK\*

\*Department of Burns, Plastic and Reconstructive Surgery, Kirtipur Hospital

### ABSTRACT

Hand is a confined anatomical unit with different types of tissues. It translates to the fact that there are variety of tumors arising in this small area. Each tumor has unique presentation and different treatment modality. It is important to differentiate among them for proper management. This paper tries to present common types of tumors of hand and forearm.

**KEY WORDS:** hand, forearm, tumor

### INTRODUCTION

Upper extremity is a unique anatomical subunit of the body because of the presence of different types of tissues in a limited space. It is also special because of the functional implications. That is the reason why people like Sterling Bunnell saw the necessity to establish hand surgery as a separate specialty (1). Because of the same reason, hand surgery is taken as a regional specialty and not a tissue specialty (2).

Tumors are abnormal growth of tissue which can be benign or malignant. Because of the presence of different types of tissues, there is a possibility of having multiple types of tumor in this region. Diagnosing them can be quite tricky without detailed history and examination supported by proper imaging test.

It requires disease-specific knowledge as well as a thorough understanding of the principles of patient evaluation and management. Knowledge of general treatment principles should be considered part of the complete and required preparation for the care of a given case. Efforts of the hand surgeon should focus on preservation or restoration of form and function of the hand which can be very challenging. However, in

the context of the malignant potential of the disease, concerns of patient function and reconstruction must be given secondary consideration over disease clearance (3).

### CASE DISCUSSION

The following are the three cases which presented during last one year to our hospital.

#### CASE 1

Thirty year old right hand dominant male presented with the history of painless, gradually increasing lump on the radiovolar aspect of right index finger proximal phalanx since three years (picture 1a and b). There were no neurological or vascular symptoms. Functionally, there was slight difficulty in making tight fist. Examination revealed firm, non-tender, globular swelling on the radiovolar aspect of the right index proximal phalanx region suggestive of giant cell tumor. Sensory, motor and vascular status of the patient was intact. The lesion was spherical and measured about 3x2.5 cm<sup>2</sup> in size. Underlying skin was not adherent to the tumor but the tumor seemed to be not moving over the bone. Transillumination test was negative. X-ray revealed soft tissue shadow corresponding to the tumor but no bony erosion (picture 1d). Other tests were not done. Brunner zigzag incision was given to expose the tumor. It turned out to be grayish yellow multilobular lesion lying over the radiovolar

#### Correspondence :

Dr. Kiran K. Nakarmi  
Department of Burns, Plastic and Reconstructive  
Surgery, Kirtipur Hospital, Kathmandu, Nepal.  
Email: kknakarmi@yahoo.com  
Mobile: 9851061490

aspect of proximal phalanx of right index finger. The tumor seemed to be extending into the proximal interphalangeal joint on the radial border which was slowly delivered along with the main tumor mass (picture 1e). Histopathology confirmed the diagnosis. One year follow up was uneventful.

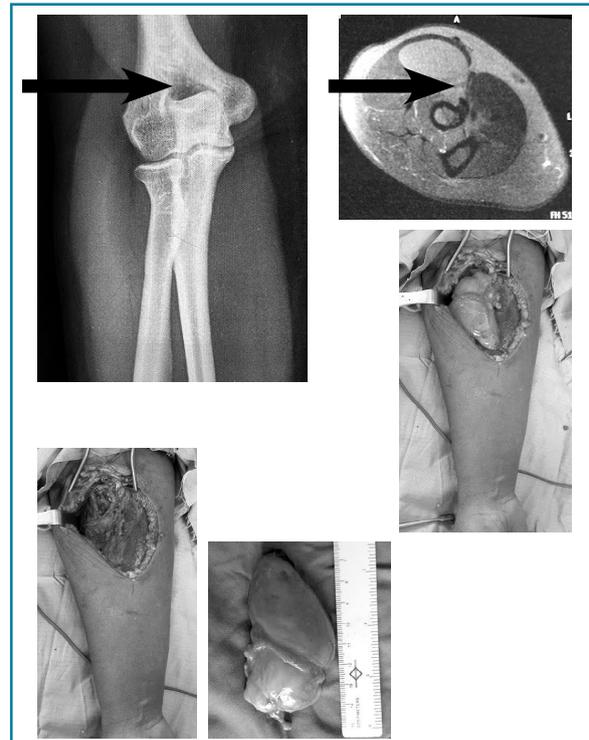


Picture 1. Giant cell tumor a) Preoperative view of the hand b) Intraoperative view showing the tail of tumor extending into the PIP joint c) Excised tumor d) X-ray of hand showing the soft tissue shadow. There is no bony erosion.

## CASE 2

Forty six year old right hand dominant lady came to us with the history of diffuse swelling on the distal half of right cubital fossa for several years. She did not have any other neurological or vascular symptoms. Examination revealed slight fullness in proximal forearm just distal to the flexor crease of elbow joint. Distal border of the lump seemed to be less obvious than the proximal border. Patient came in with X-ray and CT-scan of the forearm. X-ray showed radiolucent shadow on the proximal forearm with no obvious bony erosion (picture 2a). CT-scan showed deep seated well defined lesion below a layer of superficial flexor muscles of the forearm (picture 2b). Exploration was

done under supraclavicular block under tourniquet control. A lazy S incision was given across the flexor crease of elbow joint. The tumor was lying deep to the forearm fascia through the plane between pronator teres and brachioradialis (picture 2c and d). It was well encapsulated and was shelled out en masse. It can be taken as giant lipoma because it was 7x3.5 cm<sup>2</sup> in dimension (picture 2e). The one year follow up has been uneventful.

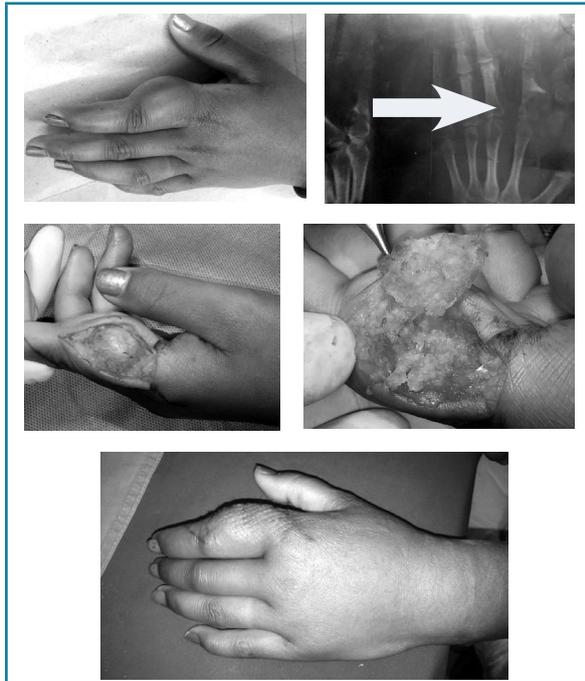


Picture 2: Lipoma a) X-ray showing tissue shadow (arrow) b) CT scan showing the tumor (arrow) c) Exposure of tumor d) After complete excision of tumor e) Ex-

## CASE 3

A 25 year old right hand dominant lady came to our hospital with history of gradually increasing swelling on the radial border of left index finger proximal phalanx (picture 3a). There was slight difficulty in making full fist due to the lesion but pain was not experienced. Clinical examination showed a smooth spherical lesion over the radial border of proximal phalanx of left hand extending from palmodigital crease to proximal interphalangeal crease measuring 3x2 cm<sup>2</sup>. She did not have any sensorimotor or vascular deficit. There was full range of movement of all joints passively but few degrees of flexion were limited at the metacarpophalangeal and proximal interphalangeal joints. X-ray showed cystic bony lesion on the distal

half of radial side of proximal phalanx with very thin cortex on the radial side (picture 3b). Only on third of the cortex was left on the ulnar side. A clinical diagnosis of enchondroma was made. Midlateral incision on radial side was used to access the lesion under supraclavicular block with tourniquet control. The egg shell like cortex was removed from the radial border (picture 3c and d). Gelatin like white tissue was curetted out from the medulla of the proximal phalanx. The cortical window was closed with the piece of cortex that was removed earlier after scraping any tumor cells on the inner side. Periosteum was closed over it. Immediate post operative appearance can be seen in picture 3e. Patient was splinted for a total of 6 weeks to avoid pathological fracture. She was discharged after 2 weeks. No follow up could be done because she hails from far-west and the phone was inaccessible.



Picture 3. Enchondroma a) Dorsal view of hand b) X-ray showing expansile lesion with cortical erosion (arrow) c) Exposure of tumor d) Elevation of cortical window showing jelly like substance underneath e) Immediate postoperative appearance

## DISCUSSION

### Giant cell tumors

Giant cell tumors of the tendon sheath are the second most common tumors of the hand after simple ganglion cysts (4). The most widely accepted theory assumes a reactive or regenerative hyperplasia associated with

an inflammatory process as a cause for this condition (5).

Patients present with a painless lump present for a long time. Occasional distal numbness and impaired function may be the manifestation of compressive effect due to size of the lesion (6). They are most common in the fourth through sixth decades of life and usually located on the flexor surface of the fingers, but dorsal involvement is not uncommon. The mass is typically non-tender to palpation. Usually, the overlying skin is freely mobile over proximal masses in the fingers. The skin is adherent to distal tumors. In digital lesions, mild numbness in the distal part of the involved fingertip is occasionally present. It does not trans-illuminate and is non-pulsatile. Standard radiograph evaluation often reveals the silhouette of a soft-tissue mass. If the mass is near the bone, erosion may be noted.

Preferred treatment is directed toward total excision. At the time of surgery, it appears as a lobulated yellowish-brown mass, well-encapsulated on its surface, with a small tail often involving an intra-articular space. Although benign, these tumors are extremely aggressive, with a high recurrence rate (7). Local recurrence rate ranged from 9% (8, 9); to 44% (10) in various studies.

### Lipomas

Lipomas are slow growing soft tissue tumors which are usually less than 2 cm in diameter. Any lipoma with 5 cm diameter is known as giant lipomas. They are the most common variety of mesenchymal tumors but very rarely found in upper extremity. They arise from primordial fat cell that is why they grow with accumulation of adipose tissue by the patient but do not decrease when patients lose adipose tissue. They are well capsulated and mobile under the skin. They can be found inter/intramuscularly, interosseously, associated with viscera or at the site of prior trauma. Swelling and signs of compression are the two most common reasons for seeking medical attention. Giant lipomas are extremely rare in upper extremity. Their presence warrants proper investigation for the possibility of malignancy (11).

Open surgical excision and proper follow up for chance of recurrence are advised. Lipomas may be single or multiple. Up to 160 lesions have been reported in a

patient (12). They usually grow slowly but rapid growth may occur if the capsule ruptures due to trauma or some other cause (13). Malignancy should be ruled out whatever may be the cause of rapid growth because liposarcoma are not uncommon. They comprise up to 27% of all the soft tissue sarcomas (14). MRI and tissue biopsy are the best options to evaluate malignancy (15). Gadolinium enhanced MRI can differentiate between the lipoma and well differentiated liposarcoma; the later will have more vascularization (16). Liposarcoma is associated with high recurrence rate of upto 50% (11).

### Enchondroma

Enchondromas are usually asymptomatic and benign tumors arising from cartilage. They affect mostly adolescents and young adults. They constitute the commonest skeletal benign tumors of hand mostly affecting the long bones of hand. They are one of the commonest causes of pathological fractures (17).

Radiographs show central area of radiolucency with minimally thickened margin. Periosteal reaction and diffuse punctate calcification are late features. Bone scan will show radioisotope uptake in the margin depending on the activity of the tumor. Treatment involves curettage and bone grafting (18).

Asymptomatic solitary tumor may be followed up with serial x-rays. Enlargement is the indication to rule out malignancy. Look out for terrible triad of pain, increased radioisotope uptake and destructive bony changes. (19).

### CONCLUSION

Some of the common tumors of hand and forearm are presented. Each has different presentation and treatment is also different. Among these, giant cell tumor and enchondroma can recur whereas lipoma rarely recurs.

### REFERENCES

1. Adamson DC, C. T., Friedman AH: Malignant peripheral nerve sheath tumor of the spine after radiation therapy for Hodgkin's lymphoma. *Clin Neuropathol*, 23((5)): 245-55, 2004.
2. Amin A, S. A., Flanagan A, Patterson D, Lehovsky J: Radiotherapy-induced malignant peripheral nerve sheath tumor of the cauda equina. *Spine*, 29((21)): E506-9, 2004.
3. Angelov L, D. A., O'Sullivan B, Bell R, Guha A: Neurogenic sarcoma: experience at the University of Toronto. *Neurosurgery*, 43(1): 56-64, 1998.
4. Di Grazia S, Succi G, Fragetta F, Perrotta RE. Giant cell tumor of tendon sheath: study of 64 cases and review of literature. *G Chir*. 2013 May-Jun. 34(5-6):149-52.
5. Jaffe HL, Lichtenstein HL, Elsturo CJ. Pigmented villonodular synovitis, bursitis, and tenosynovitis. *Arch Pathol*. 1941. 31:731-65.
6. Briët JP, Becker SJ, Oosterhoff TCh, Ring D. Giant cell tumor of tendon sheath. *Arch Bone Jt Surg*. 2015 Jan. 3 (1):19-217.
7. Ducatman BS, S. B., Piepgras DG, Reiman HM: Malignant peripheral nerve sheath tumors in childhood. *J Neurooncol*, 2(3): 241-8, 1984.
8. Phalen GS, McCormack LJ, Gazale WJ. Giant-cell tumor of tendon sheath (benign synovioma) in the hand. Evaluation of 56 cases. *Clin Orthop*. 1959. 15:140-51.
9. Moore JR, Weiland AJ, Curtis RM. Localized nodular tenosynovitis: experience with 115 cases. *J Hand Surg [Am]*. 1984 May. 9(3):412-7.
10. Wright CJE. Benign giant-cell synovioma; an investigation of 85 cases. *Br J Surg*. 1951 Jan. 38(151):257-71.
11. Cribb GL, Cool WP, Ford DJ, Mangham DC. Giant lipomatous tumours of the hand and forearm. *J Hand Surg [Br]* 2005;30:509-12.
12. Phalen GS, Kendrick JI, Rodriguez JM. Lipomas of the upper extremity. A series of fifteen tumors in the hand and wrist and six tumors causing nerve compression. *Am J Surg* 1971;121:298-306.
13. Terzioglu A, Tuncali D, Yuksel A, Bingul F, Aslan G. Giant lipomas: A series of 12 consecutive cases and a giant liposarcoma of the thigh. *Dermatol Surg* 2004;30:463-7.
14. Celik C, Karakousis CP, Moore R, Holyoke ED. Liposarcomas: Prognosis and management. *J Surg Oncol* 1980;14:245-9.
15. B Allen, C Rader, A Babigian. Giant lipomas of the upper extremity. *Can J Plast Surg* 2007;15(3):141-144.
16. Yang YJ, Damron TA, Cohen H, Hojnowski L. Distinction of well-differentiated liposarcoma from lipoma in two patients with multiple well-differentiated fatty masses. *Skeletal Radiol* 2001;30:584-9.
17. Lin SY, Huang PJ, Huang HT, Chen CH, Cheng YM, Fu YC. An alternative technique for the management of phalangeal enchondromas with pathologic fractures. *J Hand Surg Am*. 2013 Jan;38(1):104-9. doi: 10.1016/j.jhsa.2012.08.045. Epub 2012 Nov 28.
18. Bickels J, Wittig JC, Kollender Y, Kellar-Graney K, Mansour KL, Meller I, Malawer MM. Enchondromas of the hand: treatment with curettage and cemented internal fixation. *J Hand Surg Am*. 2002 Sep;27(5):870-5.
19. Kuur E, Hansen SL, Lindequist S. Treatment of solitary enchondromas in fingers. *J Hand Surg Br*. 1989 Feb;14(1):109-12).