

# OSSEOUS TUMORS OF THE HAND

M. Farzan and S.M.J. Mortazavi

Department of Orthopedic Surgery, Imam Khomeini Hospital, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

**Abstract-** *The majority of osseous tumors of the hand are benign. The surgeon who evaluates and treats osseous tumors of the hand has to be familiar with limb anatomy, tumor biology, various presentations of the tumors and the range of treatment possibilities and their limitations. Lesions in the hand more often present earlier in their course than those at other sites, just because they are more likely to be superficial and easily noticed. A review of all cases of osseous tumors of the hand, seen by a hand surgeon over the last 10 years, at Imam Khomeini hospital was performed. Among 55 cases with osseous tumors of hand, 48 primary benign bone tumors, 3 primary malignant bone tumors, and 4 metastatic bone tumors were found. Enchondroma was the most common benign bone tumor followed by osteoid osteoma, osteoblastoma, aneurysmal bone cyst, giant cell tumor, epidermoid cyst, and osteochondroma. There were two chondrosarcoma and one Ewing's sarcoma as primary malignant bone tumors. Metastasis to the hand from colon, esophagus, and breast were also found. There were also two cases with Brown tumor secondary to hyperparathyroidism. We conclude that a variety of osseous tumors could occur in the hand, and usually they are benign. Although malignant neoplasms in the hand that arise from tissues other than the skin are very rare, the hand may be the site of distant breast, lung, kidney, esophagus, or colon adenocarcinoma metastases, most of which have a predilection for the distal phalanges. Acta Medica Iranica, 40(4); 207-211: 2002*

**Key Words:** *Hand tumors, benign bone tumor, malignant bone tumor, tumor-like lesions*

## INTRODUCTION

Tumors involving the hand are classified as benign, malignant and metastatic. Benign tumors are the most common tumors in the hand and are classified as latent, active, and aggressive. Most benign tumors of the hand fall into benign active group (1-3). However, because the hand has limited free space and exquisite sensitivity, even small, histologically innocent masses can cause pain, impairment of function, or obvious swelling. Malignant osseous neoplasms of the hand are so rare that even single case warrants publication. The hand may be the site of distant breast, kidney, or lung

### Correspondence:

M. Farzan, Department of Orthopedic Surgery, Imam Khomeini Hospital, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran  
Tel: +98 21 6930041-9  
Fax: +98 21 6935512  
E-mail: smjmort@yahoo.com

adenocarcinoma metastases. We reviewed 55 patients with osseous hand tumors out of whom four were primary malignant tumors and would like to describe some interesting aspects of them.

## MATERIALS AND METHODS

Fifty-five patients were managed for the osseous hand tumors at Imam Khomeini Hospital Orthopedic ward in Tehran from December 1990 to January 2000. At the time of presentation, forty-two patients had pain; eight patients had limited range of motion in adjacent joints, and three patients had pathologic fracture. Mass was apparent in all patients at the time of the initial examination and the tumor was found incidentally in two patients. One patient who had bone involvement secondary to squamous cell carcinoma of the skin of the hand was excluded from the present study.

The medical records were reviewed for demographic data (the sex, age and any associated medical conditions at the time of presentation), the presenting complaint (the duration of pain, any associated limited range of motion of adjacent joint, mass, pathologic fracture, incidental finding), site of tumor, pathologic findings, and details regarding treatment (curettage, curettage and bone graft, wide resection, others), and any clue to recurrence or reoperation.

Data on these patients were evaluated to determine factors related to osseous tumors in hand. Of the 55 patients, 48 patients had benign bone tumors. Nineteen of these patients had an enchondroma, 12 had osteoid osteoma, 6 had osteoblastoma, 5 had aneurysmal bone cyst, two had osteochondroma, two had giant cell tumor, two had epidermoid cyst, and two had osteochondroma. Of 7 malignant bone tumors, two had chondrosarcoma, 1 had Ewing's sarcoma, and four had metastasis (table 1).

## RESULTS

Forty-eight patients (87%) who had a benign tumor were assessed. Of nineteen patients (32.7% of benign osseous tumors of the hand) who had enchondroma, eleven patients were female and eight patients were male. Their ages were between 8-72 years. Five of them were in the metacarpal and the others were located in the phalanges.

**Table 1.** Clinical data of the Patients

Tumor	n	Age	Sex		Complaint					Site			Recurrence
			M	F	Mass	Pain	Limited ROM	Fx	Incidental	Carpus	Metacarpal	Phalanx	
Enchondroma	19	8-72	8	11	19	12	0	3	2	0	5	14	0
Osteochondroma	2	17-18	1	1	2	0	0	0	0	0	0	2	0
Osteoid osteoma	12	14-37	6	6	12	11	6	0	0	0	3	9	0
Epidermoid cyst	2	12-17	2	0	2	2	0	0	0	0	0	2	0
Osteoblastoma	6	11-21	4	2	6	6	0	0	0	0	3	3	1
ABC	5	14-35	3	2	5	2	2	0	0	0	1	4	2
GCT	2	31-42	2	0	2	2	0	0	0	0	0	2	2
Chondrosarcoma	2	62-68	1	1	2	2	0	0	0	0	2	0	-
Ewing	1	16	1	0	1	1	0	0	0	0	1	0	-
Metastasis	4	16-62	2	2	4	4	0	0	0	0	0	4	-

Curettage and bone grafting proved to be successful in all of them (mean follow up: 66 months). Twelve patients (25% of benign osseous tumors of the hand) with osteoid osteoma were found, six being male and six others being female. Three of them were located in the wrist and nine of them were in the phalanges. Our treatment had been successful in all of them because of appropriate preoperative planning and exact diagnosis before the operation (mean follow-up: 61 months). Six patients had osteoblastoma (12.5% of benign osseous tumors of the hand), two in metacarpals and four in the phalanges. Four of them were male and two of them were female. Only one of our cases recurred (mean follow-up 64 months). Two male cases (4.1% of benign osseous tumors of the hand) were found to have epidermoid cyst. Both of them were located in the distal phalanx. Curettage and bone grafting were successfully performed without any recurrence (mean follow-up 40 months). Two osteochondroma in phalanges were found, one in a male patient and one in a female patient. We also had 5 aneurysmal bone cysts in our patients (10.4% of benign osseous tumors of the hand), two being female and other three being male. Four of them were in the phalanges and the other were in the metacarpal. Reoperation for recurrence was performed in three of them after recurrence. Resection Arthrodesis with interpositional bone grafting was done in recurrent tumors with no recurrence after sufficient period of follow up (mean follow-up 56 months). Two patients had giant cell tumor of phalanges, which recurred after simple curettage and bone grafting. Resection of tumor with interpositional bone grafting and Arthrodesis was done as the second operation without any recurrence (mean follow-up 42 months). Four patients (7.3%) had metastasis to hand, all of

them involving the distal phalanx. One leukemic infiltration in a 16-year old boy, breast cancer metastasis in a 36-year old woman, metastasis from adenocarcinoma of the colon in a 48- years old man, and metastasis from esophageal carcinoma in a 62-year old man were our metastatic cases. All of them died from primary cancer during follow up. Two chondrosarcoma, one in the third metacarpal of the right hand of a 62-year old man and the other in the third metacarpal of a 68-year old woman, and one Ewing sarcoma in the fourth metacarpal of a 16-year-old boy, were our primary malignant tumors of hand in our case series. Ray amputation was successful in our patients without any recurrence after 46 months follow-up.

## DISCUSSION

Enchondromas are the most common and destructive primary bone tumors of the hand skeleton (1-6). The most common location is the proximal metaphysis of the proximal phalanx where it is eccentric and expansile (4). Twelve of our cases had a location in proximal phalanx. Pathological fracture is a common complication because only minimal trauma is needed to fracture the thin shell of bone as was found in six of our cases. The fracture heals but the lesion does not. If the patient had no symptoms before the occurrence of the fracture and the injury that produces the fracture results in a significant force to the bone, surgery is not necessary. Conversely, if the patient has symptoms before the fracture or the fracture occurred with minimal or no trauma, it is probably best to curette and bone graft the enchondroma after fracture healing because

another fracture is liable to occur in the future (7). Simple curettage and bone grafting is the treatment of choice (8,9) with no recurrence as was seen in 19 of our cases. Osteoid osteoma is a well-known benign tumor of bone. It occurs in children and young adults and is rarely seen above the age of 40. The lesion occurred twice as often in men as in women (10,11). It is uncommon in hand and wrist. If it occurs in hand and wrist, its diagnosis is difficult because of its unusual presentations both clinically and radiologically (12-14). Some osteoid osteomas of the phalanges are painless, presumably because of the lack of the nerve fibers being trapped within the tumor (15). In our patients, the average time from onset of symptoms to successful treatment was 20 months (range, 4 months to 60 months). Three of our twelve patients had been treated elsewhere, all of them had received unsuccessful operative procedures related to incorrect diagnosis (16). Treatment consists of creating a cortical window for complete removal of the nidus. Recurrence may be expected if excision is incomplete. The operative treatments were successful in all the twelve patients without any signs or symptoms of recurrence. Only limitation of proximal interphalangeal joint range of motion sustained in one of our patients due to 60 months delay in diagnosis and treatment. Benign osteoblastomas are rare, but when they do arise, the small bones of the hands and feet are the second most common sites of involvement after spine. The most common location of involvement in the hand is metacarpal (17). It may occur in the wrist, but involvement of phalanges is very rare in the literature. It is two times more common in men than in women. Pain is the most common clinical feature. In the metacarpal and phalangeal lesions, swelling is the main feature. It is recommended that curettage and bone grafting is sufficient to treat them (1-3). We suggest that excision and interpositional bone grafting is the treatment of choice especially in metacarpal lesions. Only 13 aneurysmal bone cysts in the hand have been recorded in the English literature (18- 20). We had 5 such cases in our series. Four of them were located in the phalanges, where roentgenographically they were almost indistinguishable from giant cell tumors or enchondromas (21,22). The other one was in the metacarpal. Curettage and bone grafting are not sufficient for the treatment of aneurysmal bone cyst in the hand; two of our cases treated in this manner recurred. We agree that en bloc resection and autogenous bone grafting are the treatment of choice (23,24), even at the expense of adjacent joint arthrodesis. Giant cell tumors of bone are uncommon in the hand (25,26). All lesions within the phalanges and metacarpals originate in the epiphyses; however, some later extend into the diaphysis (27,28). They may be multicentric; a full bone survey is indicated to discover remote sites of tumor when a giant cell tumor is suspected. Generally, curettage and bone

grafting are not sufficient treatment modalities for this tumor. Both of our cases returned with recurrence because of inadequate treatment. Marcove et al. and Meals et al. have advocated cryosurgery, which may be useful as an adjunctive treatment when simple curettage and bone grafting are performed (29). We think that resection of the bone and reconstructive surgery is the treatment of choice in the giant cell tumors of the hand. Osteochondromas are rare in the hand but are seen occasionally on a phalanx (30). They are most common in the metaphyseal area and can continue to grow until skeletal maturity. Excisional biopsy may be indicated because of pain, deformity, or limited range of motion of adjacent joints. The distal phalanx is the most common osseous site of epidermoid cyst. It looks like an enchondroma on roentgenograms; the cortex is expanded, and a central lytic lesion is the only bony reaction (31). Careful surgical excision, which avoids rupture of tumor sac and spillage of contents, and thorough curettage is recommended as treatment of choice. In the hand, malignant tumors are rare beneath the skin, as shown in the 65-year retrospective review (1920-1985) from the Mayo Clinic. Frassica et al. found only 22 primary malignant bone tumors of the hand in 18 patients. These included 10 chondrosarcomas, 7 hemangioendotheliosarcomas, 2 osteosarcomas, 2 fibrosarcomas, and 1 Ewing sarcoma. We had two chondrosarcoma, and 1 Ewing sarcoma (32).

Chondrosarcomas are the most common primary malignant bone tumors of the hand (33,34). The most common hand site is in the proximal phalanx. Some have been reported in preexisting enchondromas, but this is rare (35-37). Chondrosarcomas of the bones of the hands and feet are rare and are difficult to be differentiated from enchondromas (38). A chondrosarcoma should be suspected if a lesion is painful or if it recurs after routine curettage of an enchondroma. If radical surgery such as ray resection is the primary procedure, recurrence of the tumor is unlikely and the prognosis is good. Ewing sarcoma, like other malignant tumors, rarely involves the hand, and only about 20 cases have been reported in the literature (39-42). It occurs more frequently in males and usually manifests during the second decade of life. Clinically, the tumor is often mistaken for a local infection because the patient may complain of pain, swelling, fever, and general malaise. Leukocytosis and elevation in the erythrocyte sedimentation rate are common. Roent-genograms of the hand demonstrate a permeative pattern of bone destruction with periosteal reaction. Ewing sarcoma is a highly aggressive tumor. New adjuvant chemotherapy with local control through radiotherapy or surgery is the suggested treatment. Chances of survival if this lesion occur in the hand may be better than if it occurs elsewhere, possibly because of its earlier recognition when is small in size (43). Hand is not a common site for metastatic tumors (44). They occur

commonly in the proximal portion of the extremities or in the spine. A metastatic lesion in the hand or foot has its primary source most commonly in the lung, but breast, kidney, colon or esophagus may metastasize to the hand. Distal phalanx and the wrist are the most common sites of metastasis in the hand (45,46). All of our cases are presented with lesions in their distal phalanges.

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