Clinicopathological study of soft tissue tumors and tumorlike conditions around the wrist and the hand

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Backgrond
Over the past few years, there has been much interest in the study of tumors and tumorlike conditions around the hand and the wrist. Most of the tumorous conditions result from repetitive strain injuries, but other true tumors do exist.
Objective
The aim of the work was to clarify the nature, incidence, and distribution of soft tissue tumors and tumorous conditions around the wrist and the hand. This study should clarify the correlation between false and true tumors of the hand and also between benign and malignant tumors.
Patients and methods
This study includes 178 patients with hand and wrist soft tissue swellings of 107 005 patients who received medical care at Orthopaedic Department at El-Hadara University Hospital during 1 year (from November 2006 to the end of October 2007). Thus, patients of this study represent 0.30% of the patients admitted from the outpatient clinic.
Results
The present study included 178 patients with soft tissue tumors or tumorlike conditions of the hand and wrist. The most common type was tenosynovitis (48%), and the second common type was simple ganglion (41%). The remaining types were Dupuytren's contracture (4%), giant cell tumor of tendon sheath (4%), chronic synovitis (0.6%), fibroma (0.6%), neuroma (0.6%), dermoid cyst (0.6%), and synovial sarcoma (0.6%). Malignancy constitutes only 0.6% of the present study. The most commonly affected patients were those in the age between 30 and 49 years; however, the age ranged between 10 and 67 years. Overall, 108 (60.6%) patients were females, whereas the remaining 70 (39.4%) were males. Regarding the occupation, housewives (62 patients; 34.8%) were more commonly affected than those in other occupation. The main presentations were interference with function (75 patients; 42%) and unsightly swelling (62 patients; 36%).
Conclusion
Malignancy constitutes only 0.6% of the present study. History of diabetes was evident in 56 (31.5%) patients. The incidence of recurrence was very high in cases of trigger finger managed by injection of corticosteroid, ganglia in which injection was done as outpatient procedure, or also where transfixation was done or even after excision. Synovial sarcoma did not show recurrence or metastasis. Regarding the site of the lesion, the palmar aspect of the right hand was affected more than the left side. The smallest size of the swellings measured 0.5 cm^3 (ganglion on the dorsum of proximal interphalangeal joint), whereas the largest one measured 4 by 7 cm (chronic synovitis).

Keywords:
hand and wrist, soft tissue tumors, tumor like conditions

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Introduction

The basic anatomic elements of the fingers are the phalanges and their articulations, a tendinous extensor mechanism, a tendinous flexor mechanism, the vessels, and the nerves. The number of extensor tendons of the fingers is variable, mainly distal to the extensor retinaculum, and they are not organized in digitorum superficialis and profundus tendons as are the flexor tendons. The metacarpophalangeal joint capsule and the lumbrical and interosseous tendons contribute to the extensor mechanism, because they form the dorsal interosseous ligament, which laterally reinforces the extensor tendon [1].

The soft tissue tumors that occur in the hand may arise from the skin, subcutaneous tissue, tendons, nerves, and blood vessels and are of many different types. Some of

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these types occur only in the hand, and some occur in other parts of the body as well. In addition to the primary tumors, metastatic lesions occur rarely. Metastatic tumors of the hand, although very rare, are found arising from primary tumor in soft tissue and in bone located elsewhere in the body. The majority are metastases to bone, arising from carcinoma of the lung [2].

These varieties of tumor that occur in the hand, because of their superficial nature, are usually found at a relatively, early stage of development. They are usually benign and do not present any special problem for management [3].

The radiologist has an important role to play in the correct presurgical diagnosis, whose aim is to describe the anatomy and the characteristic ultrasound and MRI findings of the most common tumor and tumorlike lesions of the hand and the wrist [2,4].

The aim of the work was to try to clarify the nature, incidence, and the distribution of the tumors and tumorous conditions around the wrist and the hand.

Patients and methods

This study includes 178 patients with hand and wrist swellings of 107 005 patients who received medical care at Orthopaedic Department at El-Hadara University Hospital. Thus, patients of this study represent 0.30% of the patients admitted from the outpatient clinic of the hospital. Fully informed consent was taken from all of the patients, the treatment protocol and the surgical procedures were approved from the ethical committee of our institution and followed the international standards.

All patients were subjected to complete history taking and full clinical examination. Imaging studies were done as indicated, and surgical treatment in the form of excision of the tumor according to its nature. Histopathological study of the swelling was done, and the result will be correlated to the clinical data.

Results

This study includes 178 patients with hand and wrist swellings of 107 005 patients who received medical care at Orthopaedic Department at El-Hadara University Hospital. Thus, patients of this study represent 0.30% of the patients admitted from the outpatients of the hospital.

The most common type encountered was tenosynovitis in the hand and wrist (85 patients; 48%). The second most common type was simple ganglion (74 patients; 41%) (Fig. 1). The remaining types of swellings were giant cell tumor of tendon sheath in seven (4%) patients (Fig. 2), Dupuytren's contracture in seven (4%) patients (Fig. 3), and fibroma, pigmented villonodular synovitis of the wrist (Fig. 4), neuroma, dermoid cyst (Fig. 5a–c), and synovial sarcoma in 1 (0.6%) patient each.

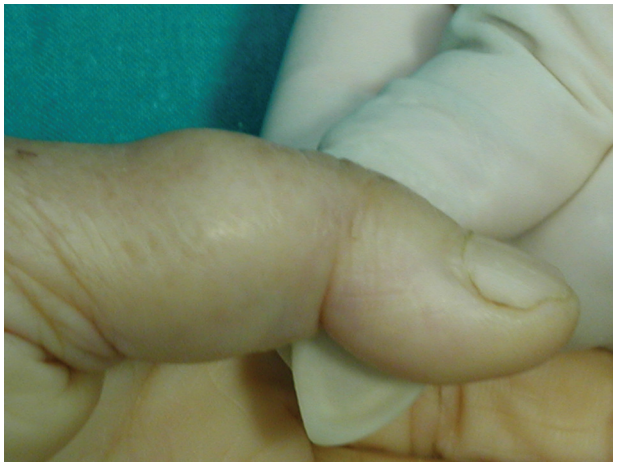
Table 1 shows the distribution of the tumors or tumorous conditions around the hand and wrist in this study.

The most common type encountered was tenosynovitis, with 85 (48%) patients. The second most common type was ganglion of the tendon sheath, with 74 (41%) patients. The third common type was giant cell tumor

Figure 1

Simple ganglion of the dorsum of the hand.

Figure 2



Giant cell tumor of the extensor tendon sheath of the hand.

Figure 3

Dupuytren's contracture of the left hand.

Figure 4

Fibroma and pigmented Villonodular synovitis of the left forearm and wrist.

of tendon sheath, with seven (4%) patients. Dupuytren's contracture was seen also in seven (4%) patients.

Age distribution

The age ranged between 3 and 64 years. The most common age group affected was between 19 and 39 years (Table 2).

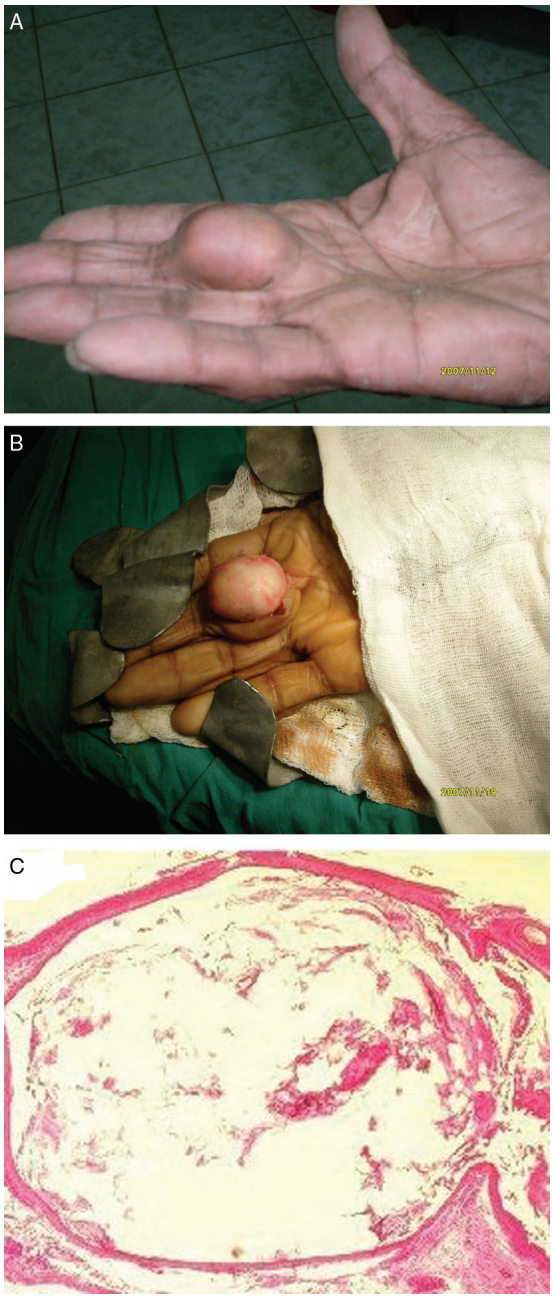
Sex distributions

One hundred and eight (60%) patients of the present study were females and 70 (40%) patients were male, so female patients were more affected than male.

Occupation distributions

Regarding the occupation, 34.8% of patients were housewives, 21.4% of patients were laborers, 15.7% of patients were professionals and had white collar jobs, 14.6% of patients were soldiers, 11.8% of patients were retired, and 1.7% of patients were students (Table 3).

Figure 5



A: Soft tissue tumor arising from the volar aspect of the proximal phalanx B: During surgical excision of the tumor. C: The histopathology of the tumor giving the picture of either neuroma or dermoid cyst.

Clinical presentation

In this series, 63 (36%) of the patients presented to the clinic because of the unsightly swelling, 13 (7%) patients owing to pain complaint, and 75 (42%) owing to swelling interfering with the hand function; and no patient presented with bleeding from the site of the lesion (Table 4).

Duration of the disease

Table 5 shows the duration of the disease. The table shows that 144 (80.9%) patients came to the hospital to get medical advice within the first 6 months of

Table 1 Frequency of the different hand and wrist swellings

Type of the swellings	Number of patients (%)
Simple ganglion	74 (41.0)
Dermoid cyst	1 (0.6)
Giant cell tumor of tendon sheath	7 (4.0)
Fibroma	1 (0.6)
Lipoma	– (0)
Sebaceous cyst	– (0)
Septic granuloma	– (0)
Neuroma	1 (0.6)
Glomus tumor	– (0)
Hemangioma	– (0)
Synovial sarcoma	1 (0.6)
Tenosynovitis	85 (48.0)
Dupuytren's contracture	7 (4.0)
Chronic synovitis	1 (0.6)
Total	178 (100)

Table 2 Age distribution of the 178 patients

Age groups in years	Number of patients (%)
<10	18 (10)
10–19	7 (3.9)
20–29	30 (21.3)
30–39	49 (27.5)
40–49	38 (16.8)
50–60	17 (9.5)
>60	19 (11)
Total	178 (100)

Table 3 The occupation of 178 patients

Occupations	Number of patients (%)
Housewife	62 (34.8)
Professional and white collar	28 (15.7)
Laborer	38 (21.4)
Soldiers	26 (14.6)
Student	3 (1.7)
Retired	21 (11.8)
Total	178 (100)

Table 4 Complaints of the patients

Complaints	Number of patients (%)
Unsightly swelling	63 (36)
Pain	13 (7.0)
Interference with function	75 (42)
Two or three of the above	20 (11.0)
Fear of malignancy	7 (4.0)
Total	178 (100)

discovery of the lesion. The remaining patients did not seek medical advice until later (>6 months).

Site of the lesions

In all patients, the lesions affected only the wrist or the hand in both sides. Table 6 shows the distribution of the site of the swelling.

Table 5 Time lapse before presentation

Time lapse (months)	Number of patients (%)
<1	79 (21.9)
1–3	37 (26.4)
3–6	25 (26.9)
6–9	12 (11.2)
9–12	11 (10.1)
12–18	9 (9.5)
>18	5 (10.6)
Total	178 (100)

Table 6 Site of the lesion

Site of lesion	Number		Total	%
	Right	Left		
Dorsal aspect	47	6	53	29.7
Wrist				
Ventral	29	9	38	21.3
Dorsal	6	3	9	5
Hand				
Palmar aspect	58	13	71	39.8
Dorsal aspect	3	1	4	2.2
Fingers				
Flexor aspect	3	0	3	2.0
Total	146	32	178	100

The table shows that the right wrist, hand, and fingers were more affected than the left side. The right side was affected in 146 (82%), whereas the lift side was affected in 32 (18%) patients.

Table 7 shows the different sites of ganglia. The table shows that the right side was more affected than the left. A total of 48 (26.9%) patients presented in the right side, whereas 27 (73.1%) of the patients presented in the left side.

Size of the lesion

The smallest size was 0.5 cm and the largest was 8 cm. Table 8 shows the size of the swellings. The table shows that the most common size of the swelling of the patients was less than 1 cm.

Discussion

The present study agrees with the general pattern of most literatures concerning soft tissue tumors or tumorlike conditions in the hand and wrist in that there is predominance of benign lesions of soft tissue origin (99.4%) and lower incidence of malignant tumors (0.6%). In a series of 300 patients over a period of 3 years, Athanasian [3] showed that 95% of tumors of the hand were benign and only 5% were malignant.

Benign tumors of the hand may be categorized using the different anatomic subunits of the hand. Each subunit

Table 7 The different sites of ganglia

Site of ganglion	Number		Total	%
	Right	Left		
Dorsal aspect	23	18	41	55.5
Wrist				
Ventral	12	6	18	24.3
Dorsal	7	2	9	12.1
Hand				
Palmar aspect	2	0	2	2.7
Dorsal aspect	3	1	4	5.4
Fingers				
Flexor aspect	0	0	0	0
Total	47	27	74	100

Table 8 The size of the lesion

Size of the swelling (cm)	Number of cases (%)
<1	89 (50)
1–2	57 (32)
2–3	29 (16.3)
3–4	1 (0.5)
>4	2 (1.2)
Total	178 (100)

has potential for disease processes and abnormal growth. Notably, the musculoskeletal, vascular, osseous, cutaneous, and soft tissue elements can develop benign lesions that may manifest as localized masses of the hand excluding cutaneous malignancy. In this study tenosynovitis of the hand was the most frequent of the swellings (48%) followed by giant cell tumor of tendon sheath (4%) and Dupuytren's contracture (4%), and then dermoid cyst, fibroma, neuroma, and chronic synovitis; all of them were subjected to resection except tenosynovitis, which was treated by injection of corticosteroid or slitting. Athanasian [3] showed that the nonneoplastic ganglion is probably the most common mass found in the hand and wrist. Some benign growths may not need excision. Following ganglions, inclusion cysts, giant cell tumors, granulomas, and hemangiomas follow in frequency. The study by Baumgarten *et al.* [5] of 48 patients found that after one or two injections, 25 of the 29 digits in the nondiabetic group had a successful outcome; moreover, Nahra *et al.* [6] found that ganglion cysts are the most common lesion of the hand and wrist, accounting for 50–70% of all identified masses. Most ganglion cysts can be treated nonoperatively, but when surgery is performed, a low recurrence rate can be anticipated. Moreover, the study found that giant cell tumors of the tendon sheath require surgical excision.

Giant cell tumors were the third most common tumors of the hand in this study. It is the most common true tumor of the hand. The reason for consultation was unsightly swellings and impairment of finger flexion, there were two radiological changes have been detected. Walsh *et al.* [7] found that giant cell tumor of tendon sheath is the most common primary tumor of the hand. Messoudi *et al.* [8] reported a retrospective study over 10 years of 32 cases of giant cell tumor of tendon sheath, with an average age of 35 years. A palmar localization was found in 56.2% especially in the fifth ray (62.5%) and at the level of the distal phalanx (68.7%). Radiological changes were observed in four cases. All patients of giant cell tumor of tendon sheath were treated surgically.

Dupuytren's contracture was reported in seven (4%) patients, and five of them had diabetes. Early stage of the disease presents itself as a small lump in the palmar surface, whereas the late stage of the disease causes severe disabling contracture. In another study of Lucas *et al.* [9], Dupuytren's disease was diagnosed in 212 (8.8%) men. Occupational exposure was associated with Dupuytren's disease with adjustment for age, leisure physical activities, alcohol consumption, history of diabetes, epilepsy, hand trauma, and familial history of Dupuytren's disease. Trojian *et al.* [10] noted that disease is common in men older than 40 years; in persons of Northern European descent; and in persons who smoke, use alcohol, or have diabetes. Patients present with a small, pitted nodule (or multiple nodules) on the palm, which slowly progresses to contracture of the fingers.

A single case of neuroma has been reported in this study, the patient was complaining of pain, and paresthesia occurs in the distribution of the median nerve. The patient was misdiagnosed as having carpal tunnel syndrome. Akambi Sanoussi and Dubert [11] showed in a survey composed of 14 patients operated owing to schwannoma that the main trunk of the median nerve was affected in four cases. A preoperative sensory deficit was present in two patients without any case of preoperative motor deficit.

Fibroma of tendon sheath was present in one case. The patient was a 34-year-old male whose tumor was at the distal phalanx, one centimeter in diameter, and painless. Franz *et al.* [12] in a study of clinical and pathological features of 138 cases of fibroma of tendon sheath reported that: the tumor predominated between the third and fifth decade of life; the youngest patient was 5 months of age, and the oldest was 70 years. The tumor was more common in males (75%) than in females; it affected chiefly the tendons and tendon sheaths of the fingers (49%), hands (21%), and wrist (12%). The main presenting symptom was an insidiously growing mass causing mild tenderness or

pain in approximately one-third of the patients. The preoperative duration of symptoms ranged from 1 week to 6 years with a median of 5 months. The tumor was generally well circumscribed and often lobulated. It measured between 1 and 2 cm in greatest diameter and in all but one case was attached to tendon and/or tendon sheath.

A dermoid cyst is a sac filled with gas, liquid, or a jelly-like material that develops on the skin of hand. The patient in this study was a 56-year-old male who complained of dermoid cyst in the volar aspect of the middle finger quite early in his age of life at 10 years, but he neglected it, so the swelling progressively increased in size. Wong *et al.* [13] noted that dermoid cyst in the hand occurs most frequently at the webs of the hand, and it presents itself at birth or later.

Pigmented villonodular synovitis of the wrist was the largest swelling in this study. It measured four by seven centimeters. It was cystic, fluctuant, with slippery edges, smooth surface, painless, with normal skin overlying. The patient neglected this swelling for 8 years; rheumatoid factor was negative. Resection was done followed by arthrodesis. Roland *et al.* [14] noted that chronic synovial inflammation induced by crystal deposits is usually associated with chronic arthritis. Synovial biopsy shows crystalline material in the synovia, associated with chronic granulomatous reaction.

Conclusion

Synovial sarcoma is the most common malignant neoplasm of somatic tissue involving the hand and feet. In the present study, a single (0.06%) patient with synovial sarcoma was included. She was a 35-year-old female who presented with mild pain and increase in size of the swelling. The tumor arose from the dorsal aspect of the hand over the second metacarpal bone. Ferrari *et al.* [15] found that incidence of synovial sarcoma in hand was the most common malignant tumor (8.5%) of the hand in a study of 271 patients complaining of soft tissue tumors of the hand. Siegel *et al.* [16] found that there may be a long delay in diagnosis or misdiagnosis, because of its insidious growth, varied presentation on imaging studies, and associated joint pain, which can be confused with trauma. On the contrary, Plate *et al.* [17] found that malignant tumors of the hand and wrist compose a wide variety of lesions. The most common of them are squamous cell carcinomas, followed in frequency by basal cell carcinomas and malignant.

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Conflicts of interest

There are no conflicts of interest.

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