fortune Journals

Research Article

JOURNAL OF ORTHOPAEDICS AND SPORTS MEDICINE

ISSN: 2688-5115

Frequency of Painful Benign Tumors of Hand: HULS Report

Sanjay Kumar Sureen[1*], Vinod Kumar Singhal[2], Faris Dawood Alaswad[3], Hasan Yousuf Bilal[4], Omer Elfaroug Amin Mohammed[4]

Abstract

Objectives: Our study was designed to evaluate the clinical features of hand tumors. We aimed to highlight the frequency of painful benign tumors of the hand.

Methodology: This retrospective study was conducted at the Department of Orthopedics in Prime Hospital, Dubai, UAE, from the year 2017 to 2020. During this timeframe, we reviewed 49 lesions of 45 patients. We classified bone lesions as the tumors located on the bones of the hand while lesions of fingers, palm, or at the back of the hand were classified as soft tissue lesions. Radiological imaging was used to measure the maximum diameter of the tumor. Continuous variables such as age and tumor size were analyzed by the receiver operative characteristics (ROV) curve. We used Fisher's exact test to measure the possibility of malignancy.

Results: We identified that 21 (46.6%) patients were less than 39 years old while 23 (51%) were aged above thirty-nine years. Overall, 49 lesions were analyzed. Out of these 49 lesions, we observed 30 (61.2%) soft tissue tumors and 19 (38.7%) bone tumors. Enchondroma was the most frequently diagnosed bone tumor, while Osteochondroma and Aneurysmal bone cysts were comparatively less diagnosed (7; 36.8% and 3; 15.7%, respectively).

Conclusion: Our results concluded that the majority of hand tumors were observed on the palm and Phalanx bone. Soft tissue tumors are more common among patients less than 39 years old than bone tumors. This tissue can cause functional impairment at a very young age and should be treated at the initial stage.

Keywords: Bony hand tumors; Soft tissue tumors; Radiological assessment; Phalanx bone; Radiological imaging

Introduction

Hands are the most sophisticated part of the human body due to their complex function and structure. Hand tumors are a more challenging disorder both in primary healthcare and specialist clinical practice [1]. The treatment of the disease affecting the hand requires knowledge, skills, and training especially for bone and soft tumors of the hand. A very few cases of hand tumors were reported in past. Despite the rare area of interest soft tissue tumors of hand occupied 15% space of all soft tissue tumors [2] while 6% bone tumors appears on the hands [3]. These tumors have the potential to cause functional impairment. In Japan total of 47,307 cases of bone tumors and 63,172 cases of soft tissue were registered between 2006 to 2017 [4,5]. Out of these, they observed that 3129 (6.6%) bone tumors and 5175 (8.2%) soft tissue tumors

Affiliation:

[1]Specialist Orthopedic Surgeon, Department of Orthopedic Surgery, Prime hospital, Dubai, UAE

[2]Consultant surgeon, Department of General Surgery, Prime hospital, Dubai, UAE

[3]Consultant General Surgeon, Department of Surgery, Gladstone Hospital, Perth, Australia

[4]Resident Specialist Surgeon, Department of General Surgery, Prime Hospital, Dubai, UAE

***Corresponding Author:**

Sanjay Kumar Sureen, Specialist Orthopedic Surgeon, Department of Orthopedic Surgery, Prime hospital, Dubai, UAE

Citation: Sanjay Kumar Sureen, Vinod Kumar Singhal, Faris Dawood Alaswad, Hasan Yousuf Bilal, Omer Elfaroug Amin Mohammed. Frequency of Painful Benign Tumors of Hand: HULS Report. Journal of Orthopedics and Sports Medicine. 7 (2025): 287-291.

Received: June 16, 2025
Accepted: June 23, 2025
Published: June 30, 2025

Sureen SK, et al., J Ortho Sports Med 2025
DOI:10.26502/josm.511500207

were appearing at hand. The diagnosis criteria and treatment of these tumors are different from other body tumors [6,7]. A recent study observed the prevalence of hand tumors in the phalanges [8]. On the other side, very limited literature has been produced regarding hand tumors. Small case series or single case reports were published which failed to reveal the comprehensive knowledge. Hence, limited knowledge leads to misdiagnoses or delayed diagnoses. Many unplanned resections can be seen due to a shortage of comprehensive knowledge. Our study was designed to evaluate the clinical features of hand tumors. We aimed to highlight the frequency of painful benign tumors of the hand.

Hands are the most sophisticated part of the human body due to their complex function and structure. Hand tumors are a more challenging disorder both in primary healthcare and specialist clinical practice [1]. The treatment of the disease affecting the hand requires knowledge, skills, and training, especially for bone and soft tumors of the hand. Very few cases of hand tumors were reported in the past. Despite the rare area of interest, soft tissue tumors of the hand occupied 15% space of all soft tissue tumors [2] while 6% of bone tumors appear on the hands [3]. These tumors have the potential to cause functional impairment. In Japan total of 47,307 cases of bone tumors and 63,172 cases of soft tissue were registered between 2006 to 2017 [4,5]. Out of these, they observed that 3129 (6.6%) bone tumors and 5175 (8.2%) soft tissue tumors appeared at hand. The diagnosis criteria and treatment of these tumors are different from other body tumors [6,7]. A recent study observed the prevalence of hand tumors in the phalanges [8]. On the other side, very limited literature has been produced regarding hand tumors. Small case series or single case reports were published which failed to reveal the comprehensive knowledge. Hence, limited knowledge leads to misdiagnoses or delayed diagnoses. Many unplanned resections can be seen due to a shortage of comprehensive knowledge. Our study was designed to evaluate the clinical features of hand tumors. We aimed to highlight the frequency of painful benign tumors of the hand.

Methodology

This retrospective study was conducted at the Department of Orthopedics in Prime Hospital, Dubai, UAE, from the year 2017 to 2020. During this timeframe, we reviewed 49 lesions of 45 patients. Surgery was indicated for the unclear diagnosed cases, pathological fracture. Patients who wished to undergo excision were also included. Cases with primary bone and soft tissue lesions were also included. However, we excluded all cases with skin tumors and infectious diseases. Reactive lesions were also excluded from this research. Data of 25 men and 20 women with a mean age of 39.6 years at the time of surgery were analyzed. We noted demographic information from electronic sources. Electronic databases including age at the time of surgery, location of the tumor, size of the tumor, major compliance, and information related to pathological diagnosis, were analyzed. We classified bone lesions as the tumors located on the bones of the hand while lesions of fingers, palm, or at the back of the hand were classified as soft tissue lesions. Radiological imaging was used to measure the maximum diameter of the tumor. MRI was used to evaluate the maximum diameter of soft tissue and bony lesions. However, some cases of bone tumors, including osteochondromas, were evaluated by X-ray and CT imaging. We excluded those cases who lost their MRI or radiological data. Moreover, cases after unplanned resection were also excluded. Informed consent was obtained from all the patients. The complete protocol of Helsinki was followed for this research.

Statistical analysis:

Continuous variables such as age and tumor size were analyzed by the receiver operative characteristics (ROV) curve. We used Fisher's exact test to measure the possibility of malignancy. SPSS version 23.0 was used for performing statistical analysis. P-value <0.05 was set for statistical significance.

Results

In this study total of 49 lesions were analyzed according to the size, location and tumor type. We identified that 21 (46.6%) patients were less than 39 years old while 23 (51%) were aged above thirty-nine years. Overall, 49 lesions were analyzed. Out of these 49 lesions we observed 30 (61.2%) soft tissue tumors and 19 (38.7%) were bone tumors. Enchondroma was the most frequently diagnosed bone tumor while Osteochondroma and Aneurysmal bone cysts were comparatively less diagnosed (7; 36.8% and 3; 15.7% respectively). On the other hand, glomus (12, 40%) was frequently observed among soft tissue tumors compared to Neuromas (9, 30%) and Neurogibroma (4, 13.3%). However, we observed 5 (16.6%) cases of Hemangioma among children aged 3-7 years old (Table 1). We observed 84% (16) cases of bone tumor at the phalanx site; however, a single case of carpal bone (5.2%) and two tumors at the metacarpal location was also observed (10.4%). The proximal phalanx bone of the ring finger was a highly affected site of bone tumors, followed by the little finger (Table 2). Pain was the most common complaint, and approximately one-third of the cases had pathological fractures. On the other side, we observed that the palm (46.6% 14/30) was the more vulnerable site for soft tumors as compared to the dorsal part of the hand (33.3% 10/30). Furthermore, 4 (13.3%) cases of soft tumors were also seen on fingers and two lesions were reported on both the dorsal and palm sites of the patient (Table 3). Painless mass was the major complaint of soft tissue tumors. The mean maximal diameter of benign tumors was reported as 17.8 mm. However, the cut-off points between soft and bone

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DOI:10.26502/josm.511500207

tumors were observed as 9 mm by using the ROC curve. We observed a significant association between age (p = 0.014) and maximal size of the tumor (p = 0.031) with tumor type. (Table 4).

Table 1: Clinical findings of hand tumors.

Variables	Frequency (N%)
Bone tumors	19 (38.7%)
Enchondroma	9 (56.2%)
Osteochondroma	7 (36.8%)
Aneurysmal bone cysts	3 (15.7%)
Soft tissue tumors	30 (61.2%)
Glomus	12 (40%)
Neuromas	9 (30%)
Neurogibroma	4 (13.3%)
Hemangioma	5 (16.6%)

Table 2: Location of bone tumors.

Bone tumor location	Frequency
Phalanx bone	16 (84%)
Distal phalanx	2 (12.5%)
Thumb	0 (0%)
Index finger	0 (0%)
Middle finger	0 (0%)
Ring finger	2 (100%)
Little finger	0 (0%)
Middle phalanx	3 (18.75%)
Thumb	0 (0%)
Index finger	0 (0%)
Middle finger	0 (0%)
Ring finger	2 (66.6%)
Little finger	1 (33.3%)
Prox phalanx	11 (68.75%)
Thumb	1 (9.09%)
Index finger	1 (9.09%)
Middle finger	2 (18%)
Ring finger	5 (45.5%)
Little finger	2 (18%)
Carpal bone	1 (5.2%)
Metacarpal bone	2 (10.5%)
1st	0 (0%)
2nd	1 (50%)
3rd	1 (50%)
4th	0 (0%)
5th	0 (0%)

Table 3: Location of soft tumors (n= 30).

Soft tumor location	Frequency
Palm	14 (46.6%)
Dorsal part of hand	10 (33.3%)
Both dorsal and palm	2 (6.6%)
Fingers	4 (13.3%)

Table 4: Fisher exact test for soft tissue tumors and bone tumors.

Variables	Benign soft tissue tumors	Benign bone tumors	p- value
Age			
≤ 39 years	19	3	0.014
> 39 years	9	14	
Maximal diameter			
≤ 9 mm	28	18	0.031
> 9 mm	2	1	

Discussion

In this study, we revealed clinical characteristics of hand tumors, including benign tumors undergoing surgery. Very few studies are available related to malignant tumors while very few comprehensive researches have been produced in the past for benign hand tumors. Recently Japanese reported 6.6% of bone lesions of the hand while they accounted for 8.2% of soft tissue lesions in their research [4,5]. The textbook of Dahlin's Bone tumors reported 290 cases of hand bone tumors out of 9973 cases. Overall, they reported 2.9% cases of bony hand tumors [9]. Meanwhile, the study of Sherman [10] and Nepal et al. [11] reported 15% soft tissue tumors of the hand. However, variations had been observed regarding the prevalence of hand tumors due to less availability of epidemiological analysis of bone and soft tissue tumors. We observed a high frequency of enchondroma in bone tumors however, glomus was most frequently diagnosed in soft tissue hand tumors. These results are compatible with the many previous studies which diagnose the high prevalence of enchondroma [4-7]. Meanwhile, our results related to soft tissue tumors are in contradiction of past studies which observed a high prevalence of tenosynovial giant cell tumors [12-14]. One of the Japanese study [4], along with the study of Athanasian et al. [13], reported malignant bone tumours of the hand, including osteosarcoma and Ewing sarcoma, while another Japanese [5] study, along with the study of Sobanko [7] reported malignant soft tissue hand tumours. However, we did not observe any single case of malignant tumors. Furthermore, we study the chief complaint of hand tumors. We observed that the majority of the cases of bone lesions reported pain due to pathological or impending fractures. However, pain with mass was highly reported in soft tissue tumors. These were the initial typical symptoms of bone and

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DOI:10.26502/josm.511500207

soft tissue tumors. A previous study by Campbell et al. [15] reported pain with swelling, pain alone, or fractures as the initial symptoms of benign and malignant tumors of the hand. We observed that majority of the tumors developed in the proximal phalanges. Only a single case of carpal bones was observed in our report. This result is similar to the previous research, which diagnosed very few cases of carpal bones and called it rare [8,15]. On the other hand, the palm was the most common location of soft benign tumors than the dorsal side of the hand. Two observant cases of malignant tumors were withdrawn after the unplanned resection. These cases were initially diagnosed as enchondroma. However, the therapeutic outcomes of these two cases were similar to the previous studies [16,17]. A study by Bray et al. [18] revealed limb salvation surgery as an effective alternative to amputations. On the contrary, the studies of Puhaindran et al. [19,20] suggested single-ray amputation for malignant tumors. The older age population is more vulnerable to malignant tumors however, both cases of malignant tumors older than 35 years old vary from different studies [21-24]. The overall mean size of tumors was 17.5. The cut-off point of tumor size was noted as 9mm between soft and bone lesions. Researchers observed that 30% of hemangiomas are present at birth. In our study, we observed a total of 5 cases of hemangiomas in patients aged 3-7 years old. No signs of involution were observed in these cases. A study by Smolinski et al. [25] revealed that 50% of hemangiomas involute at the age of 5 while 70% involute after the age of 7.

Conclusion

Our results concluded that the majority of hand tumors were observed on the palm and Phalanx bone. Soft tissue tumors are more common among patients less than 39 years old than bone tumors. This tissue can cause functional impairment at a very young age and should be treated at the initial stage.

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