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THE SPECTRUM OF SOFT TISSUE TUMOURS OF THE HAND-A RETROSPECTIVE ANALYSIS

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INTRODUCTION

Soft tissue tumours of the hand constitute a diverse and complex group of lesions arising from various soft tissue structures including the skin, subcutaneous tissue, muscles, tendons, ligaments, and neurovascular elements. These tumours may be benign or malignant and often present a diagnostic and therapeutic challenge due to the intricate anatomy and vital functional role of the hand. Early and accurate diagnosis is crucial for optimal management and preservation of hand function.

This retrospective study aims to evaluate the clinical presentation, tumour types, diagnostic modalities, and treatment outcomes in patients with soft tissue tumours of the hand.

OBJECTIVES

- To describe the clinical presentation of soft tissue tumours of the hand.
- To categorize tumour types based on histopathological diagnosis.
- To assess the diagnostic modalities employed, including imaging and histopathology.
- To identify common diagnostic challenges and patterns of presentation.

MATERIALS AND METHODS

Study Design
Retrospective observational study

Study Duration
January 2022 to January 2025

Study Setting
Institute for Research and Rehabilitation of Hand & Department of Plastic Surgery, Government Stanley Medical College, Chennai, India

Inclusion Criteria

- Patients of all age groups (excluding paediatric patients) and all genders.
- Tumours located distal to the carpal bones (i.e., involving the hand proper).
- Histopathologically confirmed soft tissue tumours of the hand.
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Exclusion Criteria

- Osseous (bone) tumours.
- Recurrent tumours following previous treatment.
- Incomplete or inadequate documentation.

Ethical Considerations
As this study is based on retrospective chart review, individual patient consent was not obtained. Patient anonymity and confidentiality were strictly maintained. Institutional approval was obtained prior to data collection.

Data Collection
The following data were retrieved from patient records:

- Demographics (age, sex)
- Presenting symptoms and duration
- Tumour location and size
- Imaging modalities used (ultrasound, X-ray, MRI)
- FNAC or biopsy reports
- Histopathological diagnosis
- Treatment modality and follow-up outcomes (where available)

Statistical Analysis
All statistical analyses were performed using GraphPad Prism software. Descriptive statistics were used to analyze demographic and clinical data.

RESULTS

A total of 75 patients with soft tissue tumours of the hand were included in this study. The age range was 10–75 years, with a mean age of 42 years.

Gender distribution was as follows: 42 males (55%) and 33 females (45%).(Table 1)

The most common presenting symptom was painless swelling, seen in 64 patients (85%), followed by pain in 7 patients (10%) and neurological symptoms in 4 patients (5%).(Table 2)

Tumour location was most frequently the volar aspect of the fingers (45%), followed by the dorsum of the hand (25%), palm (20%)(figure 1), and wrist (10%).(Table 3)

Histopathological diagnosis revealed the following distribution:(Table 4)

- Ganglion cyst – 23 cases (30%)(figure 2)
- Giant cell tumour of tendon sheath – 19 cases (25%)(figure3)
- Lipoma – 10 cases (15%)(figure 1,5)
- Hemangioma – 7 cases (10%)
- Epidermal inclusion cyst – 6 cases (8%)

- Schwannoma/Neurofibroma – 5 cases (6%)
- Vascular malformations – 5 cases (6%)(figure 6)

Imaging modalities used included:

- Ultrasound – 70% of patients
- MRI – 40% of patients
- X-ray – 30% of patients

All tumours were histopathologically confirmed by either excisional or incisional biopsy. Diagnostic accuracy was 80% for clinical examination and 90% when aided by imaging modalities.

Factors contributing to diagnostic delay included:

- Deep-seated tumours
- Small-sized lesions
- Atypical, painless presentations

Decreased range of motion was noted in 40.5% of cases. Giant cell tumour of tendon sheath (GCTTS) showed the highest recurrence rate (3 out of 19 cases; 20%).(Figure 7)

Figure 1

A case of 17/m with lipoma of left palm

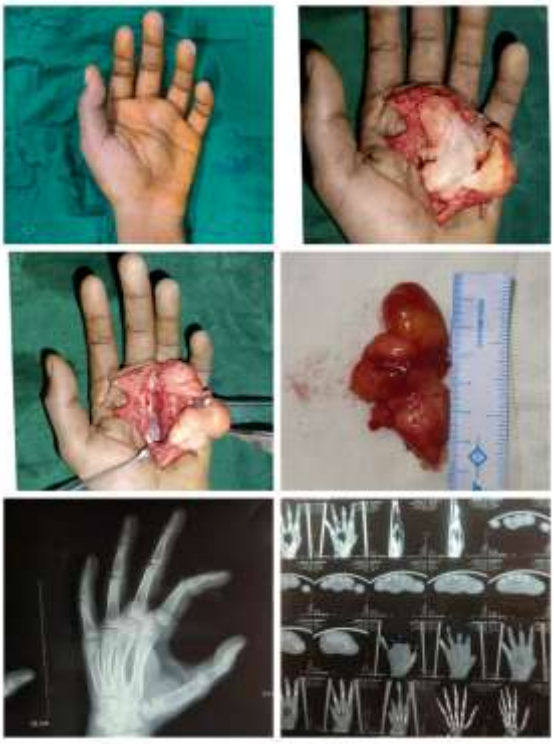

Figure 2

A case of 20/m,with Dorsal wrist-Ganglion

Figure 3

A case of 25/male with Giant cell tumour of thumb

Figure 4

Glomus tumour of Left thumb

Figure 5

A case of lipoma- Dorsum of hand

Figure 6

A cases of 58 yr old male with Hemangioma

Figure 7

A case of Recurrent Giant cell tumour- Right little finger

Gender distribution (Table 1)

Gender	No of people(in percentage)
Male	42(55%)

Female	33(45%)

Common symptoms(Table 2)

Symptoms	No of pts affected(in percentage)
Painless swelling	64 (85%)
Pain	07 (10%)
Neurological symptoms	04(5%)

Common Tumour Locations(Table 3)

Volar aspect of fingers	34(45%)
Dorsum of Hand	18(25%)
Palm	15(20%)
Wrist	08(10%)

Types of tumours (Table 4)

Tumour types	no. Of Patients(in percentage%)
Ganglion cyst	23 (30%)
Giant cell tumors	19 (25%)
Lipoma	10 (15%)
Hemangioma	07 (10%)
Epidermal cyst	06 (8 %)
Schwanoma/Neurofibroma	05 (6%)
Vascular malformations	05 (6%)

DISCUSSION

In our cohort of 75 patients, the predominant presentation (≈85%) was a painless swelling, aligning with global trends in benign hand tumours such as ganglion cysts and giant cell tumour of tendon sheath (GCTTS) [1, 2]. This finding is consistent with Pinar et al. and Koh et al., who noted that the majority of hand soft tissue lesions present without pain [3, 4].

Ganglion Cysts
Ganglion cysts accounted for 30% of cases in our study, making them the most common

lesion. This observation is corroborated by previous series reporting ganglia as the most prevalent soft-tissue mass in the hand and wrist, with a frequency of 30–35% [5, 6]. While these cysts are most commonly found on the dorsal wrist, our study revealed a 45% occurrence on the volar aspect of the fingers, possibly reflecting population-specific occupational or repetitive hand use [7].

Giant Cell Tumour of Tendon Sheath (GCTTS)

GCTTS comprised 25% of our sample and demonstrated a recurrence rate of 20%, even after complete excision. Literature cites recurrence rates ranging from 2.4% to 45%, attributed to incomplete excision or unrecognized satellite nodules [8, 9]. Histologically, GCTTS consists of multinucleated giant cells, mononuclear cells, and hemosiderin deposits [10]. MRI has proven useful in delineating tumour margins, particularly for deep or adherent lesions, and may help reduce recurrence by enabling complete excision [11].

Lipomas, Hemangiomas, Schwannomas, and Epidermal Inclusion Cysts

Lipomas (15%) and hemangiomas (10%) were also common and typically presented as asymptomatic masses, consistent with previous findings [7, 4]. Schwannomas and neurofibromas, though less frequent (6%), should be considered when patients report neurological symptoms. These findings are supported by series emphasizing the inclusion of nerve sheath tumours in the differential diagnosis of neurogenic hand swellings [12]. Epidermal inclusion cysts (8%) are frequently linked to previous penetrating trauma, often affecting the palm or fingertips [13, 20].

Rare and Malignant Lesions

Though not observed in our study, rare tumours such as glomus tumours and soft tissue sarcomas must remain in the differential, particularly for painful or atypical presentations. Glomus tumours(figure 4) represent <2% of hand masses and are typically associated with cold sensitivity and subungual location [14, 15]. Malignancies such as epithelioid sarcoma and synovial sarcoma, though rare, have been reported in the distal extremities, warranting a high index of suspicion for rapidly enlarging or deep-seated masses [1, 12].

Imaging and Diagnostic Approach

Ultrasound was used in 70% of patients and effectively differentiated cystic from solid lesions, consistent with other studies highlighting its value as a first-line imaging tool [11]. MRI was used in 40% of cases, particularly when deeper or complex lesions were suspected. Clinical examination alone yielded an 80% diagnostic accuracy, which increased to 90% with the use of imaging, reinforcing the role of adjunct imaging for better diagnostic precision [7, 10].

Diagnostic Delay and Follow-Up

Factors contributing to diagnostic delays included deep lesion location, small lesion size, and absence of pain. These challenges have been previously reported as barriers to early diagnosis in soft tissue hand tumours [7, 12]. Recurrence was most commonly associated

with GCTTS in our cohort, necessitating vigilant long-term follow-up. However, due to the retrospective design, variations in follow-up duration may have led to underestimation of actual recurrence rates, a limitation also noted by similar studies [3, 4].

Comparison with Major Series

Study	Patients (Soft Tissue)	Most Common Tumours	GCTTS Recurrence Rate	Malignant Proportion
This Study (India)	75	Ganglion, GCTTS	20%	None
Pinar et al. (2021) [3]	361	Ganglion	Variable	~1.6%
Koh et al. (2018) [4]	98 (of 186 total)	GCTTS, Chondroma	Not stated	~16% (mixed)

Strengths and Limitations

The strengths of this study include histopathological confirmation in all cases and a comprehensive clinical dataset. However, limitations include its retrospective nature, modest sample size, and incomplete follow-up in some patients. These factors may have influenced recurrence rate estimation and long-term outcome assessment. Similar limitations are recognized in other large reviews of hand tumour cases [3, 4].

Recommendations for Clinical Practice

- Employ ultrasonography as the initial imaging modality for all hand masses [11].
- Reserve MRI for deeper, recurrent, or atypical lesions for improved soft tissue contrast and delineation [11].
- In GCTTS, perform complete excision including tendon sheath to reduce recurrence [8, 9].
- Ensure regular post-operative surveillance, especially in cases with incomplete excision or GCTTS.

- Maintain a high index of suspicion for malignancy in lesions that are larger than 2 cm, rapidly growing, or exhibit unusual imaging characteristics [1, 12].
- Include rare tumours such as glomus or epithelioid sarcoma in differential diagnoses for persistent or intensely painful lesions [14, 15].

CONCLUSION

This study highlights the spectrum of clinical presentations of soft tissue tumours of the hand. The most common presentation was a painless swelling, and the most frequent tumour was the ganglion cyst.

Accurate diagnosis was achieved through a combination of clinical evaluation, imaging studies, and histopathology. Surgical excision remained the mainstay of treatment. Given the relatively high recurrence of certain tumours such as GCTTS, close follow-up is recommended.

Awareness of tumour types, locations, and recurrence risks can aid clinicians in optimizing treatment planning and improving patient outcomes.

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