

Solitary Glomus Tumor on the Base of the Right Thumb: A Rare Case Report and a Literature Review from Saudi Arabia

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Abstract: A glomus tumor (GT) is a rare and usually benign tumor that originates from the glomus body, which is involved in thermoregulation in the skin. Solitary or multiple, digital or extra-digital, these cutaneous tumors can be benign or malignant. This report describes the diagnosis and surgical management of a solitary glomus tumor at the base of the right thumb in a young Sudanese woman. The diagnosis of glomus tumor was confirmed by medical history, sonographic findings and histopathological report. The lesion was excised via direct complete excision under local anesthesia, resulting in a complete resolution of symptoms. Owing to its high sensitivity level, the use of ultrasound is appropriate to evaluate a lesion suspected to be a glomus tumor. A clinician needs to take into consideration the likelihood of glomus tumors when assessing a patient who has a skin lesion on fingers, toes, or extra-digital area, with pain triggered by temperature changes, pressure, or touch. Additionally, this report includes a review of recent globally reported cases of glomus tumor in the hand to highlight the distinctiveness of this report in context to its atypical location in the area of the thenar eminence and underscoring it as a unique report of its kind from Saudi Arabia.

Keywords: glomus, digital, extra digital, hand, thumb, solitary, benign

Introduction

Glomus tumor usually appears as a painful dermal lesion consisting of glomus cells.¹ The most common occurrence is underneath the nail plate which is termed a subungual glomus tumor (SGT).² A glomus tumor may, however, also develop at other sites; in these cases, it is called a glomus extra-digital tumor (GET). Most often, extra-digital glomus tumors present as painful nodules on the arms, legs, trunk, head or any internal organs.³

The absence of the typical GT-related cold sensitivity along with atypical location of the lesion can often delay its diagnosis.^{4,5} Though most glomus tumors are benign, malignant ones can typically measure over 2 centimeters and affect the visceral organs.^{6,7} Female patients are more likely to have glomus tumors,⁸ while there is no established gender predisposition for these tumors.^{9,10} Considering the limited effectiveness of anti-inflammatory drugs,¹¹ a full excision of the lesion is the only option to relieve pain. As a bloody field may prevent complete excision and lead to recurrence,¹² tumor removal is performed in a bloodless field under loupe magnification, with tourniquet application.^{13,14}

Other painful tumors such as neuroma, leiomyoma, hemangioma, and conditions such as gouty arthritis should be considered as a part of a differential diagnosis while assessing solitary glomus tumors.¹⁵ A neuroma may produce similar pain symptoms and have a trigger zone, but it will not exhibit hypersensitivity to cold.¹⁶ On the other hand, melanoma would not cause pain and would be visible beneath the skin.¹⁷ It is crucial to carefully distinguish multiple glomus tumors, which may be painless, from cavernous hemangioma¹⁸ and blue rubber nevus syndrome.¹⁹ Both ultrasound and magnetic resonance imaging (MRI) have a comparably high sensitivity and are preferred in confirming the tumor diagnosis of a skin lesion. With established high sensitivity level, ultrasound modality can be an economic and time-saving alternative for the patients. Although the diagnosis of a glomus tumor can be suspected based on clinical features

and radiographic examination, a microscopic evaluation of the lesion is required to establish the diagnosis.²⁰ Due to the uncertain nature of the clinical presentations and unusual anatomical locations, it is very important to report any atypical cases of GT to support earlier diagnosis and thus effective relief of symptoms. The current case report is elaborated and reported in this study with this purpose.

Case Presentation

A 36-year-old woman presented herself for evaluation of a tender area beneath the skin on the base of her right thumb that had been symptomatic for about 6 months. The patient did not recall any history of trauma to the site of lesion. Upon cold exposure, the lesion was very painful with worsening pain and tenderness.

Investigations

On physical examination, the right thumb of the patient showed a 3 millimeter raised erythematous patch surrounded by a flat-topped papule with diameter of 2 millimeters that had a slight central depression (Figure 1a). Standard clinical tests were applied which consisted of the Love's test, Hildreth test and a cold sensitivity test.¹² Love's test showed an amplified pain with an application of pressure on the location. Hildreth test was deemed positive as there was reduction in tenderness in the area of the lesion when the area was exsanguinated. Cold sensitivity test was positive as the area

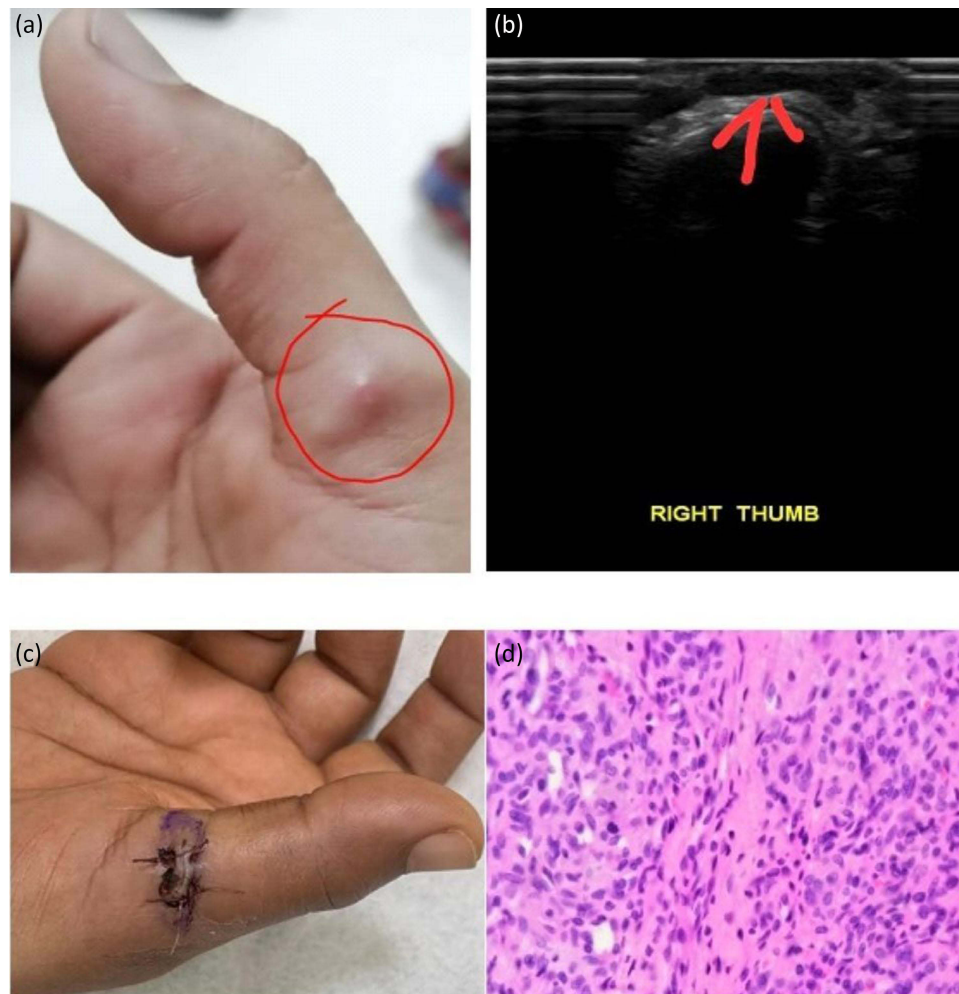


Figure 1 (a) Preoperative clinical pictures showing a soft nodule suggestive of glomus tumor. (b) Ultrasound images showing a raised size of 1.3×0.7 × 0.5 cm on the base of right thumb. (c) Postoperative image showing direct complete excision approach. (d) Histopathological images showing round to ovoid glomus cells with interspersed fibroblast, delicate vasculature and myxoid stroma. No evidence of necrosis, mycosis and atypia was seen.

elicited pain on exposure to cold water. Ultrasound imaging revealed a small nodule beneath the skin which was well defined and hypoechoic along with a prominent vascularity. This was an important finding which was consistent with the glomus tumor diagnosis in this case (Figure 1b).

The tissue specimen from the lesion site on microscopic examination showed large nodular clusters of benign cells in the dermis along with compact hyperkeratosis and mild acanthosis that correlated with the typical thickness of the skin at this location (Figure 1d). The basophilic tumor appeared as solid sheets of uniform-appearing glomus cells with sparse smooth muscle and thus identifying it as glomus tumor, classified as the solid type.

Differential Diagnosis

A mucous cyst or a foreign body presence, along with other possible hand tumors were included among the preliminary considerations in the clinical differential diagnosis. Correlated with the patient's symptoms, ultrasound findings and the lesion morphology, a diagnosis of a glomus tumor was established.

Treatment and Follow Up

A direct complete excisional biopsy under local anesthesia was performed using a 4-millimeter elliptical excisional biopsy tool and the wound was closed with 4-0 absorbable braided sutures (Figure 1c). The histopathological images (Figure 1d) showed round to ovoid glomus cells scattered with fibroblast, myxoid stroma with fine vasculature, with no evidence of necrosis, mycosis, and atypia.

Sutures were removed after 2 weeks of the biopsy and the biopsy site had completely healed on examination. No pain was reported at the site of lesion at the 2 weeks follow-up visit. On telephonic follow up during the subsequent 12 months, there was no report of any recurrence of symptoms.

Discussion

An updated prevalence and incidence context is provided here by a comprehensive literature review from a PubMed search of case reports/series from 2019–2023 on glomus tumor on hand among adult patients. Studies report that the incidence of subungual glomus tumor is about 1–6% of all soft tissue tumors in the upper limb, with hand accounting for about 50–75%.²¹ To provide the context of the current case report, this review focused on glomus tumor of the hand, though it can occur on various locations in the human body.²²

An electronic literature search was undertaken with key words such as “glomangioma”, “glomus tumor”, “Saudi Arabia”, “glomangiomyoma”, and “case”. A total of 101 patients were identified from 2019 to January 2024. Tumor topography across the literature included is described in Table 1 and the patient/sample demographics and characteristics are described in Table 2.

A total of 101 patients with glomus tumor in the hand were assessed in the literature review included in this case report. As observed from the literature reviewed, GT on the subungual region was the most widely reported with 98 (97.03%), while the digital pulp GTs were 9 (8.91%) and GTs on other parts of the hand were only 7 (6.93%). On assessing the presentation of the size of the GTs reported, tumors smaller than 5 mm were reported among 16 (32.0%) patients and tumors ranging between 5 mm to 1 cm in 29 (58.0%), while 5 (10.0%) had tumor size reports between 1–2 cm. Within the sample from the included literature, there were 4 reports (3.96%) of recurrence of the tumor.

Female gender was the most predominant of all the cases as seen from Table 2. No statistical correlation with the recurrences of the tumor could be derived from the variables such as gender and age reported across the literature, which

Table 1 Tumor Topography from the Reviewed Literature

	Right Side	Left Side	Thumb	Index Finger	Middle Finger	Ring Finger	Little Finger
n	42	40	25	12	22	10	13
%	51.22%	48.78%	30.49%	14.63%	26.83%	12.20%	15.85%

Table 2 Patient Demography and Tumor Variables from the Reviewed Literature

Gender			p-value
Female	73	72.28%	0.1
Male	28	27.72%	
Tumor location			
Subungual	98	97.03%	0.6
Digital pulp	9	8.91%	
Extra digital (Hand/ Base of finger)	7	6.93%	
Histopathological size			
< 5 mm	50 (63.41%)		1.0
Above 1 cm	32 (39.02%)		

is observable from Table 2. As ethnicity cannot be considered as a variable for correlation just based on the region of reporting and publishing, it was not practical to report a reliable conclusion on the ethnic presentation of this case. However it can be mentioned 85.14% (86) of all the cases were reported from India, Pakistan and Bangladesh. It is recommended to undertake future cross-sectional studies examining the association between ethnicity and the incidence of GT to provide clinically relevant insights about this condition. Table 2 is descriptive of the statistical correlation analysis of these observations. The information from the case reports (Table 3) and case series (Table 4) reviewed are described in Table 1 which illustrates the rarity of the anatomical location of the present case.

Though the first clinical description of a glomus tumor was reported in 1812 by Wood, as a painful subcutaneous tubercle,⁴⁰ the histopathological features of the glomus tumor and its emergence from the glomus body were not described until 1924 by Barre and Masson.⁴¹ There is no clear understanding of the factors influencing the pathogenesis of glomus tumors and their etiology, including age at onset, gender, family predisposition, and history of trauma to the site.⁴² Most cases of delayed diagnosis of GT, which could be between 3–15 years,^{43–45} were due to a lack of awareness about the disease among the general practitioners who usually receive the patients initially, its anatomical presentation and visibility. Most cases go undiagnosed or misdiagnosed for a long period, even with the typical clinical symptoms of pain, pinpoint tenderness, and cold sensitiveness.^{46,47}

It was deemed necessary to report this case, particularly in light of its rarely reported anatomical location (the base of the thumb) and geographical location (Saudi Arabia). An emphasis on the importance in the early diagnosis and management of such cases and the necessity of vigilance in monitoring painful skin lesions is underscored here. There is a need for further investigation of the pathogenesis of this tumor formation and reoccurrence in light of this case report. Ultimately, this case report provides valuable information to the medical community, highlighting the need for continuous research on differential diagnosis and the right diagnostic protocols to follow. A review of previous publications indicates that this is the first case of glomus tumor of the thumb reported from Saudi Arabia.

Conclusion

The present study is a case history with a comprehensive literature review, which points to the disadvantage of proposing causal hypotheses based on the results. It is noted in this study that future research should be designed to appraise genetic factors, bone and tendon involvement, and histological features of hand tumors with an objective to understand and identify possible predictors of reoccurrence of these tumors.

Though MRI is an extremely important tool to help in the diagnosis of glomus tumors,^{48,49} ultrasound is also deemed efficient enough to confirm the diagnosis as the tumor can be seen as well-defined small hypoechoic nodule/s beneath the

Table 3 Literature Review Summary from Case Reports of Glomus Tumors on Hand

Study	Patient/Sample Characteristics				Location of the Lesion	History of Pain (Approximate)	Size of Lesion (mm)	Physical and Diagnostic Tests	Diagnosis	Follow Up Details		Country
	Size	Gender	Age	Ethnicity						Period	Remarks	
Rahbari ²³ et al 2019	I	M	49	Iranian	Tip of right thumb	3 years + trauma	30 (diameter)	HRMRI X-ray + Histopathology	GT of uncertain malignant potential	1 year	Recovered completely No recurrence	Iran
Ardeleanu ²⁴ et al 2019	I	M	63	Romanian	Right Radio carpal joint	15 years + history of trauma	114x 18.6 x 18	US, MRI, Doppler + Histopathology	Reoccurred GT	2 weeks	Complete resolution of symptoms	Romania
Bordianu ²⁵ et al 2019	I	F	33	Romanian	Distal phalanx of left thumb	8 years	3 diameter)	MRI + Histopathology	Classic GT	2 weeks	Immediate pain relief.	Romania
Rashid ²⁶ et al 2021	I	F	54	Indian	Adjacent tip of the right index and ring fingers	1 year	6 each (diameter)	Love's test MRI	GT	6 months	Complete resolution of symptoms	India
Saba ²⁷ et al 2021	I	F	30	NA	Tip of right thumb	15 years with history of trauma	3 x 4	MRI + Histopathology	GT	2 weeks	Complete recovery	USA
Kumar ²⁸ et al 2021	I	F	35	Indian	Pulp of distal phalanx of right middle finger.	2 years	NA	Love's test, Hildreth test, Cold sensitivity test, CT scan HRMRI	GT	1 year	Recovered completely No recurrence	India
Mortada ²⁹ et al 2022	I	M	27	Middle eastern	Ulnar aspect of the pulp of the right little finger	10 years	2 (diameter)	Love's test MRI	GT	6 months	Complete recovery	Saudi Arabia
Patel ³⁰ et al 2022	I	M	39	Indian	Distal phalanx of left middle finger		10 x 10	X-ray, MRI + Histopathology	Reoccurred GT	2 weeks	Complete recovery	India
Rahman ³¹ et al 2022	I	M	59	Bangladeshi	Palmer surface of distal phalanx of right little finger	2 years	8 x 4	MRI + Histopathology	GT	1 month	Complete recovery	Bangladesh

(Continued)

Table 3 (Continued).

Study	Patient/Sample Characteristics				Location of the Lesion	History of Pain (Approximate)	Size of Lesion (mm)	Physical and Diagnostic Tests	Diagnosis	Follow Up Details		Country
	Size	Gender	Age	Ethnicity						Period	Remarks	
Dhingra ³² et al 2022	4	F	27	Indian	Nail bed of right thumb	2 years	2 x 2	X-ray, MRI + Histopathology	GT	2 months	Recovered completely No recurrence	India
		F	37		Nail bed of right thumb	2 years	6x 4		GT	4 months		
		M	43		Nail bed of left middle finger	7–8 years	NA		GT	10 months		
		F	50	Nail bed of left ring finger	10 years	6 (diameter)	GT		8 months			
Kamble ³³ et al 2023	5	F	30	Indian	Tip of right index finger	6months	2 x 4x5	X-ray, MRI + Histopathology	GT	6 months	Recovered completely	India
		F	35		Tip of left ring finger	8 months	5 x 4x3		GT	1 year		
		F	45		Nail bed of right middle finger	3 months	10 x 10		Reoccurred GT	NA		
		F	42		Nail bed of right thumb	NA	NA		GT	3 weeks		
		M	44		Left little finger	NA	1 x 2 x 2.5		GT	6 weeks		
Abidin ³⁴ et al 2023	1	F	35	Indonesian	Tip of left middle finger	6 years	4.33 x 9 x 5.6	Love's test, Hildreth test, cold, sensitivity test, MRI.	Subungual GT	NA	Complete recovery	Indonesia
Cohen ³⁵ et al 2023	1	F	59	Vietnamese	Distal right wrist	Few months	5 x 2	Love's test, Hildreth test, cold, sensitivity test, MRI.	GT	20 weeks	Complete recovery and no recurrence	USA
Present case	1	F	36	Sudanese	Thenar aspect of the right thumb	6 months	13 x 7 x 5	Love's test, Hildreth test, Cold sensitivity test, Ultrasound.	GT			Saudi Arabia

Abbreviations: GT, Glomus tumor; MRI, Magnetic resonance Imaging; US, Ultrasound.

Table 4 Literature Review Summary from Case Series and Retrospective Studies of Glomus Tumors on Hand

Study	Patient/Sample Characteristics				Location of the Lesion	History of Pain Range	Size of Lesion (Range -mm)	Physical and Diagnostic Tests	Diagnosis	Follow Up Details		Country
	Size	Gender	Age Range	Ethnicity						Period	Remarks	
Santhoshi ³⁶ et al 2019	37	21- F, 16- M	16–55	Indian	Right(16) Left(21) Thumb(8), Index(5) middle(5), ring(14), little(5)	2 years to 12 years	2 to 10	Love's test, Hildreth test, Cold sensitivity test, MRI.	GT	6months to 4 years	No reoccurrence and complete recovery	India
Saaqi ³⁷ et al 2021	17	12-F, 5-M	13–41	Pakistani	Right(111) Left(6) Thumb(2), Index(6) middle(1), ring(14), little(4)	9 months to 2 years	2 to 11	Love's test, Hildreth test, Cold sensitivity test, MRI.	14- Subungual DT, 3- Volar pulp GT	2 to 4 weeks	Complete recovery	Pakistan
Partea ³⁸ et al 2021	7	F		Romanian	Right(n=5) Left (n=2) Thumb(1), Index(2), ring(1), little(1)	1 to 7 years	6 to 02	Love's test, Hildreth test, cold, sensitivity test, US	GT	2 years	No reoccurrence and complete recovery	Romania
Nikhil ³⁹ et al 2022	30	73-F 28-M	21–62	Indian	26-Finger 22-Subungual 4-volar digital aspect of distal phalanx 4-extra digital	1 to 2 years	8 to 2.5	Love's test, Hildreth test, cold, sensitivity test, US, MRI	GT	2 years	2 cases has reoccurrence of the tumor and the rest has complete recovery	India

Abbreviations: GT, Glomus tumor; MRI, Magnetic resonance Imaging; SGT, subungual glomus tumors; US, Ultrasound.

affected area.^{50–52} This present case was early and easily diagnosed with confirmation as glomus tumor from the initial ultrasound scan itself. The direct complete excision offered a greater chance of a cure and thus a better functional outcome.^{53,54}

Documenting occurrence of glomus tumor cases in unusual locations in the literature raises awareness of this condition and reduces the time needed for diagnosis, which could be very long and contribute to severe morbidity to the patient. In order to completely remove glomus tumors and prevent recurrence, accurate preoperative localization is essential.

Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board of the College of Medicine, Imam Mohammed Ibn Saud Islamic University (RC12.12.12) in human studies.

Informed Consent Statement

Informed consent was obtained from all the subjects involved in the study. It is confirmed that the patient's informed consent for the case details to be published including the publication of the images has been obtained.

Data Sharing Statement

All data underlying the results are available as part of the article and no additional source data are required.

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Disclosure

The author declares no conflicts of interest in this work.

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