



## Case report

## Diagnosis of glomus tumor of the elbow: A case report

Bader AlNuaim<sup>a</sup>, Najd Binsulaiman<sup>b,\*</sup>, Albatoul Alkohlani<sup>b</sup>, Abdullah Al-Ghannam<sup>c</sup>,  
Zaid AlMohsen<sup>d</sup>, Maad Al-Saati<sup>a</sup>

<sup>a</sup> Section of Orthopaedic Surgery, Department of Surgery, King Abdullah Bin Abdulaziz University Hospital (KAAUH), Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia

<sup>b</sup> College of Medicine, Alfaisal University, Riyadh, Saudi Arabia

<sup>c</sup> Lifestyle and Health Sciences Research Center, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia

<sup>d</sup> Section of Dermatology, Department of Medicine, Unaizah College of Medicine, Qassim University, Qassim, Saudi Arabia

## ARTICLE INFO

## Keywords:

Case report  
glomus tumor  
glomus body  
Extradigital  
Elbow

## ABSTRACT

**Introduction:** Glomus tumors are rare and often benign vascular lesions that present classically in the subungual region of the hand. Nonetheless, presentations in atypical sites have been reported over the years. However, the classic symptoms of typical glomus tumors are often absent in tumors of atypical sites.

**Case presentation:** We present a case of an extradigital glomus tumor with a 3-year history of pain in the lateral aspect of the elbow.

**Discussion:** The case we present took three years and multiple visits to different clinics and specialties to reach the final diagnosis and management. It often takes longer to diagnose Glomus tumors of atypical sites and presentations. The causes could be related to the rare incidence, the atypical presentation in site and symptoms, or the diagnostic methods.

**Conclusion:** This case report discusses the possible causes behind the diagnostic delay in extradigital glomus tumors, aiming to raise clinical awareness among primary health care physicians.

## 1. Introduction

Glomus tumors are rare, benign, vascular neoplasms of the glomus body commonly found in the subungual region of the hand [1]. Glomus bodies are considered specialized variants of arteriovenous anastomosis generally found in the reticular dermis; they contain glomus cells that carry some properties of smooth muscles wherein they contract in response to temperature, and in normal conditions, result in the regulation of blood to the skin [2]. The focal concentration of glomus bodies is in the hands (digits and palms) and soles of the feet [3], which explains the typical incidence of the tumor in the subungual region, although reports of extradigital and atypical presentations do arise.

A classic triad of symptoms has been identified in glomus tumors, but reports of said clinical symptoms in extradigital tumors, apart from pain, are seldom described [2]. C. Macharia and P. Nthumba referred to glomus tumors as “a diagnostic dilemma” because although surgical excision is considered curative for these tumors, it takes years of consultations and investigations to perform a biopsy or reach a proper diagnosis [4].

Following the SCARE guidelines [5], we present a case of an extradigital glomus tumor of the elbow, aiming to raise the index of suspicion of glomus tumors as a differential in the diagnosis of elbow pain and other atypical sites for symptoms, and discuss the possible explanations behind the recurring delay in diagnosis.

## 2. Case presentation

A 43-year-old-male smoker, known to have diabetes mellitus, hypertension, dyslipidemia, and asthma, presented to the orthopedic clinic with a 3-year history of intermittent pain on the posterior lateral aspect of his left elbow. The pain did not affect his range of motion or daily activities and was not related to time or elicited by movement. There was also no tenderness to touch on the lateral aspect of the elbow. A history of cold intolerance was found where the patient had exacerbated pain when the elbow was exposed to cold water or temperatures. No sensory or neural deficit was identified. No palpable masses, skin changes, or inflammatory signs were appreciated.

Ultrasound showed a small oval-shaped hypochoic lesion in the

\* Corresponding author at: College of Medicine, Alfaisal University, P.O. Box 50927, Riyadh 11533, Saudi Arabia.

E-mail address: [najd.sulaiman@gmail.com](mailto:najd.sulaiman@gmail.com) (N. Binsulaiman).

<https://doi.org/10.1016/j.ijscr.2021.106709>

Received 7 October 2021; Received in revised form 7 December 2021; Accepted 14 December 2021

Available online 21 December 2021

2210-2612/© 2021 Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

subcutaneous tissue of the dorsal aspect of the left elbow with posterior enhancement measuring about  $0.6 \times 0.2$  cm with no vascularity on color doppler. An MRI was done, which showed a small subcutaneous oval-shaped lesion at the posterior lateral aspect of the left elbow. Measuring  $0.44 \times 1 \times 0.8$  cm in AP, trans and CC dimensions. This lesion was hyperechoic in T1 and T2, not suppressed with fat, and there was no definite enhancement (Fig. 1).

Surgical excision of the nodule was done where the incision was directed above the nodule, which was superficial. Complete excision was done, and tissue was sent for histopathology. Pathology report identified an SMA (1A4) positive, Desmin (D33) negative, PAN CK (AE1/AE3) negative, glomus tumor that is negative for malignancy (Fig. 2).

On follow-up two and twelve months post-surgical excision, there was no pain or wound site problems, and the patient had an unremarkable recovery (Fig. 3).

### 3. Discussion

From early 1812, William Woods described cases of what is now known as a glomus tumor in several parts of the body [6]. More and more understanding of this tumor was established over the years, and associations to several gene mutations have been suggested [7–9].

A classic triad of glomus tumor symptoms is comprised of severe paroxysmal pain, point tenderness, and hypersensitivity to cold. Most extradigital cases present with pain and point tenderness specifically, although our case was positive for cold intolerance where his pain was increased in severity and frequency by exposure to lower temperatures [2,10].

It takes 7–11 years and about 2.5 consultations to diagnose glomus tumors overall [11]. In the presented case, it took three years and three previous consultations to diagnose the patient. We believe that the commonly atypical presentation of extradigital cases could be one of the factors contributing to the diagnostic delay of these tumors, in addition to the fact that glomus tumors can mimic other lesions, including angiomas [12], neuromas [13] cysts, lipomas, melanomas, gout, and arthritis [14,15]. Another factor that could be instrumental to the delay in diagnosis in our case is that glomus tumors of the elbow are rare, representing only 4.4%–7% of extradigital glomus tumors [16].

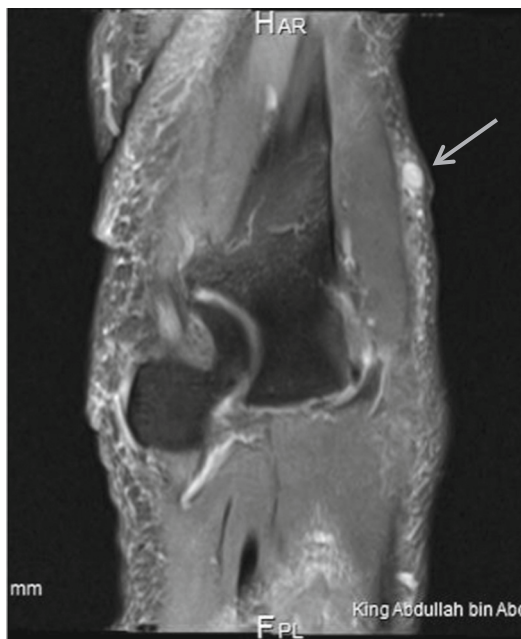


Fig. 1. MRI picture showing small subcutaneous oval-shaped lesion at the posterior lateral aspect of the left elbow.

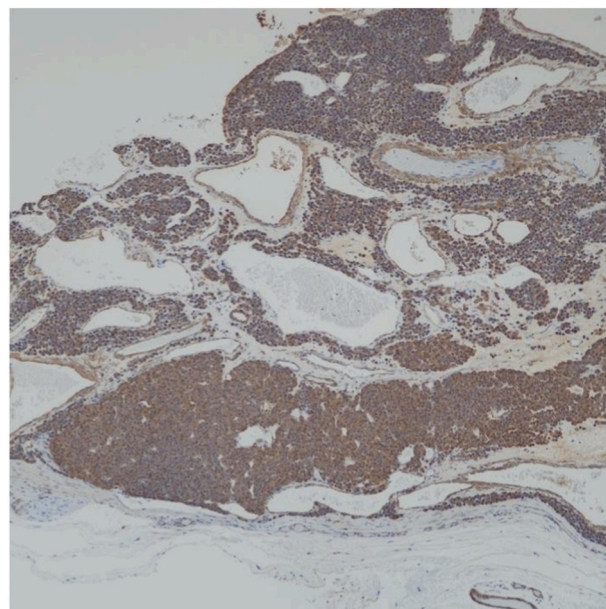


Fig. 2. Glomus tumor, panoramic view shows well-circumscribed tumor with thin pseudo capsule (Hematoxylin and Eosin, 2 $\times$ ).



Fig. 3. Post-surgical scar on 12 months follow-up.

MRI is believed to be the best non-invasive diagnostic test of glomus tumors, given its high positive predictive value of 97%; however, several tumors are missed on MRI due to its negative predictive value of only 20% [17]. Ultimately, a biopsy of the lesion remains the only way to confirm the diagnosis of a glomus tumor, and if a complete excisional biopsy is done, it is typically also entirely curative.

A question we would like to raise is, what indicates an MRI or a biopsy? Furthermore, why are they not done earlier in extradigital glomus tumor cases? In his article, Tang describes a simple algorithm to be used as a guideline in diagnosing glomus tumors [18]. This algorithm relies on special tests; Love's pin test, Hildreth's test, and cold intolerance test, which in turn rely on the classic symptoms we described above [19]. Therefore, although this algorithm can be helpful in the diagnosis of some extradigital tumors that present with classic symptoms, most

extradigital cases do not present classically, deeming this algorithm a lot less valuable and the index of suspicion in primary medicine low.

#### 4. Conclusion

Patients often visit multiple departments and physicians before reaching a diagnosis of extradigital glomus tumors; this can create an emotional, physical, and financial burden on both the patient and the healthcare system when ultimately, complete resection of a benign glomus tumor is often entirely curative of symptoms. Our report discusses possible explanations for the delay in diagnosis, hoping to raise the index of suspicion in primary healthcare when presented with a case of localized pain and begin an early investigation with a glomus tumor as a differential diagnosis.

#### Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

#### Source of funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

#### Ethical approval

Our study's proposal was evaluated considering the national regulations that govern the protection of human subjects by the Princess Nourah bint Abdulrahman University Institutional Review Board. The IRB has determined that our proposed project posed no more than minimal risk to the participants. Therefore, it has been EXEMPT from the IRB review.

Registration number with King Abdulaziz City for Science and Technology, KSA: HAP-01-R-059

#### Registration of research studies

N/A.

#### Guarantor

Dr. Bader AlNuaim, Assistant Professor of Orthopedics, Section of Orthopedic Surgery, Department of Surgery, King Abdullah bin Abdulaziz University Hospital, Princess Nourah bint Abdulrahman University, Riyadh, Saudi Arabia.

#### CRedit authorship contribution statement

1. First author: writing, supervising.
2. Second author: corresponding author, writing, review, editing, data collection, and finalizing the manuscript.
3. Third author: writing, review, editing, data collection, and finalizing the manuscript.
4. Fourth author: review and data analysis.
5. Fifth author: review and data analysis.
6. Sixth author: reviewing and supervising.

#### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

#### Acknowledgments

We would like to thank Dr. Reham Ali Khubrani, Assistant consultant of Anatomic Pathology at King Abdullah University Hospital in Riyadh, KSA, for her contribution with the pathology pictures and report.

#### References

- [1] V.M. Morey, B. Garg, P.P. Kotwal, Glomus tumours of the hand: review of literature, *J. Clin. Orthop. Trauma* 7 (4) (2016) 286–291, <https://doi.org/10.1016/j.jcot.2016.04.006>.
- [2] T.K. Schiefer, W.L. Parker, O.A. Anakwenze, P.C. Amadio, C.Y. Inwards, R. J. Spinner, Extradigital glomus tumors: a 20-year experience, *Mayo Clin. Proc.* 81 (10) (2006) 1337–1344, <https://doi.org/10.4065/81.10.1337>.
- [3] B.D. Fornage, Glomus tumors in the fingers: diagnosis with US, *Radiology* 167 (1) (1988) 183–185, <https://doi.org/10.1148/radiology.167.1.2831563>.
- [4] C. Macharia, P.M. Nthumba, Glomus tumor presenting as complex regional pain syndrome of the left upper limb: a case report, *J. Med. Case Rep.* 9 (1) (2015), <https://doi.org/10.1186/s13256-015-0793-3>.
- [5] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, for the SCARE Group, The SCARE 2020 guideline: updating consensus Surgical CAse REport (SCARE) guidelines, *International Journal of Surgery* 84 (2020) 226–230.
- [6] W. Wood, On painful subcutaneous tubercle, *Edinb. Med. Surg. J* 8 (31) (1812) 283–291.
- [7] J.-M. Mosquera, A. Sboner, L. Zhang, C.-L. Chen, Y.-S. Sung, H.-W. Chen, N. P. Agaram, D. Briskin, B.M. Basha, S. Singer, M.A. Rubin, T. Tuschl, C. R. Antonescu, Novel mir143-notch fusions in benign and malignant glomus tumors, *Genes Chromosom. Cancer* 52 (11) (2013) 1075–1087, <https://doi.org/10.1002/gcc.22102>.
- [8] H. Brems, C. Park, O. Maertens, A. Pemov, L. Messiaen, M. Upadhyaya, K. Claes, E. Beert, K. Peeters, V. Mautner, J.L. Sloan, L. Yao, C.-C.R. Lee, R. Sciot, L. De Smet, E. Legius, D.R. Stewart, Glomus tumors in neurofibromatosis type 1: genetic, functional, and clinical evidence of a novel association, *Cancer Res.* 69 (18) (2009) 7393–7401, <https://doi.org/10.1158/0008-5472.can-09-1752>.
- [9] M. Amyere, V. Aerts, P. Brouillard, B.A.S. McIntyre, F.P. Duhoux, M. Wassef, O. Enjolras, J.B. Mulliken, O. Devuyt, H. Antoine-Poirel, L.M. Boon, M. Vikkula, Somatic uniparental isodisomy explains multifocality of glomuvenous malformations, *Am. J. Hum. Genet.* 92 (2) (2013) 188–196, <https://doi.org/10.1016/j.ajhg.2012.12.017>.
- [10] S.K. Trehan, E.A. Athanasian, E.F. DiCarlo, D.N. Mintz, A. Daluiski, Characteristics of glomus tumors in the hand not diagnosed on magnetic resonance imaging, *J. Hand Surg.* 40 (3) (2015) 542–545, <https://doi.org/10.1016/j.jhssa.2014.12.002>.
- [11] J. Van Geertruyden, P. Lorea, D. Goldschmidt, S. de Fontaine, F. Schuind, L. Kinnen, P. Ledoux, J.P. Moermans, Glomus tumours of the hand. A retrospective study of 51 cases, *J. Hand Surg. (Edinb. Scotl.)* 21 (2) (1996) 257–260, [https://doi.org/10.1016/s0266-7681\(96\)80110-0](https://doi.org/10.1016/s0266-7681(96)80110-0).
- [12] J.S. Chun, R. Hong, J.A. Kim, Extradigital glomus tumor: a case report, *Mol. Clin. Oncol.* 2 (2) (2014) 237–239, <https://doi.org/10.3892/mco.2013.219>.
- [13] C.P. White, D.D. Jewer, Atypical presentation of a glomus tumour: a case report, *Can. J. Plastic Surg.* 14 (4) (2006) 237–238, <https://doi.org/10.1177/229255030601400402>.
- [14] E.M. McDermott, A.P. Weiss, Glomus tumors, *J. Hand Surg.* 31 (8) (2006) 1397–1400, <https://doi.org/10.1016/j.jhssa.2006.05.018>.
- [15] M. Mravic, G. LaChaud, A. Nguyen, M.A. Scott, S.M. Dry, A.W. James, Clinical and histopathological diagnosis of glomus tumor: an institutional experience of 138 cases, *Int. J. Surg. Pathol.* 23 (3) (2015) 181–188, <https://doi.org/10.1177/1066896914567330>.
- [16] C. Anley, B. Vrettos, S. Roche, M. Solomons, A glomus tumour of the elbow: a case report and review of the literature, *Shoulder Elbow* 6 (1) (2014) 60–62, <https://doi.org/10.1111/sae.12041>.
- [17] C. Antoinette Bargon, A. Mohamadi, M. Talaei-Khoei, D.C. Ring, C.S. Mudgal, Factors associated with requesting magnetic resonance imaging during the management of glomus tumors, *Arch. Bone Joint Surg.* 7 (5) (2019) 422–428.
- [18] C.Y. Tang, T. Tipoe, B. Fung, Where is the lesion? Glomus tumours of the hand, *Arch. Plast. Surg.* 40 (5) (2013) 492–495, <https://doi.org/10.5999/aps.2013.40.5.492>.
- [19] D.T. Netscher, J. Aburto, M. Koeplinger, Subungual glomus tumor, *J. Hand Surg.* 37 (4) (2012) 821–823, <https://doi.org/10.1016/j.jhssa.2011.10.026>.