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Utilization of triple phase nuclear medicine bone scan for diagnosis of extradigital glomus tumors

Jay Fiechter, Matthew Noyes

ABSTRACT

Introduction: Presentations of glomus tumors in atypical areas have been documented and often lack the classic symptoms typically associated with glomus tumors. Diagnosis of extradigital glomus tumors is difficult and often comes after years of misdiagnosis.

Case Report: We present the case of an 82-year-old male with an extradigital glomus tumor at the tip of the olecranon. Gold standard magnetic resonance imaging (MRI) was negative and 3-phase nuclear medicine scan identified uptake near the olecranon process. Glomus tumor diagnosis was confirmed after pathology results. At two weeks post-op, the patient reported complete resolution of the pain. At the final follow-up, the patient had returned to all functional activities without pain and his strength was symmetric to the contralateral side.

Conclusion: This case demonstrates the importance of clinical suspicion in the workup and diagnosis of an atypical extradigital glomus tumor and how nuclear medicine scans can provide additional information in the presence of negative MRI.

Keywords: Elbow, Glomus tumor, Nuclear medicine scan

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INTRODUCTION

Glomus tumors account for 1.5–4.5% of benign soft tissue tumors [1]. These tumors are benign neoplasms of the glomus apparatus typically located in the subcutaneous tissue. Quintessential glomus tumors present in the hands but they can less often present extradigitally. One review found a prevalence of such glomus tumors in extradigital areas between 11% and 65% [2]. Of these extradigital tumors, one study found a prevalence of glomus of the elbow of 4.4% [1–3]. We present a case report of a glomus tumor of the elbow at the tip of the olecranon process. This specific tumor was not identified by the gold standard magnetic resonance imaging (MRI) and a nuclear medicine scan assisted in making the final diagnosis.

CASE REPORT

An 82-year-old male presented to the senior author for a second opinion with persistent elbow pain for more than two years that developed of insidious onset. Three months prior, he underwent an ulnar nerve decompression which failed to relieve his symptoms. Radiographs of the right elbow demonstrated mild osteoarthritis and disuse osteopenia (Figure 1).

Physical exam identified hypersensitivity and extreme pain over the right elbow just over the tip of the olecranon. There was no change in skin pigmentation or palpable nodule. The patient rated the pain as a 10/10 when the elbow was even lightly touched. Magnetic resonance imaging (MRI) without intravenous (IV) contrast of the right elbow was obtained and was negative for fracture or complete ligament/tendon complete tear. Small partial tears of the common flexor and extensor tendon were noted (Figure 2).

Three weeks after initial presentation to the senior author, 1 cc of triamcinolone and 1 cc of 1% lidocaine was injected at the tip of the olecranon for both diagnostic and therapeutic purposes. This provided only a few days of pain relief. A 3-phase nuclear medicine bone scan was then ordered. The radiologist interpretation from the 3-phase bone scan reported mild uptake in the radiocapitellar joint consistent with arthritis. The senior author's interpretation of the nuclear scan identified uptake at the olecranon process which correlated clinically to the location of the patient's pain (Figure 3).

After a lengthy discussion with patient and family discussing treatment options, they elected to proceed with surgery. During the procedure, a yellow-brownish soft tissue mass was excised and sent to pathology. Histology was consistent with a glomus tumor. At two weeks post-op, the patient reported complete resolution of the pain that had been present for two years. At the 2-month follow-up, the patient had no pain, full range of motion, and triceps strength symmetric with the contralateral side.

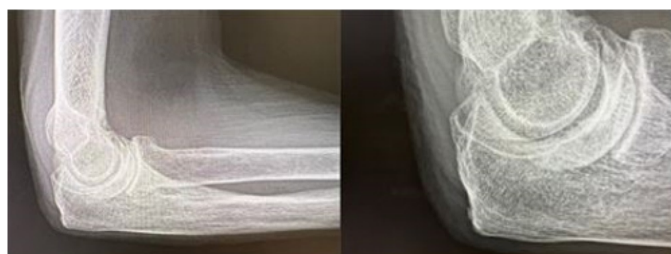

Figure 1: Lateral plain radiograph of right elbow demonstrates mild osteoarthritis and disuse osteopenia. No evidence of osteoclastic or osteoblastic lesion.

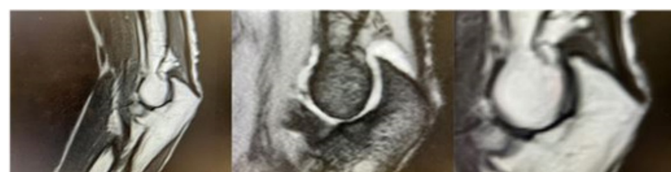

Figure 2: Lateral MRI right elbow. Negative for fracture or complete ligament/tendon complete tear. Small partial tears of the common flexor and extensor tendon. No bony edema or fracture lines noted. No evidence of soft tissue tumor.

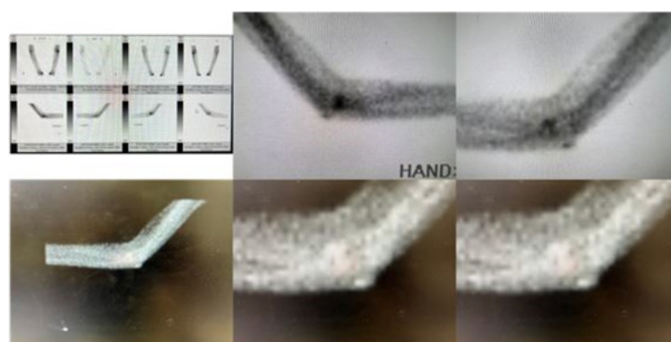

Figure 3: Lateral view of right elbow, 3-phase nuclear bone scan. Mild uptake in the radiocapitellar joint consistent with arthritis. Mild focal uptake was noted laterally in the soft tissue adjacent to the olecranon process, which was the location of the patient's pain.

DISCUSSION

Glomus tumors have been well described and documented in the literature. Wood first described each of 8 lesions in 1812 as a "painful subcutaneous tubercle" [2]. The term "glomus tumor" was then coined in 1924 by Masson [4]. Since the founding work of these two scholars, numerous cases have been reported. The classic triad for a glomus tumor is pain, cold sensitivity, and point tenderness [2, 5]. They are classically bluish purple on examination, can have bluish purple presentation on the skin, and can often be palpated as an encapsulated nodule [6, 7]. Diagnosis and workup was well described by Tang et al. by first noticing the classic triad, performing 3 common physical exam tests, and lastly confirming with an MRI or ultrasound [8]. The three tests described are Love's Pin test, Hildreth's test, and a cold sensitivity test. Love's pin test involves pressing on the painful site with the head of a pin or tip of a paper clip: extreme pain is a positive test. Hildreth's test is described by the Journal of Hand Surgery as a reliable clinical sign for diagnosis of glomus tumors. It involves using a tourniquet to artificially produce ischemia to the painful area. Reduction or absence of pain is a positive finding [9]. Lastly, ice or commonly ethyl chloride can be applied over the area of pain. Extreme pain on exposure to cold (cold sensitivity test) is a positive finding. Confirmatory MRI shows glomus tumors as hypointense on T1 and hyperintense on T2 [10].

Glomus tumors commonly present in the hands, often in the subungual region. These tumors are more easily diagnosed as they more commonly portray the classic features of glomus tumors. Extradigital glomus tumors are diagnostic anomalies, as each has a distinct set of symptoms and exam findings [11]. Our specific patient presented with pain, no palpable nodule, and no abnormal skin findings. Plain radiograph can detect glomus tumors in 25% or cases [6]. It was not surprising to have a negative finding on plain radiograph. The negative MRI was surprising after final diagnosis. In one study, MRI was found to be 100% sensitive [8], and another found it to be 90% sensitive [6]. Nuclear medicine scans are a newer imaging modality to identify glomus tumors. Two separate studies demonstrated uptake in glomus tumors using a nuclear medicine study [12, 13]. In our case, the positive uptake on the nuclear medicine assisted in decision making to surgically excise the source of uptake and was the correct treatment choice to alleviate the patient's long-standing pain.

This patient's delayed diagnosis and chronic pain illustrates the importance of interdisciplinary communication and collaboration. Multiple disciplines had seen this patient without successful diagnosis and treatment. Communication with orthopedics and radiology is an example of interdisciplinary collaboration that is paramount in cases with complexity such as this one.

CONCLUSION

Extradigital glomus tumors are a rare finding and present a diagnostic challenge. This specific glomus tumor proved to be extremely abnormal, was not identified on the gold standard MRI test, and was only detectable by a nuclear medicine scan. This case demonstrates the importance of maintaining clinical suspicion of glomus tumors and utilizing nuclear medicine scans to identify uptake to localize to the source of patient's symptoms in the setting of atypical presentation and delay in diagnosis.

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Author Contributions

Jay Fiechter – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Matthew Noyes – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Guarantor of Submission

The corresponding author is the guarantor of submission.

Source of Support

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Written informed consent was obtained from the patient for publication of this article.

Conflict of Interest

Authors declare no conflict of interest.

Data Availability

All relevant data are within the paper and its Supporting Information files.

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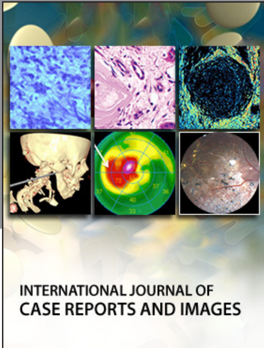
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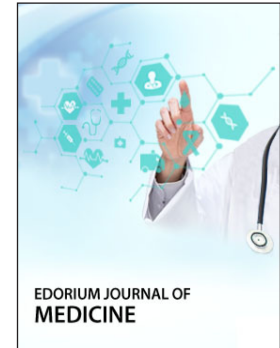
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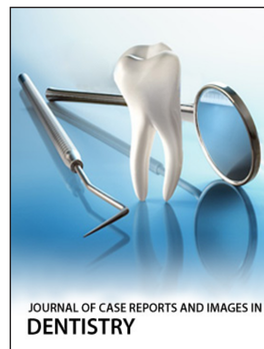
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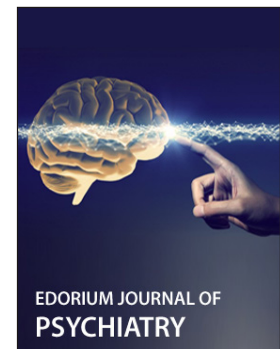
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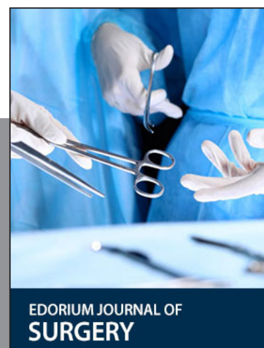
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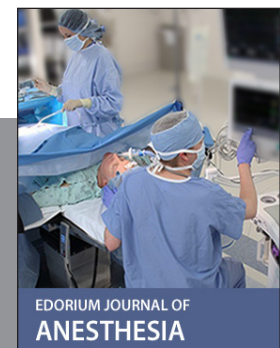
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