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Manuscript: EMJ-2020-10-27 - Glomus tumors of the foot and ankle: case series

Date submitted: 2020-10-26

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ABSTRACT: Glomus tumors are uncommon tumors and even rarer in the foot and ankle. This case series describes glomus tumors located in 2 hallux, 1 foot and 3 ankles. This is an interesting series in which one case was misdiagnosed and mistreated, radiographs were not diagnostic in any case, and magnetic resonance imaging was diagnostic in 2 cases. This case series can be considered of interest and may be useful in increasing the awareness of foot and ankle surgeons.



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Submission: EMJ-2020-10-27 - Glomus tumors of the foot and ankle: case series

Attention: Dr. Irianto

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Title:	Glomus tumors of the foot and ankle: case series			
Keywords:	ankle, foot, glomus, neuromyoarterial receptor, tumor			
Type:	Brief Report			

Glomus tumors of the foot and ankle: case series

Abstract

Glomus tumors are uncommon tumors and even rarer in the foot and ankle. This case series describes glomus tumors located in 2 hallux, 1 foot and 3 ankles. This is an interesting series in which one case was misdiagnosed and mistreated, radiographs were not diagnostic in any case, and magnetic resonance imaging was diagnostic in 2 cases. This case series can be considered of interest and may be useful in increasing the awareness of foot and ankle surgeons.

Keywords: Glomus; tumor; foot; ankle; neuromyoarterial receptor.

Introduction

The glomus body is a neuromyoarterial receptor found in the reticular dermis, which is responsible for regulating blood pressure and temperature by adjusting blood flow(1). Glomus tumors occurring in the glomus bodies are rare benign neoplasms. Although glomus tumors are most commonly found in the subungual areas of the hand, they can originate in various locations on the body(1). Glomus tumors in the hands have female dominance, while glomus tumors in other locations have been reported to have male dominance(2-4).

Most of the available information about foot and ankle glomus tumors is based on published case reports and series(2, 3, 5, 6). In addition, in the largest case series about extradigital glomus tumors, only 4 tumors of 56 patients were located in the foot and ankle region(7). The low incidence of foot and ankle glomus tumors can cause misdiagnosis and mistreatment. Cases have been reported of patients who have been misdiagnosed such as Morton neuroma and ingrown toenail, and have subsequently undergone above-the-knee amputation due to persistent pain(8-11). With the aim of increasing the awareness of foot and

ankle surgeons, the cases are here reported of 6 glomus tumors of the foot and ankle, which were treated surgically over a 10-year period.

Methods

A retrospective study was conducted by reviewing the cases of foot and ankle glomus tumors managed in our hospital from January 2007 to December 2017. The clinical, radiological and pathological information about the tumors were obtained from digital hospital charts. The patients with a pathological diagnosis of 'glomus tumors' were recruited. There were 55 glomus tumors in total. A total of 49 patients were excluded from the study; 47 with glomus tumors other than in the foot and ankle, and 2 patients with incomplete medical history data.

Results

A total of 6 patients with glomus tumors of foot and ankle were included in this retrospective study (Table 1). The patients comprised 4 males and 2 females with an average age of 48.5 years (range, 29-60 years), and mean follow-up of 7.4 years (range, 2.5-12 years). The main presenting symptom of all patients was pain. The mean duration of symptoms was 4 years (range, 0.5 – 11 years). Of the 6 patients, 1 patient had cold sensitivity and 4 patients had tenderness with palpation over the lesion. Patient #5 had a history of wedge toenail resection for ingrown toenail at another hospital, but this diagnosis could not be confirmed.

Radiography and magnetic resonance imaging (MRI) were used as diagnostic tools. All patients had normal foot radiographs. All patients had an MRI, only 2 had accurate prediagnosis of glomus tumor, which were located in the distal phalanx of the hallux (Figure 1). In the other 4 patients, there were pre-diagnoses of two pilomatricoma, an epidermoid cyst, and a sebaceous cyst.

All patients underwent marginal tumor excision. All cases had the diagnosis of glomus tumor confirmed histopathologically. There was no malignant transformation in any case.

There were no recurrences in the follow-up period. All preoperative symptoms were completely resolved in all patients. One patient had post-operative toenail deformity.

Discussion

This study is one of the largest series of glomus tumors of the foot and ankle and there is a similarity between the results and previous findings in literature.

Although Trehan et al reported female predominance in foot glomus tumors, the present foot and ankle case series had a male predominance(6). There was also male predominance in the largest extradigital glomus tumor case series which was published by Schiefer et al(7), but there is no information about gender distribution in the foot and ankle cases of that series. The age distribution of patients has been observed to be between 28 and 61 years in almost all of the foot and ankle glomus tumor case reports reported in the literature(2, 5, 6, 8).

In the case reports of foot and ankle glomus tumors, glomus tumor has sometimes been misdiagnosed as ingrown toenail(6, 8). A patient in the current study was also diagnosed as ingrown toenail and even underwent surgical treatment. The triad of classic symptoms (pain, localized tenderness, and cold sensitivity) was only seen in Patient #2. Although the presence of the classical triad clinically refers to glomus tumor, it is known that it is not present in all cases(6, 7, 12).

Geertruyden et al. reported that radiography is not an important diagnostic tool in glomus tumors and is used to rule out other possible pathologies(13). Similarly, all of the current patients had radiographs which were not diagnostic for glomus tumor. However, MRI in 2 of the 6 cases pointed to the correct diagnosis. Al-Qattan et al reported that MRI has high sensitivity but low specificity in the diagnosis of glomus tumors(14).

We acknowledge that this study has several limitations. The first and foremost being the rarity of foot and ankle glomus tumors making the incidence of disease low. Consequently, the sample size of this study is too small to make a statistical analysis. In additionally, the clinical data were evaluated retrospectively. Although this study included a low number of patients, there is a significant number of foot and ankle glomus tumors.

In conclusion, successful diagnosis of foot and ankle glomus tumors can be made by histopathological examination based on clinical suspicion due to the low incidence and wide differential diagnosis. A misdiagnosis of glomus tumors and possible unnecessary surgical interventions can be prevented with greater awareness of glomus tumors by foot and ankle surgeons. Although the clinical examination points to glomus tumor, it can be recommended that MRI is taken to assist in confirming the diagnosis. In addition, successful clinical results can be obtained with marginal excision of the tumor.

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- 128 Figure Legends
- 129 Figure 1: MRI of the foot, showing the glomus tumor in the hallux (A, B). Intraoperative
- photograph of excision of the tumor in the hallux (C).



 Table 1: Characteristics of the patients.

	Age	Gender	Location	Follow-up from excision (years)	Duration of symptoms (years)	Tumor dimensions	aSMA	S-100	CD34
1	60	M	Dorsum of foot	12	1	1.3x1x1	+	-	-
2	59	F	Subungual region of 1st toe	11	3	0.6x0.6x0.3	+	+	+
3	51	M	Anterior surface of ankle	10	2	1x1x0.6	+	+	-
4	39	M	Medial surface of ankle	6	0.5	1.1x0.5x0.5	+	+	-
5	29	F	Subungual region of 1st toe	3	11	0.7x0.3x0.3	-	+	-
6	53	M	Anterior surface of ankle	2.5	3	1.6x1.2x0.7	+	+	+

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