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Outcomes of surgery for glomus tumours in the hand

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ABSTRACT

Glomus tumours are rare, benign lesions of vascular origin. In the hand, they frequently localize in the distal phalanges and under the nail plate. Most tumours are symptomatic with characteristic features such as spontaneous pain at the end of the digit exacerbated at exposure to the cold, and trigger point tenderness. This study presents results of the operative treatment of 18 patients, 12 women and 6 men, at a mean age of 38 years with glomus tumours in the hand. Most of them (n = 16) were localized in the distal phalanges, 8 of which were subungual. The follow-up assessment was performed in the form of a phone interview at a mean of 4.2 years following surgery. All patients declared pain relief almost immediately after the tumour's resection. Problems reported by the patients at the follow-up were inaesthetic scars, occasional pain in the operated digit at weather changes, and mild tenderness at the operation site. Three cases of recurrence were noted. These results show that operative treatment of glomus tumours is effective, provides fast relief of troublesome symptoms and is associated with a moderate risk of recurrence.
Keywords: glomus tumour diagnosis; outcomes of surgery; recurrence rate.

INTRODUCTION

Glomus tumours are rare, benign lesions arising from a neuromyoarterial structure called a glomus body that controls blood pressure and temperature by regulating blood flow in the cutaneous vasculature. The glomus tumour is not a neoplasm but rather a hamartoma. The aetiology of glomus tumours is unknown and may be related to sex, age, trauma or inheritance. Some authors have proposed that a weakness in the structure of a glomus body could lead to reactive hypertrophy after trauma. These lesions are usually solitary and located in the hands, particularly in the nail bed or pulps of the fingers, however they may present in other body parts, too (Fig. 1). A subungual location is characteristic for these lesions. The incidence of glomus tumours is 1–5% of all tumours of the hand and they affect women more frequently than men [1, 2, 3, 4]. It is a small but troublesome lesion, causing very unpleasant symptoms. The triad of symptoms characterised for the tumour are as follows:

- paroxysmal pain,
- trigger point tenderness,
- intolerance to the cold in the affected finger.

Subungual presentation can be associated with a slight blue discolouration and/or deformation of the nail plate [5]. Histologically, glomus tumours belong to the vascular tumour category and are considered a hypertrophic glomus body. Apart from glomus bodies, the tumour may be composed of smooth muscles, non-myelinated nerve fibres and mastocytes. Based on this, glomus tumours are divided into 3 subtypes:

- glomangiomas with an abundance of vessels,
- solid glomus tumour mainly composed of glomus cells,
- glomangiomyomas with a predominance of smooth muscles [3, 4].

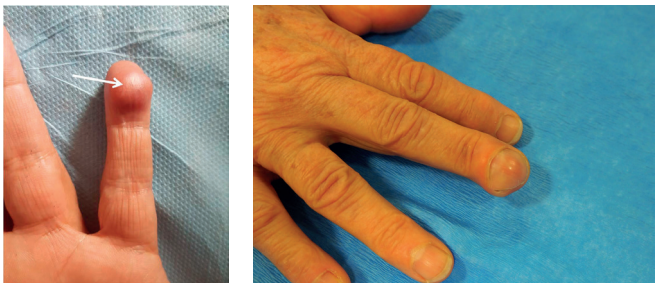

FIGURE 1. Glomus tumour: a) in the fingertip; b) subungual localization

Diagnosis of the tumour is based on clinical signs and symptoms, and can be completed with X-ray, ultrasound examination (USG) or magnetic resonance imaging (MRI). A regular bony erosion in the distal phalanx caused by the lesion may be present on an X-ray (Fig. 2). Ultrasound and MRI are very sensitive for diagnosing these lesions (Fig. 3). Some diagnostic tests for glomus tumour are known, including Love's pin test, Hildreth's test and the cold sensitivity test [4, 5, 6]. Love's pin test consists of pressing the suspected area with a pinhead. The point at which intense pain is detected confirms the presence of a glomus tumour. The Hildreth's test consists of the induction of transient ischemia by exsanguination of the extremity and inflation of a tourniquet on the arm. The test is positive if the patient experiences withdrawal of pain from the affected area. When the tourniquet is deflated, the patient will

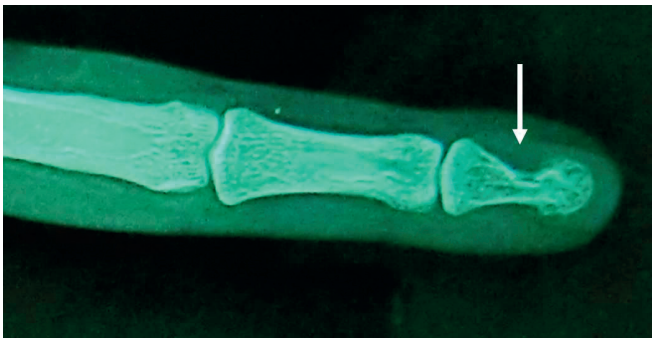

FIGURE 2. Bone erosion caused by the tumour on X-ray

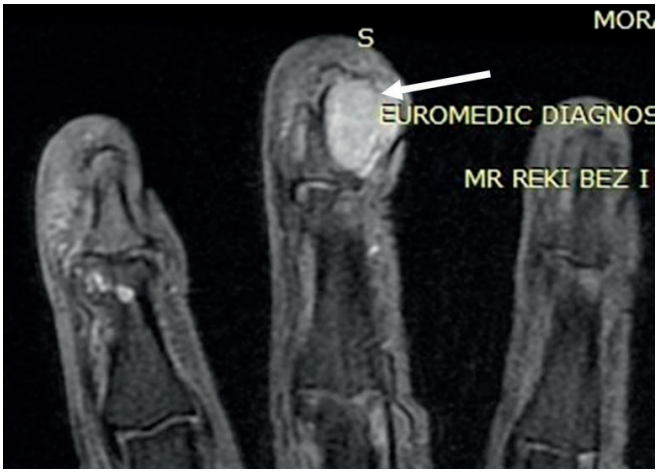

FIGURE 3. Magnetic resonance imaging showing the tumour in the distal phalanx

feel a sudden return of pain. The cold-sensitivity test consists of exposure of the affected area to the cold. Exacerbation of the pain experienced by the patient would indicate a positive result. The Ekin test uses trans-illumination to identify the location and diameter of subungual glomus tumours. It is not really a diagnostic test, but it enables a pre-operative assessment of tumour size. However, the clinical usefulness of all these tests is limited [6].

Treatment of glomus tumours is almost exclusively surgical and consists of excision/encapsulation of the lesion [3, 4]. Some of them have a well-defined capsule which facilitates its removal in total, but this is not a rule. The shape of the tumour is usually spherical (Fig. 4, 5). There are also 2 different morphological forms of these lesions: a beige, and a red, blue or purple coloured tumour. The tumour can be linked with a small vessel or fine nerve fibre (Fig. 4a).

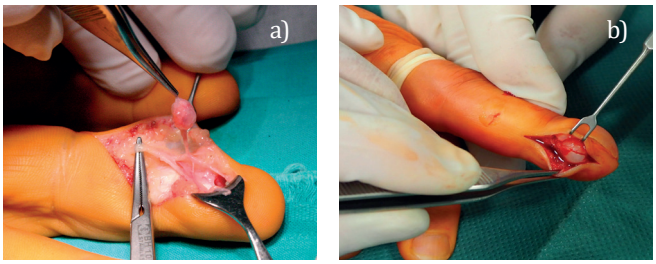

FIGURE 4. Resection of the tumour from: a) pulp of the finger; b) from under the nail plate, showed in the Figure1b

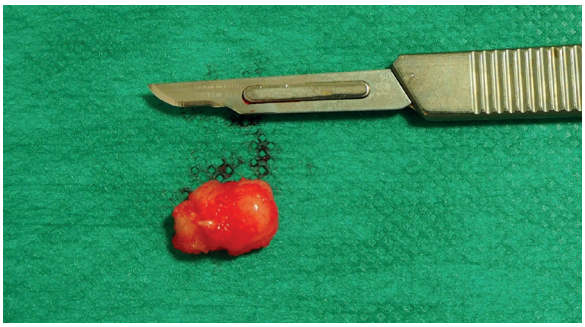

FIGURE 5. The lesion on the table

The objective of the study was the presentation of clinical manifestations and assessment of outcomes of surgical treatment of glomus tumours localized in the hand.

MATERIALS AND METHODS

Between 2013–2014 18 patients, 12 women (67%) and 6 men (33%), aged a mean of 38 years (range 32–55) with glomus tumours localised in the hands were operated on in the authors' institution. Diagnosis of the tumour was made on a clinical basis in most cases. Six patients had an USG and 3 patients had MRI, confirming the presence and character of the lesion. All patients were operated on; tumours on the digits were excised under local anaesthesia and with a rubber tourniquet in the proximal part of the digit, whereas lesions localised in the wrist and metacarpus were resected under brachial plexus block anaesthesia and with the tourniquet on the arm. Some tumours had well defined fibrous capsules and they were shelled-out *in toto*. All resected tumours were given a histological examination, which confirmed the clinical diagnosis of a glomus tumour. The follow-up assessment was performed in the form of a phone interview with all patients, at a mean of 4.2 years (range 3–5) after the operation.

RESULTS

Preoperative findings

The localization of the tumours is shown in the Table 1. The most common localization was in the distal phalanges of the digits – 16 cases (89%). In 8 patients (44%), the lesion had subungual presentation.

The duration of the disease (time between detection of the condition and operation) was a mean of 5 years (range 6 months – 8 years).

Symptoms and signs

In the vast majority of cases, the lesions were symptomatic: spontaneous pain and tenderness at touch was reported by 15 patients (83%), cold hypersensitivity by 13 (72%), while paraesthesiae in the affected digit by 10 (53%). For 13 patients (72%) the lesion caused a significant problem in daily activities or at work, and for 5 (28%) additionally caused a cosmetic concern, due to nail plate deformity.

TABLE 1. Localization of the tumours in the hand

Localization of the tumour	Number of cases	%
Digits	16	89.0
thumb	2	11.0
index finger	3	17.0
middle finger	5	28.0
ring finger	4	22.0
little finger	2	11.0
Metacarpus	1	5.5
Wrist	1	5.5
Total	18	100.0

Intraoperative findings

Three of 18 tumours (17%) had a well-defined capsule, however, the majority were distinctly separated from surrounding tissues (Fig. 4).

Postoperative findings

The follow-up assessment was performed in the form of a phone interview. All patients declared that they were free from pain and tenderness almost immediately after the operation. The most frequent problem reported by 4 patients (22%) was an inaesthetic scar on the digit. Three patients (17%) complained of occasional pain in the operated digit at weather changes, 2 (11%) of mild tenderness in the operation site, and 2 (11%) of nail plate deformity. No patients reported loss of finger movement or grip strength.

Recurrence

Three cases (17%) of tumour recurrence were noted, all over a period 1–2 years post-surgery. All these patients were re-operated on with good results.

DISCUSSION

The results obtained in this study show that there is a significant delay in making a diagnosis of glomus tumours, reaching 5 years on average. It is surprising as clinical features of the condition are distinct and characteristic, particularly at subungual presentation. However, data from the literature show that an average duration of symptoms to diagnosis is 6 years (range from 3 months to 15 years) [3, 4].

Glomus tumours can be misdiagnosed because the presence of pain and tenderness can be attributed to other painful tumours, such as neuromas, gouty tophi, chronic paronychia, subungual exostosis, *eccrine spiradenoma* or Raynaud's phenomenon. A correct diagnosis is obviously difficult in asymptomatic lesions, as it was in 3 patients from our study. In these cases, imaging (USG or MRI) was a very helpful solution to the diagnostic dilemma. The most common localization of the tumours in this study was in the distal phalanges – in 16 cases (88%). This finding is consistent with data from the literature [6, 7, 8].

A recurrence rate of 17% in this study is also consistent with what was reported in the literature 4–50% [3, 4, 5, 6]. The range of recurrence rates is very wide and may be associated with several factors. The cause of early recurrence (up to 6 months post-op) may be an incomplete excision of the tumour. In most cases, it is well separated from surrounding tissues or has a well-defined capsule. However, some beige coloured lesions (in contrast to the red or purple) are difficult to delineate from adjacent tissue and this may lead to their incomplete excision. Another cause of early relapse may be a satellite tumour which was overlooked at the primary surgery; however, this is rare. Late recurrence is attributed to the development of a new lesion near the excision site. The probability of recurrence is higher in the case of subungual manifestation; this can be attributed to the operative approach and the surgeon's tendency to spare the nail matrix to avoid nail plate deformity. The preferable surgical approach in the digits is mini-invasive, as large incisions may cause painful postoperative scars, nail plate deformity or dystrophy and poor cosmetic effect.

Malignant variant

The malignant variant of the glomus tumor (glomangiosarcoma) is extremely rare. It presents similarly to the common, benign lesion and is correctly diagnosed after histological examination of the excised tumour. Histologically, the malignant variant shows features that resemble a benign glomus tumor. This neoplasm is considered a low-grade malignant tumor with tendency for local recurrence, although metastasis has been reported [4, 5, 6].

Literature review

Kumar et al. reported the results of the surgical treatment of 57 patients, 44 women and 13 men, at a mean age of 49 years with glomus tumours in the hand. The most common site of lesion was the nail bed in 50 cases (88%) and the tip of the finger in 7 cases (12%). During clinical assessment, pinpoint tenderness was present in all 57 cases, spontaneous pain in 56 and cold hypersensitivity in 20 cases (35%). Nail deformity was noted in 14 cases (25%). The mean duration of the disease was 2.3 years. All patients underwent surgical resection of the tumour. At the 6-month follow-up, 54 patients were symptom free and 3 (5%) had residual pain. Of these 3 patients, recurrence was the cause in 2. Nail deformity was detected in 8 (14%) cases, but pain was not present in any of the 8 cases [8].

Reinders et al. reported results of the surgical treatment of 26 patients who underwent transungual excision of a subungual glomus tumour. After a mean follow-up of 5 years, the pain improved from numerical rating scale 7.9 at baseline to 0.8 at final assessment. Quality of life improved significantly: the mean nail-psoriasis questionnaire 10-score improved from 5.5 to 0.64 ($p < 0.0001$). Nail-related sequelae were not reported

in any of the patients. The authors conclude that glomus tumours localized under the nail plate cause impairment to the quality of life mostly due to severe pain. Surgical excision with the transungual approach is an effective treatment which gives pain relief and improves quality of life, without permanent damage to the nail [9].

Lee et al. reported the outcome of nail-preserving transungual surgery for subungual glomus tumours in 34 patients. Preoperatively, all patients complained of strong pain in visual analogue scale (VAS = 8.9) and 7 presented concomitant nail deformities. During surgery, nails were elevated after incising nail folds, and tumours were excised after a longitudinal nail bed incision. Elevated nails were relocated to their original position after nail bed repair. Thirty-two patients (94%) achieved complete recovery without a sign of recurrence. Postoperative pain was reduced to a mean VAS of 0.9 and preoperative nail deformity was also improved [10].

Jawalkar et al. reported results of the treatment of 12 patients, 9 women and 3 men, at a mean age of 40 years, with 12 glomus tumours located subungually. All patients presented with pain in the nail bed and cold sensitivity. A bluish discoloration of the nail plate was present in 6 patients. Love's pin test was positive in all persons, and Hildreth's test was positive in 8 patients. All tumours were resected via transungual approach. The mean duration of time from symptoms to operation was 3 years (range 1–9). At the mean follow-up of 3 years (range 1–5), all patients had complete pain relief. Neither nail deformity nor recurrence of the tumour were noted [11].

The results of this study show that operative treatment of glomus tumours is effective, provides fast relief of troublesome symptoms and is associated with a moderate risk of recurrence.

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