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Original article

Glomus tumors of the upper limb: Single-center retrospective study of clinical and functional outcomes

Tumeurs glomiques du membre supérieur : évaluation des résultats cliniques et fonctionnels par une étude rétrospective monocentrique

K. Hufschmidt [a,*], R. Foissac [a], O. Camuzard [a], N. Cardot-Leccia [b], B. Chignon-Sicard [a], T. Balaguer [a]

[a] *Department of Reconstructive and Plastic Surgery, University Hospital Nice, Pasteur 2, 30, avenue de la Voie-Romaine, 06000 Nice, France*
[b] *Department of Pathology, University Hospital of Nice, Pasteur 2, 30, avenue de la Voie-Romaine, 06000 Nice, France*

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ABSTRACT

Glomus tumors are rare and benign hamartomas, arising from neuro-myo-arterial proliferation and deriving from mesenchymal origin. As they have a long-term impact on the individual's quality of life, the primary complaint is unbearable pain. The aim of this study was to assess the clinical and functional outcomes of their surgical treatment, and to review their clinical, radiological and therapeutic features. We performed a retrospective study over a 16-year period including 31 patients with an upper limb glomus tumor. Epidemiologic, diagnostic, therapeutic and follow-up data were collected and a functional outcome questionnaire was filled out postoperatively. Thirty-one patients underwent surgery with safe macroscopic resection margins. The glomus tumor was located on the fingers in 77.4% of cases, with predominance in the ring finger (41.9% of the cases). Patient age at surgery ranged from 22 to 80 years old (mean: 54.6) with a sex ratio of 0.48. Upon clinical suspicion, magnetic resonance imaging and ultrasound were done in most cases. Immediate pain relief was obtained in 18 cases. Only one patient underwent a second surgery for incomplete removal and persistent pain. The QuickDASH questionnaire was completed by 24 patients, resulting in a mean score of 1.61, with a mean follow-up time of 88.8 months (range: 3–171 months). Seven patients were lost to follow-up. These subcutaneous, mostly subungual, nodules, with predominance on the ring finger, have a disproportionate negative impact despite their small size. The long-term outcomes after microscope-assisted surgery indicate obvious improvement in the quality of life and the patient's satisfaction, with a very low rate of recurrence.

Mots clés :
Tumeurs glomiques
Membre supérieur
Chirurgie de la main
Périunguéal
QuickDASH

RÉSUMÉ

Les tumeurs glomiques sont des hamartomes bénins et rares, provenant d'une prolifération neuro-myo-artérielle d'origine mésenchymateuse. La plainte première est une douleur intolérable altérant la qualité de vie au long cours. L'objectif de cette étude était de déterminer les résultats cliniques et fonctionnels après exérèse et d'analyser leurs caractéristiques cliniques, radiologiques et thérapeutiques. Nous présentons une étude rétrospective sur 16 ans incluant 31 patients avec une tumeur glomique localisée aux membres supérieurs. Les données épidémiologiques, diagnostiques, thérapeutiques et de suivi étaient colligées et un questionnaire fonctionnel était complété en postopératoire. Trente et un patients ont bénéficié d'une résection chirurgicale avec marges macroscopiques saines. La tumeur glomique était localisée au niveau des doigts dans 77,4 % des cas, avec une prédominance sur l'annulaire (41,9 % des cas). L'âge moyen des patients lors de la chirurgie variait de 22 à 80 ans (moyenne : 54,6) avec un sex-ratio de 0,48. Selon la présentation clinique, une imagerie par résonance magnétique ou une échographie étaient

* Corresponding author.
E-mail address: katharinahufschmidt@gmail.com (K. Hufschmidt).

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les plus fréquemment pratiquées. Une cessation immédiate de la douleur fut observée dans 18 cas. Un seul patient a bénéficié d'une chirurgie de seconde intention pour marges incomplètes et douleur persistante. Le score Quick DASH fut complété par 24 patients avec un score moyen de 1,61 au cours d'un suivi moyen de 88,8 mois (3–171 mois). Sept patients furent perdus de vue. Ces tumeurs sous-cutanés, surtout sous-ungueales, prédominant au niveau de l'annulaire, ont un retentissement disproportionné malgré leur petite taille. Les résultats au long cours après traitement chirurgical assisté par le microscope montrent une amélioration franche de la qualité de vie et de la satisfaction, avec de faibles taux de récidive.

1. Introduction

Glomus tumors are rare and benign hamartomas that commonly occur in the upper extremities, arising from the arterial end of the glomus body. They frequently affect the subungual area of the fingers. Extradigital presentation is rare and many times misdiagnosed [1]. Clinical evaluation, Doppler ultrasonography and magnetic resonance imaging (MRI) are important diagnostic tools; however definitive diagnosis rests on histology. A classic triad including cold hypersensitivity, paroxysmal pain and point tenderness is typically reported and negatively affects the patients' quality of life. The symptomatology is due to the thermoregulatory control provided by the glomus apparatus, which is a myoarterial unit acting like an arteriovenous anastomosis [2–4]. Excision surgery with clear margins is the gold-standard treatment.

The aim of this study was to assess the clinical and functional outcomes of patients with upper limb glomus tumors, and to review their clinical, radiological and therapeutic features.

2. Material and methods

We conducted a retrospective study including all cases of glomus tumors occurring in the upper extremities operated by the senior surgeons of a Plastic, Reconstructive and Hand Surgery Department over the past 16 years. Observations were made on the tumor's location, the patient's demographics, surgical indication, follow-up and complications.

2.1. Patients

The inclusion criteria were patients older than18 years at time of surgery, surgical resection in our department with histological confirmation of a glomus tumor and the tumor being in the upper limb. Any patients with glomus tumors in other locations were excluded from the final analysis.

Clear information about the study's purpose was given to the patients and written consent was obtained from all patient, if necessary by a third party, for use of their medical data. All patients underwent a clinical examination by one of the department's surgeons who performed the surgical procedure. Further investigation, such as radiographs, ultrasonography, MRI, electromyography or angiography was performed as part of the preoperative workup if necessary. The patients' characteristics are summarized in Table 1.

Minimally invasive surgical resection was done according to the patients' demand, mostly for complaints of unbearable pain and a negative impact on the quality of life, as well as nail deformity. Either transungual or lateral subperiosteal excisions were performed depending on the periungual location of the tumor. A wedge resection and suture with flaps or grafts, if necessary, was used for other locations (fingertips, dorsum of the hand, wrist, forearm and arm) in most cases. All patients were treated on ambulatory basis. The immediate postoperative follow-up was done between the third and fifth day, and again during the third postoperative week for information about the histological diagnosis.

We used the QuickDASH score for the postoperative functional assessment of upper-extremity disability and symptoms [5]. The QuickDASH score was completed postoperatively in June 2016 by all patients reachable either by clinical examination or by a phone interview. Furthermore, we assessed the prevalence of postoperative nail dystrophy and the recurrence rate at last follow-up. The minimum follow-up time was 3 months, a period sufficient to show improvement after surgery.

2.2. Analyses

We analyzed our data to assess the quality of life after surgery, the functional and aesthetic outcomes and to determine relationships between tumor location, sex and patient age at the time of surgery.

A two-tailed Fisher's exact test for categorical data was used to analyze the association between the variables "smoker" and "QuickDASH", with an alpha risk set to 5% ($\alpha = 0.05$). For normally distributed variables, the mean difference between the length of surgery and the QuickDASH score was assessed with the two-tailed Student's *t*-test for paired data. Normality was verified with the Shapiro-Wilk test of normality, with an alpha risk set to 5% ($\alpha = 0.05$).

Table 1
Baseline patient characteristics.

	Patients *n* (%)
Gender	
Female	21/31 (67.7)
Male	10/31 (32.3)
Age at surgery (years)	
>50	17/31 (54.8)
<50	14/31 (45.2)
Located on dominant side	
Yes	16/28 (57.1)
No	12/28 (42.8)
Smoker	6/27 (22.2)
Symptoms	
Pain	22/31 (70.9)
Tingling/temperature sensitivity	10/31 (32.3)
Onycholysis	3/31 (9.7)
Swelling	19/31 (61.3)
Pigment stain	10/31 (32.3)
Prior imaging	
Magnetic resonance imaging	13/31 (41.9)
Ultrasound	13/31 (41.9)
X-ray	12/31 (38.7)
Electromyography	1/31 (3.2)
Angiography	1/31 (3.2)
None	8/31 (25.8)

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