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Outcome of transungual surgical approach with synthetic nail shield in the treatment of digital glomus tumors: A retrospective study

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ABSTRACT

Glomus tumor is a benign neuromyoarterial tumor commonly found in the hand, particularly in the subungual region, that is removed only by surgery. Surgical excision leaves postoperative nail deformity and may cause a recurrence of subungual glomus tumors. A retrospective chart review was performed to assess the role of a synthetic nail shield in the prevention of postoperative nail deformity after transungual glomus tumor excision; the review was performed at a minimum of one year of follow-up of proven diagnosed 19 patients with digital glomus tumor between May 2011 and April 2016 in the orthopedic department in the university hospitals. All patients underwent surgical excision using transungual approach with a synthetic nail shield under digital nerve block anesthesia. Pain, cold intolerance, and complications were examined before and after surgery, and data were recorded. All patients had pain, tenderness, and cold intolerance, 12 patients (63.2%) had nail discoloration, and 3 patients (15.8%) had dystrophic changes. The tumors detached from surrounding tissues had an ovoid or round shape of 2–10 mm in size. Diagnosis was confirmed after pathological examination. In all patients, pain and cold sensitivity diminished. The mean follow-up period was 20.6 months, with no recurrences detected and improved nail appearance. No patient had postoperative nail deformity. Transungual approach followed by

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artificial coverage was an effective method for the treatment of glomus tumors without complications to the nail bed.

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Introduction

A glomus tumor is a tumor arising from neuromyoarterial tissue and is an arteriovenous anastomosis functioning without an intermediary capillary bed.¹

Glomus tumors occur in 1.8 new patients per million and account for about 1%–5% of all hand tumors.² Although they can appear in any part of the body, they are commonly found in the upper extremities.

They are frequently misdiagnosed or have a delayed diagnosis.³ Diagnosis is based on an accurate history and physical examination. The classic triad: paroxysmal spontaneous pain, positive ice cube test: cold sensitivity (specificity of 100%) and Positive Love's test: localized tenderness (sensitivity of 100%, specificity of 0%), can help in diagnosing this rare, small tumor.

Other manifestations in diagnosis include nail dystrophy and discoloration and Hildreth test: inflation of cuff of sphygmomanometer relieves pain (sensitivity of 92%, specificity of 95%).^{4,5} Additional imaging studies can be conducted for more accurate diagnoses. MRI can also be useful for cases with less distinct clinical signs and symptoms.^{5,6}

Complete surgical removal is the only known curative treatment. However, the subungual area inherently poses difficulties for excision.⁷ Improper surgery may leave a nail deformity, as well as cause a local recurrence.⁶

We herein report a retrospective study of 19 proven subungual glomus tumors assessing the efficacy of transungual approach with a synthetic nail shield in the treatment of digital glomus tumors.

Patients and methods

A retrospective study with chart data of case series of glomus tumors was carried out by a single surgeon between May 2011 and April 2016 in the orthopedic department in the University Hospitals. A full ethical review and approval from the institutional review board was obtained prior to the commencement of the study. A minimum 12-month postoperative follow-up interval for each patient was planned. Nineteen patients were included in the study. Our inclusion criteria were patients of any age or sex diagnosed with a digital glomus tumor and treated by excision through transungual approach with artificial coverage. Preoperative diagnosis was made clinically by the characteristic manifestations of spontaneous pain, point tenderness, temperature sensitivity, discoloration (Figure 1a), and dystrophic changes (Figure 2a). Preoperative plain X-ray radiographs were taken for all patients, and ultrasound images were taken when needed in difficult diagnosis cases.

Surgical technique

All patients underwent excision of the glomus tumor. The affected digit was marked preoperatively. All operations were performed under digital nerve block anesthesia with a tourniquet placed at the base of the involved finger.⁸

Patients were operated on using the transungual approach. The nail was separated from the nail bed using surgical forceps and then avulsed cautiously in order not to injure the nail bed (Figure 1b). A longitudinal incision to the nail bed was performed. Complete excision of the tumor was performed (Figures 1c), and (2b). Curettage of the distal phalanx was done. The nail bed was repaired using



Figure 1a. Preoperative nail discoloration and dystrophy in the right thumb.



Figure 1b. Nail bed and glomus tumor after nail extraction.

vicryl 6–0. Suture packet material was placed in the nail fold to cover the bed, which was then sutured to the digit tip (Figures 1d and 2c). All specimens were sent to pathology.⁹

Postoperative and follow-up protocol

Two days postoperatively, the site of the operation and the synthetic nail shield were reviewed and kept clean, each other day a dressing was applied, and the synthetic nail shield was removed 3 weeks later.

For a minimum of one year, patients were clinically assessed every month using Love's test and Ice cube test with data recorded.

Statistical analysis

Acquired data were analyzed with SPSS version 17 software program for windows. The mean, standard deviation, range, and frequencies were calculated for the results.



Figure 1c. Dissection and excision of capsulated glomus tumor.



Figure 1d. Synthetic nail shield of the nail bed (suture packet material).

Results

There were 17 females and 2 males. Right side digits were 11 (57.9%). The mean age was 43.2 ± 11.2 years (range: 22 to 68). All patients had pain, tenderness, and cold intolerance, 12 patients (63.2%) had nail discoloration, and 3 patients (15.8%) had dystrophic changes.

The tumors that were removed were in an ovoid or round shape of 2–10 mm. In all cases, they were covered in a capsule and were removed clearly from the surrounding tissues.

Histopathological examination revealed that tumors had a well-defined fibrous capsule in a low-power field. Epithelioid cells in round shapes surrounded dilated and thin-walled blood vessels in single or multiple layers.

In all patients, Love's test and Ice cube test were negative. The mean follow-up period was 20.6 months, with no recurrences detected and improved nail discoloration (Figures 1e), and (2d). No patient had a postoperative nail deformity.

Discussion

The current study demonstrates the results of 19 cases of diagnosed digital glomus tumors at the subungual region with female predominance. The mean age was 43.2 years, and the mean duration from start of complaint till final diagnosis was 5.7 years, which is comparable with Fujioka et al. and Song et al.; however, the mean duration was 11 years in Moon et al.^{7,9} The cause of delayed diagnosis or misdiagnosis of patients was attributed to the small size of the tumor and a lack of awareness of the symptoms among primary physicians.¹⁰ In subungual glomus tumors, a complete surgical excision is the only way to relieve pain and prevent recurrence.¹⁰



Figure 1e. One year postoperatively; improved nail discoloration.



Figure 2a. Preoperative nail discoloration and dystrophic changes in the left ring finger.

Transungual approach is a common choice for tumors located under the nails. Although this approach offers a good view, it can result in cosmetically unsatisfying outcomes, such as if the nail bed is severely damaged while removing tumors or if sutures of the nail bed are made without care, causing postoperative nail deformity.^{11,12}

Lee et al. described a modified transungual nail preserving approach for excision of subungual glomus tumors to minimize manipulation of the nail bed and the nail plate, but recurrence of pain in some cases and incomplete remission in all patients indicated that this study was limited and needed further work.¹⁵

In our study, all cases were treated by transungual approach with a complete excision and a synthetic nail shield of the nail bed, made by suture packet material which presents a cheap protection method for the nail bed. Love's and Ice cube tests were negative in all patients, with no recurrence of symptoms during the follow-up period, which is comparable with Ekin et al., Hamdi et al., and Moon et al.^{9,13,14} However, Song et al. reported a recurrence rate with 5%, and both Fatih et al. and Tomak et al. had a similar recurrence rate of 7.1%.^{8,11,12}



Figure 2b. Excision of capsulated glomus tumor.

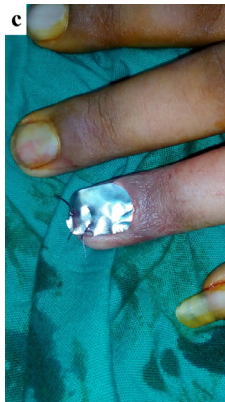


Figure 2c. Synthetic nail shield of the nail bed (suture packet material).



Figure 2d. One year postoperatively; improved nail discoloration.

The strength of our study includes the fact that all surgical techniques were done by the same surgeon and all patients had a regular follow-up for at least one year postoperatively. No other studies reported the use of a synthetic nail shield for the nail bed.

More studies are required with regard to long-term follow-up to assess recurrence and comparison of biological nail coverage with a synthetic nail shield.

Conclusions

Excision of glomus tumors through a transungual approach resulted in the complete improvement of symptoms without recurrences. Using a synthetic nail shield was an effective method for the prevention of nail bed complications.

Ethical approval

This study was approved by our institutional review board.

Statement of human and animal rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

Declaration of Competing Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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