

Clinical Characteristics and Results of Transungual Excision of the Subungual Glomus Tumors

Suresh Pandey¹

¹Department of Orthopedics, College of Medical Sciences and Teaching Hospital, Bharatpur, Chitwan, Nepal.

ABSTRACT

Introduction

Glomus tumor is rare and subungual location of the distal phalanx is the most common site. Surgical excision is the mainstay of treatment to relieve the symptoms. The objective of this study was to analyze the clinical characteristics and result of transungual excision of the tumor.

Methods

A retrospective cross sectional study was conducted among 15 cases of subungual glomus tumors operated with transungual excision over 8 years period in the department of Orthopedics. The clinical and demographic characteristics were noted from the case record. The outcome variables were assessed from case records, OPD visits, and telephone interviews and the results analyzed were pain relief, postoperative recurrence, nail deformity, and patient satisfaction. Data was analyzed by using descriptive statistical tools in SPSS-20.

Results

The mean age of the patients was 32.6 years with the mean duration of symptoms 1.8 years. The mean tumor size was 3.4 mm. Pain and pinpoint tenderness were present in all 15 cases and positive cold sensitivity test and positive Hildreth's test in 13 (86.7%) and 10 (66.7%) cases respectively. All cases had complete relief of pain within 2 weeks of the operation. There was no case of recurrence and nail deformity till a minimum of 1 year of follow up.

Conclusions

The diagnostic clinical triad of pain, point tenderness, and cold sensitivity are the most common findings. The transungual excision of the tumor can give rise to excellent results with complete relief of pain in all cases with no recurrence or nail deformity.

Keywords: clinical characteristics; Glomus tumor; nail deformity; transungual excision.

Correspondence: Dr. Suresh Pandey, Department of Orthopedics, College of Medical Sciences and Teaching Hospital, Bharatpur, Chitwan, Nepal. Email: drsuresh.orthonepal@gmail.com. Phone: +977-9845047228.

INTRODUCTION

Glomus tumor is a relatively rare but very disabling benign soft tissue tumor. The hand is the most common site and glomus tumor comprises 1-5% of all hand tumors.¹ Subungual location beneath the nail matrix of the distal phalanx is the most common anatomical location comprising about 75% of the glomus tumor.^{2,3} It is a tiny but complex type of tumor arising from the glomus body. The Glomus body consists of complex neuromyoarterial tissue which regulates skin temperatures by regulating blood flow to the skin.^{1,2,4} The typical triad of symptoms is paroxysmal pain, localized touch tenderness, and cold sensitivity. Since the tumor is rarely visible or palpable, the diagnosis is often delayed causing prolonged suffering to the patients. Surgical excision is the mainstay of treatment to relieve the symptoms.

The major concern to the patients and surgeons is to diagnose it early and excise this delicate tumor carefully to prevent injury to the nailbed. The major post-operative challenges are nail deformity and the chance of local recurrence. The rate of nail deformity has been reported to range from 0%-26.3%.^{1,5-7} The rate of recurrence varies in the literature and has been reported from 0-50%.^{1,5,8} There is limited published literature regarding the clinical characteristics of the tumor which are diagnostic in most of the cases and results of operative excision in terms of nail deformity and tumor recurrence. The present study has been carried out to describe the clinical characteristics of the subungual glomus tumor and the results of transungual surgical excision with at least 1 year of follow-up.

METHODS

A retrospective cross sectional study was conducted among 15 cases of subungual glomus tumors operated with transungual excision over 8 years period in the department of Orthopedics from 2013-2021. Ethical clearance was taken from the institutional review committee for

the study. Informed and written consent was taken from all the patients for the operative treatment of the tumor. Patients who are clinically diagnosed subungual glomus tumor of the fingers of any age treated with transungual excision technique and confirmed the diagnosis with histopathological findings were included in this study while patient operated elsewhere, patient with incomplete data or lack of follow-up, and operation of the recurred tumor were excluded from this study. Preoperative diagnosis was confirmed with typical clinical symptoms and tests. An X-ray was done to rule out bony erosion. MRI was done to confirm the diagnosis and localize the tumor. The operation was done under the finger block with a 2% plain xylocaine injection. A preoperative mark was applied at the site of maximum tenderness over the nail plate. A sterile rubber glove was used for the tourniquet application at the base of the finger. Transungual approach was used in all the cases with separation and reflection of the nail plate from distal to proximal keeping the proximal attachment intact. For the eccentric location of the (medial or lateral part of the nail bed, only half of the nail plate was incised and reflected proximally. For the tumor located quite proximally under the eponychium, the eponychium was incised and dissected from the nail plate and reflected proximally with an anchor suture. The tumor site was decided by the presence of bluish discoloration of the nail matrix. A sharp longitudinal incision was made on the nail matrix over the tumor and the tumor mass was gently separated from the nail matrix and underlying distal phalanx. Utmost care was taken to prevent inadvertent injury to the nail bed. The tumor was removed completely in-block and the nail bed was sutured properly with 6-0 vicryl. The nail plate was repositioned to cover the nail bed and two anchor sutures with 4-0 cutting body proline were applied. A loose dressing was done with proper padding and the patient was discharged with oral analgesics on an SOS basis. The dressing was

done after 2 days and the suture was removed at 12 days. The reflected nail plate was allowed to fall spontaneously once the nail bed continues to grow. Post-operative pain was assessed and follow-up was made in OPD at 2 weeks, 1 month, 3 months, and yearly to assess relief of pain, nail deformity, recurrence, and patient satisfaction. The outcome measures were assessed on a phone call and requested to send photographs for those who were unable to come for a later follow-up. Demographic and clinical characteristics of paroxysmal pain, preoperative pain severity on VAS score 0-10 (0 being no pain and 10 being maximum pain that can be experienced), point tenderness, Cold sensitivity test, Hildreth's test, X-ray, MRI findings, tumor size were noted from treatment chart and postoperative pain relief, biopsy findings, pain at last follow-up,

months (range 12-30). There was a right-sided predominance of 9 (60%) cases over the left 6 (40%). The most commonly involved finger was the ring finger, in 6 (40%) cases followed by the index finger 4 (26.7%), third finger 3 (20%), and thumb 2(13.3%). The diagnostic characteristics of paroxysmal pain and point tenderness were present in all the cases. The color change over the nail was present in 2 cases and no cases had preoperative nail deformity at the time of presentation. No case had bony changes in the distal phalanx. MRI was diagnostic in all 12 cases that underwent this investigation. The mean tumor size was 3.4 mm (range 2-6mm). Histopathological examination confirmed the clinical and MRI diagnosis of a glomus tumor in all the cases. The clinical diagnostic findings have been presented in table 1.

Table 1. Frequency and percentage of clinical characteristics that are diagnostic of subungual glomus tumor.

Clinical Characteristics	Number (%)
Paroxysmal pain	15 (100)
Love's pin test	15 (100)
Cold sensitivity test	13 (86.7)
Hildreth's test	10 (66.7)

tumor recurrence, nail deformity, and patient satisfaction were noted from the OPD record, phone call interview and assessment at the OPD visit. Collected data was check for completeness. Data was entered and analyzed by using SPSS version 20.0 software. Frequency and percentage were calculated for the categorical variable while mean and standard deviation was calculate for the continuous variable.

RESULTS

The total number of subungual glomus tumors in the distal phalanx was 15 with the mean age of the patients 32.6 years (range 18-52). There was female (n=8, 53.3%) predominance over the male (n=7, 46.6%). The mean duration of symptoms was 1.8 years (range 8 months -4 years) and the mean duration of follow-up was 19.79

The mean preoperative pain in a visual analog score (VAS) of 0-10 was 7.47 (range 6-9). All patients had significant pain relief on the 1st postoperative day only and complete pain relief at 2 weeks. The mean VAS score at the last follow-up was 0.29 (range 0-1). The mean time for the regrowth of the nail from the nail bed was 3. 3 months (range 3-4). There was no case of recurrence or nail deformity. Intraoperative excision of the tumor and the outcome have been illustrated in figures 1 and 2. There was the presence of a fine longitudinal ridge over the nail in 3 cases but it was of no cosmetic concern to any of them. All the patients were satisfied with the result and returned to the previous level of work.

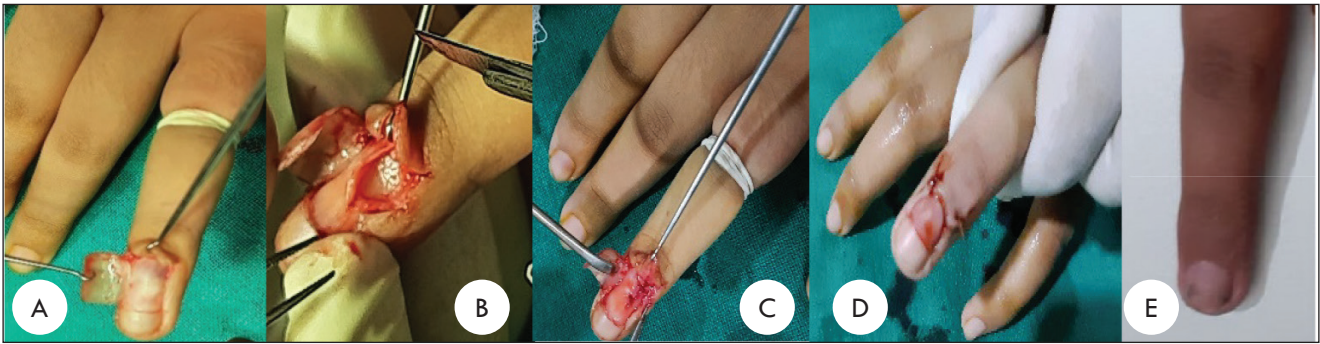


Figure 1. Showing Transungual approach with transverse nail plate incision A, Intraoperative picture after excision of the glomus tumor from nail bed B, Repair of the nail bed with fine suture C, Nail plate reposition and stay suture D, Normal looking nail at 6 months after operation E.

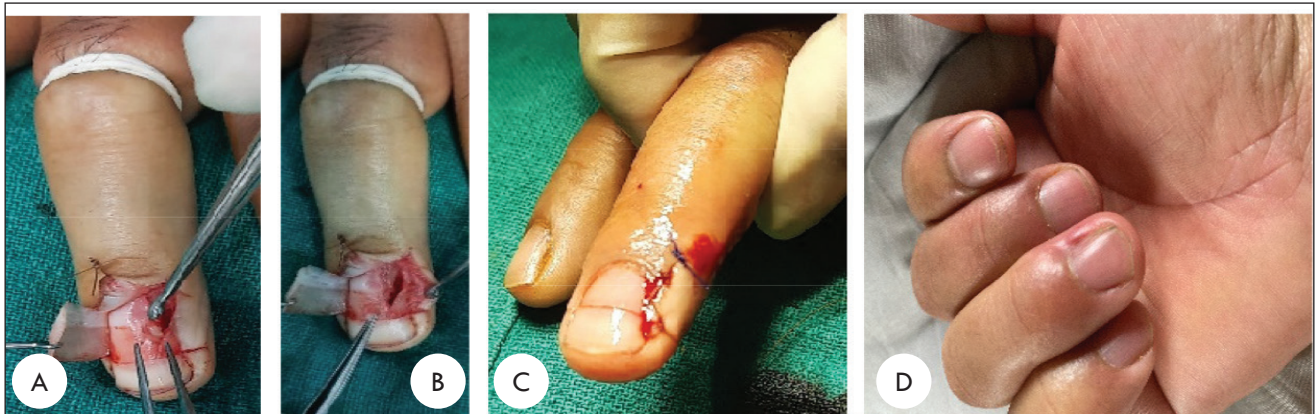


Figure 2. Showing transungual approach A, Tumor mass after excision and longitudinal incision on nail bed B, Reposition of the nail plate after nail bed repair C, Nail after 6 months of operation D.

DISCUSSION

Though the subungual glomus tumor is a rare benign tumor, timely diagnosis and surgical intervention in the form of excision of the tumor are important to relieve the disabling pain. The diagnosis often gets delayed because of the rarity of the tumor and the lack of awareness to the treating clinician about the typical diagnostic triad of clinical findings in the form of intermittent severe pain, pinpoint tenderness, and cold sensitivity.

Paroxysmal pain is the most consistent finding and is invariably present in all cases.⁹ This was true in the current study also. Pinpoint tenderness also known as Love's pin test is elicited by the experience of marked pain on pressing a nail at the lesion site with the head of the thumb pin.

It was also present in all the cases in the present study. Cold sensitivity test and Hildreth's tests were positive in the majority of the cases in our study. The cold sensitivity test is tested by exacerbation of the pain on the application of an ice cube or cold at the nail. Hildreth's test is done by exsanguination of the limb by elevation and inflation of pressure in the blood pressure cuff applied at the arm to obliterate the distal arterial flow. Pain decreases with this maneuver and increases with the deflation of the cuff. A study done by Grover C et al⁶ in 10 cases of glomus tumors showed the presence of pain, positive Love's test, and cold sensitivity in all the cases. The most common symptoms of pain were found in 100% of the cases in the study done by Saaqi M⁹ and the same was true for tenderness also. But, cold sensitivity was found in 76% of the cases

and positive Hildreth's test was observed in 72% of the cases. The sensitivity of pain and Love's pinpoint tenderness is 100% and the specificity of Hildreth's test is said to be 100%.¹⁰ The tumor is most common in middle-aged adults. The mean age of 32.2 years in the present study was similar to the findings in other studies. Santoshi JA et al¹¹ from India reported 38 years as the mean age at presentation with a range from 16-55 years. Ham KW et al¹² from Korea found a mean age of 48.4 years (range 36-78) in the study of 21 cases of glomus tumors. There was a female predominance in the current study which is on par with many other studies. Santoshi et al¹¹ had shown 21 females out of a total of 37 cases, Ham KW et al¹² showed 17 females out of 21 cases. The findings of males outnumbering females by a ratio of 7:1 in the study of Montandon C et al are different from our result. The most commonly involved finger was the ring finger (n=6) followed by the index finger in the present study which was similar to the findings of Montandon C et al and Jawalkar H et al.^{13,14} The mean duration of the symptoms is relatively long and variable before establishing the diagnosis of the glomus tumor probably because of the rarity of the tumor and lack of awareness from the clinicians. The mean duration of symptoms was 1.8 years in the present study which is similar to the findings of Saaq M (18 months), Santoshi JA et al (3.8 years), and Jawalkar H et al (3.25 years). The color change in the nail was noted in the 2 cases only and no case had nail deformity at the time of presentation. In the study done by Van Geertruyden et al¹⁵, bluish discoloration of the nail was present in 29% and nail deformity in 33%. No case had nail deformity preoperatively in this study probably because of a relatively early diagnosis of the condition. Glomus tumors can have X-ray changes in the form of variable degrees of erosion due to late presentation. No case had an X-ray change in the present study. MRI is the choice of imaging modality in the diagnosis of glomus tumor and shows a low signal on the T1 weighted image and

hyperintense on the T2 weighted image. Only 12 cases underwent MRI in the current study and all were diagnosed as a glomus tumor. In 3 cases, MRIs were not done probably because of financial constraints or because the operating surgeon thought it was unnecessary. All the excised specimens underwent histopathological confirmation of the glomus tumor. The surgical excision is the mainstay of treatment to relieve the pain of the glomus tumor. The biggest challenge of excision is to preserve the nail matrix so that nail deformity can be prevented. Recurrence can be due to inadequate excision. Meticulous dissection of the nail matrix for the complete removal of the tumor and prevention of inadvertent injury to the nail bed at the same time to preserve the cosmesis of the nail are the two major challenges during operation.^{16,17} All the cases in the present study were treated with transungual excision, and the pain was relieved the next day only and there was no pain after 2 weeks postoperatively in all the cases. The mean time for the regrowth of the nail was 3.3 months in this study which is similar to the findings of the mean of 3 months in the study done by Saaq M.⁹ There was no case of recurrence and nail deformity at a minimum of 1 year of follow-up in the current study. There was a fine longitudinal ridge over the nail in 3 cases but none had any subjective or objective complaint or cosmetic concern. The risk of tumor recurrence varies and ranges from 0-50% in different studies.^{9,16} In the study of 17 cases of subungual glomus tumor done by Saaq et al⁹, there was no case of recurrence or nail deformity. Similarly, Fujjoka H et al¹⁸ and Jawalkar H et al¹⁴ in their study of excision of subungual glomus tumor found no case of recurrence. Elsherif M et al¹⁹ in their study of 19 cases of excision of the glomus tumor of fingers found no case of local recurrence or nail deformity. Vasisht B et al¹⁷ in their study of 19 cases found one case of nail deformity and 15% cases of recurrence. All the cases had complete pain relief and disappearance of tenderness and cold sensitivity after the excision of the tumor

in this study; similar to the findings shown in different studies.^{11,14,16,19} The transungual approach for the excision has got the advantage of better visualization and complete removal of the tumor so that chance of recurrence is minimal or nil. But, it can have some risk of nail deformity in the form of ridges if the nail bed is injured inadvertently intraoperatively or repair with the fine suture is not done properly.¹⁶ Subungual or Subperiosteal approach involves lifting off of the nail bed from the medial or lateral side depending upon the site of the lesion. This approach is suitable for the peripheral location of the tumor beneath the nail bed and is said to have slightly less risk of postoperative nail deformity. But, it has an increased risk of digital nerve injury, limited exposure to midline tumors,

and a slightly increased risk of recurrence.^{1,2,17}

The limitations of the present study are the retrospective nature of the study, relatively less sample size, less duration of follow-up, and evaluation of the outcome by the operating surgeon. A prospective study with a larger sample size and longer duration of follow-up can substantiate the result of this study further.

CONCLUSIONS

Paroxysmal pain, pinpoint tenderness, and sensitivity to cold is the diagnostic triad of subungual glomus tumor. Transungual excision of the tumor can result in complete pain relief, no risk of recurrence, and nail deformity.

Conflict of Interest: None

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