

# Subungual Glomus Tumor: A Review of 15 Cases Treated with Partial Nail Plate Excision Technique

Mahmoud Farzan<sup>1</sup>, Mahdi Neshan<sup>2</sup>, Amir Reza Farhoud<sup>3</sup>, Abbas Abdoli<sup>4,\*</sup>

<sup>1</sup> Professor, Department of Orthopaedic and Trauma Surgery, Imam Khomeini Hospital Complex, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

<sup>2</sup> Medical Student, Department of General Surgery, Shahid Sadoughi Hospital, School of Medicine, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

<sup>3</sup> Assistant Professor, Department of Orthopaedic and Trauma Surgery, Imam Khomeini Hospital Complex, Joint Reconstruction Research Center, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

<sup>4</sup> Assistant Professor, Department of Orthopaedic and Trauma Surgery, Shahid Sadoughi Hospital, School of Medicine, Shahid Sadoughi University of Medical Sciences, Yazd, Iran

\*Corresponding author: Abbas Abdoli; Department of Orthopaedic and Trauma Surgery, Shahid Sadoughi Hospital, School of Medicine, Shahid Sadoughi University of Medical Sciences, Yazd, Iran. Tel: +98-9121760799, Email: aabdoli2000@yahoo.com

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## Abstract

**Background:** Although there are various surgical methods for subungual glomus tumor treatment, there is no consensus on the optimal surgical approach.

**Methods:** We analyzed the outcomes of 15 patients treated with partial nail plate excision technique. The medial or lateral section of the nail plate was excised longitudinally based on the tumor location. After incision of the nail bed and tumor removal, the matrix was repaired carefully.

**Results:** In this study, 15 people, including 11 men and four women, were studied. The mean onset of symptoms until diagnosis was 88 months. In the postoperative evaluation, the mean follow-up was 20 months. Two patients had recurrent tumors, and one had postoperative nail deformity.

**Conclusion:** Meticulous nail bed repair and complete tumor excision are key treatment points needed to prevent nail deformity and recurrence.

**Keywords:** Glomus Tumor; Treatment; Hand

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## Background

Glomus Tumors are benign, painful, and vascular tumors originating from glomus bodies (1, 2). These glomus bodies are found in large quantities in fingertips, and their main responsibility is to control temperature and blood pressure through controlling blood flow (1, 3-5). The basis of the formation of these tumors, which can occur in all parts of the body, is glomus hyperplasia (6). The hand is the most frequent site for these tumors in the body, especially in the subungual region, and they account for 1 to 5% of all hand tumors in terms of prevalence (6-9). The typical triad of pinpoint tenderness, cold hypersensitivity, and paroxysmal pain identifies the clinical diagnosis. Usually, there is no need for imaging, but a magnetic resonance imaging (MRI) may be helpful (1, 10).

Although full removal of the tumor is thought to be curative, the treatment of subungual tumors can be challenging (11). There is no consensus on an optimal approach to provide both maximum visibility and minimum postoperative nail deformity (12). The classic surgical method is transungual, in which the nail is excised completely or partially (2, 12, 13). For more proximal tumors, the lateral sub-periosteal method is prescribed (14). Additionally, there is another procedure called the nail-flipping technique that the nail plate can be flipped instead of excision (15). We report a cohort of our cases treated with the partial nail bed methods.

## Methods

**Patients:** From August 2012 to September 2017, 21

patients diagnosed with glomus tumor were treated surgically by the senior author (F.M). The presence of all or part of the symptoms of the triad of paroxysmal pain, pinpoint tenderness, and cold hypersensitivity was enough to recommend surgery. If necessary, we used an MRI to confirm the diagnosis. One patient with a glomus tumor of the arm and another with a subungual glomus tumor in the big toe were excluded.

**Surgical Technique:** The exact place of point tenderness was determined before anesthesia. After local anesthesia and finger exsanguination, a part of the nail, usually the medial or lateral one-quarter to one-half of the nail plate, was removed longitudinally depending on the tumor location. Then, the nail bed was probed gently with a hemostat to find the softened spot and locate the tumor under the bed. With a longitudinal incision of the nail bed, the tumor was excised completely with a curette and then sent for pathological examination. The nail bed was then repaired meticulously by a fine absorbable suture (Figure 1).

**Outcome Evaluation:** After approval of the university's ethics committee, all patients were recalled to evaluate the postoperative outcomes. Four of the 19 patients with hand subungual glomus tumors were out of reach and excluded. All remaining 15 patients were explained about the study and they filled the consent form. We reviewed preoperative symptoms and deformity, duration, postoperative deformity, and recurrence.

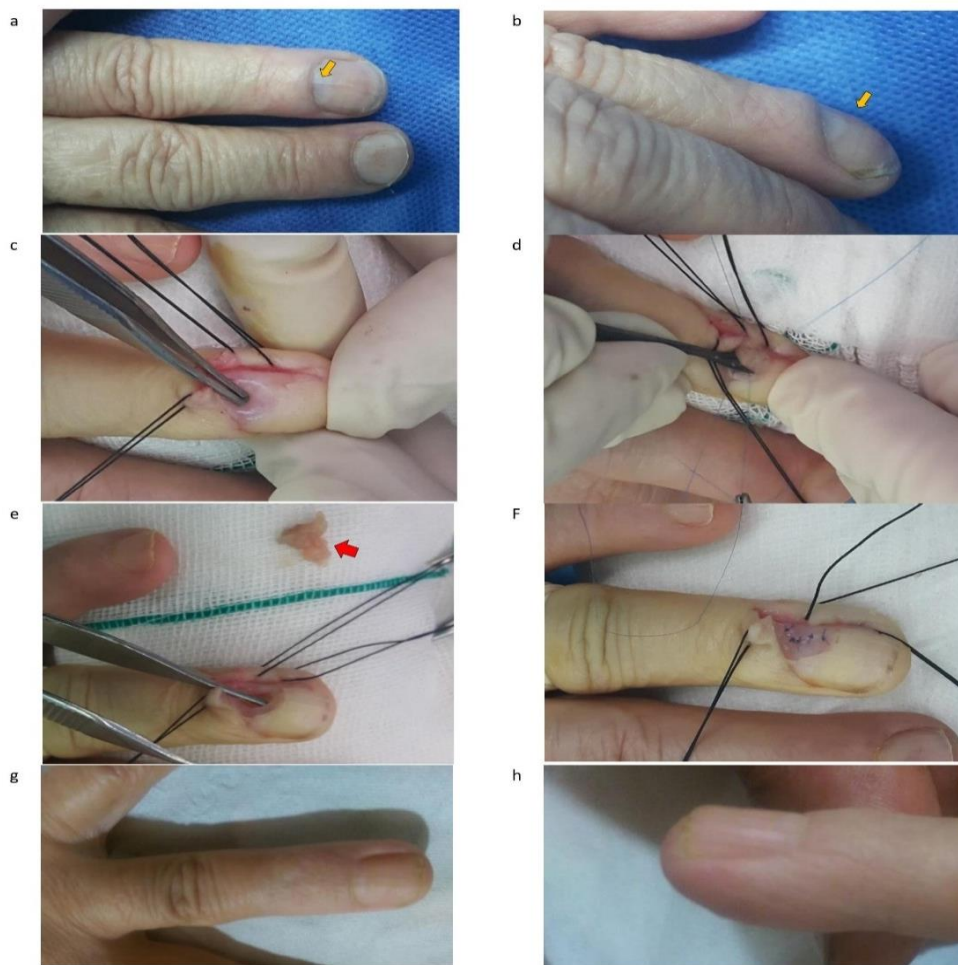
## Results

A total of 11 of the 15 patients were women (73.3%).

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**Figure 1.** A case of partial nail bed excision (Case No.10). a, b: Preoperative nail deformity (longitudinal crest and slight bulging), c: Nail plate lateral part removal and probing the nail bed, the soft spot demonstrates tumor location. d: Excision of the tumor with a small curette, e: Glomus tumor is excised (red arrow). f: Careful fixing of the nail matrix, g, h: 8 months after surgery

The average age of the participants was 46.6 years (the age range was from 33 to 87 years). Before surgery, the average duration of symptoms was 88 months (range from 12 to 300 months). The location of the hand subungual glomus tumors in patients was the thumb, forefinger, middle finger, ring finger, and little finger in 5, 4, 2, 1, and 3 patients, respectively. 8 (53.3%) tumors were in the right hand. All patients had paroxysmal pain, 13 (86.7%) patients had cold hypersensitivity, and 9 (60%) patients had chronic pain. On physical examination, all had point tenderness. 8 (53.3%) patients had preoperative nail deformity such as a longitudinal ridge or nail bulging. Blue blush discoloration was noted in 7 (47.7%) patients.

The average duration of follow-up was 20 months (range from 6 to 60 months). There was no persistent pain after surgery. Only two patients had a recurrent tumor, none of who were in early weeks after surgery, and only one case (Case No.13) required a second surgery. 3 (20%) patients had postoperative nail deformity, two of whom had a preoperative deformity, and just 1 (6.66%) developed a new deformity (Table 1).

## Discussion

Glomus tumor is an uncommon benign tumor. Statistically, the prevalence of this tumor is between 1 to 5%

of hand-related tumors and just 2% of soft tissue neoplasms (2, 14). Any area of the body, including the viscera, might be affected by this tumor (1, 14, 16-18). The subungual area of our hand is a common site to around half of these malignancies (19).

The diagnosis is clinical, and the most common clinical manifestations of these tumors are relatively severe with persistent pain, which aggravates by cold (7, 8, 20, 21). Other factors, such as tenderness, blue discoloration of the affected area of the nail, as well as increased pain when touched by cold, help us to diagnose these tumors (11, 19, 22).

All of our patients had paroxysmal pain and point tenderness, 86.4% of patients had cold hypersensitivity, and 60.0% of patients had spontaneous pain. A total of 47.7 % and 53.3% of patients had discoloration and nail deformity, respectively. In general, our results are similar to other case series in which the most common reported symptoms were paroxysmal pain and point tenderness, usually 100% of patients. Moreover, in most cases, cold hypersensitivity was found the same as our results (1, 14). Often, the diagnosis is delayed as it is rare and unfamiliar to many physicians (23). Some diagnosis reports are as delayed as six or eight years (24). Our series had two patients, one with 21 and another with 25 years of undiagnosed pain (Cases No. 12 and 14).

**Table 1.** Patients' characteristics and results

Case No.	Age - Sex	Delay to treatment (month)	Finger - Side	Symptoms	Pre op discoloration/deformity	Follow-up (month)	Recurrence	Post op deformity
1	51 - F	120	Long - Left	Point tenderness	No/No	60	Yes	Yes
2	34 - F	48	Thumb - Left	Point tenderness Chronic pain Cold sensitivity	Yes/No	37	No	No
3	42 - F	84	Index - Right	Point tenderness Cold sensitivity	Yes/Yes	29	No	No
4	43 - F	36	Thumb - Left	Point tenderness Cold sensitivity	Yes/No	20	No	No
5	37 - M	48	Index - Right	Point tenderness Chronic pain Cold sensitivity	No/Yes	14	No	No
6	33 - F	48	Little - Left	Point tenderness Chronic pain Cold sensitivity	No/No	12	No	No
7	44 - M	60	Index - Right	Point tenderness Chronic pain Cold sensitivity	No/Yes	8	No	Yes
8	53 - F	72	Thumb - Right	Point tenderness	No/Yes	6	No	No
9	46 - F	36	Index - Left	Point tenderness Cold sensitivity	No/No	8	No	No
10	55 - F	48	Ring - Left	Point tenderness Chronic pain	Yes/Yes	8	No	No
11	42 - F	240	Little - Left	Point tenderness Chronic pain Cold sensitivity	Yes/No	6	No	No
12	48 - M	12	Thumb - Right	Point tenderness Cold sensitivity	Yes/Yes	25	No	No
13	50 - M	300	Thumb - Right	Point tenderness Chronic pain Cold sensitivity	No/Yes	10	Yes	No
14	34 - F	120	Little - Right	Point tenderness Chronic pain Cold sensitivity	Yes/No	30	No	No
15	87 - F	48	Long - Left	Point tenderness Chronic pain Cold sensitivity	No/Yes	32	No	Yes

SD: Standard deviation; BMI: Body mass index

The treatment prescribed is the complete excision of the tumor. Multiple surgical techniques are reported for subungual tumors. Traditionally, the transungual approach is used wherein the nail plate is removed, and the tumor is excised with a longitudinal incision on the nail bed (5, 12). The nail plate removal may be complete or partial (2, 13, 25). Then nail plate can be flipped instead of excision. In the nail-flipping technique, the proximal part of the nail is folded distally and, after tumor excision, is again returned (21). The advantage of the transungual approach is a good visualization of the tumor, but it is assumed to cause high rates of nail deformities as a result of a nail bed incision (2).

Other techniques such as the lateral subperiosteal technique prescribed by Vasisht et al. (14) for proximal lateral third tumors (26, 27) and subungual technique prescribed by Nambi and Varanambigai (19) are proposed to prevent nail bed incision. Different rates of post-surgical deformity are reported in case series using a transungual approach varying from 4.5% to 19.0% (2, 26). An important factor in decreasing the risk of nail deformity is preventing nail bed injury during surgery and ensuring meticulous bed repair (21).

In our series, we did not replace the excised part of the nail plate but did a careful nail bed repair. Three patients had postoperative nail deformity, two of whom had a preoperative deformity and just 1 (6.66%) developed a new deformity which is similar to deformity rate in other series with transungual approach and complete nail excision and final restoration of the nail plate (2, 26). This shows that respect to the nail bed and its precise repair may be the most important factor in nail deformity prevention.

There is no common consensus about the reason for the recurrence of this tumor among surgeons in various articles (1, 2, 4). In general, a theory attributes the recurrence that occurs less than six months after surgery to incomplete excision and the recurrence of tumors that occur more than six months after surgery to the growth of

a new lesion (4, 6, 28-31). What is clear is that the transungual approach gives the surgeon a relatively good view to complete tumor excision, resulting in a lower recurrence rate (26, 29). A missed second tumor, as well as an incomplete tumor excision, can also be the cause of early recurrence. For late recurrence, it is suggested that a new tumor growth or synchronous satellite lesions may be responsible (11, 14).

In our series, we had no early recurrence showing that the excision was complete and there were only 2 (13.3%) cases of late recurrence, perhaps due to a new tumor or a satellite lesion growth. The present study suffered from the following limitations. First, the study faced few numbers of cases due to the fact that glomus tumor is rare and accounts for only 1-5% of hand tumors. In addition, we did not consider early postoperative period symptoms such as pain and discomfort, and we could not compare it with other techniques.

### Conclusion

Partial nail bed removal may be a good method for subungual glomus tumor excision. However, not restoring the nail plate may cause postoperative nail deformity and discomfort, but respect to the nail bed and its meticulous repair is the key point required to avert postoperative nail deformity. To prevent tumor recurrence, it is important to excise the tumor completely and check for synchronous satellite lesions.

### Conflict of Interest

The authors declare no conflict of interest in this study.

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