

## Case Report

# Subungual glomus tumor causing 15 years of pain: a case report

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Received April 6, 2016; Accepted September 16, 2016; Epub December 15, 2016; Published December 30, 2016

**Abstract:** Subungual glomus tumors are rare benign tumors arising from glomus body, which often present with pinpoint pain under the nail. A case of 36-year-old female patient presented with intense pain over the right middle fingertip for 15 years is reported here. A transungular approach was taken to excise the tumor mass under local anesthesia, and histopathology reported a subungual glomus tumor. Complete removal of the tumor mass is critical to reduce the nail bed damage and deformity. Characteristic clinical features of excruciating pain, localized tenderness and cold sensitivity are important to make correct diagnosis. Physical examination and imageology can help to confirm the diagnosis and locate the tumor mass.

**Keywords:** Glomus tumor, subungual, surgical excision, diagnosis, pain

### Introduction

Glomus tumors are relatively rare tumors found all over the body. About 80% of the tumors are located in the upper extremities, especially subungual areas, accounting for about 2% of all hand tumors [1]. Glomus tumors are closely related with hyperplasia of glomus bodies [2], which are supposed to function in thermoregulation and blood circulation of the skin.

Glomus tumors require careful assessment for differential diagnosis to avoid misdiagnosed and unsuitable treatments, which may leave patients with years of chronic pain. Complete removal of the tumor mass is very effective to cure the pain and avoid recurrence. Typical glomus tumors present characteristic clinical features of excruciating pain, localized tenderness and cold sensitivity. These features strongly indicate the diagnosis of subungual glomus tumor. Imaging examinations such as magnetic resonance imaging (MRI) and ultrasonography also have been suggested to confirm the diagnosis.

### Case report

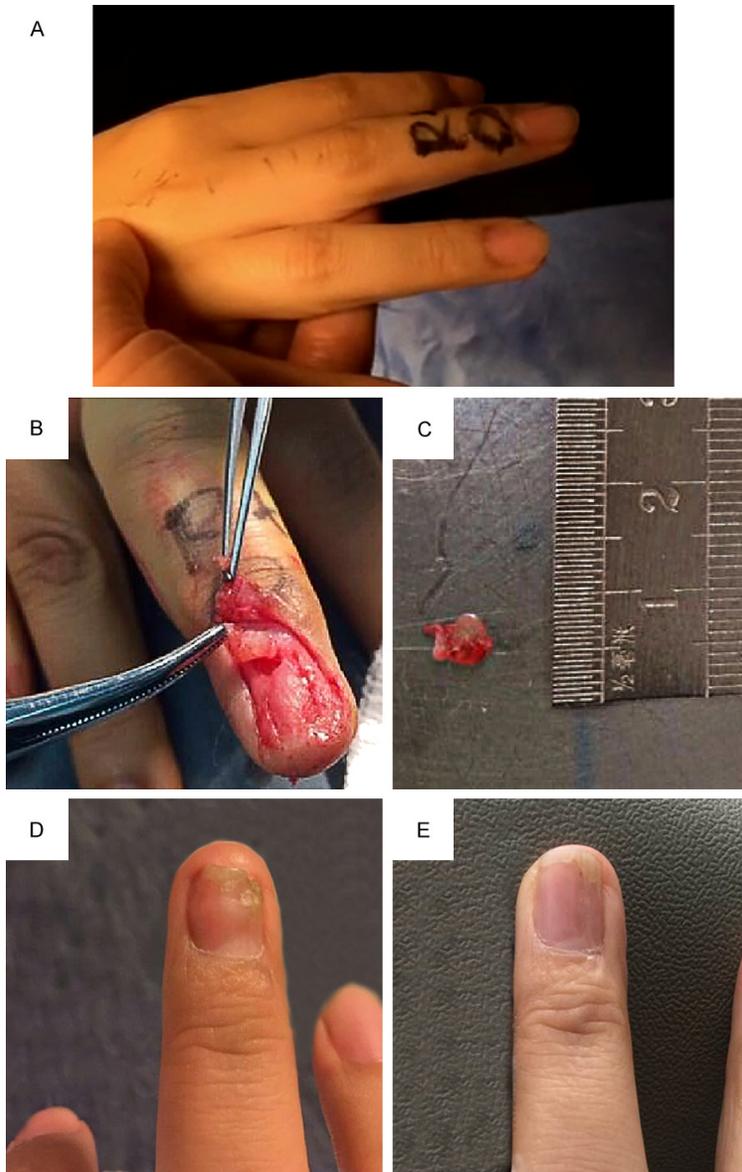
A 36-year-old patient was admitted to our hospital with complain of excruciating pain over the

right middle fingertip for 15 years. No trauma happened prior to onset of symptom. The pain was intensified by mild touch or cold stimulation, torturing her even at sleep time. No relevant past medical history or family history was mentioned. She suffered the pain for such a long period, and pain gradually intensified in recent years, however no accurate diagnosis could be confirmed by any previous hospitals.

Physical examination revealed obvious point tenderness over the tip of the right middle finger. There were no visible masses, no color change of skin and finger nail, no feeling of numbness, which differentiated from Raynaud's phenomenon. The pain was aggravated by immersing the hand in cold water. Love's test and Hildreth's test were both positive. Ultrasound revealed a sheet hypoechoic mass (diameter: 4.9\*2.9 mm) beneath the subcutaneous soft tissues with clear boundaries and CDFI (color Doppler flow imaging) showed rich blood flows inside the mass.

Before surgery, the most fierce tenderness area was marked (**Figure 1A**), and a rubber band was fixed to the finger root to exsanguinate the digit. The mass was located at the lower central

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**Figure 1.** Macroscopic view of the tumor. A. Fingers before the surgery. B. Glomus tumor exposed on the nail bed. C. Excised tumor tissue. D. A follow-up of 3 months after the surgery. E. A follow-up of 1 year after the surgery.

subungual region. A transungular approach was performed to excise the mass under the nerve block anesthesia of the finger root. Firstly a separation of nail was made by a sharp scalpel along the bilateral nail groove. After removing the nail plate, an approximately 3 mm mass was well exposed (**Figure 1B**) and then completely excised (**Figure 1C**). The germinal matrix should be taken excellent care of during the whole procedure. Later histopathological report demonstrated a subungual glomus tumor (**Figure 2**).

The patient recovered well during the follow-ups of 3 months, 6 months, and 1 year after

the surgery (**Figure 1D, 1E**). No recurrence was observed in the latest follow-up, even though there was a light deformity of the nail.

### Discussion

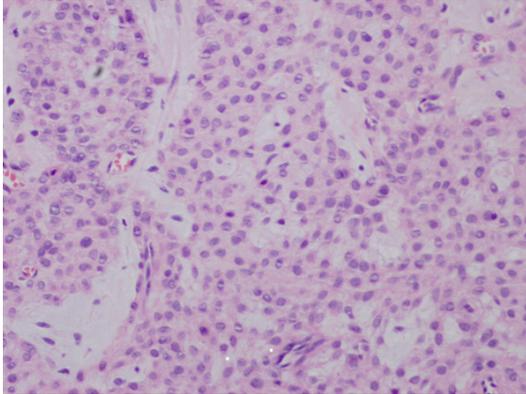
Glomus tumor is a rare benign tumor, whose pathological features were first described by Masson in 1924 [2]. Glomus tumor is mainly caused by hyperplasia of the glomus body. Glomus bodies locate in the dermal reticular layers and directly connect arteriovenous structures, consisting of afferent artery, vascular anastomosis, venous pooling, intraglomerular reticulum and capsular portion. Normal glomus bodies are found in trunk, neck as well as extremities, which are supposed to function in thermoregulation and blood circulation of the skin.

Glomus tumors are mostly seen in female ranging from 30 to 50 years old, with diameters generally less than 1 cm. Although glomus tumors can be found all over the body, even in the stomach [3], it usually occurred in the extremities, accounting for 1-5% of all hand tumors and 75% are subungual. The clinical features include a classic triad of excruciating pain, localized tenderness and cold sensitivity. Sometimes it may present as

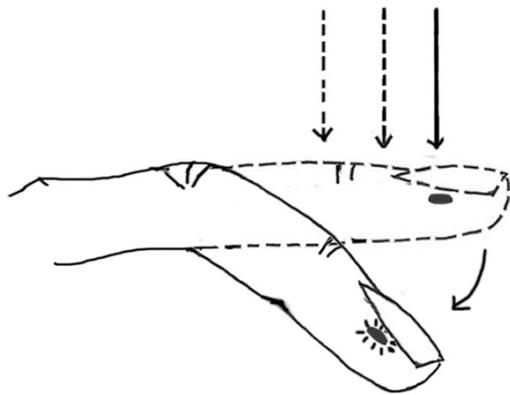
deformed nails, subungual discoloration, hypoesthesia or other symptoms. Recently, it's widely accepted that the pain of glomus tumor referred to the rich unmyelinated sensory nerve fibers in the tumor. Additionally, hypotheses of increased intracapsular pressure sensitivity to stress and algogenic substance released by mast cells also need to be further testified [4].

The clinical diagnosis of glomus tumors usually based on the classic triad, assisted with Love's test, Hildreth's test, cold sensitivity test and trans-illumination. Love's test is applied by pressing the suspicious area with a pin head or

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**Figure 2.** Histopathology examination of the tumor. The tumor has multiple dilated blood vessels surrounded by clusters of glomus cells. The tumor cell contains round nucleus with amphophilic or pale eosinophilic cytoplasm (Haematoxylin-Eosin stain,  $\times 400$ ).



**Figure 3.** Love's test for patients. Pressing the suspicious area will trigger a severe pain and retraction response, which indicates positive sign to Love's test.

a ball point pen. A severe pain with hand retraction indicates positive (**Figure 3**). The sensitivity of Love's test is 100%, but its specificity is not high enough, because some diseases can also cause the similar pain, such as onychia, paronychia, and subungual hematoma. Hildreth's test is fastening the elevated limb with tourniquet to eliminate pain, whose specificity is 91% to 100%. Therefore, clinical features with positive Hildreth's test are of great diagnosis value to glomus tumor.

Imaging examination can also contribute to the diagnosis. High frequency (40 MHz) ultrasonography can detect  $>2$  mm subcutaneous homogeneous hypoechoic masses, often presented

with clear boundaries and rich blood flow signal inside. X-ray test can show tumor pressure trace and bone erosion for those with relatively large size. While MRI (magnetic resonance imaging) (T2 phase) displays a local signal enhancement. MRI has a sensitivity of 90% for glomus tumor, but only 50% in specificity [5]. In addition, MRI can also be helpful to locate the tumor [6]. Therefore, in patients with typical clinical manifestations, ultrasonography and MRI are routinely recommended as the most helpful tools for the preoperative accurate diagnosis. MDCT (multidetector computed tomography) has an advantage in showing a subungual nodule and a depression of the distal phalanx more directly and helps to locate the tumor [7]. However, the average time to make right diagnosis of subungual tumor is 7 year [8], and lack of awareness to this rare disease is the major problem for misdiagnoses as neuralgia, paronychia, or arthritis, which leads to ineffective treatment and causes intolerant anxiety of patients for many years.

Complete surgical excision is the only effective way to cure glomus tumor. Love's test or transillumination test should be done preoperatively to locate the tumor. The proximal phalanx should be fully exsanguinated by binding tourniquet to the root of digits to clear surgical field. One more tourniquet on the upper limb may be chosen in case of poor exsanguinating effect.

There are two major surgical approaches to excise subungual glomus tumor. The traditional approach is transungual excision, which removes part or entire nail plate, and cuts through the nail bed to guarantee good tumor exposure. Complete removal is relatively easy, but damage to the nail bed is obvious more serious, with higher incidence of postoperative nail deformity. Another commonly used approach is lateral incision, which makes an L-shaped incision along the edge of the nail, and lifts the entire nail bed and nail plate to expose the tumor. This approach leaves smaller damage, and preserves the wholeness of the nail bed, reducing the risk of postoperative nail deformity. But with a smaller exposed surgical field, it is restricted by the location of tumor, and requires more skills if the tumor is located on the central nail bed, and may even damage digital nerves. Hence this approach is usually reserved for laterally located tumors [9,

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10]. Garg proposed a modified lateral subperiosteal approach, which curves around the pulp, dissects to the periosteum, and raises a dorsal flap of nail matrix to expose the tumor [11]. This approach avoids damage to the nail bed and nail plate without restriction of tumor location.

More and more modified surgical approaches and new techniques have been introduced. Roan reported a case of nail bed complex incision without extracting the nail [12]. The follow-ups returned a significant lower rate of postoperative nail deformity [12]. Microscopic assisted surgery has also been reported in glomus tumors for its blood-less procedure, and little damage to the nail matrix with larger assurance of complete excision of tumor [13]. A 12-year follow-up reported that microscopic excision of subungual glomus tumors were as safe as traditional surgery excision, and had advantages in little damage and low rate of recurrence and nail deformity [14].

In this report, we showed a patient with chronic pain in right middle fingertip for 15 years, and most patients with subungual glomus tumors also have a long history. They may have consulted many doctors, but still being misdiagnosed and treated with ineffective conservative treatment for many years. Some of these patients cannot tolerate such pain and resort to nerve block, even amputation or other inappropriate treatment. Surgical excision is the only effective treatment method to terminate the suffering. The principle is complete removal of the tumormass and reducing the nail bed damage. Once a doctor has mind of this rare subungual disease, it would be not that difficult to make correct diagnosis with the characteristic clinical features.

### Disclosure of conflict of interest

None.

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