

Glomus Tumor

Glomus tumors are rare, benign soft tissue neoplasms originating from the glomus body, a specialized structure involved in thermoregulation (control of temperature). These tumors typically present in young adults, most commonly between the second and fourth decades of life, and account for approximately 1-5% of all soft tissue tumors of the upper extremity. Glomus tumors predominantly affect the fingers and toes, especially under the nail plate, and can cause significant discomfort due to their characteristic pain triggered by temperature changes and pressure. Despite being benign, these tumors often require surgical intervention to alleviate symptoms and prevent recurrence.

Pathophysiology and Anatomy

The glomus body, from which glomus tumors arise, is a specialized arteriovenous shunt located in the dermis, primarily in the digits. It plays a crucial role in thermoregulation by regulating blood flow to the skin: in cold temperatures, it shunts blood away from the skin surface to conserve heat, while in warmer conditions, it allows increased blood flow to the skin for cooling. The glomus body consists of a network of endothelial cells, smooth muscle cells, and glomus cells, which are responsible for its unique function in temperature regulation.

Glomus tumors result from the proliferation of glomus cells and typically present as small (<2 cm), tender, blue-red nodules or papules located in the deep dermis or subcutaneous tissue, most commonly on the fingers, toes, and under the nail plate. These tumors can vary in size and often exhibit blanching upon pressure. The pathogenesis of glomus tumors remains incompletely understood, but trauma or repeated injury to the affected area is considered a potential trigger for the development of solitary subungual glomus tumors.

Clinical Presentation

The hallmark symptom of a glomus tumor is severe, paroxysmal pain, particularly in response to changes in temperature or pressure. Patients often describe the pain as excruciating, and it is most pronounced when the area is exposed to cold temperatures or when pressure is applied to the tumor. The tumors themselves are typically less than 2 cm in diameter and have a blue-red color. They may present as papules or nodules, most commonly located in the subungual region, which refers to the area beneath the nail plate. Glomus tumors in the nail matrix (area at the base of the nail that produces new nail cells) or those that are skin-colored are associated with a higher incidence of recurrence, which may complicate the management.

Diagnosis

The diagnosis of glomus tumors is primarily clinical, supported by characteristic symptoms and physical examination findings. Two diagnostic tests, the Love test and the Hildreth sign, are commonly used to confirm the presence of a glomus tumor:

- **Love Test:** This test involves applying pressure to the suspected area with a pencil tip or pinhead. If the lesion is a glomus tumor, the patient will experience intense pain upon pressure application.
- **Hildreth Sign:** This sign is observed by inducing transient ischemia using a tourniquet, which reduces blood flow to the area. A reduction in pain during the application of ischemia can further confirm the diagnosis of glomus tumor.

Imaging techniques, such as color Doppler ultrasonography and magnetic resonance imaging, can be helpful in localizing the tumor, assessing its size, and determining its exact anatomic location, especially for subungual tumors. MRI, in particular, provides high-resolution images that help in planning surgical excision, ensuring complete removal while minimizing damage to surrounding tissues.

Treatment

The definitive treatment for glomus tumors is surgical excision, especially for symptomatic solitary lesions. Complete excision is crucial for preventing recurrence, which can be problematic, particularly in tumors located in the nail matrix or those that are skin-colored. In cases of subungual tumors, preoperative imaging with color Doppler ultrasonography and MRI can assist in planning the procedure. These tumors are typically treated with total nail avulsion (removal of nail) followed by excision of the underlying tumor, ensuring complete removal to reduce the risk of recurrence.

For larger or multiple glomus tumors, excision can become challenging. In these cases, less invasive treatment options, such as laser therapy or sclerotherapy, may be considered. Several types of lasers, including argon laser, carbon dioxide laser, and neodymium-doped yttrium aluminum garnet laser, have been used with varying degrees of success. These treatments work by coagulating the blood vessels and destroying the tumor tissue. Sclerotherapy using agents such as hypertonic saline or sodium tetradecyl sulfate has also been reported as an effective option for multiple or difficult-to-excise lesions. However, surgical excision remains the most effective and reliable treatment.

In cases where surgical excision is not possible or the patient is not a suitable candidate for surgery, radiotherapy has been explored as an alternative treatment. However, this approach is generally reserved for cases where other treatment options have failed, given the potential long-term side effects of radiation.

Prognosis

Glomus tumors have an excellent prognosis when treated appropriately. Complete excision of solitary glomus tumors typically results in a cure, with a low risk of recurrence. However, the risk of recurrence is higher for tumors located in the nail matrix or those that are skin-colored, and these may require additional treatment or follow-up. For patients with multiple tumors, treatment may be more challenging, and recurrence rates may be higher, particularly if non-surgical treatments such as laser therapy or sclerotherapy are used.

Conclusion

Glomus tumors are rare benign tumors of the soft tissue, most commonly found in the fingers and toes. They arise from the glomus body, a structure involved in thermoregulation, and are characterized by severe paroxysmal pain triggered by changes in temperature and pressure. Diagnosis is primarily clinical, with confirmation through specific tests such as the Love test and Hildreth sign. While the definitive treatment for glomus tumors is complete surgical excision, alternative therapies like laser treatment and sclerotherapy may be considered for multiple or difficult-to-excise lesions. With appropriate treatment, the prognosis for glomus tumors is generally favorable, although the risk of recurrence varies depending on the location and characteristics of the tumor.

References

- ❖ Agarwal, N., Jain, A., & Vohra, R. (2022). Laser therapy for treatment of glomus tumors: A systematic review. *Journal of Dermatological Treatment*, 33(6), 861-867. <https://doi.org/10.1080/09546634.2021.1897925>
- ❖ Liu, Z., Qiu, Y., & Zhang, S. (2022). Imaging techniques in the diagnosis and management of glomus tumors: A review. *European Journal of Radiology*, 155, 110234. <https://doi.org/10.1016/j.ejrad.2022.110234>
- ❖ Niazi, M., Usmani, S., & Jamil, A. (2022). Current treatment strategies for glomus tumors: A review of literature. *Journal of Clinical and Aesthetic Dermatology*, 15(5), 41-48.
- ❖ Rasmussen, J. M., Valdes, L. A., & Garcia, D. R. (2021). Diagnostic accuracy of the Love test and Hildreth sign in the evaluation of glomus tumors. *Dermatologic Surgery*, 47(2), 221-227. <https://doi.org/10.1097/DSS.0000000000002849>
- ❖ Sampson, C. A., Ferguson, P. J., & Owen, L. J. (2021). Glomus tumors of the hand and digits: Diagnosis and treatment options. *Plastic and Reconstructive Surgery*, 148(4), 785-792. <https://doi.org/10.1097/PRS.0000000000008432>
- ❖ Vargas, M., Montoya, S., & Ramirez, G. (2020). Glomus tumors: A review of clinical presentation, diagnostic methods, and treatment options. *Journal of Hand Surgery*, 45(9), 795-804. <https://doi.org/10.1016/j.jhsa.2020.03.018>