Glomus tumors are relatively rare benign neoplasms that originate from the normal glomus body, which is an arteriovenous shunt related to thermoregulation. Glomus bodies are present in the stratum reticularis of the dermis throughout the body but are highly concentrated in the digits, palms, and soles. The incidence of glomus tumors in nerves is extremely rare, as normal glomus bodies have not been found in nerves. We describe the case of a 30-year-old woman with a glomus tumor originating from a digital nerve that required excision along with a nerve segment. In this case, because the tumor was inseparable from both fascicles of the nerve, a segment of the ulnar digital nerve was resected with the tumor. After tumor resection, direct nerve repair was performed, and the patient showed favorable outcomes.

CASE REPORT

A 30-year-old woman presented with pain on the ulnopalmar aspect of the middle phalanx of the left little finger for the past 2 years. The patient denied any pertinent medical or family history. The patient also reported sensitivity to low temperature and severe pain by direct pressure at the same location. Physical examination revealed a normal appearing left little finger with a full range of motion and no neurological deficits. We noted extreme point tenderness but no distally radiating pain. Ultrasoundography revealed a 3.4 × 1.4-mm hypoechoic mass adjacent to the digital artery on the ulnar side of the middle phalanx (Fig. 1). Magnetic resonance imaging (MRI) demonstrated a mass with low signal intensity on T1-weighted images and high signal intensity on T2-weighted and fat-suppressed T2-weighted images in the axial plane (Fig. 2). Thus, we suspected a solitary glomus tumor in the middle phalanx area of the left little finger. Surgical excision was performed with the use of pneumatic tourniquet under brachial plexus anesthesia. Intraoperatively, a tumor was found within the ulnar digital nerve. The tumor location was slightly displaced from the running axis of the nerve (Fig. 3). Intraneural microdissection was performed under a microscope. The tumor was observed to arise from both fascicles of the nerve. Because further dissection was not possible, a segment of the ulnar digital nerve was resected with the tumor. After tumor resection, the resection stumps were approximated end to end and epineural suture was performed without tension. Histological findings were compatible with a benign glomus tumor. The tumor was confined within the nerve and was composed of a solid sheet of uniform, round tumor cells with eosinophilic cytoplasm surrounding the vascular structures. The nuclei were round to oval (Fig. 4).

Although numbness on the ulnar side of the little finger developed immediately after surgery, ulnar digital nerve function gradually recovered. One year 6 months postoperatively, the patient had resolution of the preoperative pain, point tenderness, and cold intolerance. According to the Semmes-Weinstein monofilament test, she showed diminished light touch (blue).

DISCUSSION

Glomus tumors account for 1%–5% of all soft-tissue tumors of the hand. They occur more frequently in women, predominantly in the subungual areas. These tumors are typically characterized by paroxysmal pain, pinpoint tenderness, and cold hypersensitivity. Although this tumor can be found anywhere in the body, it does not typically occur in nerves, because normal glomus bodies have...
not been found in nerves. Therefore, glomus tumors in nerves are extremely exceptional. There are several hypotheses regarding the occurrence of glomus tumors in nerves. First, the tumor might have infiltrated from extraneural tissues, such as concomitant vessels, by direct extension. Second, tumors may develop from possible intraneural ectopic glomus cells. The third hypothesis is that the tumor develops through differentiation from unspecialized perivascular cells, or pericytes. At present, the differentiation from a nonglomus cell origin theory is widely accepted.

The diagnosis of glomus tumors is based on symptoms and physical examination. However, preoperative imaging findings are important to determine the tumor size and localization before surgery and to consider other tumors in the differential diagnosis, such as neuroma, schwannoma, and hemangiomas. Ultrasonography can identify tumors as small as 2 mm in diameter in any cross-section. Glomus tumors are depicted as well-circumscribed hypoechoic masses. MRI can also be useful for detecting tumors as small as 2 mm. Most glomus tumors have low signal intensity on T1-weighted images, high signal intensity on T2-weighted images, and strong enhancement after gadolinium injection. In our case, although preoperative imaging revealed the tumor size and localization, it was difficult to confirm that it was a nerve-connected tumor because the digital nerve at the level of the middle phalanx was relatively thin and the tumor was slightly displaced from the running axis of the nerve. MRI revealed the tumor in axial images only because of the small size.

To the best of our knowledge, only 4 cases of glomus tumors and 1 case of multiple glomus tumors within a digital nerve have been reported to date. In 3 cases, it was possible to separate the tumor from the nerve, and in 2 cases, the tumor(s) at the level of the proximal pha-
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lanx were inseparable from one of the several nerve fascicles. The tumor(s) were resected with a segment of the fascicle, and nerve repair was not performed in the 2 inseparable cases. Some cases had sensory disturbances after lesion resection, and numbness persisted in 1 case.4,7,8,10 In 5 published cases, there were no recurrences. In 1 case, the follow-up period was unknown, and the remaining 4 cases had an average follow-up period of 21 (10–36) months.4,7,8,10 In our case, tumor recurrence was not identified over an 18-month follow-up period. Further follow-up is necessary to evaluate long-term results, including recurrence.

Surgical excision is the only feasible method for the treatment of glomus tumors. In a glomus tumor originating from the peripheral nerve, careful microsurgical dissection is essential to prevent recurrence and to minimize iatrogenic injury to the nerve fascicles. When the tumor cannot be separated from the nerve, it may be necessary to excise the tumor along with a segment of the nerve for curative treatment, even if nerve repair is required. In our case, because the tumor was inseparable from both fascicles of the nerve, a segment of the ulnar digital nerve was resected with the tumor. Direct nerve repair was subsequently performed because of a minimal gap between the nerve ends. If tensionless direct repair could not be achieved, we would select autologous nerve grafting or conduit implantation.

Our patient showed favorable outcomes, with sensory recovery and no recurrence, because direct nerve repair was performed on the distal site of the proximal interphalangeal joint and the patient was relatively young.

Fig. 4. Histology finding. A, Glomus tumor within the nerve (hematoxylin and eosin staining, ×40). B, High-power microscopic view of the glomus tumor with uniform cells exhibiting round to oval nuclei, intermixed with the vascular structures (hematoxylin and eosin staining, ×400).

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