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신경초종에 의한 표재요골신경의 압박

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Compression of the Superficial Radial Nerve by Schwannoma: A Case Report

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Purpose: Schwannoma, a benign peripheral nerve tumor, is slow-growing, encapsulated neoplasm that originates from the Schwann cell of the nerve sheath. Schwannoma most frequently involves the major nerve. Schwannoma occurring in the superficial radial nerve rare. This is a report of our experience with schwannoma arising from the superficial radial nerve with neurologic symptom.

Methods: A 55-year-old woman presented with eight-month history of progressive numbness and paresthesia in dorsum of the thumb and index finger. Physical examination revealed a localized mass on the midforearm. Sonographic examination showed an ovoid, heterogenous, hypoechoic lesion, located eccentrically in related to the superficial radial nerve. The lesion was mobile in the transverse but not in the longitudinal axis of the nerve, which was thought to favour schwannoma rather than neurofibroma. At operation, a 20 × 15 mm ovoid, yellowish grey mass was seen arising from the superficial radial nerve. The tumor present as eccentric masses over which the nerve fibers are splayed. Using operating microscope, the tumor was removed, preserving the surrounding nerve.

Results: Histology confirmed that the mass was a benign schwannoma. There were no postoperative complications. After two months the patient had no clinically demonstrable sensory deficit.

Conclusion: An unsusual case of a schwannoma of the superficial radial nerve is presented. In case with neurologic symptom, prompt surgical decompression must be made to prevent further nerve damage and to restore nerve function early.

Key Words: Schwannoma, Superficial radial nerve

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I. INTRODUCTION

Peripheral nerve tumors are rare. They are commonly benign and the two major types are schwannoma and neurofibroma.[1] The former is the most common. Schwannoma is usually solitary, ovoid, slow-growing, encapsulated nerve sheath tumor that originates from the Schwann cell of the nerve sheath.[2] It has a predilection for the head and neck, flexor surface of the limbs, and major nerve[1,3] It comprises 5% of the soft tissue tumors in upper extremities.[3]

The superficial radial sensory branch separates from the radial nerve approximately 2 cm proximal to the lateral epicondyle and never enters the radial tunnel.4 The superficial radial nerve passes between the tendons of the brachioradialis and extensor carpi radialis longus and pierces the deep fascia and travels a subcutaneous plane. Then, it bifurcates into the medial and lateral branches. The lateral branch extends along the dorsoradial aspect of the thumb and innervates the skin in this area. The medial branch continues distally and divides into several branches that pass over the tendon of the extensor pollicis longus and innervates the ulnar side of the thumb and the dorsum of the hand and fingers.[4]

Compression of the superficial radial nerve has classically been reported at its vulnerable subcutaneous level at the wrist.[4] Also, superficial radial nerve compression has been localized to the site where it emerges from the deep fascia.[4] More proximal compression of the superficial radial nerve in the deeper tissues is rare. We reports a unusual case of schwannoma arising from the superficial radial nerve beneath deep brachioradialis tendon.

II. CASE

A 55-year-old woman presented with progressive numbness and paresthesia in the dorsal aspect of her right thumb and index finger for 8 months. She had no history of injury. Physical examination revealed a localized mass on the anterolateral side of the midforearm (Fig. 1, Left) and showed a positive Tinel's sign. Radiographs of the hand and forearm showed no abnormalities. Electrodiagnostic test revealed a decreased superficial radial sensory nerve action potential of 18 μV. Sonographic examination showed a sharply delineated hypoechoic hetergenous mass, measuring approximately 2.0 × 1.5 cm (Fig. 1, Right). It was immobile in the longitudinal plane when compared with the adjacent tendons during flexion and extension. However, its movement could be appreciated in the transverse plane. A cord-like structure consistent with a nerve was showed in continuity with the mass. The mass was located eccentrically in related to the superficial radial nerve. A diagnosis of schwannoma was suggested on the basis of these findings. Under general anesthesia, the superficial radial nerve was identified. The tumor present as eccentric masses over which the nerve fibers are splayed beneath brachioradialis tendon (Fig. 2). Using the operating microscope, a 20 × 15 × 10 mm ovoid, yellowish grey tumor was shelled out, preserving the surrounding superficial radial nerve. Histopathologic examination proved a schwannoma characterized by the biphasic morphology of Antoni A areas with hypercellularity and the less cellular, more myxoid-appearing Antoni B areas (Fig. 3). Two months after surgery, she experienced considerable improvement

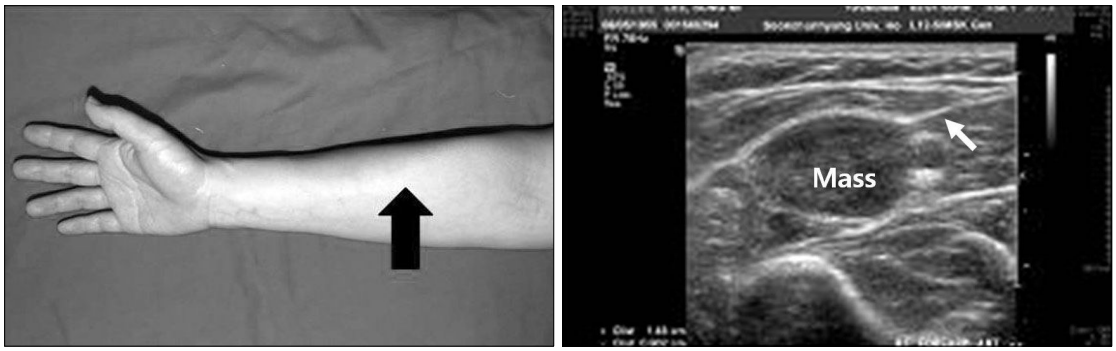

Fig. 1. (Left) A 55-year-old woman was presented with 2 × 1 cm mass on the right midforearm (arrow). (Right) Sonography of schwannoma. Longitudinal sonogram of a mass reveals an ovoid, well-defined mass with a heterogenous and hypoechoic pattern. The mass was eccentrically located in the superficial radial nerve (arrow).

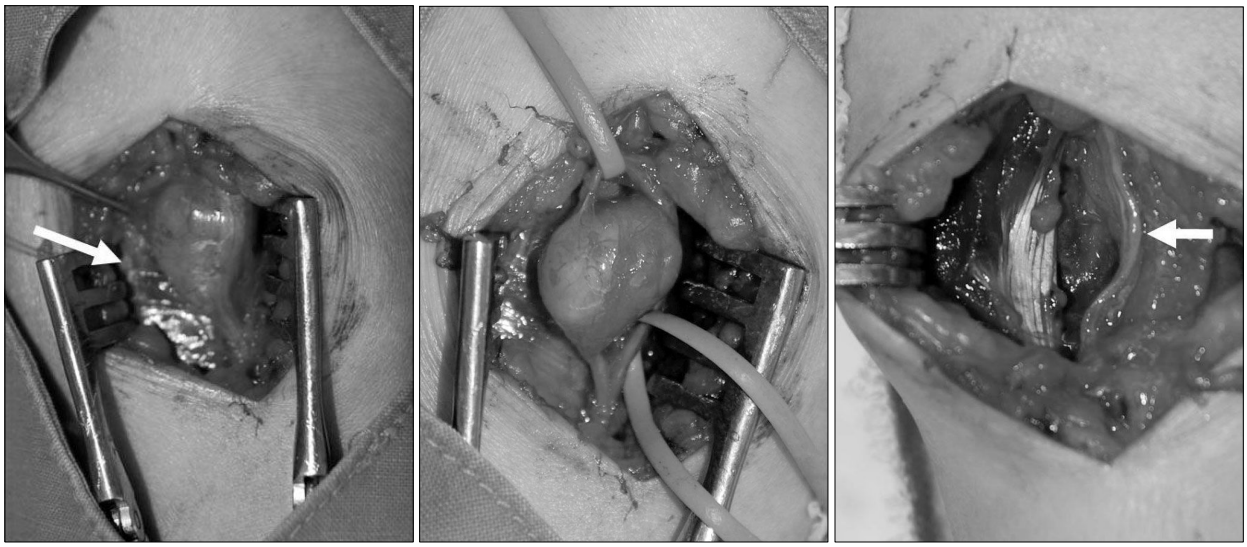

Fig. 2. Intraoperative findings. (Left) The tumor compressed the superficial radial nerve beneath brachioradialis tendon (arrow). (Center) The mass was sprayed by the superficial radial nerve. (Right) After separating the superficial radial nerve from the tumor, the superficial radial nerve (arrow) was demonstrated.

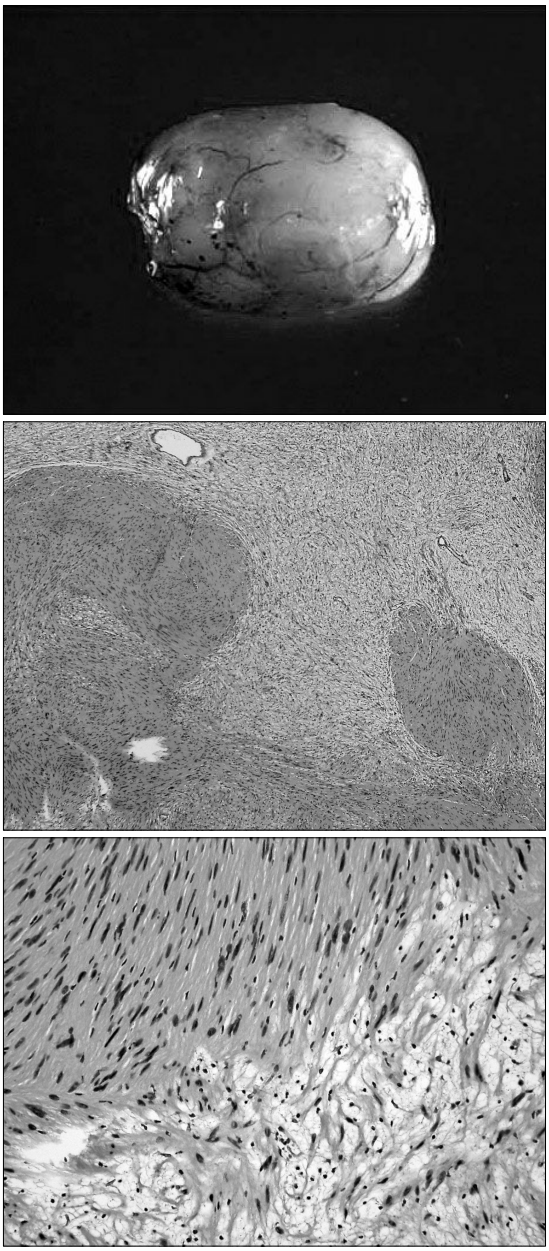

Fig. 3. (Above) Macroscopic specimen of the mass. (Center) Biopsied specimen demonstrating the biphasic morphology (Hematoxylin and eosin stain, × 40). (Below) Photomicrograph of specimen shows spindle-shaped cells with palisading nuclei (Antoni A area) mixed with relatively hypocellular areas (Antoni B) (Hematoxylin and eosin stain, × 100).

of symptoms and had no evidence of recurrence.

III. DISCUSSION

Schwannoma, also referred neurilemoma, neurinoma, and perineural fibroblastoma, is an encapsulated nerve sheath tumor.[2] It is typically less than 2.0 cm in diameter. Schwannomas most frequently involve the head and neck area, and the major nerve.[1,3] Consequently, the spinal roots and the cervical plexus, the vagus, peroneal and ulnar nerves are most commonly affected.[1,3] Interestingly, the upper extremity nerve most commonly affected by schwannoma is the median nerve or ulnar nerve. Schwannoma occurring in the superficial radial nerve rare.

Most schwannomas are solitary and present as a slowly growing painless mass.[2] Schwannoma occurs at all ages but frequently in patients the ages of 20 and 50 years. It has no sex or race predilection.[2] Because schwannoma arises from a nerve, it may be mobile in the transverse but not in the longitudinal axis of the nerve. Pain and neurological symptoms are uncommon unless schwannoma becomes large. However, deep schwannoma is symptomatic by virtue of compression on neighboring structures.[3] Our case presents a sensory deficit due to schwannoma beneath brachioradialis tendon though it is not large.

The pathological hallmark of schwannoma is the mixed pattern of alternating Antoni A and B areas.[2] Antoni A areas are composed of compact spindle-shaped cells with palisading nuclei. Antoni B areas are less cellular with myxoid appearance.

The superficial radial nerve has a variable course. The superficial sensory branch separates from the radial nerve approximately 2 cm proximal to the lateral epicondyle.[4] Most commonly the arcade of Frohse is implicated as the compressive site. Then, the superficial radial nerve passes between the tendons of the brachioradialis and extensor carpi radialis longus.[4] At this area, compression of the superficial radial nerve is rare, but may be due to masses or trauma. It had previously been describes that compressive neuropathy of the radial sensory nerve caused by a ganglion cyst or lipoma.[5,6] Like our case, schwannoma arised from superficial radial nerve beneath brachioradialis tendon is rare. The superficial radial nerve comes out from under the brachioradialis and extensor carpi radialis longus tendon to pierce the forearm fascia.[4] It can be compressed at the fascial level. It enters the subcutaneous tissue 5 to 7 cm proximal to the wrist. It can be copmressed at subcutaneous level of the wrist and it has commonly been reported as Wartenberg syndrome or cheiralgia paresthetica. Then, the superficial radial nerve divides into multiple branches that provide sensation to the dorsum of the thumb, first web, the index finger, and the middle finger.[4]

The two major types of peripheral nerve tumors are schwannoma and neurofibroma. Both schwannoma and

neurofibroma may cause identical symptoms and signs, and there are no clinically distinct pathognomic features.[3] Imaging findings of schwannoma is similar to those seen with neurofibroma and cannot be distinguished in many cases. However, some features can help differentiate these two lesions. In relation to the nerve, schwannoma shows as eccentric masses over which the nerve fibers are splayed, whereas a centrally located mass suggests neurofibroma.[3,7] Heterogeneous appearance with degeneration and cystic cavitations are much more common in schwannoma than in neurofibroma.[7] In our case, Sonographic examination showed an heterogeneous, hypoechoic lesion, located eccentrically in related to the superficial radial nerve. The lesion was mobile in the transverse but not in the longitudinal axis of the nerve. On the basis of these finding, we thought to favour schwannoma rather than neurofibroma.

Operative exploration is indicated if symptom worsen, neurological deficit appear or malignancy is suspected.[8] Recurrence is rare.[1,8]

Schwannoma is slow-growing and push nerve fascicles aside as it grow. In addition, this feature of schwannoma distinguishes it from neurofibroma in which the nerve fascicles ramify through the tumor making enucleation impossible. The capsule of schwannoma is the epineurium and meticulous dissection can achieve complete surgical enucleation without damage to nerve function. If schwannoma is correctly diagnosed preoperatively or intraoperatively, it may be successfully enucleated from the involved nerve with minimal morbidity.

This case is unusual because the patient presented with numbness and paresthesia, presumably due to the direct compression beneath brachioradialis tendon on the sensory branch of radial nerve to the thumb and index finger. In case with neurologic symptom, prompt surgical decompression must be made to prevent further nerve damage and to restore nerve function early.

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