

# Radial Nerve Compression Caused by a Ganglion Cyst at the Elbow

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Although ganglion cyst is a relatively common benign mass in soft tissues, there have been very few reports of intramuscular ganglion cyst. We encountered such a case located in the antecubital fossa originating from the supinator muscle. A 61-year-old woman presented with a painless mass in the antecubital fossa. However, the patient complained of a significant sensory deficit in the radial side of the thumb, index, and middle finger. She also had extensor weakness at the metacarpophalangeal joint. The mass was excised completely, with no post-surgical complications. Pathologic results revealed the ganglion cyst. The patient showed improvements in sensory dysfunction and extensor weakness. Intramuscular ganglion cyst can be misdiagnosed. This report might be useful for making an accurate diagnosis and rapidly initiating treatment for an intramuscular mass.

**Keywords:** Elbow joint, Radial nerve, Ganglion cysts

## INTRODUCTION

Ganglion cyst is relatively common. It originates from the joint capsule or tendon sheath and contains gel-like fluid. The etiology and pathogenesis of ganglion cysts remain obscure. However, degenerative changes at the affected joint and repeated minor trauma might contribute to their development. Compressive neuropathies are important and widespread debilitating clinical problems. The two most common compressive peripheral nerve

disorders in the upper limb are carpal tunnel syndrome and cubital tunnel syndrome. Radial tunnel syndrome occurs less frequently<sup>1</sup>. Radial tunnel is defined as the potential space created by structures surrounding the radial nerve and its posterior interosseous nerve, as well as its superficial sensory branch as the nerve and branch travel through the proximal forearm from the radiocapitellar joint past the proximal edge of the supinator muscle<sup>1</sup>.

Radial nerve compression by a ganglion in the radial tunnel is uncommon. The occurrence of intramuscular

ganglion is relatively rare compared to ganglion at other sites<sup>2</sup>. The occurrence of a ganglion cyst in the elbow joint causing radial nerve compression is extremely rare<sup>3</sup>. In this report, we present a case of intramuscular ganglion cyst in the supinator muscle that caused radial nerve compression.

## CASE REPORT

A 61-year-old woman presented with a mass in the right antecubital fossa. The mass had increased in size over the past several months. The mass was painless, although the patient complained of altered sensation in the dorso-radial aspect of her right hand and extensor weakness at the metacarpophalangeal joint. She had no history of surgery or trauma, or any exacerbating factors at the site of the lesion. Physical examination revealed a firm and non-tender mass in the right antecubital fossa area (Fig. 1). Altered sensation of the superficial radial nerve was detected. A computed tomography scan demonstrated a 2.2×1.2×1.8 cm<sup>3</sup> sized lobulated cystic lesion in the volar radial aspect of the proximal radius (Fig. 2). Magnetic resonance imaging (MRI) was recommended to the patient to ascertain malignancy and further evaluate the tumor. However, the patient refused because of personal reasons.

We suggested compression of radial nerve by the mass

near the proximal radius. A simple ganglion is treated only with aspiration. However, the recurrence rate is high. In addition, surgical resection is the gold standard in cases of nerve entrapment caused by a space-occupying mass<sup>4</sup>. An excisional biopsy of the mass was done to eliminate symptoms. In this surgical procedure,



Fig. 1. Preoperative gross clinical photo. The mass is palpable to about 2×2 cm<sup>2</sup> sized firmly in the antecubital fossa.

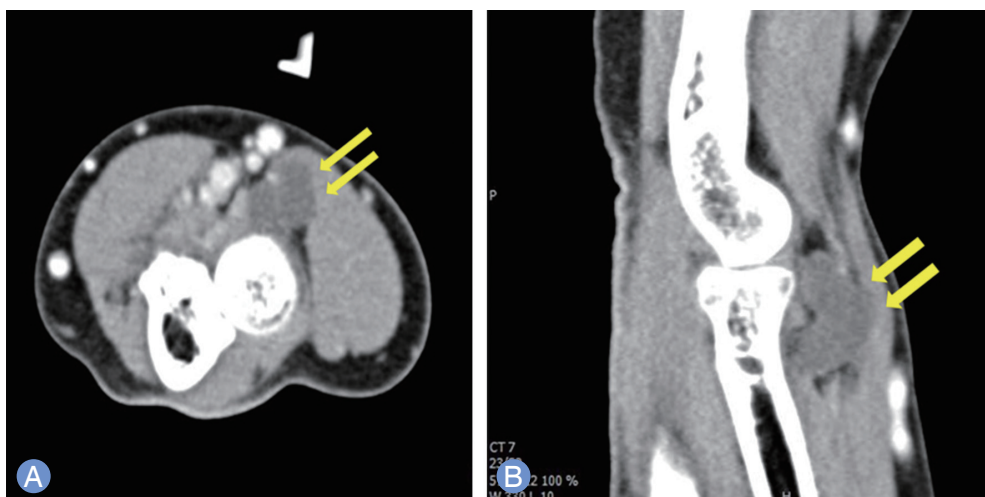
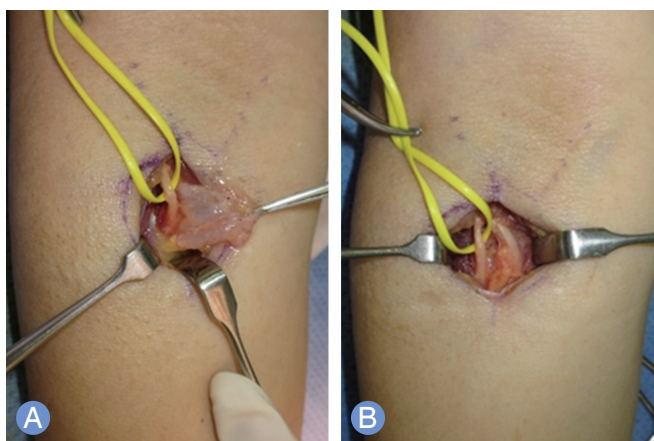


Fig. 2. Preoperative computed tomography shows a lobulated cystic lesion (arrows) arising from a volar radial aspect of the proximal radius. (A) Axial view. (B) Sagittal view.

the brachioradialis muscle was split. This revealed that the origin of the intramuscular ganglion cyst was from the supinator muscle. The mass was located near the bifurcation of the deep branch and superficial branch of the radial nerve (Fig. 3). During the excision of the mass, a clear jelly-like fluid gushed out from the sac (Fig. 4). Histopathology studies determined that the cystic wall of the mass was composed of fibrous tissue without synovial lining with muscular tissue on the surface of the wall, indicating an intramuscular ganglion cyst (Fig. 5). After the surgery, both sensory deficit and extensor weakness improved without any further complications. There was no recurrence or complication during the 1-year follow-up period.



**Fig. 3.** Intraoperative gross clinical photo. (A) A mass was located where the radial nerve is a bifurcation to the deep branch and superficial branch. (B) Well-preserved nerve was visible after removing the mass.

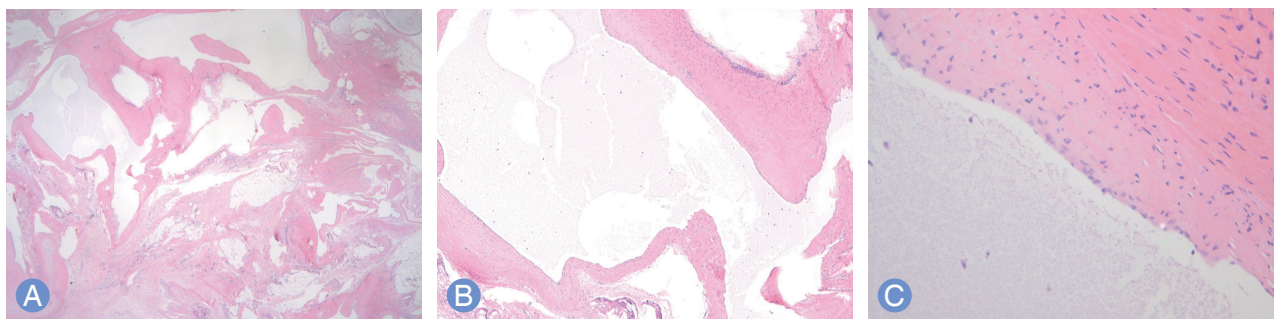
## DISCUSSION

Ganglion cysts are common benign tumors originating from joint capsules and tendon sheaths of the whole body<sup>5</sup>. The pathogenesis of ganglion cysts has not been clearly established yet<sup>5</sup>. These cysts are relatively common. However, intramuscular ganglion cysts are rare. Ganglion cysts frequently occur around the wrist, with rare reports at the elbow joint<sup>3</sup>.

Ganglion cysts are usually treated with conservative care, such as needle aspiration, steroid injections, and sclerosing therapy. Ganglion cysts have a high rate of recurrence when only aspiration is done or when they are not completely excised. Steroid therapy can lead to fat atrophy and sclerotherapy can cause damage to the adjacent tissues. For these reasons, surgical excision is the gold standard for a ganglion cyst, especially in cases with clinical symptoms<sup>4</sup>. Ganglion cysts are usually asymptomatic. However, when they compress nerves or



**Fig. 4.** Intraoperative gross clinical photo of the excised mass.



**Fig. 5.** Pathologic finding shows a lack of a cyst lining and a muscular tissue on the tissue surface consistent with intramuscular ganglion cyst. Hematoxylin and eosin stain, examined at magnification of  $\times 100$  (A),  $\times 200$  (B), and  $\times 400$  (C).



blood vessels, pain, numbness, and muscle weakness can occur.

The radial nerve is divided into a superficial branch (sensory) and deep branch (motor) at the antecubital fossa. The superficial branch crosses the brachioradialis and extends to the dorsal aspect of thumb, index finger, middle finger, and the radial side of the ring finger. The deep branch penetrates the supinator muscle, developing into the posterior interosseous nerve to supply motor function for extensors of the forearm. Radial nerve palsy due to a mass is uncommon in peripheral nerve compressive neuropathies<sup>6</sup>. Compression of the superficial sensory branch is also uncommon. However, the posterior interosseous nerve is more vulnerable to compression at the arcade of Frohse (part of the proximal edge of the supinator) than the superficial branch<sup>6</sup>. Most patients with radial nerve palsy due to mass have complaints of decreased motor functions in finger extension<sup>6</sup>. Sometimes only the superficial branch is compressed by the mass, resulting in sensory dysfunction<sup>7</sup>. However, in our case, the mass compressed both the superficial and deep branches of the radial nerve, causing numbness in the dorsoradial aspect of the forearm and radial side of the thumb, index finger, middle finger, and extensor weakness. Therefore, compression of nerves by masses like a ganglion cyst at the elbow joint should be considered when a patient presented with decreased motor and sensory function in the hand. In this case, electromyography was not done. However, this procedure can help evaluate and diagnose neuropathy due to a mass.

Soft-tissue sarcomas are difficult to diagnose because their clinical features are similar to other benign or non-neoplastic soft-tissue lesions<sup>8</sup>. It is more likely to be a malignant lesion like sarcoma when the size exceeds 5 cm, when the patient is older than 50 years of age, when the lesion located in the lower extremity, and when the tumor is located deeply<sup>9</sup>. Even if the mass is less than 5 cm in size, 5% of cases are diagnosed as malignant lesions; these include synovial sarcoma and spindle cell sarcoma<sup>8</sup>. The limitation of our case is the possibility of sarcoma in the case of multilobulated on computed tomography. Additional discrimination provided by MRI is

valuable<sup>10</sup>. However, the patient refused MRI.

We searched PubMed using the keyword 'intramuscular ganglion' and found 12 cases of intramuscular ganglion cysts. We reviewed all of them<sup>5</sup>. However, none of the 12 cases reported intramuscular ganglion cyst originating from the supinator muscle and causing neurological symptoms. This report might contribute to accurate diagnosis and rapid treatment for possible intramuscular masses.

In conclusion, intramuscular ganglion cyst should be included in the differential diagnosis of intramuscular mass around the elbow joint, such as lipoma, sarcoma, myositis ossificans, septic arthritis, lymphoedema, pseudogout, and vascular aneurysms<sup>3</sup>. We present a case of an intramuscular ganglion cyst originating from the supinator muscle around the elbow joint causing neurological symptoms.

## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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## 요골신경 신경병증을 동반한 주관절 결절종

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결절종은 연부조직에서 비교적 흔하게 발생하나, 근육 내의 결절종은 매우 드물다. 본 저자들은 주관절에서 기원한 근육 내의 결절종 1예에 대해 보고하고자 한다. 61세 여성환자는 주관절 전방부에서 촉진 되는 무통성의 종괴를 주소로 내원하였다. 환자는 수배부 요측의 감각마비를 호소하였으며 신전근의 약화 소견이 관찰되었다. 증상 호전을 위하여 종괴를 완전 절제하였으며, 병리조직학적 검사 결과 결절종이 확진되었다. 수술 후 1년간 추적 관찰한 결과 환자는 후유증 없이 감각마비 및 근력 약화 증상 모두 호전되었다. 근육 내의 결절종은 매우 드물기 때문에 진단하기가 쉽지 않다. 이에 저자들은 근육 내의 종괴를 진단하고 치료함에 있어 도움이 되고자 최근에 경험한 근육 내 결절종 1예와 기존 문헌들을 함께 검토하여 보고하고자 한다.

**색인단어:** 주관절, 요골신경, 결절종

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