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Case Report

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Incidental finding of an accessory pronator during anterior transposition of the ulnar nerve with anterior interosseous nerve supercharge transfer: a case report

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ABSTRACT

The anterior transposition of the ulnar nerve with anterior interosseous nerve (AIN) supercharge transfer is a well-established procedure for improving motor recovery in severe ulnar neuropathy. Anatomical variations in the forearm musculature, such as the presence of an accessory pronator muscle, can have surgical and clinical implications. A 54-year-old female with cubital tunnel syndrome presented with progressive ulnar nerve dysfunction, including intrinsic muscle weakness and sensory deficits. She underwent anterior transposition of the ulnar nerve with AIN supercharge transfer. During the procedure, an unexpected accessory pronator muscle was identified between the pronator quadratus (PQ) and flexor digitorum profundus (FDP). The AIN innervated the muscle and was carefully dissected to facilitate nerve transfer. Postoperatively, the patient demonstrated improved intrinsic muscle strength without complications. Accessory muscles in the forearm are rare but may contribute to nerve compression syndromes or impact surgical approaches. This case highlights the importance of recognizing such anatomical variations to optimize surgical technique and avoid iatrogenic injury. Awareness of accessory pronators is crucial in upper limb nerve surgeries to ensure successful nerve transfer and prevent intraoperative complications.

Keywords: Accessory pronator, Anterior transposition, AIN supercharge transfer, Anatomical variation, Cubital tunnel syndrome, Ulnar nerve

INTRODUCTION

Cubital tunnel syndrome is the second most common upper limb compression neuropathy, affecting the ulnar nerve at the elbow.[1] It presents with shooting pain, sensory disturbances in the ulnar nerve distribution and progressive intrinsic hand muscle weakness.[2] Surgical decompression, often through anterior transposition of the ulnar nerve, is indicated in cases of persistent symptoms or severe motor impairment.3 The addition of anterior interosseous nerve (AIN) supercharge transfer has been shown to enhance intrinsic muscle reinnervation and improve functional recovery. Anatomical variations in the forearm musculature can influence surgical outcomes. The PQ, primarily responsible for forearm pronation, is typically composed of superficial and deep heads and is innervated by the AIN.[4]

However, rare reports describe accessory pronator muscles in this region, which may alter nerve pathways, contribute to compression syndromes or complicate surgical dissections. This case report presents the incidental finding of an accessory pronator muscle during anterior transposition of the ulnar nerve with AIN supercharge transfer in a 54 years old female with cubital tunnel syndrome. Recognizing such variations is essential for optimizing surgical technique and preventing iatrogenic nerve injury.

CASE REPORT

A 54 years old female presented with progressive weakness and tingling numbness in the ulnar nerve distribution of his right hand. Over the past 18 months, she has experienced increasing difficulty with fine motor tasks, weakened grip strength (3/5) and intermittent tingling in the ring and little fingers, particularly aggravated by prolonged elbow flexion. There was no history of trauma, systemic illness or prior surgical intervention. The patient had no family history of neuromuscular disorders or hereditary neuropathies. Her psychosocial history was unremarkable, with no occupational or repetitive activities contributing to his condition. Conservative management, including activity modification, physiotherapy and nonsteroidal anti-inflammatory drugs (NSAIDs), had provided no significant symptom relief.

Clinical findings

On examination, the patient exhibited sensory deficits in the ulnar nerve distribution of the right hand, with diminished sensation over the volar and dorsal aspects of the ring and little fingers. Motor weakness was evident, particularly in the intrinsic hand muscles, with reduced grip strength (3/5) and difficulty performing fine motor tasks. Froment's sign was positive, indicating weakness in the adductor pollicis and Wartenberg's sign was present, suggesting third palmar interosseous muscle involvement. Tinel's sign at the cubital tunnel elicited paresthesia along the ulnar nerve distribution and the elbow flexion test reproduced his symptoms within 30 seconds. Mild ulnar clawing of the ring and little fingers was also noted.

Nerve conduction studies (NCS) revealed a significant reduction in conduction velocity across the right elbow segment of the ulnar nerve, confirming severe cubital tunnel syndrome.

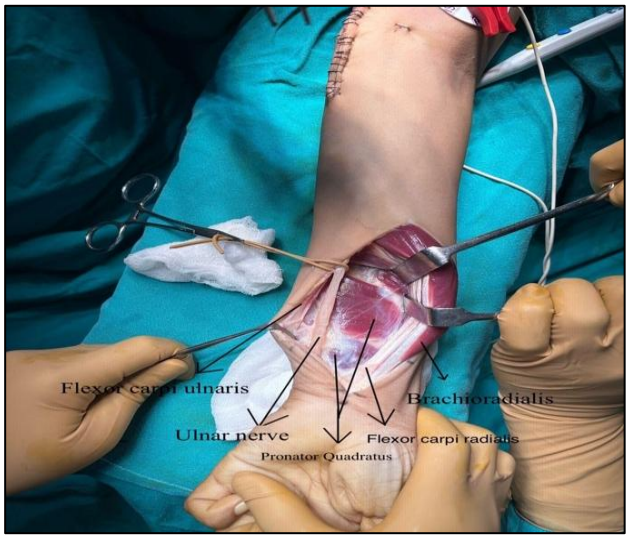

Figure 1: Schematic diagram of accessory pronator quadratus intraoperatively.

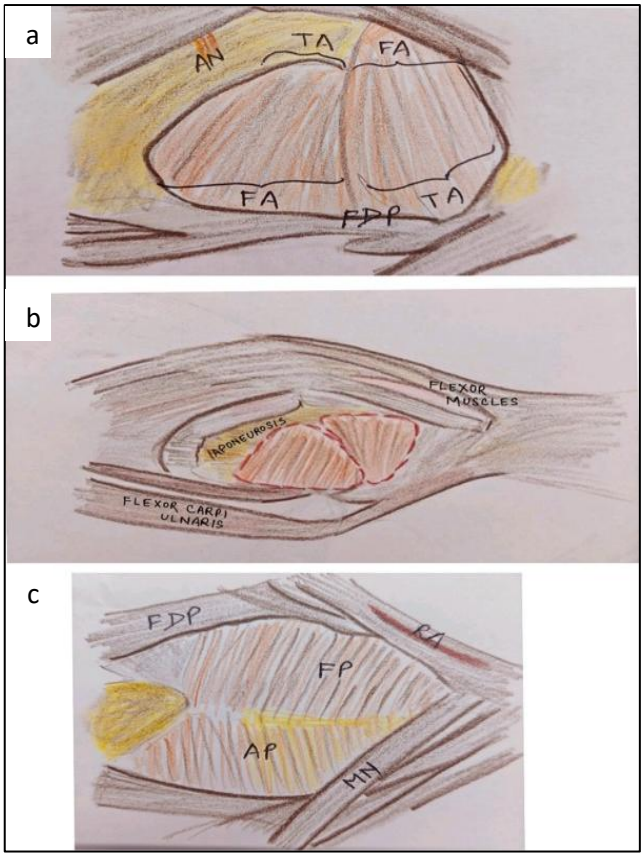

Figure 2 (a-c): Anatomical variations of accessory pronator quadratus.

Figure 3 (a, b): Preoperative X-ray of elbow joint.

Surgical procedure

The patient underwent anterior transposition of the right ulnar nerve with AIN supercharge transfer under general anesthesia. A curvilinear incision was made along the medial aspect of the right elbow and proximal forearm, exposing the ulnar nerve at the cubital tunnel as seen in Figure 1.

The nerve was carefully decompressed and mobilized for anterior submuscular transposition to prevent further compression. During dissection, an accessory pronator muscle was unexpectedly identified between the PQ and FDP, extending from the distal ulna to the radius. The muscle was found to be innervated by the AIN, with its nerve branches closely related to the ulnar nerve. To ensure an unobstructed nerve transfer, the accessory muscle was carefully dissected and preserved.

A fascicle of the AIN was then coapted end-to-side to the ulnar motor fascicles using microsurgical techniques to enhance intrinsic muscle reinnervation. The transposed ulnar nerve was positioned securely in its new location, ensuring a tension-free course. The wound was irrigated, hemostasis was achieved and the incision was closed in layers. The arm was immobilized in a soft dressing and postoperative care was initiated to facilitate nerve recovery. Intraoperatively, precautions were taken to prevent complications by using magnification for precise dissection, preserving neurovascular structures, ensuring tension-free coaptation and confirming full elbow range of motion to avoid nerve compression or kinking.

Outcome and follow-up

The postoperative course was uneventful. At six months, the patient reported significant improvement in grip and pinch strength (4+/5), with early signs of intrinsic muscle recovery. There were no signs of recurrent nerve compression or dysfunction related to the accessory muscle.

DISCUSSION

Anatomical variations of forearm muscles are not uncommon and may have clinical implications, especially during surgical procedures involving the ulnar nerve or AIN. In our case, we encountered an accessory pronator muscle during anterior transposition of the left ulnar nerve with AIN supercharge transfer. This structure, not identifiable preoperatively, resembled a variation of the PQ muscle and was innervated by the AIN. Its presence close to the ulnar nerve made accurate identification and careful dissection essential to avoid iatrogenic injury during nerve transfer.

Our findings reported further evidence which was previously demonstrated by Davidge et al that supercharge end-to-side anterior interosseous–to–ulnar nerve transfer may be a useful technique for augmenting intrinsic muscle function for severe ulnar nerve lesions.[5] The pronator quadratus muscle exhibits known anatomical variations as seen in Figure 2, which are important for Orthopedicians during forearm surgeries. Sakamoto et al classified PQ variations into three types: Type I, the most common, is a single-layered quadrilateral muscle between the radius and ulna; Type II includes a deep and superficial head. Type III features a completely separated accessory head or muscle slip, which may extend toward the radius or distal interosseous membrane.[6]

Preoperative diagnosing accessory pronator quadratus and the course of nerve supplying it can prevent iatrogenic nerve injury through high resolution USG.[7] In this case, the accessory pronator identified intraoperatively resembles a Type III variation, lying deep to the FDP and innervated by the anterior interosseous nerve. Awareness of such variations is crucial during procedures involving distal forearm dissection or nerve transfers to avoid iatrogenic injury or misidentification of structures.

CONCLUSION

This case emphasizes the importance of anatomical awareness and meticulous intraoperative technique, particularly when performing nerve transfers in young patients with severe ulnar neuropathy. Knowledge of such anatomical variations can reduce surgical complications and improve outcomes in peripheral nerve surgery.

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REFERENCES

1. Bozentka DJ. Cubital tunnel syndrome pathophysiology. Clin Orthop Relat Res. 1998;351:90–4.
2. Chauhan M, Anand P, Das JM. Cubital tunnel syndrome. InStatPearl. 2023.
3. Huang W, Zhang P, Peng Z, Xue F, Wang T, Jiang B. Anterior subcutaneous transposition of the ulnar nerve improves neurological function in patients with cubital tunnel syndrome. Neural Regen Res. 2015;10(10):1690–5.
4. Hinds RM, Gottschalk MB, Capo JT. The Pronator Quadratus and Distal Anterior Interosseous Nerve: A Cadaveric Study. J Wrist Surg. 2015;4(3):183–7.
5. Davidge KM, Yee A, Moore AM, Mackinnon SE. The supercharge end-to-side anterior interosseous–to–ulnar motor nerve transfer for restoring intrinsic function: clinical experience. Plastic Reconstr Surg. 2015;136(3):344.
6. Sakamoto K, Nasu H, Nimura A, Hamada J, Akita K. An anatomic study of the structure and innervation of the pronator quadratus muscle. Anat Sci Int. 2015;90(2):82-8.

7. Kuboi T, Tajika T, Endo F, Ichinose T, Sasaki T, Hamano N, et al. Ultrasonographic appearance of the pronator quadratus muscle in high school baseball pitchers with and without elbow symptoms: a pilot study. J Ultrasound. 2023;26(3):627–33.

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