

# Ulnar Nerve Blockade from Peripheral Intravenous Catheter Infiltration of Lidocaine and Propofol

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## Introduction

Peripheral intravenous catheters are ubiquitously used in anesthesia, with subcutaneous infiltration a common complication, which can progress, potentially, to acute compartment syndrome with long term neurological sequelae.<sup>i</sup>

## Materials and Methods

As the case report is devoid of patient identifiable information, it is exempt from IRB review requirements per UICOM IRB's policy.

## Case report

A 62-year-old male with history of type 2 diabetes, hypertension with no prior history of peripheral neuropathy, presented for elective goniotomy under general anesthesia. Attempted induction of general anesthesia occurred with 80 mg lidocaine, 140 mg propofol, 120 mg succinylcholine, and 6 mg dexamethasone, given in divided dose. During injection, the patient reported significant right arm pain and failed to lose consciousness, raising suspicion for IV infiltration. Consequently, the surgical procedure was cancelled, and ice packs applied to the catheter site with elevation of the right arm. Initially, the patient reported only localized pain but subsequently reported altered temperature and light touch sensation.

At the time of the first evaluation, the right arm compartments were mildly tense but not rigid, and radial pulses were palpable. The patient reported decreased sensation in the right 3<sup>rd</sup>, 4<sup>th</sup>, and 5<sup>th</sup> digits and weakness of right-hand grip. Three hours later, the compartments of the forearm showed improvement; however, sensory exam noted changes in two-point discrimination of the 4<sup>th</sup> and 5<sup>th</sup> digit, and progressive inability to abduct all digits. Wrist flexion / extension and motion at the elbow and shoulder remained intact, with no pain on palpation, but the 4<sup>th</sup> and 5<sup>th</sup> digits exhibited a mild claw positioning, with unchanged distal pulses and rapid capillary refill.



**Image 1.** White fluid, likely propofol, present in the subcutaneous tissue, distal to the right medial epicondyle.



**Image 2.** The two heads of the FCU muscle had been split, noting more propofol deep to the fascia.



**Image 3.** Propofol completely engulfing the ulnar nerve (appears dull white).

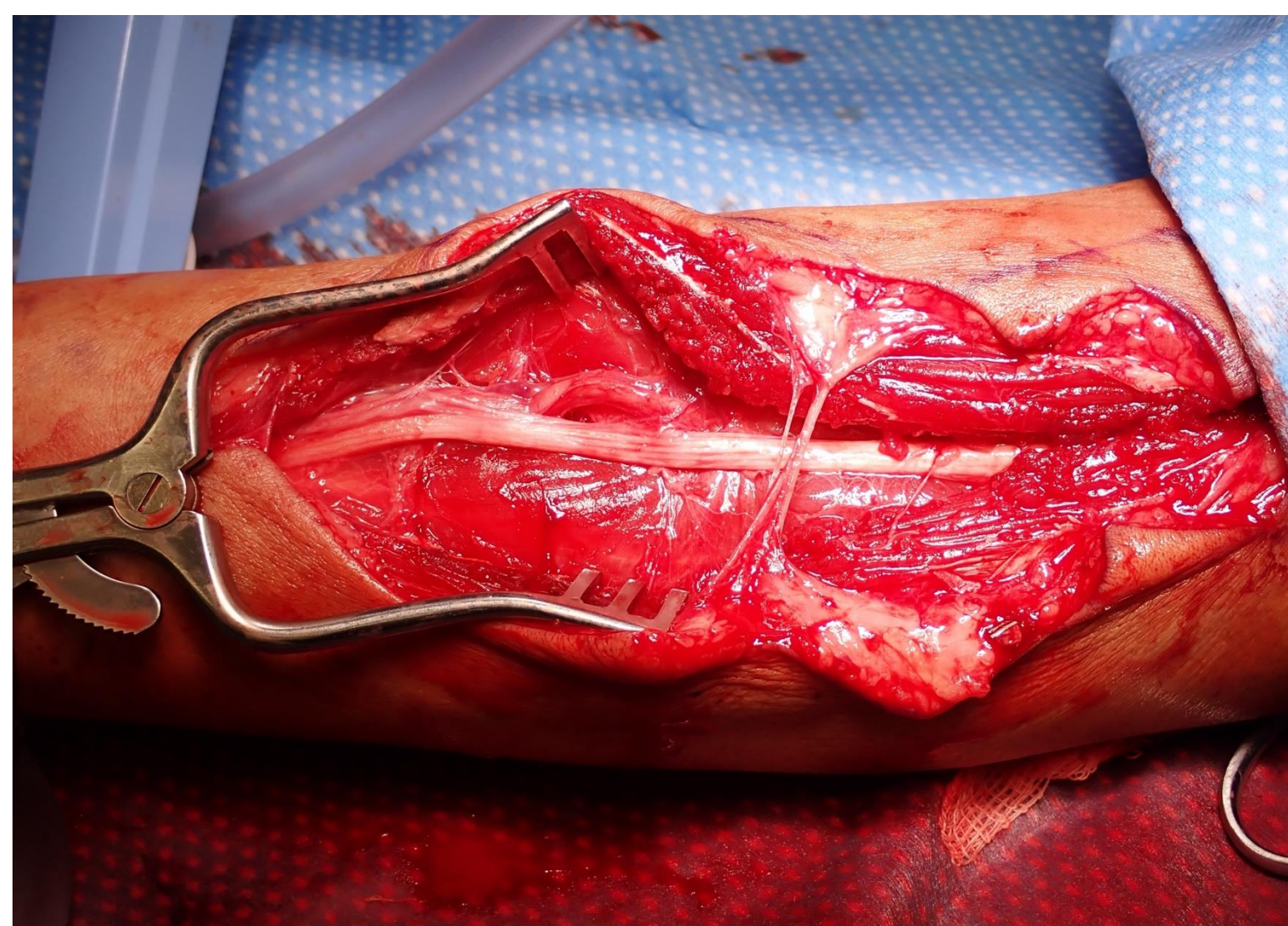


**Image 4.** Fully decompressed ulnar nerve. Of note, the two branches of the medial antebrachial cutaneous nerve crossing the ulnar nerve had been preserved.

## Case report

Based on the progression of neurological findings, orthopedic surgery undertook open exploration, for possible decompression of an acute compartment syndrome. Despite an absence of elevated compartment pressures, they noted widespread white fluid intramuscularly in the superficial anterior compartment, distally to the flexor digitorum superficialis tendons, and proximally to the elbow, fully surrounding the ulnar nerve.

POD#1 examination demonstrated complete resolution of the ulnar nerve palsy with complete sensory recovery in the right 4<sup>th</sup> and 5<sup>th</sup> digits without paresthesia and complete motor recovery of abduction / adduction of all digits at 5/5 strength, and fully preserved wrist, elbow, and shoulder motion. All arm compartments remained soft and compressible, with only mild tenderness of the anterior forearm.

At postoperative follow up, patient reported intermittent pain (VAS 4-7/10) and paresthesia of all digits, with sensory loss of two-point distribution in the 3<sup>rd</sup> and 4<sup>th</sup> digit (POD #7) and persistent motor weakness throughout the hand, most notably in the ulnar nerve distribution (3/5 abduction / adduction of all digits). All sensory, motor and pain / paresthesia symptoms progressively improved with continued physical and occupational therapy.

## Discussion

This case, involving subcutaneous infiltration of induction medications, presented with a progressive ulnar nerve sensory and motor blockade, resulting in open exploration of the forearm. However, in the absence of elevated compartment pressures, alternative mechanisms for extended peripheral nerve blockade can be posited, including prolongation of lidocaine sodium channel blockade by propofol. In vitro, propofol has been shown to accelerate NaV inactivation.<sup>ii</sup> Prompt recognition of peripheral IV infiltration remains crucial to prevent further harm and ensure appropriate management.

## References

<sup>i</sup>Dychter SS, Gold DA, Carson D, Haller M. Intravenous therapy: a review of complications and economic considerations of peripheral access. J Infus Nurs. 2012 Mar-Apr;35(2):84-91. doi: 10.1097/NAN.0b013e31824237ce. PMID: 22382792.

<sup>ii</sup>Xiao J, Chen Z, Yu B. A Potential Mechanism of Sodium Channel Mediating the General Anesthesia Induced by Propofol. Front Cell Neurosci. 2020 Dec 4;14:593050. doi: 10.3389/fncel.2020.593050. PMID: 33343303; PMCID: PMC7746837.