Annals of Case Reports
Mahiou P, et al. Ann Case Rep: 10: 102261
www.doi.org/10.29011/2574-7754.102261
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Case Report

Lateral Antebrachial Cutaneous Nerve Paresthesia After Venipuncture at the Elbow Crease During Placement of a Peripheral Venous Catheter

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Citation: Mahiou P, Maesani M, Breton O, Cuisinier A (2025) Lateral Antebrachial Cutaneous Nerve Paresthesia After Venipuncture at the Elbow Crease During Placement of a Peripheral Venous Catheter. Ann Case Report. 10: 2261. DOI:10.29011/2574-7754.102261

Received: 09 April 2025, **Accepted:** 16 April 2025, **Published:** 18 April 2025

Case Description

A 43-year-old male patient, an engineer and athlete, was admitted to the operating room for clavicle plate removal after consolidation of the fracture. No medical or surgical history was available. The clinical examination was unremarkable, Mallampati [1], the venous capital was correct without difficulty of puncture and the patient was classified as ASA I.

An indication for general anesthesia was given for this removal of material from the left side of the clavicle on an outpatient basis.

When the patient arrived in the operating theatre, an 18-gauge peripheral venous catheter was being placed. While attempting to place the catheter on the cephalic vein at the bend of the elbow, the patient suddenly felt a shooting pain, like an electric discharge, which extended from the puncture site to the bend of the elbow, radiating to the dorsal surfaces of the thumb and index finger and passing through the lateral aspect of the forearm.

The sharp pain disappeared after a slight withdrawal of the catheter needle. However minimal paresthesia remained in the same nerve area despite needle withdrawal. A peripheral venipuncture with catheter placement at a different site was subsequently performed without any problems. At the end of the day, the patient was discharged hospital without any discomfort or post-operative pain, with an exit treatment of tramadol (300 mg/day) and ketoprofen (100 mg x 2/day).

The next morning, the patient called in because of a persistent painful dysesthesia localized in the area of the lateral cutaneous nerve of the forearm and the superficial radial nerve of the hand, with increased pain on flexion and extension of the forearm on the arm and on pronation supination of the hand. The same symptomatology was described by the patient himself when manipulating objects with his hand.

Exquisite pain with radiation was also noted when the patient touched the puncture site with pressure. Otherwise, the subject presented with permanent dysesthesia along the course of the lateral cutaneous nerve of the forearm (terminal branch of the musculocutaneous nerve) and numbness with a troublesome sensation of shivering in the same area. The patient did not report any motor deficit.

On the same day, clinical examination revealed hypoesthesia at the sensory level of the forearm in all modes (fine touch and hot-cold test) without allodynia or specific trigger zone. The affected area extended from the elbow crease along the lateral aspect of the forearm to the proximal dorsal aspect of the thumb, including the thenar eminence. The rest of the sensory neurological examination was negative, and no motor deficit was found. The overall diagnosis was therefore an incomplete partial neurological injury involving the lateral cutaneous nerve of the forearm and one of the terminal branches of the superficial radial nerve innervating the dorsal aspect of the thumb. The cause was found to be direct injury to the nerve at the elbow crease by the tip of the catheter mandrel during an attempt to puncture the cephalic vein due to its proximity to the lateral cutaneous nerve of the forearm.

Treatment was started immediately and the patient received paracetamol (Doliprane@) in combination with prednisone (Cortancyl@) and pregabalin (Lyrica@) for 3 weeks. Zopiclone (Imovane@) was prescribed on demand for insomnia.

A high-resolution ultrasound performed the next day by a specialist radiologist showed no compressive hematoma and no increase in the diameter of the nerve. Only the nerve showed intra-neural hyperemia with redistribution and increase in local microcirculation related to inflammation caused by the accidental puncture of the needle.

The clinical evolution was favorable, with an initial regression of the painful neurological signs from day 15 and a complete disappearance of the sensory signs after 1.5 months.

Anatomical Description

The lateral forearm cutaneous nerve or lateral antebrachial cutaneous nerve (LACN) is a sensory nerve that is the continuation of the musculocutaneous nerve beyond the lateral edge of the tendon of the biceps brachii muscle [1]. The LACN supplies sensory innervation to the skin of the lateral forearm.

It passes behind the cephalic vein and divides into a volar branch and a dorsal branch (Figure1). The volar branch communicates with the superficial branch of the radial nerve and the palmar cutaneous branch of the median nerve. The dorsal branch communicates with the superficial branch of the radial nerve and possibly with the posterior cutaneous branch of the radial nerve.

Discussion

Venipuncture may be associated with nerve injury, but reports in the literature are rare. At the anterior elbow, the lateral antebrachial cutaneous nerve (terminal sensory branch of the musculocutaneous nerve) is rarely injured during peripheral venipuncture, despite the closer proximity of the cephalic vein. In a retrospective study of LACN neuropathy by Vasudeva G [2], the most common etiology was iatrogenic injury. This article also aimed to identify and protect the LACN during elbow and upper arm surgery to avoid perioperative injury.

In a case report on venipuncture, Ramos [3] points out that the LACN in the antecubital fossa classically lies in a plane just below and in close proximity to the veins, making it susceptible to injury during venipuncture; it has also been shown that there is a wide range of anatomical variation, suggesting that even a non-traumatic, satisfactory venipuncture can directly damage these nerves. Anesthetists need to be aware of this potential complication, its diagnosis and prognosis, in order to advise patients appropriately should it occur.

So, the most potentially serious adverse events associated with venipuncture are related to nerve injury. Such adverse events can be disabling.

Two studies from blood transfusion centers focused on neurological damage. In a New Zealand blood transfusion unit performing approximately 80000 venipunctures per year, Berry and Wallis [4] 228 found that over a two-year period, six people suffered injuries to the median nerve or medial and lateral cutaneous nerves severe enough to require medical attention, an overall rate of approximately 1 in 25000 (0.004%). Of these six, only one was given a venipuncture for diagnostic purposes using a 20-gauge needle; the other five were given venipunctures for blood donation using a larger 16-gauge needle.

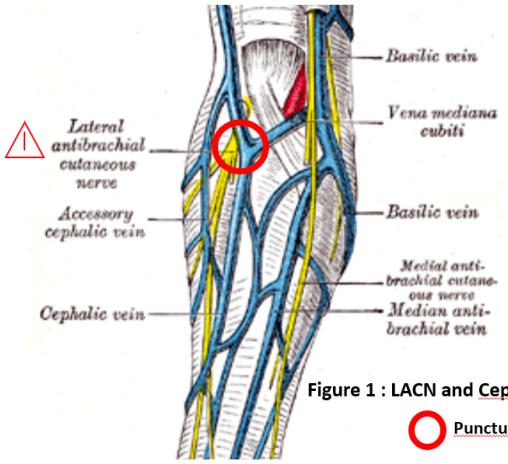

Figure 1 : LACN and Cephalic vein

Puncture Point

Newman and Waxman [5] reported a higher rate of nerve injury from a blood center in the USA where nurses routinely reported all donor injuries. Over a 2-year period, 419000 blood donations were collected with a 16-gauge needle, and 66 cases of neurological nerve injury were identified from nursing records - a rate of 1 in 6300 (0.016%). This is not directly comparable with the New Zealand study because it includes cases that were not presented to a physician, but the data for donors who requested a physician consultation (17 of the 56 individuals with nerve injury for whom follow-up data were available) also indicate a rate of approximately 1 in 25000 (0.004%).

In most cases, all nerve injuries heal, but in a small number of cases it may take months and in rare cases there may be permanent damage. Nerve injury is the most common cause of disability in donors.

In patients with difficult peripheral venous access, ultrasound guidance increased success rates of peripheral venous placement when compared with traditional techniques [6]. It therefore seems interesting to us to use ultrasound to locate veins near nerves and thus avoid the risk of nerve puncture when inserting a peripheral venous line. In this sence, the American Society of Echocardiography has published Guidelines for performing ultrasound-guided vascular cannulation [7].

In fact, US-guided vascular access improves success rates and reduces complications, particularly neurological ones.

Conclusion

Peripheral nerve injuries have been described after venipuncture. Nerves in the antecubital fossa classically lie on a plane just beneath, and near the veins. Also, it has been shown that there is a large range of anatomic variation, suggesting that even a non-traumatic, satisfactory venipuncture can directly damage these nerves. So, doctors and nurses must be aware of this risk of complication, diagnosis and prognostication if this complication occurs. So, US-guided vascular access improves success rates and should reduce the risk of complications, particularly neurological ones.

Keywords: Peripheral nerve injury; Lateral antebrachial cutaneous nerve; Peripheral venous catheter; Cephalic vein

Disclosure of interest: No conflicts of interest

Consent: The patient has completed a written consent form for the publication of this case report. This article adheres to the applicable Enhancing the Quality and Transparency of Health Research (Enhancing the Quality and Transparency of Health Research = EQUATOR) guidelines.

Ethical statement: No ethical statement for this case report.

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