



REVISTA BRASILEIRA DE ANESTESIOLOGIA

Official Publication of the Brazilian Society of Anesthesiology
www.sba.com.br



CLINICAL INFORMATION

Venipuncture-related lateral antebrachial cutaneous nerve injury: what to know?

Juan A. Ramos

Department of Anesthesiology, Mayo Clinic, College of Medicine, Jacksonville, FL, United States

Received 23 January 2013; accepted 10 June 2013

Available online 11 October 2013

KEYWORDS

Peripheral nerve injuries;
Phlebotomy;
Informed consent

Abstract

Background and objectives: Venipuncture is one of the most common procedures performed in daily anesthetic practice. Though usually innocuous, peripheral nerve injuries with serious sequelae have been described following venipuncture. We present a case of venipuncture-related lateral antebrachial cutaneous nerve injury, alongside the essential diagnostic and prognostic information for day to day practice.

Case: 27-Year old male who underwent venipuncture of the right antecubital fossa with a 20-gauge needle, for routine metabolic assessment. The patient suffered a shooting, electric-type pain traveling on the lateral side of the forearm, from the antecubital fossa proximally, to the right lateral wrist and base of the right thumb. After 24h, the patient still experienced shooting, electric-type pain that was rated as 8/10 at the right distal lateral arm, right lateral wrist and base of the thumb, accompanied by paresthesia. The literature was reviewed and the patient was counseled regarding published outcomes of these type of injuries. At follow-up, the patient stated that the dysesthesia subsided approximately 3–4 weeks after initial injury, and reported no remaining neurologic deficits.

Conclusions: Peripheral nerve injuries have been described after venipuncture, but the literature is limited. Nerves in the antecubital fossa classically lie on a plane just beneath, and in close proximity to, the veins, making them susceptible to injury during phlebotomy; 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. Anesthesiologists must be aware of this possible complication, diagnosis and prognostication to adequately counsel patients in the event that this complication occurs.

© 2013 Sociedade Brasileira de Anestesiologia. Published by Elsevier Editora Ltda. All rights reserved.

Introduction

Venipuncture, including intravenous cannulation, is one of the most common procedures performed in daily anesthetic practice. It is universally implied that proper intravenous

E-mail: ramos.juan@mayo.edu

access should be obtained in order to adequately and safely perform general anesthesia. Though usually innocuous, peripheral nerve injuries with more serious and long-lasting sequelae have been described as rare complications following venipuncture¹; these complications produce unnecessary angst and physical suffering in affected patients and may result in debilitating outcomes.

Case

Our case, a 27-year old male without significant past medical history, underwent venipuncture of the right antecubital fossa with a 20-gauge needle, for routine metabolic assessment. At the time of the blood draw, the patient suffered a shooting, electric-type pain traveling on the lateral side of the forearm, from the antecubital fossa proximally, to the right lateral wrist and base of the right thumb. Shortly after the needle was removed, the pain faded gradually.

After 24h, the patient noticed shooting, electric-type pain that was rated (on an 11-point visual analog scale, VAS, anchored with 0=no pain and 10=worst pain ever experienced) as 8/10 at the right distal lateral arm, right lateral wrist and base of the thumb. The pain was exacerbated by flexion at the elbow, lasting for a few seconds and subsiding once arm flexion was discontinued. The pain was accompanied by mild paresthesia (described as perception of pins and needles) of the area but there were no motor deficits. Interval examinations 24h and 7 days after the incident, revealed no hematoma or local signs of infection. The sensory deficits clearly followed the distribution of the lateral antebrachial cutaneous nerve, electromyographic (EMG) testing was deferred, but was offered as an option to the patient if deficits did not subside by 4 weeks.

At the time, the literature was reviewed and the patient was reassured that most commonly, 70%, 90% and 96% of venipuncture-related nerve injuries resolve within 1, 3 and 6 months, respectively.¹ Follow-up was arranged 4 weeks postoperatively for further assessment and possible treatment.

At follow-up, the patient stated that the dysesthesia subsided approximately 3–4 weeks after initial injury, and reported no remaining neurologic deficits.

Discussion

Peripheral nerve injuries have been described both after venipuncture and blood donations, but the literature is limited. This injury is defined by a persistent burning, shooting, electrical-type pain or paresthesia in a specific peripheral nerve distribution, which begins immediately while the needle is *in situ*, or can be delayed for several hours thereafter. Commonly, historical evidence at the time of the procedure suggests a difficult (e.g., multiple attempts), traumatic or septic phlebotomy (e.g., formation of hematoma or, rarely, abscess).²

Its incidence in blood donor population has been described between 1 in 21,000 and 1 in 26,000 venipunctures.^{1,3} Most of the injuries resolve spontaneously. Chronic disabling deficits have been described (1 in 1.5 million phlebotomies),⁴ but permanent damage has been reported in as many as 87% of patients who required

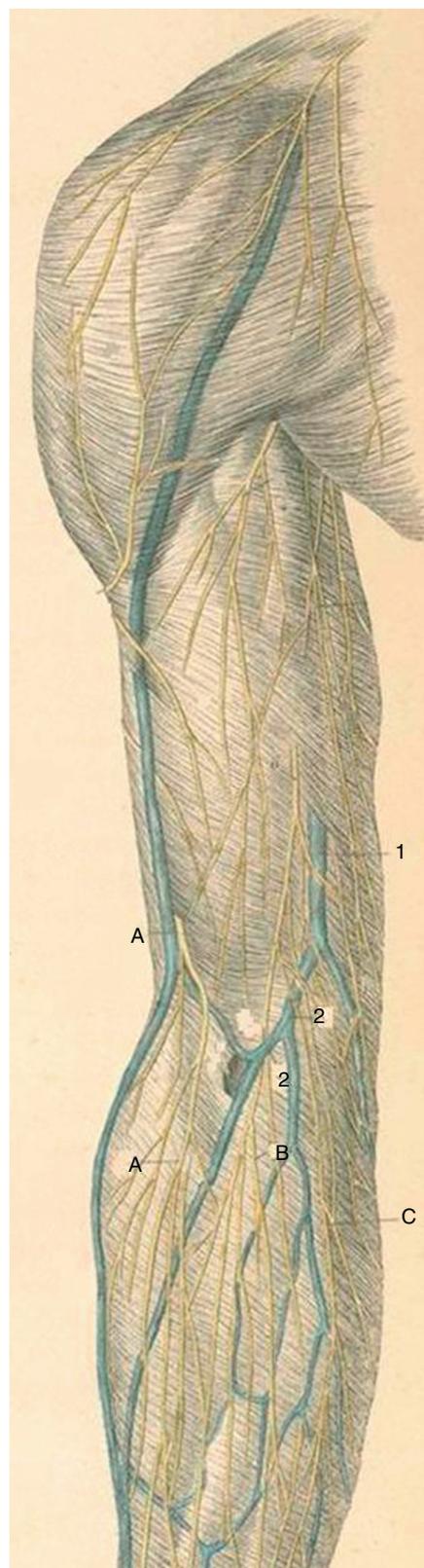


Figure 1 Antecubital fossa. Reproduced with permission from D'Alessandro M. Anatomy Atlases. Curated by Ronald Bergman, Ph.D. <http://www.anatomyatlases.com>. 1 – median basilic vein, 2 – median cephalic vein, A – lateral antebrachial cutaneous nerve, B – palmar branch of the medial antebrachial cutaneous nerve, C – ulnar branch of the medial antebrachial cutaneous nerve.

care by pain management specialists.² Hematoma formation is present at the venipuncture site in 24% of patients with venipuncture-related nerve injuries, suggesting some degree of puncture trauma.¹ The majority of the times, however, hematomas are absent.

Nerves in the antecubital fossa classically lie on a plane just beneath, and in close proximity to, the veins (Fig. 1), making them susceptible to injury during phlebotomy.⁵ Additionally, Horowitz² showed in dissected cadaveric upper extremities that in 6 of 14 specimens, major branches of cutaneous nerves were superficial to or overlaying veins: medial and lateral antebrachial cutaneous nerves in relation to the basilic, median basilic, median cephalic, or cephalic veins in the antecubital fossa. This suggests that even a non-traumatic, satisfactory venipuncture can directly damage these nerves.

Phlebotomy best practice has suggested that for venipuncture the inserted needle should be placed superficially, and the medial aspect of the antecubital fossa should be avoided.³ Minimizing needle movement while *in situ* is probably also wise; however, taking the high anatomic variability into account, the risk of inadvertent nerve damage is still a possibility. As anesthesiologists, we need to be aware of these risks in order to avoid this complication, and equally importantly, we should be ready to discuss with the patient the potential options for diagnosis and treatment as well as the prognosis.

Conclusion

Anesthesiologists routinely administer medications requiring an intravenous route of delivery. Although

venipuncture-related nerve injuries are infrequent, anesthesiologists must be aware of this possible complication, and advise patients properly during acquisition of informed consent if the possibility of antecubital venous access is contemplated. Familiarization with prognosis in venipuncture-related nerve injuries is also advocated to adequately counsel patients in the event that this complication occurs.

Conflicts of interest

The author declares no conflicts of interest.

Acknowledgments

The author would like to express his gratitude to Dr. Sorin J. Brull for his guidance and intellectual contributions toward the making of this manuscript.

References

1. Newman BH, Waxman DA. Blood donation-related neurologic needle injury: evaluation of 2 years' worth of data from a large blood center. *Transfusion (Paris)*. 1996;36:213–5.
2. Horowitz SH. Venipuncture-induced causalgia: anatomic relations of upper extremity superficial veins and nerves, and clinical considerations. *Transfusion (Paris)*. 2000;40:1036–40.
3. Berry P. Venipuncture nerve injuries. *Lancet*. 1977;1:1236–7.
4. Newman B. Venipuncture nerve injuries after whole-blood donation. *Transfusion (Paris)*. 2001;41:571–2.
5. Horowitz SH. Peripheral nerve injury and causalgia secondary to routine venipuncture. *Neurology*. 1994;44:962–4.