American Journal of Emergency Medicine 34 (2016) 1088–1091

Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

Brief Report

Hand dominance in intravenous drug using patients does not affect peripheral venous access sites identified by ultrasound☆,☆☆

Nicole L. Kaban, MD [a], Nicholas C. Avitabile, DO [b], Sebastian D. Siadecki, MD [c], Turandot Saul, MD [c,*]

[a] Mount Sinai Beth Israel, Department of Emergency Medicine, New York, NY
[b] St. Barnabas Hospital, Department of Emergency Medicine, Bronx, NY
[c] Mount Sinai St. Luke's Hospital, Mount Sinai West Hospital, Department of Emergency Medicine, New York, NY

ARTICLE INFO

Article history:
Received 15 December 2015
Received in revised form 27 January 2016
Accepted 17 February 2016

ABSTRACT

Background: The peripheral veins in the arms and forearms of patients with a history of intravenous (IV) drug use may be sclerosed, calcified, or collapsed due to damage from previous injections. These patients may consequently require alternative, more invasive types of vascular access including central venous or intraosseous catheters. We investigated the relationship between hand dominance and the presence of patent upper extremity (UE) veins specifically in patients with a history of IV drug-use. We predicted that injection into the non-dominant UE would occur with a higher frequency than the dominant UE, leading to fewer damaged veins in the dominant UE. If hand dominance affects which upper extremity has more patent veins, providers could focus their first vascular access attempt on the dominant upper extremity.

Methods: Adult patients were approached for enrollment if they provided a history of IV drug use into one of their upper extremities. Each upper extremity was examined with a high frequency linear transducer in 3 areas: the antecubital crease, forearm and the proximal arm. The number of fully compressible veins ≥1.8 mm in diameter was recorded for each location.

Results: The mean vein difference between the numbers of veins in the dominant versus the non-dominant UE was −1.5789. At a .05 significance level, there was insufficient evidence to suggest the number of compressible veins between patients' dominant and non-dominant arms was significantly different ($P = .0872$.)

Conclusions: The number of compressible veins visualized with ultrasound was not greater in the dominant upper extremity as expected. Practitioners may gain more information about potential peripheral venous access sites by asking patients their previous injection practice patterns.

1. Background

The peripheral veins in the arms and forearms of patients with a history of intravenous (IV) drug users may be sclerosed, calcified, or collapsed due to damage from previous injections. There can be difficulty in establishing peripheral IV access on presentation to the Emergency Department (ED), resulting in delays in resuscitative efforts with IV hydration, the administration of medications or in obtaining blood for laboratory analysis. These patients may consequently require alternative, more invasive types of vascular access including central venous or intraosseous catheters.

Ultrasound guidance increases peripheral IV catheter placement success rates in patients with difficult IV access [1–3]. One study which investigated the relationship between certain patient and vein characteristics and the success of ultrasound-guided peripheral IV placement found that successful placement was primarily associated with increasing diameter of the vessel [4]. Although the inclusion criteria varied, these prior study populations included combinations of patients who reported a history of IV drug use or a history of difficult IV access, patients who already had a number of prior IV access attempts during their ED visit, and patients with a history of certain disease entities associated with difficult peripheral IV access (e.g. sickle cell anemia and end stage renal disease). The population of patients with a history of IV drug use has not been specifically previously studied, and the patterns of poor vascular access in this group may be different from other difficult access groups.

IV drug-using patients may use their dominant hand to inject vessels in the non-dominant arm or conversely inject their dominant arm with their non-dominant hand. We hypothesized that, due to issues of dexterity, the dominant hand would be more often used for needle and syringe manipulation; thus, injection into veins in the non-dominant

☆ There is no grant support or involvement.
☆☆ There are no conflicts of interest.
* Corresponding author at: Mount Sinai St. Luke's Hospital, Mount Sinai West Hospital, Department of Emergency Medicine, 1000 10th Avenue, New York, NY 10019. Tel.: +1 212 523 3981; fax: +1 212 523 2186.
E-mail address: turan@joshsaul.com (T. Saul).

http://dx.doi.org/10.1016/j.ajem.2016.02.049
0735-6757/

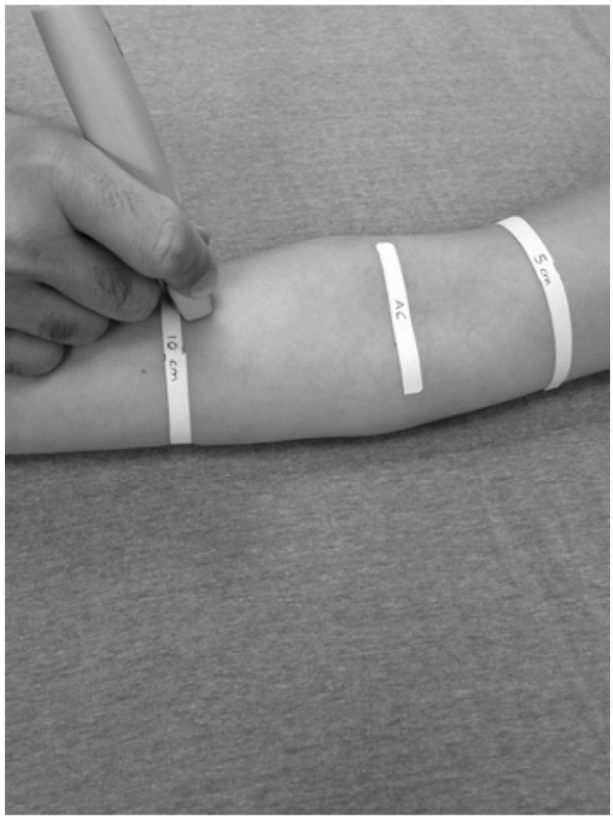

Fig. 1. Locations of probe placement for scanning the different sites.

upper extremity would occur more frequently, resulting in more damage from recurrent injection.

If hand dominance affects which extremity has more patent and compressible veins, providers could focus their first attempt on the patient's veins in that extremity. This approach could potentially save time, reduce painful procedure attempts, decrease frustration for both providers and patients, and lead to greater success in establishing peripheral IV access, thereby reducing the need for more invasive alternatives.

The objective of this study was to investigate if patients with a history of IV drug use have more sonographically identifiable, patent, and compressible peripheral veins in their dominant upper extremity as compared to their non-dominant upper extremity.

2. Methods

This was a prospective convenience sample study of patients enrolled from January 2014 through June 2014 at an academic, urban ED when one of the study investigators was available. Study physicians did not enroll patients if they were the treating physician. Those enrolling included two emergency ultrasound fellowship-trained emergency medicine faculty members and two emergency ultrasound fellows. All physicians completed at least 10 supervised examinations, the minimum number required for proficiency in vascular access as delineated by the 2008 American College of Emergency Physicians policy statement [5]. Prior to patient enrollment, the primary investigator held a one-hour

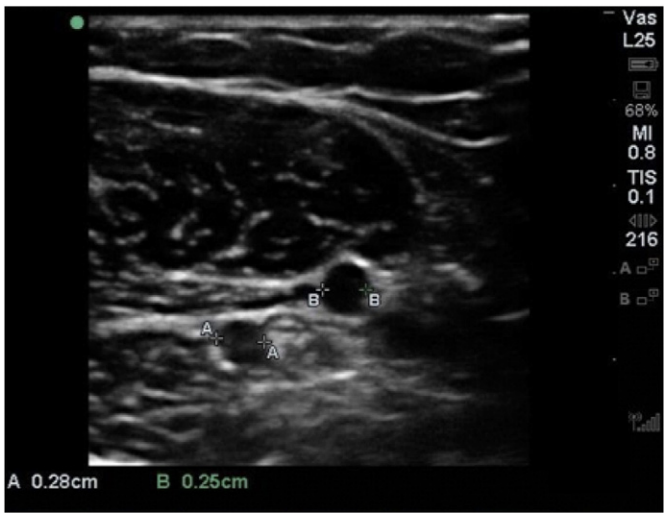

Fig. 2. Vessels with diameter of >1.8 mm.