PostScript

LETTERS

Technique for upgauging peripheral venous cannulae in volume resuscitation

Achieving large-bore venous access in a shocked patient is a frequent problem encountered by the emergency department physician. Alternatives^{1–3} to standard cannula-over-needle percutaneous cannulation are time/operator dependent, and confer increased potential morbidity. We aimed to prospectively validate the anecdotally described, but largely overlooked, technique of utilising an initial distending volume of saline to facilitate large-bore peripheral venous cannulation.

With regional ethics committee approval and verbal consent, adult (≥ 16 years) patients presenting to our tertiary emergency department with a clinical diagnosis of hypovolaemia (pulse ≥ 100 bpm, systolic blood pressure ≤ 100 mm Hg, aetiology of presentation consistent with haemorrhage or dehydration) were studied. Patients were excluded if on application of standard tourniquet, a vein of suitable calibre was successfully cannulated.

The study technique involved siting a small-calibre peripheral venous cannula (usual catheter-over-needle technique) distally in the upper limb, with the tourniquet remaining tightened, infusing 30–50 ml 0.9% NaCl to distend the venous compartment distal to the tourniquet. A presenting distended vein was then cannulated with a large-bore catheter, again in a standard way. Achieving a cannula bore of ≥ 18 G was the primary outcome measure.

Twenty patients (aged 19–78 years) with hypovolaemia of varying aetiology (7 with trauma, 6 with gastrointestinal tract haemorrhage, 5 with sepsis, 1 with abdominal aortic aneurysm rupture and 1 with fat emboli syndrome) were prospectively enrolled from a convenience sample of 52 presentations meeting the study criteria for hypovolaemia. Mean (SD) pulse rate was 119 (11.9) bpm and mean (SD) blood pressure was 86(10.9) mm Hg. Nineteen (95% CI 85 to 100) patients underwent successful incremental cannulation (median initial and subsequent cannula bore 20 (range 24–20) G and 16 (range 18–14) G, respectively). In six (30%) patients, the initial cannula was sited by a pre-hospital provider. One failure was observed in a 19-year-old patient with trauma treated with multiple prehospital venepuncture attempts (resultant extravasation) in the ipsilateral limb. All attempts were completed in < 5 min.

The described technique for upgauging peripheral venous cannulae is simple, relies on the existing skill set of prehospital and emergency practitioners, and is reliable in achieving large-bore peripheral venous cannulation. Although not universally successful, it should be considered as an adjunct to the emergency physicians' armamentarium of vascular access techniques. Of note, due to saline haemodilution, blood aspirated from the second cannula is unsuitable for laboratory analysis.

Author contributions

MH was involved in study synthesis, ethical approval, performance of the study technique, data analysis and manuscript generation. VT was involved in the study synthesis, performance of the study technique and manuscript generation. GC was involved in study synthesis and manuscript generation.

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References

- 1 Westfall MD, Price KR, Lambert M, et al. Intravenous access in the critically unwell patient: a multicentred, prospective, randomised trial of saphenous cutdown and percutaneous femoral access. *Ann Emerg Med* 1994;23:541–5.
- 2 Halvorsen L, Bay BK, Perron PR, et al. Evaluation of an intraosseous infusion device for the resuscitation of hypovolaemic shock. *J Trauma* 1990;30:652–8.
- 3 Keys LE, Frazee BW, Snoey ER, et al. Ultrasound-guided brachial and basilic vein cannulation in emergency department patients with difficult intravenous access. *Ann Emerg Med* 1999;34:711–14.

Pneumothorax due to electrical burn injury

Deep tissue damage almost always accompanies local and regional cutaneous burn injuries, especially in electrical burns. The lungs and the heart can be affected by high-voltage arcs in electrical injuries of the chest wall. A 14-year-old boy was electrocuted by an electrical current of 25 000 V. There were second- and third-degree burns on 35% of the total body surface. There was also a severe burn injury extending into the subgaleal plane at the

Figure 1 Right-sided pneumothorax seen on chest x ray, two days after electrical injury.

Figure 2 Pneumothorax has subsided after intercostal tube drainage.

Figure 3 Ten days after removal of the chest drain; pneumothorax has resolved completely.

frontoparietal scalp. Respiratory distress, tachypnoea, tachycardia and right-sided pleuritic pain ensued on day 2. Physical examination and chest x ray revealed collapse of the lungs and right-sided pneumothorax (fig 1). There were no fractures of the clavicle or the ribs. A closed intercostal tube drainage was applied (fig 2). On the 10th day, the chest x ray showed regression of the pneumothorax, and auscultation revealed equal inflation of the lungs. The drain was then removed (fig 3).

It is widely accepted that electrical current causes tissue damage by producing heat due to local tissue resistance.¹ The main issue in electrical burns of the trunk is injuries to the viscera. Pulmonary damage due to electrical current can cause pneumothorax.² Although visceral damage usually appears in late stages, organ perforations can occur due to disruption of visceral walls, immediately or several days after direct contact with high-voltage electrical current. Despite the burn injury affecting the left anterior chest wall, development of pneumothorax in the right lung reflects the potential difference between different parts of the body. The probability of pneumothorax must be considered in high-voltage electrical injuries having ports of entry on the trunk.³ Hence, it is of vital importance to closely monitor all patients with electrical injuries.

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