Critical Care

CORRESPONDENCE

Open Access

STAB-5: an aide-mémoire for the efficient prehospital management of penetrating trauma by emergency medical services

M. Robinson[1], F. Rath[1], C. Sutton[1], M. Kinsella[1], E. ter Avest[2,3*] and L. Carenzo[4]

Introduction

Penetrating trauma represents a significant percentage of the overall trauma case load in many trauma systems. For patients with penetrating injuries, a longer time to hospital is associated with an increase in risk-adjusted odds of death [1, 2]. Therefore, expedited treatment and transport of by Emergency Medical Services (EMS) crews, who are usually the first healthcare practitioners to attend these patients on scene, is warranted.

Methods

To expedite decision-making by EMS crews and to improve immediate care for patients withpenetrating torso injuries, a 5-step aide-mémoire was developed based on available literature and expert opinion.

Results

5 key-points are essential in the EMS treatment of patients with (central) stab wounds. They can be remembered by the STAB-5 mnemonic (Fig. 1).

*Correspondence:
E. ter Avest
e.ter.avest@umcg.nl
[1] Great Western Air Ambulance Charity, Bristol, UK
[2] Department of Acute Care, University Medical Centre Groningen, University of Groningen, Groningen, The Netherlands
[3] London's Air Ambulance and Bart's Health NHS Trust, Royal London Hospital, London, UK
[4] Department of Anesthesia and Intensive Care Medicine, IRCCS Humanitas Research Hospital, Rozzano, Milano, Italy

Scene safety

Traditionally, EMS crews are trained to follow a classic approach to scene safety, accessing scene only when deemed safe by the police [3]. In the evolving landscape of emergency response, a shift towards the concept of dynamic risk assessment is emerging worldwide. This approach emphasises the importance of scene assessment by EMS personnel and their ability to swiftly adapt to evolving situations to prevent a therapeutic vacuum.

Triage

Immediately after arrival, crews should establish the location and the severity of the injuries sustained. This should be done succinctly to prevent attention being drawn towards the most obvious injury whilst other sources of significant bleeding or injury are neglected. Clothing should be cut-off to facilitate a quick full-body examination, especially of often neglected areas such as axillae, groin, gluteal cleft and perineum, whilstcare should be taken to maintain dignity to the patient when performing these examinations.

Assertive scene & patient management

An early request for critical care teams capable of performing advanced interventions such as blood transfusion or resuscitative thoracotomy should be made, but crews should NOT wait on scene for their arrival. Focus should be on advancing towards the nearest Major Trauma Center (MTC) unless the patient is peri-arrest (agonal breathing, barely recordable pulses), where diverting to the nearest (trauma) hospital is appropriate. If available and deemed necessary (depending on distance

Fig. 1 STAB-5 Mnemonic

from hospital and the patient's condition), a Rendezvous Point (RVP) with a criticalcare team can be established en route to hospital. Early communication with dispatch regarding the destination hospital and planned rendezvous points are key in these instances.

Bleeding control

Direct pressure, wound packing and tourniquet application are the mainstem of bleeding control. In catastrophic extremity bleeding, a tourniquet should be applied immediately and tightened sufficiently to stem arterial bleeding. A second tourniquet may be required if the bleeding continues. Some wounds require packing in addition to direct pressure. The bleeding vessel should be located within the wound, and hemostatic gauze applied directly to the source of the bleed, packing tightly until the wound is filled to provide sufficient pressure. A pressure bandage can then be applied over the top of the haemostatic gauze. For neck wounds direct pressure should be maintained and the need for (early) airway interventions should be considered.

5-min scene time

EMS focus should be to provide immediate life-saving interventions and leave scene towards definite care within 5 min. Patients should be assisted to walk to the ambulance where possible or rapidly extricated by carry-chair or stretcher if necessary. All emphasis should be upon leaving scene with a shared understanding that most intervention can be performed en route to hospital. If vascular (IV/IO) access cannot be gained immediately, additional attempts can be made on route if safe to do so. Tranexamic Acid (IV or IM if no access can be obtained), analgesia and basic monitoring can all be managed en route to hospital and if no reliable blood pressure readings are generated, the patient's volume status should be assessed and described by peripheral pulses, colour, diaphoresis and respiratory status.

Discussion

The use of the STAB-5 mnemonic ensures a standardised, rapid delivery of essential interventions in a structured manner for critically unwell patients in the prehospital setting. It emphasises the importance of thorough patient exposure and early haemorrhage control, as various studies have shown that over 50% of in-hospital death after penetrating trauma occur due to exsanguination [4]. STAB-5 differs from the classic "Scoop and run" approach, wherein patients are transported with minimal- or no interventions at all. However, it still urges crews to minimise scene times, as prolonged scene times directly correlate with a higher mortality [1, 2].

Previous research has confirmed the effectiveness of medical mnemonics for recalling information [5]. Based on preliminary feedback received from ambulance crews, we expect the STAB-5 mnemonic introduced in this study may assist and support crews in tailoring their clinical priorities in this patient group, whilst simultaneouslyencouraging them to prioritise hemostatic interventions and short scene times over other treatments.

We hope that by formalising these key priorities, clinical innovation and quality improvement projects can have significant impact on (preventable) pre-hospital trauma deaths [6]. Prospective evaluation of the introduction of the mnemonic on scene times and treatments provided is warranted to confirm our hypothesis.

Conclusion

The STAB-5 mnemonic is a standard simple approach for treatment of patients with penetrating injuries by EMS crews, focusing on early haemorrhage control and short on-scene times, which may contribute to better patient outcomes in systems where providers have limited exposure to penetrating injuries.

Abbreviations

MTC	Major trauma center
RVP	Rendezvous point
TU	Trauma unit

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s13054-024-05048-1.

Additional file1 (PDF 527 kb)

Additional file2 (PDF 543 kb)

Acknowledgements

We are grateful to Mr. Joolz Ingram for his invaluable help in designing the STAB-5 infographic, and would like to thank Dr. Niccolò Stomeo for the French translation of the STAB-5 infographic.

Author contributions

MR, FR, CS and MK developed the concept of STAB-5. Together with LC and EtA they searched the available literature and collected experiences from various pre-hospital services. EtA and LC drafted the manuscript, and all authors revised it critically for important intellectual content. All authors gave final approval of the version to be submitted and agreed to be accountable for all aspects of the work.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Data availability

No datasets were generated or analysed during the current study.

Declarations

Competing interests

The authors declare no competing interests.

Received: 21 June 2024 Accepted: 27 July 2024
Published online: 05 August 2024

References

1. Byrne JP, Kaufman E, Scantling D, Tam V, Martin N, Raza S, et al. Association between geospatial access to care and firearm injury mortality in Philadelphia. JAMA Surg. 2022;157:942–9. https://doi.org/10.1001/jamasurg.2022.3677.
2. Gauss T, Ageron FX, Devaud ML, Debaty G, Travers S, Garrigue D, et al. Association of prehospital time to in-hospital trauma mortality in a physician-staffed emergency medicine system. JAMA Surg. 2019;154:1117–24. https://doi.org/10.1001/jamasurg.2019.3475.
3. Holgersson A. Review of On-scene management of mass-casualty attacks. J Hum Secur. 2016. https://doi.org/10.12924/johs2016.12010091.
4. Callcut RA, Kornblith LZ, Conroy AS, Robles AJ, Meizoso JP, Namias N, et al. The why and how our trauma patients die: a prospective multicenter western trauma association study. J Trauma Acute Care Surg. 2019;86:864–70. https://doi.org/10.1097/TA.0000000000002205.
5. Hurst NB, Grossart EA, Knapp S, Stolz U, Groke SF, Solem CR, et al. Do mnemonics help healthcare professionals learn and recall cholinergic toxidromes? Clin Toxicol (Phila). 2022;60:860–2. https://doi.org/10.1080/15563650.2022.2042551.
6. Reade MC. Perspective: the top 11 priorities to improve trauma outcomes, from system to patient level. Crit Care. 2022;26:395. https://doi.org/10.1186/s13054-022-04243-2.

Publisher's Note