

# Early control of non-compressible abdominal hemorrhage when resources are scarce: where do we stand and where should we go?

Nikolay Bugaev,<sup>1</sup> John J Como <sup>2</sup>

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Hemorrhage remains the leading cause of preventable trauma-related death.<sup>1</sup> Non-compressible abdominal hemorrhage (NCAH) is frequently encountered in the prehospital environment, but effective clinical tools that can be used in such settings to control bleeding are limited. In this scoping review, Adams and colleagues explored NCAH in the prehospital setting, examining the current status of its management, reviewing existing knowledge gaps, and discussing future innovations that might improve outcomes.<sup>2</sup> This review focused specifically on providing such care in austere environments, both military and civilian, where access to definitive surgical control of NCAH was greater than 30 minutes.<sup>3</sup> To address this subject, a multidisciplinary team developed a protocol, using stakeholder consultation to perform a scoping review of the literature published on this topic over the past 30 years.<sup>2,3</sup>

The literature search was non-restrictive and included studies of various designs that conceptually addressed the purpose of this scoping review. Remarkably, out of 868 articles, only 26 examined the management of NCAH in austere environments. Although hemorrhage control remains one of the critical problems in trauma care, most studies that have addressed management of NCAH have done so under resource-rich conditions.

Several common topics in the management of NCAH in the austere environment were highlighted: damage control resuscitation (DCR), damage control surgery, advanced resuscitative care, resuscitative endovascular balloon occlusion of the aorta (REBOA), self-expanding foam, and prehospital provider decision-making capacity, including remote prehospital expert consultation. Effectiveness of these interventions has not yet been demonstrated in the austere environment, although some approaches have shown some preliminary promise. For example, early DCR along with non-surgical methods of temporary hemorrhage control (REBOA and self-expanding foam) may improve mortality.<sup>2</sup> REBOA in prehospital settings remains an intervention of unknown efficacy and deserves further study. Some reports suggest effectiveness of REBOA when access to surgical care is delayed or requires a prolonged transport time to definitive care facilities.<sup>4</sup> Another promising area of improvement and future research is expert consultation in the prehospital environment. Some data are available to support the potential utility of this approach.<sup>5</sup>

In conclusion, Adams and colleagues<sup>2</sup> have performed a methodologically robust scoping review that addresses NCAH, an important clinical problem in trauma care. This report reviews current evidence and attempts to predict the future direction of clinical research aimed at reducing mortality in NCAH, including the use of DCR, novel hemostatic approaches such as REBOA and self-expanding foam, prehospital expert consultation, and prompt transport to definitive care.

**Twitter** Nikolay Bugaev @BugaevNikolay

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## ORCID iD

John J Como <http://orcid.org/0000-0002-1116-8357>

## REFERENCES

- Butler FK, Holcomb JB, Shackelford SA, Barbabella S, Bailey JA, Baker JB, Cap AP, Conklin CC, Cunningham CW, Davis MS, et al. Advanced Resuscitative care in tactical combat casualty care: TCCC guidelines change 18-01:14 October 2018. *J Spec Oper Med* 2018;18:37–55.
- Adams D, McDonald P, Holland S, Merkle A, Puglia C, Miller B, et al. Management of non-Compressible torso hemorrhage of the abdomen in civilian and military austere/remote environments: a Scoping review. *Trauma Surg Acute Care Open* 2024:e001189.
- Adams D, McDonald PL, Sullo E, Merkle AB, Nunez T, Sarani B, Shackelford SA, Bowyer MW, van der Wees P. Management of non-Compressible torso hemorrhage of the abdomen in civilian and military austere/remote environments: protocol for a Scoping review. *Trauma Surg Acute Care Open* 2021;6:e000811.
- Yamamoto R, Cestero RF, Muir MT, Jenkins DH, Eastridge BJ, Funabiki T, Sasaki J. Delays in surgical intervention and temporary hemostasis using Resuscitative Endovascular balloon occlusion of the aorta (REBOA): influence of time to operating room on mortality. *Am J Surg* 2020;220:1485–91.
- Alter N, Arif H, Wright DD, Martinez B, Elbuli A. Telehealth utilization in trauma care: the effects on emergency Department length of stay and associated outcomes. *Am Surg* 2023;89:4826–34.



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<sup>1</sup>Emergency Surgical Services, Department of Surgery, Tufts Medical Center, Boston, MA, USA

<sup>2</sup>Department of Surgery, MetroHealth Medical Center, Cleveland, Ohio, USA

## Correspondence to

Dr John J Como;  
[johnjcomomdmph@gmail.com](mailto:johnjcomomdmph@gmail.com)