Letter to the editor regarding the joint statement from the American College of Surgeons' Committee on Trauma (ACS-COT) and the American College of Emergency Physicians (ACEP) regarding the clinical use of resuscitative endovascular balloon occlusion of the aorta (REBOA)

At a time when the value of military-civilian coordination in trauma care practice, research and development is being emphasized,[1] we are concerned by the recently published statement of the American College of Surgeons' Committee on Trauma and the American College of Emergency Physicians (ACS-COT/ACEP) on the use of resuscitative endovascular balloon occlusion of the aorta (REBOA).[2] We are disconcerted that the work group did not include any representatives from the US military's Joint Trauma System (JTS) and failed to cite the JTS' REBOA clinical practice guideline (CPG).[3] We are concerned that after overlooking the military perspective on the use of REBOA, the work group crafted language is too prescriptive and that could limit the military health system's use of this life-saving technique in deployed settings.

The data that defined the disproportionate mortality from torso hemorrhage that led to the development of REBOA were generated by the US military.[4] JTS-led studies of combat injured indicate that as many as one in five service members killed in action during the recent wars bled to death while being transported to, or waiting for, a surgeon and an equipped operating room.[4] It became readily apparent to those of us who served down range that the old 'surgeon-centric' dogma to hemorrhagic shock did not work in all cases. This is why the military pursued endovascular solutions that could enable all types of surgeons, as well as certain non-surgeon providers who staff early points in the chain of casualty care, to temporarily stabilize a shocked and rapidly deteriorating patient.[5]

The military pursued new or revised endovascular approaches for the scenario of torso hemorrhage and shock as these methods had clear advantages in the management of aortic aneurysms and blunt aortic injury.[5] The military partnered with civilian innovators, private investors and the Food and Drug Administration to efficiently develop and commercialize a viable REBOA-specific product.[5 6] Recognizing the need for concurrent training, the military also developed a comprehensive 'Endovascular Skills for Trauma and Resuscitative Surgery' course.[7] Finally, with the aid of a new, evidence-supported practice guideline, the military successfully implemented REBOA in deployed settings.[1 8 9] Although it is too soon to definitively characterize the impact of REBOA in casualty care, early reports suggest that it can be safely and effectively used in the austere setting.[8 9]

This experience is overlooked in the ACS-COT and ACEP statement. The working group asserts that military general and trauma surgeons 'should' and military emergency physicians 'must' take a proprietary ACS course before they can attempt REBOA. Furthermore, military emergency physicians must have an acute care surgeon present prior to attempting the procedure. Both statements are unduly prescriptive and fail to address the fact that the initial effectiveness of REBOA in deployed settings was not achieved by fellowship-trained trauma or vascular surgeons, but by general surgeons, emergency physicians and anesthesiologists without critical care certificates.[6 7] The US military has consistently found that an inclusive, team approach, guided by standard operating procedures and practice guidelines, is more useful in deployed settings than arbitrary rules based on specialty interests. Taken too far, overemphasis of needed certificates could limit the use of REBOA, and other endovascular procedures, to only fellowship-trained endovascular surgeons and interventional radiologists, a move that would be antithetical to the premise to save lives in the 'pre-operating room' setting.

Instead of taking inflexible positions such as 'one must always' or 'one can never', and endorsing a single proprietary training program such as the ACS-COT's Basic Endovascular Skills for Trauma (BEST) course, the military has opted for a more pragmatic, provider-centered approach. Consistent with the motto 'One team, one fight', the US military engages all members of its resuscitation teams (including medics, nurses and physicians). We recognize that in many cases, a trauma surgeon, vascular surgeon or even a critical care trained emergency physician may be unavailable, or too busy saving other casualties to supervise REBOA. This is why we have developed a variety of practical training modalities, including recently implemented vascular access and REBOA courses stateside and down range, to prepare our personnel to save lives down range. Making use of this approach, and guided by the JTS CPG and its performance improvement processes, REBOA has been safely implemented and used to good effect by forward-deployed resuscitation and surgical units.[1 6 7]

Given the rapidly changing nature of this field, including emergence of new prospective clinical data, we hope that the ACS-COT and ACEP will revise its joint statement in the near future. If this occurs, we urge them to include military experts in the work group and incorporate the military's data and unique perspective in the analysis. Perhaps with this added perspective, a more collaborative approach to this and future much-needed casualty care products can be attained to improve survival from severe torso hemorrhage and refractory shock.

Joseph J DuBose,[1] Todd E Rasmussen,[2,3] Michael R Davis[4]

[1]R Adams Cowley Shock Trauma Center, University of Maryland Medical Center, Baltimore, Maryland, USA
[2]F Edward Hebert School of Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland, USA
[3]Department of Surgery, Walter Reed National Military Medical Center, Bethesda, Maryland, USA
[4]Department of Defense Combat Casualty Care Research Program, Fort Detrick, Maryland, USA

Correspondence to Dr Michael R Davis, United States Combat Casualty Care Research Program, Fort Detrick, MD 21702-5012, USA; michael.r.davis166.mil@mail.mil

Disclaimer The statements in and perspective of this letter are those of the authors and do not reflect official positions of the US Air Force, US Army or the Department of Defense.

Competing interests TER is an inventor of REBOA and REBOA-like technology, the patents for which are assigned to the US Air Force. TER has no financial conflicts to disclose. Other authors have no competing interests to declare.

Patient consent Not required.

Provenance and peer review Not commissioned; internally peer reviewed.

OPEN ACCESS

Open Access This is an Open Access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/

© Article author(s) (or their employer(s) unless otherwise stated in the text of the article) 2018. All rights reserved. No commercial use is permitted unless otherwise expressly granted.

Check for updates

To cite DuBose JJ, Rasmussen TE, Davis MR. *Trauma Surg Acute Care Open* 2018;**3**.

Received 23 January 2018
Revised 26 January 2018
Accepted 5 February 2018

Linked

► http://dx.doi.org/10.1136/tsaco-2018-000170

Trauma Surg Acute Care Open 2018;**3**. doi:10.1136/tsaco-2018-000167

REFERENCES

1 National Academies of Sciences, Engineering and Medicine. *A National trauma care system: integrating military and civilian trauma systems to achieve zero preventable deaths after injury*. Washington, DC: The National Academies Press, 2016.
2 Brenner M, Bulger EM, Perina DG, Henry S, Kang CS, Rotondo MF, Chang MC, Weireter LJ, Coburn M, Winchell RJ, *et al*. Joint statement from the American College of Surgeons Committee on Trauma (ACS COT) and the American College of Emergency Physicians (ACEP) regarding the clinical use of Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA). *Trauma Surgery & Acute Care Open* 2018;3:e000154.
3 JTS Clinical Practice Guideline on Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) for hemorrhagic shock. http://www.usaisr.amedd.army.mil/cpgs/REBOA_%2006Jul2017CORRECTED.pdf (accessed 21 Jan 2018).
4 Eastridge BJ, Mabry RL, Seguin P, Cantrell J, Tops T, Uribe P, Mallett O, Zubko T, Oetjen-Gerdes L, Rasmussen TE, Butler FK, Kotwal RS, Kotwal RS, Holcomb JB, Wade C, Champion H, Lawnick M, Moores L, Blackbourne LH. Death on the battlefield (2001-2011): implications for the future of combat casualty care. *J Trauma Acute Care Surg* 2012;73(Suppl 5):S431–7.
5 Rasmussen TE, Eliason JL. Military-civilian partnership in device innovation: development, commercialization and application of Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA). *J Trauma Acute Care Surg* 2017;84:732–5.
6 Rasmussen TE, Franklin CJ, Eliason JL. Surgical innovation: resuscitative endovascular balloon Occlusion of the aorta for hemorrhagic shock. *JAMA Surg* 2017;152:1072–3.
7 Villamaria CY, Eliason JL, Napolitano LM, Stansfield RB, Spencer JR, Rasmussen TE. Endovascular Skills for Trauma and Resuscitative Surgery (ESTARS) course: curriculum development, content validation, and program assessment. *J Trauma Acute Care Surg* 2014;76:929–36.
8 Manley JD, Mitchell BJ, DuBose JJ, Rasmussen TE. A modern case series of resuscitative endovascular occlusion of the aorta (REBOA) in an out-of-hospital combat casualty care setting. *J Spec Oper Med* 2017;17:1–8.
9 Fisher AD, Teeter WA, Cordova CB, Brenner ML, Szczepanski MP, Miles EA, Galante JM, DuBose JJ, Rasmussen TE. The Role I Resuscitation Team and Resuscitative Endovascular Balloon Occlusion of the Aorta. *J Spec Oper Med* 2017;17:65–73.