

EDITOR'S MESSAGE

According to Statistics Canada, in 2011, the fourth leading cause of death for all ages was unintentional injury from accidents. When looking at deaths for people up to the age of 44, accidents causing unintentional injury are the number one cause of death.¹

Of traumatic mortality, 30 to 40% is caused by hemorrhage (exsanguination). About half of the deaths from hemorrhage occur before patients even reach a hospital.²

In the past few years there has been an increasing amount of research investigating REBOA (Resuscitative Endovascular Balloon Occlusion of the Aorta) as one method to reduce the mortality of hemorrhage from accidental injuries.

REBOA involves feeding a balloon catheter through the femoral artery into the descending aorta or infrarenal artery to occlude bloodflow and prevent lethal hemorrhage. It is designed to treat injuries in non-compressible regions, like the abdomen or pelvis.³

A significant portion of published research is based on data from porcine models, but there is some data from human studies showing REBOA as a promising treatment for potentially fatal hemorrhage.⁴ Some studies have looked at the benefits of continuous REBOA in comparison to intermittent REBOA. Although there is not yet enough data to provide a conclusive answer as to which method is more effective, some early porcine studies show that continuous REBOA might have a larger impact on decreasing mortality.⁵

Along with the expected risks of any invasive medical intervention, REBOA also carries the risk of inflammatory sequelae, including potential organ failure, caused by the release of IL-6 (interleukin 6) and TNF- α (tumor necrosis factor alpha) because of decreased perfusion.⁶ One case series published noted that for six patients in which REBOA was used, there were no hemorrhage or REBOA linked complications.⁴

The Royal London Hospital in the UK has used REBOA over the past two years to treat non-compressible hemorrhagic torso injuries. Until now, the procedure has always been completed in operating theatres in hospitals but in June of this year, London's Air Ambulance used REBOA in a pre-hospital setting for the first time.

The procedure is normally fluoroscopically guided but when used at the roadside, REBOA was guided by ultrasound.⁷

While REBOA being used to treat patients before they reach the hospital is a great advance in trauma care, we are still a distance away from REBOA being used by trauma teams around the world. Dr. Gareth Davies, Chair of London's Air Ambulance, has said the procedure is performed with the goal of the patient being in surgery within the hour. But there is not yet sufficient research on how long the balloon can remain inflated before risking injury to the lower limbs or organ failure from inflammatory mediators (such as IL-6 and TNF- α). Further research might expand the indications for REBOA from the current one of fatal hemorrhage to include those aimed at preventing not only mortality but possibly limb morbidity as well. There needs to be greater specification of which patients are viable candidates for the procedure. And of course, the cost of the procedure itself as well as the necessary training for physicians and paramedics to perform the procedure would need to be examined.

REBOA is a promising intervention that, at this early stage of implementation, appears to have the capacity to make a significant reduction in the number of people who die from traumatic hemorrhage.

*Regards,
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Editor in Chief*

References

1. Statistics Canada [Internet]. Ottawa: Government of Canada; 2014 [cited 2014 Jul 2]. Available from: <http://www.statcan.gc.ca/pub/82-625-x/2014001/article/11896-eng.htm>.
2. Kauvar DS, Lefering R, Wade CE. Impact of hemorrhage on trauma outcome: an overview of epidemiology, clinical presentations, and therapeutic considerations. *J Trauma* 2006;60(6 Suppl): S3-11.
3. Morrison JJ, Lendrum RA, Jansen JO. Resuscitative endovascular balloon occlusion of the aorta (REBOA): A bridge to definitive haemorrhage control for trauma patients in Scotland? *Surgeon* 2014;12(3):119-120.
4. Brenner ML, Moore LJ, DuBose JJ et al. A clinical series of resuscitative endovascular balloon occlusion of the aorta for hemorrhage control and resuscitation. *J Trauma Acute Care Surg* 2013;75(3):506-11.
5. Morrison JJ, Ross JD, Houston R 4th et al. Use of resuscitative endovascular balloon occlusion of the aorta in a highly lethal model of noncompressible torso hemorrhage. *Shock* 2014;41(2):130-7.
6. Morrison JJ, Ross JD, Markov NP et al. The inflammatory sequelae of aortic balloon occlusion in hemorrhagic shock. *J Surg Res* 2014;S0022-4804(14):00366-7.
7. London's Air Ambulance [Internet]. London: London's Air Ambulance; 2014 [cited 2014 Jul 2]. Available from: <http://londonsairambulance.co.uk/our-service/news/2014/06/we-perform-worlds-first-pre-hospital-reboa>.