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Letter to the Editor

Reply to: Prehospital REBOA: Time to clearly define the relevant indications

Dear Sir,

We are grateful for the interest in our work by Thabouillot et al. and welcome the opportunity to respond to the points raised.

Indication criteria for pre-hospital REBOA

We agree with the authors premise regarding the need to accurately define which patients may or may not benefit from interventions like REBOA and in which context (pre-hospital, in-hospital, operating room) it is most effective. As our global understanding evolves, we recognise the importance of careful investigations such as the ongoing, multicentre UK-REBOA Trial, at informing our practice.[1]

Currently, our indications for pre-hospital Zone III REBOA are adults with non-compressible exsanguinating haemorrhage from either blunt or penetrating pelvic injury, who are assessed to be at imminent risk of hypovolaemic cardiac arrest.[2]

Our service specifically avoids relying on pre-defined thresholds of systolic blood pressure or treatment criteria such as inotrope administration as described by Thabouillot et al., in critical decision-making. In our experience, no clinical factor in isolation can reliably assist clinicians predict which injured patients are at imminent risk of exsanguination and pre-hospital cardiac arrest, and which would survive to hospital and definitive haemostasis. We regularly encounter patients with profound hypotension very soon after injury that is unrelated to haemorrhage and caused by fundamentally different pathophysiological mechanisms, such as impact brain apnoea, cardiogenic shock post head injury or vagal response to pain.[3] Therefore, we believe it is paramount to make a clinical diagnosis of exsanguinating haemorrhage, rather than depend on blood pressure measurements alone, when establishing indication criteria for REBOA.

The following criteria are used to identify patients with exsanguinating haemorrhage in our pre-hospital service. They are based on our institutional experience and the available clinical and physiological research on the human response to haemorrhage following injury.[4,5]

Diagnosis of exsanguinating pelvic haemorrhage:

- Mechanism associated with large energy transfer or a penetrating injury to the pelvis.
- Injuries compatible with vascular disruption and exsanguinating haemorrhage.
- Appropriate time course (rapid evolution of shocked state).
- The following clinical signs (“Hateful Eight”)

1 Pale
2 Clammy
3 “Air-hunger”
4 Venous collapse
5 Hypotension (low volume or absent peripheral pulses)
6 Low/falling ETCO2
7 Tachy or bradycardia
8 Altered mentation

We feel this is approach is pragmatic. However, we acknowledge the need for high quality future research to (a) better define the patient groups that derive benefit from REBOA, and (b) develop novel diagnostic and decision-support tools that enhance treatment decisions.

Pre-hospital diagnosis, source of haemorrhage

The rationale behind the use of REBOA in Zone III alone is described in our paper.[2] Excluding coexistent abdominal haemorrhage in patients undergoing Zone III REBOA is challenging and it is impossible to “rule-out” more proximal haemorrhage with or without Focused Assessment Sonography in Trauma (FAST). Therefore, making a clinical diagnosis as to the most likely source of haemorrhage based on detailed assessment of the mechanism of injury and meticulous clinical examination remains fundamental. Furthermore, although Zone III REBOA may aggravate more proximal sites of bleeding, we don’t believe that this is a contra-indication to its use in patients assessed to be at imminent risk of cardiovascular collapse from exsanguinating pelvic haemorrhage.

Conflicts of interest

Dr Robbie Lendrum is a National Institute for Health Research, Health Technology Assessment (NIHR HTA) grant holder for the UK-REBOA Trial. No other disclosures were reported.

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