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LETTER TO THE EDITOR

Pre-hospital fluid therapy in the critically injured patient: Need for clinical studies

The excellent work by Søreide and Deakin¹¹ is a practical updated approach of great usefulness to professionals whose task is optimal pre-hospital management of critically injured patients.¹ However, we would like to offer some comments on this controversial and complex topic.

The authors refer to the study by Dutton et al.³ in order to question the concept of hypotensive resuscitation. We think that the Dutton study presents a serious limitation: aiming to compare different therapeutic objectives (hypotension versus normotension), the result was that neither of the two groups had hypotension (average systolic blood pressure during bleeding of 114 mmHg versus 100 mmHg), although the authors did find a statistically significant difference between the two groups ($p < 0.001$).⁵ This was probably due to the fact that cristaloid infusion of 200–500 ml aliquots to achieve a systolic blood pressure (SBP) target of 70 mmHg or 100 mmHg makes the concept of hypotensive resuscitation difficult to achieve. However, infusing these quantities for the above-mentioned reasons seems not to have affected mortality in either blunt or penetrating trauma without suspicion of traumatic brain injury (TBI). Lower doses might achieve hypotensive resuscitation and perhaps improve survival in human uncontrolled haemorrhage without TBI, as has been observed in animal models.⁶

Given individual variability in auto-regulation, the most important objective in uncontrolled haemorrhage may be to achieve “acceptable” tissue perfusion without an increase in haemorrhage rather than a particular value of arterial pressure. Similarly, as the authors note, a state of consciousness and the presence of a radial pulse may be better therapeutic objectives than arterial pressure, not because the presence of pulse corresponds with a particular value of SBP but because consciousness and pulse may reflect an “acceptable” perfusion which prevents cardiac arrest caused by hypovolaemia, and additionally ensures sufficient

oxygen supply to preserve vital organ function without increasing haemorrhage or re-bleeding; moreover, this approach perhaps does not require distinguishing between blunt and penetrating trauma objectives in the absence of TBI.^{3,13}

In our opinion, the concept of hypotensive resuscitation could be replaced by that of permissive hypovolaemia for pre-hospital attention given that:

1. Hypotensive resuscitation presupposes measuring SBP and its use as a therapeutic objective.
2. SBP is a poor indicator of perfusion and the state of microcirculation.
3. The use of SBP as a therapeutic objective has important limitations since its measurement varies considerably among observers,⁴ which may be accentuated in states of shock making auscultation of Korotkoff sounds more difficult.¹⁰
4. It is difficult to determine SBP by pulse palpation.
5. Measuring SBP may constitute a distracting factor.

We understand permissive hypovolaemia as abstaining from fluid administration in trauma patients with clinical signs of haemorrhagic shock, palpable radial pulse and who respond to verbal instructions, but do not present signs indicative of TBI.

Given that there are expert opinions in support of hypotensive resuscitation,^{7,8} that there are coherent physiopathological reasons behind non-normalisation of BP in uncontrolled haemorrhage¹² and that there are no clinical studies that define the quantities of fluid to be administered, it is imperative that studies be performed in humans, designed to effectively compare:

1. The concept of hypotensive resuscitation versus normotensive resuscitation.
2. BP versus indicators of perfusion such as sublingual CO₂ level, as therapeutic objective.⁹
3. The concept of hypotensive resuscitation versus that of permissive hypovolaemia.

As things stand at present we can only base our opinions on personal experience and low levels of

evidence. Efforts must be made to design and perform studies that provide the level of evidence necessary to optimise the management of pre-hospital trauma and shock.²

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