## Controversies in the prehospital management of major trauma Paul E Pepe

## 5 **Trauma-associated circulatory arrest** Cardiac arrest following injury involves a state of cardiac standstill, with either asystole or agonal electrical activity. If not due to an acute airway or respiratory compromise, it essentially carries a fatal

- 10 prognosis. In contrast, circulatory arrest implies that although the patient may be pulseless and apnoeic, the heart may still be beating or attempting to beat. This scenario is a result of <u>a severely compromised cardiac</u> <u>output secondary to conditions such as marked</u>
- 15 <u>hypovolaemia</u>, cardiac tamponade or tension pneumothorax. Survival after circulatory arrest secondary to trauma is associated with four main factors; younger

trauma is associated with four main factors: younger age; single organ involvement; very brief times until

 surgical intervention (< 10 min); and prehospital rapid ETI (with adequate lung inflation and a slow, controlled rate of assisted ventilations).27,32,33
Nevertheless, the data for these positive correlations have yet to be substantiated in controlled trials.

## Impact of on-scene time

There are several studies that have examined the role of paramedic on-scene times with outcomes of trauma patients.10,26,28,56 Most studies conclude that patient

- 30 evacuation should not be delayed to provide prehospital advanced life support interventions. The exception to this may be rapid ETI (endotracheal intubation). Although experienced paramedics can establish i.v. lines very quickly, any additional on-scene 85
- 35 time merely to start an i.v. would be ill advised in patients with suspected internal injuries. This is particularly so in light of the recent evidence suggesting <u>the deleterious</u> <u>effect of prehospital fluid administration in those with</u> <u>presumed internal haemorrhage</u>. Provision of ETI 90
- 40 and i.v. access *en route* would be preferable when internal bleeding is suspected. In such patients, if i.v. fluid administration may be harmful, and because only a small subset of trauma patients may require prehospital ETI, perhaps the most important

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prehospital intervention is rapid transport to an appropriate facility.
A retrospective study comparing outcomes of patients transported to an urban trauma centre by paramedics with those patients transported by private
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50 vehicles, found that the adjusted mortality rate was

higher for **patients with moderate to severe injuries who were transported by EMS**. Again, this may underscore the need for rapid transport of victims of penetrating trauma and to avoid delays in

performing prehospital interventions. Therefore, in tiered EMS systems with both basic life support (BLS) and advanced life support (ALS) ambulances, the closest available ambulance might be the most appropriate to dispatch to ensure the most rapid transport of patients with penetrating truncal injuries.

- As with many prehospital interventions, the role of prehospital needle thoracostomy has not been well studied. Two retrospective studies, however, one from an air ambulance setting and another from an urban ground-based EMS system, suggest that needle thoracostomy is easily performed, is associated with few complications, and may improve patient outcome when tension pneumothorax is suspected.69,70 Perhaps the best approach to **the prehospital**
- 70 treatment of the severely injured penetrating trauma patient is not necessarily to 'scoop and run' but to 'scoop and treat'. In other words, appropriate monitoring and BLS and ALS interventions can then be performed while *en route* to an appropriate centre.

## Conclusions

Recent research efforts have demonstrated that **many long standing practices for the prehospital resuscitation of trauma patients** may be inappropriate under certain circumstances. Traditional therapies, such as application of antishock garments and i.v. fluid administration, may even be detrimental in certain patients with uncontrolled bleeding. Endotracheal intubation, although potentially capable of prolonging the ability to tolerate circulatory arrest, may be harmful if overzealous ventilation further compromises cardiac output in such patients with severe haemodynamic instability. In addition, if these procedures delay patient transport, any benefit they may offer could be outweighed by delaying definitive care.

Further prospective, randomized clinical trials are needed to better define the role of prehospital trauma care. Such research must specifically address the different mechanisms of injury, anatomical areas involved, and physiological staging in a given patient. Hopefully, with better scientific scrutiny, we can eventually improve current systems of trauma care and resuscitation.

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