

Anaesthetic priorities in pre-hospital trauma care

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Abstract

Trauma is a significant cause of morbidity and mortality in the UK. Developments in the delivery of pre-hospital trauma care and advances in techniques for managing critically injured patients on scene, partly due to military medical experiences in recent conflicts, have encouraged greater scrutiny of the performance of these services. In addition to the unique environmental and logistical challenges posed by pre-hospital care, the injury and physiology patterns typically associated with trauma patients necessitate a specific approach to their assessment and treatment, whereby control of Catastrophic haemorrhage is prioritized before management of Airway, Breathing and Circulation issues (<C>ABC). The time-critical casualty needs to be recognized, and immediate life- or limb-threatening complications addressed promptly, with expedited evacuation to definitive hospital care. In 2011 the General Medical Council (GMC) approved Pre-hospital Emergency Medicine (PHEM) as a subspecialty of Emergency Medicine and Anaesthetics, thereby highlighting it as an area of medical expertise which requires training of its practitioners, as well as demonstration of competent, evidence-based, and meticulously audited practice.

Keywords Hypotensive resuscitation; massive haemorrhage; pre-hospital; rapid sequence induction; trauma

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According to The Trauma Audit and Research Network (TARN), trauma is the most common cause of death in those aged under 40 in the UK.¹ The principal aim of pre-hospital care is to transport the patient as rapidly as possible to a hospital that can provide definitive care, remaining on scene only long enough to identify and treat time-critical life- or limb-threatening injuries. The terms ‘golden hour’ and ‘platinum ten’ (minutes) refer to target timeframes for the commencement of definitive treatment post-injury and pre-hospital team scene time, respectively. Whilst the timings are arbitrary, they convey the urgency with which trauma patients should be packaged and transferred to a

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Learning objectives

After reading this article, you should be able to:

- Describe the standardized approach to pre-hospital trauma care, whereby management of massive haemorrhage is a priority
- Identify the indications for Pre-Hospital Emergency Anaesthesia (PHEA), including endotracheal intubation, the associated risks and recommendations for safe practice
- Explain hypotensive resuscitation fluid management strategies in pre-hospital trauma care
- Evaluate some of the recent advances in pre-hospital medicine
- Recognize potential areas for further research and development in pre-hospital trauma care

place of definitive care, although entrapment is an unavoidable impediment to this. Such a situation exemplifies one of many hazardous or austere environments to which pre-hospital clinicians may be exposed, in which utilizing recommended personal protective equipment and liaising closely with the other emergency services at the scene are paramount for maintaining safety. An ETHANE report (Exact location, Time of the incident, Hazards present, Access and egress, Number and nature of the casualties, Emergency services present) conveys a succinct summary of the scene, and specific risks, for those approaching it. In addition, the scene itself can provide clues as to the likely injuries sustained by any casualties (for example, ‘reading the wreckage’ of a road traffic collision). If there are multiple casualties, the triage sieve (Figure 1) may be required to determine clinical priority.

A focused casualty primary survey is performed as promptly as possible, facilitating the execution of only essential clinical interventions by the pre-hospital care team. Procrastination of patient evacuation not only delays definitive care, but also further compromises their physiology secondary to the ‘lethal triad’ of hypothermia, acidosis and coagulopathy. Progressively, and particularly since the recent endowment of General Medical Council (GMC)-recognized subspecialty status to pre-hospital emergency medicine (PHEM), these traditionally paramedic-only teams have been augmented by a doctor. The PHEM subspecialty training programme admits only doctors training in emergency medicine or anaesthetics (who also have at least six months of experience in the counterpart specialty). This change in skill mix potentially confers advantages such as the provision of a greater range of clinical interventions both at the scene and during patient transfer (including multimodal analgesia and sedation), in addition to physician-led decision-making regarding the likely clinical course of, and most appropriate destination for, each casualty. The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) 2007 report ‘Trauma: who cares?’ identified that almost two-thirds of the patients included in the study received care that did not meet the standard of best practice, and concluded that ‘all patients who have sustained serious trauma should have a primary survey conducted at the earliest opportunity’ and that ‘critical resuscitation should be undertaken and reviewed throughout the prehospital phase of care’.² The importance of

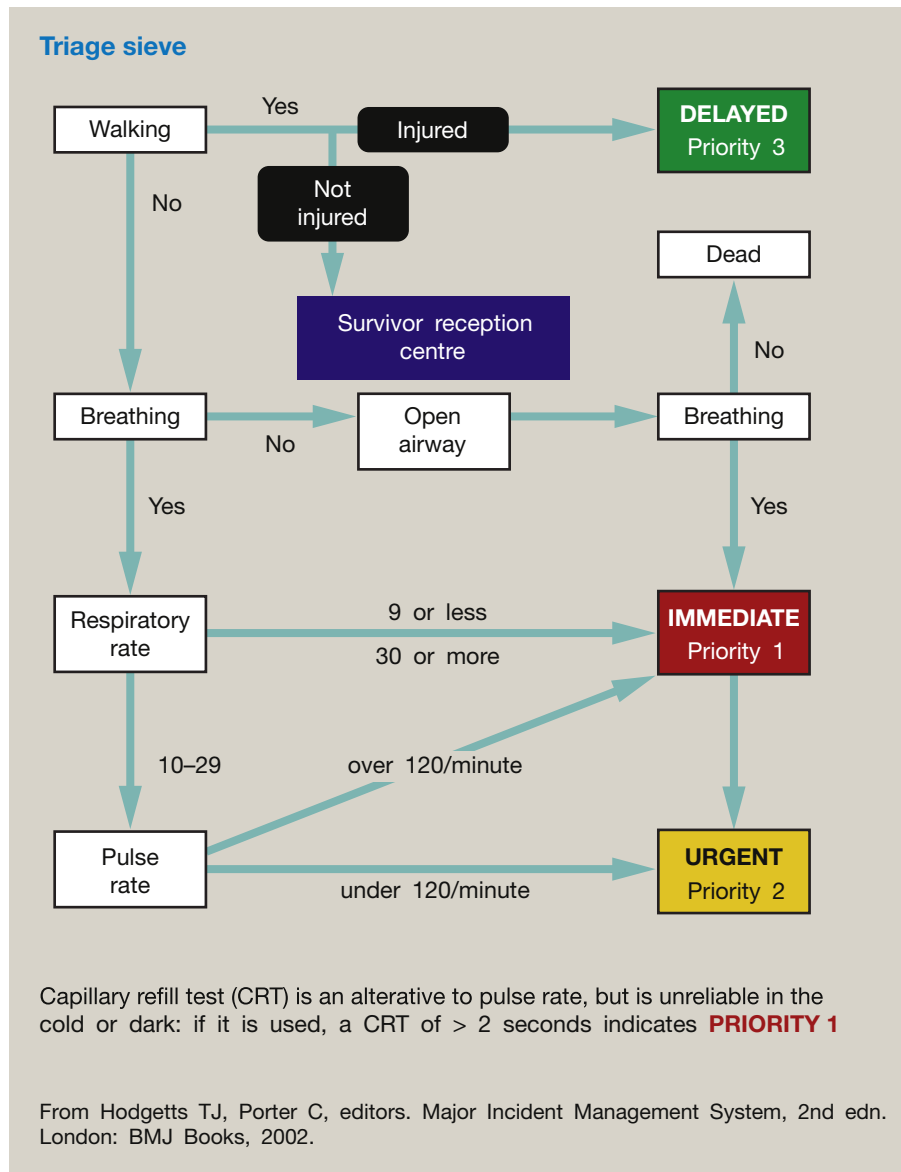


Figure 1

good quality pre-hospital care, and recommendations for practice, are also documented in the National Institute for Health and Care Excellence (NICE) 2016 guideline 'Major trauma: assessment and initial management',³ and the Association of Anaesthetists of Great Britain and Ireland (AAGBI) has produced safety guidelines on pre-hospital anaesthesia, the most recent drafted in 2016.⁴ Clinical management of the casualty in the pre-hospital environment is best conducted systematically, with a Catastrophic haemorrhage, Airway/C-Spine, Breathing, Circulation, Disability, Exposure/Everything else (<C>ABCDE) approach to the primary survey.

Control of massive haemorrhage

Exsanguination from catastrophic haemorrhage is the leading cause of preventable death – and a significant cause of morbidity – from trauma, and must be dealt with promptly. It is classified

as compressible and non-compressible. The majority of external or extremity bleeding can be controlled by methods such as compression, elevation and splinting. The mnemonic DDIT can be used to describe options for managing this type of haemorrhage: application of Direct pressure to the bleeding site with a dressing, further Direct pressure and superimposition of another dressing, Indirect pressure by compressing the relevant artery against a bone, and application of a Tourniquet if the bleeding is from a limb. Suspected long bone fractures are reduced by splinting, and pelvic fractures by binding. Haemostatic agents are available in different forms, such as CELOX™-impregnated gauze, and can be applied to wounds to achieve haemostasis. Patients with suspected internal, non-compressible, haemorrhage require rapid transfer to hospital for surgical intervention. The CRASH-2 (Clinical Randomisation of an Antifibrinolytic in Significant Haemorrhage 2) trial shows that administration of

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