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Prehospital care – Scoop and run or stay and play?

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Summary[1] Improved training and expertise has enabled emergency medical personnel to provide advanced levels of care at the scene of trauma. While this could be expected to improve the outcome from major injury, current data does not support this. Indeed, prehospital interventions beyond the BLS level have not been shown to be effective and in many cases have proven to be detrimental to patient outcome. It is better to "scoop and run" than "stay and play". Current data relates to the urban environment where transport times to trauma centres are short and where it appears better to simply rapidly transport the patient to hospital than attempt major interventions at the scene. There may be more need for advanced techniques in the rural environment or where transport times are prolonged and certainly a need for more studies into subsets of patients who may benefit from interventions in the field.

Introduction

The provision of high quality prehospital care is an essential part of any established trauma system and critical to the survival of the severely traumatised patient. As trauma systems have developed, the abilities of prehospital providers to provide advanced care has increased enabling a number of basic and advanced, potentially life-saving techniques to be performed in the field. However, it is still debated whether it is better to mainly rely on the speed of response and transport, ie, "scoop and run" or take the time at the scene to initiate primary treatment and stabilise the patient before transport, ie, "stay and play". Clinical practice would suggest that in some situations field stabilisation should benefit the patient whereas in others (where more critical time-limited issues are present) speed of transfer to a definitive care facility is the most important priority. This discussion will focus on the role of prehospital personnel in the field as an integral part of the care process. Inevitably, the experience, abilities and role of prehospital personnel will differ between different areas and countries and between different trauma systems, however, the key physiological principles should remain the same.

Prehospital systems

The prehospital process after trauma should follow a standard pattern. The initial alert should go to a central receiving station to enable dispatch of appropriate emergency services.

In the USA, fire, police and ambulance services routinely attend every trauma call. The prehospital medical services are then provided at different levels, which are certified or licensed at the individual state level. Most states follow national recommendations from the Federal Department of Transportation (DOT) and National Highway Traffic Safety Administration (NHTSA) and categorise the rescue services as first responders (fire or police) or trained Emergency Medical Technicians (EMT). The latter have a variety of training and skills and are certified at the "Basic" (EMT-B), "Intermediate" (EMT-I) and "Paramedic" (EMT-P) level. The exact capabilities may differ slightly from state to state, particularly at the paramedic

[1] Abstracts in German, French, and Spanish are printed at the end of this supplement.

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level where in some states medications are given and procedures are performed by standing protocol, while in others the paramedics must speak to a physician by radio (online medical direction) before they institute a specific therapy on a particular patient. Essentially, what is produced is a system in which a victim may be initially assessed by a provider able to provide only basic (BLS) or perhaps advanced (ALS) initial interventions.

In some countries, the role of individual practitioners may not be so well defined or wide ranging, while in others, a doctor with more extensive skills may be part of an early response team, particularly if helicopter transport is involved. Clearly, the level of management initiated at the scene should depend on the specific scenario but local geography, training and the experience of a local rescue team will also be significant.

Skills and procedures performed in the field

A variety of skills are potentially available for use in the field. These skills range from the simple to the complex and include spinal immobilisation and limb splintage, simple airway support and provision of oxygen to control of a sucking chest wound, needle chest decompression, extremity haemorrhage control, the provision of intravenous fluids and advanced airway control with intubation, which may include administering medications (including paralytics) and even cricothyrotomy.

Clearly, several of these require advanced training and subsequent maintenance of these skills. When used, they take time at the scene and the most advanced are very rarely used. Some have become very controversial, particularly prehospital intubation, which takes time in often difficult circumstances. Problems are not uncommon with aspiration and oesophageal intubations, and are probably under reported. Even the role of prehospital intravenous fluid administration is doubtful; venous access in the field can be very difficult, it also takes time and it is considered that providing immediate fluids to elevate the blood pressure without formal haemorrhage control may be harmful.

Airway management

Basic airway management ranges from the simple jaw thrust and oropharyngeal airway to use of the laryngeal mask airway (LMA) and endotracheal intubation. The latter remains the gold standard of airway management but needs time and may require the use of prehospital paralytic agents. A recent study by Davis et al [2] showed that comparing prehospital endotracheal intubation by paramedics to more basic airway management resulted in a higher mortality for an apparently matched prehospital trauma population. There was an increased mortality of 33% versus 24% overall and of 41% versus 30% for serious head or neck injury. Confirming these findings, Murray [5] showed that field intubation or intubation attempts were associated with increased mortality of 81% versus 77%. Bochicchio [1] et al also showed a significant increase in mortality (23% versus 12 %) when comparing intubation and in the field to intubation after arrival in the trauma centre.

Prehospital fluids

Standard EMT protocols call for the provision of intravenous (IV) access with two large bore IVs followed by the rapid administration of saline or Ringers lactate if the blood pressure is below 90 systolic. However, obtaining an IV in poor conditions is difficult and has been documented to take between 8 and 12 minutes; in an urban situation this may be enough time for the patient to have reached the hospital. It is therefore vital that the prehospital providers consider this delay against the potential benefit from the field treatment of hypotension. In addition, running fluid into a patient without haemorrhage control is itself controversial and there are a number of different protocols describing the use of planned hypotensive resuscitation. Indeed, it has been demonstrated that aggressive prehospital fluid administration of hypotensive victims of penetrating trauma did not improve survival and infact increased blood loss when compared with delayed resuscitation when the patient arrived at the trauma centre [4].

Immobilisation and splintage

It is accepted that all trauma patients should be appropriately immobilised for extrication and transport. After complex blunt injury, this immobilisation should include a cervical collar and a long backboard as this provides the best overall spinal immobilisation. The scoop stretcher or Kendrick extrication device (KED) is also useful. Recently, early application of a pelvic binder has become widely practiced for immediate stabilisation of potentially unstable pelvic fractures. Various types of traction splints are used by prehospital providers for which simple realignment of a fractured limb is required with

documentation of distal, vascular and neurological function before and after intervention.

Wound care

Complex wounds should be covered and simple haemorrhage control techniques employed by direct wound pressure. Rarely, with traumatic amputation, a tourniquet may be applied and can be life saving. Penetrating objects such as knives or other projectiles should be bandaged in place and should not be removed by prehospital providers prior to in-hospital assessment.

Triage or transfer

Most trauma systems have specific protocols and rules that direct a patient to the correct facility. These protocols use physiological (hypotension, respiratory distress), anatomical criteria (amputations) or injury mechanism criteria (roll over, ejection from the vehicle etc) to guide decision making. This process may involve taking a less injured patient to a local hospital, with a potential for subsequent transfer to a trauma centre, or direct transfer to a specialist centre bypassing closer hospitals without appropriate facilities. Additional transfer or bypass protocols should be in place for some specific injuries such as acute amputations with a potential for re-implantation, severe burns, spinal injuries or major paediatric trauma.

The paradox of advanced level paramedic services

Highly trained paramedics often work in urban environments where the transport times to hospitals are short and there may be less need to use their advanced skills. Indeed, it may be more beneficial to maintain a simple airway and not start IV fluids when the trauma centre is only a few minutes away than to practice advanced skills, causing delay at the scene. EMTs with more basic training more commonly work in the rural environment where response and transport times are much more likely to be prolonged. This also makes maintenance of skills an issue, as no provider of any level can maintain skills that are only used once or twice a year. Unfortunately, the rural environment with a prolonged transport times is probably the specific situation where advanced field interventions for airway control, needle decompression of the chest or intravenous resuscitation are probably most needed.

General ALS versus BLS data

While there are limitations in the studies available, several have addressed the effectiveness of prehospital care and specifically the use of extended skills in the field. Cornwell et al [3] performed a prospective cohort-matched observation study of patients transported by emergency medical services (EMS) or not (non EMS). They noted that in 103 patients, the deaths, complications and length of hospital stay were similar in both groups suggesting that the use of prehospital EMS had little effect on patient outcome. In addition, for the more severe trauma patients (ISS > 13) the non EMS transported patients arrived at the trauma centre earlier than those transported by EMS (15 minutes versus 28 minutes; $P = .05$).

Lieberman and colleagues [8] reported a meta analysis comparing BLS with ALS care in trauma patients. Compiling the results from 49 articles, they reported that the odds ratio of death was 2.59 times higher for the trauma patients receiving prehospital ALS compared with BLS, even after the ratio was adjusted for the severity of injury. In a more specific study, the same authors [7] reported that in urban areas served by Level 1 trauma centres, patients who received ALS care had a higher mortality rate than those who had only received BLS in the field (29% versus 18%).

In a comprehensive review of the benefits of advanced life support, Isenberg [4] also concluded that there is poor evidence that ALS improves outcome for trauma patients in urban areas and indeed suggested that ALS may contribute to poorer outcomes. However, it was also suggested that advanced prehospital care may be useful in rural areas with long transport times; paradoxically, where the advanced skills are not available.

Recently, Stiell, Nesbitt and Pickett [9] have further defined the issue. The Ontario prehospital ALS (OPALS) study considered data on 2,867 trauma patients in 17 cities comparing their outcome before and after ALS was implemented. Essentially, 1,373 had prehospital BLS and 1,494 ALS. The two groups were comparable for age, blunt and penetrating injury ratio, ISS and GCS. After implementation of a system-wide ALS programme there was no improvement in mortality or morbidity. Looking at specific groups; in the patients with a GCS < 9, survival was worse after initiation of the ALS system than before (50.9% versus 60.0%; $P = .02$).

Conclusion

Improved training and expertise has enabled emergency medical personnel to provide advanced levels

of care at the scene of trauma. While this could be expected to improve the outcome from major injury, current data does not support this. Indeed, prehospital interventions beyond the BLS level have not been shown to be effective and in many cases have proven to be detrimental to patient outcome. It appears better to "scoop and run".

This data is valid for the urban environment where transport times to a trauma centre are short and it appears better to simply rapidly transport the patient to hospital than attempt major interventions at the scene. There may be more need for advanced techniques in the rural environment or where transport times are prolonged and there may be subsets of patients in all areas that do benefit from specific prehospital interventions, but these have yet to be identified.

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