Minimal patient handling: a faculty of prehospital care consensus statement

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INTRODUCTION

Safe and effective patient packaging is a vital step in the safe transport of trauma patients to definitive care. A significant proportion of patients are treated with spinal immobilisation precautions based on their examination findings or on the mechanism of injury.[1] Current UK practice commonly involves the use of a cervical collar and blocks usually secured to a rigid spinal board. Alternatively, and increasingly commonly, immobilisation is achieved using either a scoop stretcher or a vacuum mattress.

BACKGROUND

Spinal immobilisation is a common intervention for the prehospital patient following trauma. Most commonly the patient is log-rolled on to a rigid long spinal board. Once on the long spinal board, the patient, with a cervical collar applied, will be immobilised using head blocks and straps and secured to the board for transportation to definitive care.

Once at definitive care, the patient may again be log-rolled to facilitate removal of the spinal board, removal of clothing and examination of the back and spinal columns. Further movement of the patient will usually occur again during transfer for CT imaging.

Spinal immobilisation using these techniques is not without negative sequelae.[2] There is the potential for harm to be caused by the log-rolling used to place and remove the patient on the spinal board and by the immobilisation on the spinal board. Consequently, a number of prehospital clinicians are using alternative techniques to provide spinal immobilisation and to package patients either using a scoop stretcher or a vacuum mattress.

This consensus statement will outline emerging best practice when packaging the prehospital trauma patient and providing spinal immobilisation. The best practice described is based on the recommendations of a consensus meeting held in the West Midlands in April 2012, where the opinion of experienced practitioners from across the prehospital and emergency care community considered the currently available evidence and reviewed current clinical practice.

The indications for spinal immobilisation are not considered in this statement as they are addressed in other consensus statements.

RECOMMENDATIONS

1. *The long spinal board is an extrication device and should no longer be used for providing spinal immobilisation during transport to definitive care.*

This recommendation marks a significant change in current practice. It is made in the light of the potential risks to the patient from log-rolling in the prehospital environment and the risk of harm from immobilisation on the long spinal board, also giving consideration to the likelihood of repeated transfers during the early stages of management after arrival in hospital.

Risks of log-rolling

Promoting haemostasis in the trauma patient is a vital step in attempting to minimise further deterioration. There is increasing evidence that movement of the patient and changes in their positioning and orientation may promote further internal haemorrhage; for example, the compression and distraction of a fractured pelvic ring when rolling the patient to 90° perpendicular to the ground.[3]

Log-rolling the patient with multiple long bone and rib fractures is often a painful process for the patient despite analgesia. This pain is not only avoidable but may also lead to an increase in sympathetic drive and an associated increase in BP.

Evidence base

The evidence base for spinal immobilisation techniques and the equipment used is not extensive.[4] Log-rolling a patient to 90° in order to facilitate placement of a long spinal board under the patient may not maintain alignment of the spinal column in the patient with spinal injuries.[5 6] Techniques involving placement on a scoop stretcher and application of spinal immobilisation have been demonstrated to be equivalent, if not superior, to log-rolling and immobilisation on a long spinal board for spinal column movement. A long spinal board is likely to be less comfortable than a vacuum mattress and possibly a scoop stretcher.[7] The risk of tissue pressure injury is reduced when using a vacuum mattress and potentially when using a scoop stretcher due to the increased surface area of contact.

2. *The scoop stretcher should be used for patient transfer and to provide spinal immobilisation.*

The scoop stretcher is a piece of transfer equipment with which the majority of prehospital practitioners will be familiar. Although it currently does not satisfy all the ideals for a prehospital spinal immobilisation device, it was felt by the consensus working group that its routine use has a number of advantages. The main advantage of using a scoop stretcher is that only a minimal tilt, sufficient to allow insertion of the blades under the patient, is needed, thus satisfying the intention to minimise patient handling as much as possible. There is no evidence to recommend one particular model, but use of a second generation design compatible with radiological imaging is important.

Placement on a scoop stretcher is also easier to achieve where there are a limited number of practitioners available compared with performing a log-roll.

Disadvantages of the scoop stretcher include its suitability for carrying over long distances, its cost, the weight limit of the device and the lack of a custom-designed system for immobilising the head and neck once the patient has been placed on the stretcher. Current practice by clinicians who routinely use the scoop stretcher for immobilisation involves adapting existing blocks either by inverting or rotating the blocks and securing with straps or tape. It was felt that this practice is acceptable in the interim while waiting for the widespread use of custom-designed devices that are soon to be released on to the market.

Management at definitive care

Management of the trauma patient at definitive care increasingly involves CT imaging of injuries soon after arrival in the emergency department. If the patient has been packaged on a scoop stretcher, this will enable easy transfer on and off the scanner, avoiding further

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potentially detrimental changes in patient positioning.

3. *Patients should be managed according to a package of minimal handling considerations*

In order to promote haemostasis, and with the aim of avoiding any unnecessary movement that may interfere with this goal, patients should be managed with a number of *minimal handling considerations*. The principle of a *single movement* early on in the patient's care should be adopted with the intention of restoring the patient to the anatomical position. Due consideration should be given to adequate analgesia to avoid further sympathetic stimulation. A single episode of patient movement early in the timeline of the patient's care will avoid unnecessary patient movement and handling later during the patient's care, at a point where coagulation and clinical condition may have deteriorated.

Under this *single movement principle,* all necessary interventions and procedures should be carried out contiguously to prepare the patient for transportation to definitive care and to facilitate ongoing care in the emergency department.

After arrival in the resuscitation room, examination of the patient's back should be carried out after removal of the scoop stretcher, facilitated by a gentle (15°) tilt. Alternatively, and where appropriate, this part of the examination can be delayed until after completion of focused or 'whole-body' CT scanning.

4. *The patient should be immobilised on the scoop stretcher with scoop-to-skin.*

It is at this stage that clothing should be removed so that the patient is immobilised 'scoop-to-skin' and all necessary pelvic splints and traction devices should have been applied. This will avoid unnecessary handling at definitive care to remove clothing. It also has the benefit of reducing localised pressure injury from clothing and its contents.

It was clearly recognised that hypothermia is an important factor in the morbidity and mortality of trauma patients. Therefore, exposure to the elements through removal of the patient's clothing must be minimised through the use of measures to prevent heat loss. This exposure to the environment must be appropriate to the weather conditions and temperate and to the patient's clinical condition.

Transportation to definitive care

5. *When the total time immobilised on a scoop stretcher is likely to exceed 45 min, consideration should be given to using a vacuum mattress.*

Vacuum mattresses provide the most comfortable method of immobilising the trauma patient with the lowest incidence of pressure tissue injury. They are, however, not routinely used in many areas of the UK, are expensive and require care and maintenance to avoid device failure. The recommendation that the total duration spent on the scoop stretcher should not exceed 45 min is not based on any robust evidence; indeed, tissue pressure injury can occur after a very short time frame in some frail patients. However, this time frame was felt to be a balance between the benefits of immobilising on a vacuum mattress and the added length of on-scene time and additional patient transfers that would be needed if a vacuum mattress were used.

In recommending that the total time spent on a scoop stretcher should not exceed 45 min, it is felt that it would be advantageous to include the time when immobilisation was initiated in the patient handover and on patient documentation.

Special circumstances

The applicability of the Consensus Meeting's recommendations was considered for both paediatric and bariatric patients, as well as for Search and Rescue and mountain rescue clinicians. It was felt that the principles of minimal handling applied and should be the same. In some specialised circumstances, additional equipment and techniques may need to be employed while adhering to the principles stated above.

Impact of recommendations

It is believed that these recommendations are readily achievable and do not represent an undue financial or training burden. Consideration needs to be given at a local and network level to exchange of equipment at definitive care. In addition, there is a need to ensure that equipment remains traceable and is maintained.

Further research

The recommendations made in this consensus statement are based on input from a wide range of experienced clinicians. The evidence base supporting the recommendations is not extensive, but nor is the evidence base for the practice that the recommendations are intended to replace. Consequently, further research into the techniques and equipment used is needed. Areas where research is clearly needed include identifying frequency of use of immobilisation, spinal column stability and movement with the various devices, the incidence of tissue pressure complications and heat loss and maintenance associated with the devices.

Summary

This consensus statement seeks to change the spinal immobilisation practices for prehospital trauma patients. Following the principles of minimal handling with one single early movement, the consensus no longer supports the routine use of the long spinal board for spinal immobilisation and patient transportation. In its place the scoop stretcher should be the preferred device for transfer, immobilisation and transportation to definitive care. Consideration should be given to using a vacuum mattress when the time spent on the scoop stretcher would be expected to exceed 45 min.

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