Guideline 9.1.6 – Management of Suspected Spinal Injury

Guideline

Who does this guideline apply to?

This guideline applies to adult, child and infant victims.

Who is the audience for this guideline?

This guideline is for use by bystanders, first aiders and first aid providers. This guideline is equally applicable to healthcare professionals working in the pre-hospital setting.

1.0 | Introduction

The spine is made up of 33 separate bones, known as vertebrae, extending from the base of the skull to the coccyx (tailbone). Each vertebra surrounds and protects the spinal cord (nerve tissue). Fractures or dislocations to the vertebral bones may result in injury to the spinal cord. The direct mechanical injury from the traumatic impact can compress or sever the nerve tissue. This is followed by secondary injury caused by ongoing bleeding into the spinal cord as well as continued swelling at the injured site and surrounding area.

The possibility of spinal injury must be considered in the overall management of all trauma victims. The risk of worsening the spinal injury in the prehospital period is probably less than previously thought, yet to minimise the extent of the secondary injury, caution must be taken when moving a victim with a suspected spinal injury.

Spinal injuries can occur in the following regions of the spine:

- the neck (cervical spine)
- the back of the chest (thoracic spine)
- the lower back (lumbar spine).

The cervical spine is most vulnerable to injury, which must be suspected in any victim with injuries above the shoulders. More than half of spinal injuries occur in the cervical region.

Suspected spinal injuries of the neck, particularly if the victim is unconscious, pose a dilemma for the rescuer because correct principles of airway management often cause some movement of the cervical spine.

2.0 | Recognition

The most common causes of spinal cord injury are:

- a motor vehicle, motor cycle or bicycle incident as an occupant, rider, or pedestrian
- an industrial accident (i.e. workplace)
- a dive or jump into shallow water or water with obstacles or being "dumped" in the surf
- a sporting accident (e.g. rugby, falling from a horse)
- a fall from greater than a standing height (e.g. ladder, roof)
- falls in the elderly population
- a significant blow to the head
- a severe penetrating wound (e.g. gunshot).

The symptoms and signs of a spinal injury depend on two factors: firstly the location of the injury and secondly, the extent of the injury – whether there is just bone injury or associated spinal cord injury, and whether the spinal cord injury is partial or complete. It will be difficult to elicit symptoms and signs in victims with an altered conscious state.

2.1 | Symptoms

Symptoms of spinal injury include:

- pain in the injured region
- tingling, numbness in the limbs and area below the injury
- weakness or inability to move the limbs (paralysis)
- nausea
- headache or dizziness
- altered or absent skin sensation.

2.2 | Signs

Signs of spinal injury include:

- head or neck in an abnormal position
- signs of an associated head injury
- altered conscious state
- breathing difficulties
- shock

- change in muscle tone, either flaccid or stiff
- loss of function in limbs
- loss of bladder or bowel control
- priapism (erection in males).

3.0 | Management

The priorities of management of a suspected spinal injury are:

1. calling for an ambulance
2. management of airway, breathing and circulation
3. spinal care.

An awareness of potential spinal injury and careful victim handling, with attention to spinal alignment, is the key to harm minimisation.

3.1 | The Conscious Victim

Tell the victim to remain still but do not physically restrain if unco-operative. Those with significant spinal pain will likely have muscle spasm which acts to splint their injury. Keep victim comfortable until help arrives.

If it is necessary to move the victim from danger (e.g. out of the water, off a road), care must be taken to support the injured area and minimise movement of the spine in any direction. Ideally, only first aid providers or health care professionals trained in the management of spinal injuries, aided by specific equipment, should move the victim.

3.2 | The Unconscious Victim

Airway management takes precedence over any suspected spinal injury. It is acceptable to gently move the head into a neutral position to obtain a clear airway. If the victim is breathing but remains unconscious, it is preferable that they be placed in the recovery position.

The victim should be handled gently with no twisting. Aim to maintain spinal alignment of the head and neck with the torso, both during the turn and afterwards. In victims needing airway opening, use manoeuvres which are least likely to result in movement of the cervical spine. Jaw thrust and chin lift should be tried before head tilt.

4.0 | Spinal Immobilisation Techniques and Devices

The clinical importance of prehospital immobilisation in spinal trauma remains unproven. There have been no randomised controlled trials to study immobilisation techniques or devices on trauma victims with suspected spinal cord injury. All existing studies have been retrospective or on healthy volunteers, manikins or cadavers[1].

Prehospital spinal immobilisation has never been shown to affect outcome and the estimates in the literature regarding the incidence of neurological deterioration due to inadequate immobilisation may be exaggerated. Spinal immobilisation can expose victims to the risks associated with specific devices and the time taken in application leads to delays in transport time.[2,3,4]

4.1 | Cervical Collars

The use of semi rigid (SR) cervical collars by first aid providers is not recommended (CoSTR 2015, weak recommendation, low quality evidence).[5]

ANZCOR recommends all rescuers in the pre-hospital environment review their approach to the management of suspected spinal injury with regards to SR cervical collars. Consistent with the first aid principle of preventing further harm, the potential benefits of applying a cervical collar do not outweigh harms such as increased intracranial pressure, pressure injuries or pain and unnecessary movement that can occur with the fitting and application of a collar. In suspected cervical spine injury, ANZCOR recommends that the initial management should be manual support of the head in a natural, neutral position, limiting angular movement (expert consensus opinion). In healthy adults, padding under the head (approximately 2cm) may optimise the neutral position.[6,7]

The potential adverse effects of SR cervical collars increase with duration of use and include:

- unnecessary movement of the head and neck with the sizing and fitting of the collar
- discomfort and pain
- restricted mouth opening and difficulty swallowing[8]
- airway compromise should the victim vomit[8]
- pressure on neck veins raising intra-cranial pressure[9] (harmful to head injured victims)
- hiding potential life-threatening conditions[10].

4.2 | Spinal Boards

Rigid backboards placed under the victim can be used by first aiders should it be necessary to move the victim. The benefits of stabilizing the head will be limited unless the motion of the trunk is also controlled effectively during transport.[11,12] Victims should not be left on rigid spinal

boards. Healthy subjects left on spine boards develop pain in the neck, back of the head, shoulder blades and lower back. The same areas are at risk of pressure necrosis.[13,14,15] Conscious victims may attempt to move around in an effort to improve comfort, potentially worsening their injury.

Paralysed or unconscious victims are at higher risks of development of pressure necrosis due to their lack of pain sensation. Strapping has been shown to restrict breathing and should be loosened if compromising the victim.[16,17]

Victims may be more comfortable on a padded spine board, air mattress or bead filled vacuum mattress; devices used by some ambulance services.[18,19]

4.3 | Log Roll

The log roll is a manoeuvre performed by a trained team, to roll a victim from a supine position onto their side, and then flat again, so as to examine the back and/or to place or remove a spine board.[20]

4.4 | Children

After road traffic accidents, conscious infants should be left in their rigid seat or capsule until assessed by ambulance personnel. If possible, remove the infant seat or capsule from the car with the infant/child in it. Children under eight years of age may require padding under their shoulders (approximately 2.5cm) for neutral spinal alignment.[21]

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Further Reading

[ANZCOR Guideline 2 Priorities in an emergency]

[ANZCOR Guideline 3 Unconsciousness]

[ANZCOR Guideline 4 Airway]

About this Guideline

Search date/s	2016
Question/PICO:	P: In victims with suspected spinal injury I: does the use of spinal immobilisation (in-line manual immobilisation, head blocks, spinal boards, cervical collars) C: compared with no immobilisation O: effect neurological outcome or other outcomes (neurologically intact long term survival, patient comfort, pressure injury, intra-cranial pressure, aspiration)?
Method:	Literature review 2011 and evidence update 2016
Primary reviewers:	Natalie Hood
Other consultation	
Worksheet	[Insert link(s) here]
Approved:	2016
Guidelines superseded:	9.1.6

Referencing this guideline

When citing the ANZCOR Guidelines we recommend:

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