

## 4.10 Cervical spine immobilisation

- The possibility of cervical spine injury should always be considered if there is a mechanism of injury that could involve the cervical spine.
- If all of the following criteria are met, the patient's cervical spine can be cleared clinically:
  - a) A normal level of alertness and
  - b) No tenderness at the posterior midline of the cervical spine and
  - c) No signs or symptoms of spinal cord injury and
  - d) No pain or other factors that might distract the patient from the pain of a cervical spine injury.
- If the patient's cervical spine cannot be cleared clinically:
  - a) Place a firm cervical collar or
  - b) Place a lanyard around the patient's neck indicating the cervical spine has not been cleared clinically and consider using head blocks, rolled towels or manual stabilisation of the neck.

### Additional information

#### Clearing the cervical spine clinically

- The criteria described above may be used in a child, provided the child is old enough to cooperate with having a history taken and being examined.
- Begin by taking a history, does the patient have:
  - Neck pain?
  - Numbness or tingling anywhere?
  - Pain elsewhere?
- Examine the patient:
  - Feel for midline tenderness by palpating the posterior cervical spine from the skull to the prominence of the first thoracic vertebrae. Lateral muscle tenderness is not a sign of cervical spine injury.
  - Look for normal sensation to light touch in the limbs.
  - Look for normal movement of the limbs.
  - Look for signs of decreased alertness.
- A patient has a decreased level of alertness if any of the following are present:
  - A GCS less than 15.
  - Short term memory loss.
  - Clinical signs of intoxication.
  - Delayed or inappropriate response to external stimuli.
- Signs and symptoms of possible spinal cord injury are present if there is altered sensation or altered motor power (strength) in the limbs.
- Deciding if the patient has pain that might cause distraction from the pain of a

cervical spine injury requires clinical judgement. To be considered distracting, the pain must be significant enough to prevent the patient from noticing that their neck is sore.

- Use additional caution when clearing the cervical spine clinically if the patient is not in apparent pain, but has an injury that would be expected to cause pain. Examples include long bone fractures and dislocations.
- If the cervical spine is cleared clinically, no form of cervical spine immobilisation is required.

### **Factors that increase risk**

- The following factors increase the risk of cervical spine injury:
  - Road crash involving rollover or ejection.
  - Fall from a significant height. For example, more than one metre or more than five stairs in an adult, particularly if head first.
  - Diving head first into shallow water.
  - Injury involving axial loading of the spine. For example, a rugby scrum collapse.
  - Pre-existing cervical spine abnormalities. For example, rheumatoid arthritis and ankylosing spondylitis.

### **General principles of immobilisation and cervical collars**

- Significant abnormalities within the primary survey always take priority over the cervical spine.
- The patient should always be positioned with their spine in neutral alignment. If the patient's spine is not aligned, for example there is significant angulation, the spine must be aligned immediately.
- For most adults in the supine position, achieving neutral alignment will require 3-4 cm of flat pillow or a folded towel behind the head, noting that if pre-existing kyphosis is present the patient may require more than this. Conversely, small children may require padding under the thoracic spine to avoid neck flexion from their relatively large head.
- A cervical collar should not be routinely placed if the patient's cervical spine cannot be cleared clinically. Deciding to place a cervical collar requires clinical judgement that balances the benefits and risks:
  - A cervical collar will limit movement of the cervical spine but there is no good evidence that this significantly reduces the risk of secondary spinal cord injury.
  - A cervical collar may worsen neck pain, promote the development of pressure areas, make airway management more difficult and raise intracranial pressure.
- Always place a lanyard (labelled "cervical spine not cleared") around the patient's neck if their cervical spine has not been cleared clinically and a cervical collar has not been placed.

## **When a cervical collar should be placed**

- A cervical collar should be placed if the patient has severe posterior midline tenderness or signs/symptoms of spinal cord injury:
  - The cervical collar must be correctly sized and fitted.
  - The collar should be firm but not tight.
  - The patient may sit up to 15 degrees if they have difficulty breathing or for comfort.
  - Head blocks or rolled towels may be used to limit lateral movement of the head but are not routinely required.

## **If the patient is cooperative**

- A cervical collar should not usually be placed if the patient is cooperative:
  - The patient should be advised to keep their head and neck still.
  - The patient may sit up to 15 degrees if they have difficulty breathing or for comfort.
  - Head blocks or rolled towels may be used to limit lateral movement of the head but are not routinely required.
- If the patient is being carried or driven over rough or winding terrain, there is an increased risk of head and neck movement. Consider placing a cervical collar and consider adding head blocks or rolled towels at the side of the head.

## **If the patient is uncooperative**

- Clinical judgement is required if the patient is uncooperative as placing a cervical collar may result in an increase in movement and/or agitation.
- Have a low threshold for not placing a cervical collar and consider providing manual stabilisation.
- Often the only realistic option is to repeatedly instruct the patient to keep still.

## **If the patient is unconscious**

- If the patient is unconscious and has not had an ETT or LMA placed:
  - Do not place a cervical collar.
  - Position the patient on their side.
  - Provide manual stabilisation of the head and neck.
- If the patient is unconscious and has had an ETT or LMA placed:
  - Do not place a cervical collar.
  - Position the patient supine.
  - Sit the patient to 15 degrees if TBI is present. This maximises cerebral venous drainage and minimises intra-cranial pressure.
  - Use head blocks or rolled towels to limit lateral movement of the head. Head blocks or rolled towels are routinely used in this setting to limit lateral movement of the head because this group of patients are at increased risk of cervical spine injury.

## **Additional notes on immobilisation**

- Do not place tape across the patient's head and/or chin when the patient is on an ambulance stretcher because this has no useful role in immobilisation and risks creating a fulcrum effect that may worsen injury. It is acceptable to use tape for a brief period of time during extrication on a device such as a scoop stretcher or combi-carrier.
- Consider providing manual stabilisation during extrication from a vehicle, but this is not required if the patient is cooperative, is able to extricate themselves and is instructed to keep their head and neck still.
- Cervical spine immobilisation is not required if there is a penetrating injury to the neck.
- Cervical spine immobilisation is not routinely required following hanging. Clinically significant cervical spine injury following hanging is extremely rare and should only be considered a possibility if the patient has fallen a height that is greater than or equal to the height of their body.
- If it is not possible to place a cervical collar, for example if the patient has severe obesity, alternative options for stabilisation (including manual stabilisation) should be considered.
- If the patient has a pre-existing abnormality of the anatomy of their cervical spine (for example ankylosing spondylitis or rheumatoid arthritis), placing a cervical collar may be unsafe because this may cause the patient's normal anatomical position to be altered. Maintain the normal anatomical position of the patient's spine, noting this may require the patient to sit and be provided with additional pillows.
- Cervical collars are sometimes promoted in the absence of concerns regarding the cervical spine, as a means of limiting neck movement in small children who have been intubated with an endotracheal tube.
  - In this setting the cervical collar is being used to limit flexion of the neck which may dislodge the endotracheal tube.
  - Clinical judgement is required but the balance of risk is usually against this practice and the preferred approach is to provide manual stabilisation of the head and neck during patient movement.

## **Spine boards, scoop stretchers and combi-carriers**

- Spine boards (and other rigid flat boards) are primarily sliding and extrication devices.
- Scoop stretchers and combi-carriers are primarily lifting and carrying devices.
- None of these devices have a role in providing immobilisation of the spine.
- All of these devices carry the risk of creating pressure injury if a patient is on one for longer than 30 minutes. If this is expected, the patient should be removed from the device prior to beginning transport whenever feasible.

- If the patient is transported on such a device, it must be removed as soon as possible after arrival at hospital.

### **The Kendrick extrication device (KED)**

- The KED is primarily a lifting and extrication device and has no role in providing continuing immobilisation of the spine.
- The KED has the disadvantages of taking time to apply and restricting the patient's breathing.
- The preferred approach is to slide the patient out laterally or vertically, with their spine in alignment without using a KED. However, a KED may be used if there is significant clinical concern regarding the patient's spine and insufficient personnel or space to extricate the patient with their spine in alignment.
- If a KED is used it should be removed as soon as possible following extrication.

### **Cervical spinal cord neuropraxia**

- Also sometimes called cervical cord concussion, this is temporary loss of motor and/or sensory function followed by recovery over a few minutes to a few hours.
- It is due to bruising and/or stretching of the cervical spinal cord and is often associated with hyper-flexion or hyper-extension of the neck.
- Most commonly the patient experiences immediate symptoms with any combination of the following: burning pain, numbness, tingling, weakness or paralysis. All four limbs are usually involved, but the patient may experience symptoms in only some limbs.
- Commonly the patient does not have a cervical fracture and may be completely symptom free following recovery from their symptoms.
- There is a high association between cervical cord neuropraxia and pre-existing cervical stenosis (narrowing of the cervical canal through which the spinal cord runs). If cervical stenosis is present this often requires urgent surgery.
- The symptoms of cervical neuropraxia may have resolved by the time ambulance personnel reach the scene:
  - The history must be recorded and passed on to medical staff, as this is likely to change the subsequent investigation of the patient.
  - The patient's cervical spine should not be cleared clinically, even though the patient may not have any symptoms.
  - The patient should be transported by ambulance to an ED.

## Cervical collars placed by other personnel

- Sometimes cervical collars (including soft cervical collars) have been placed by other healthcare providers prior to ambulance arrival.
- If a collar has been placed prior to ambulance arrival:
  - The collar should be removed if the patient’s cervical spine can be cleared clinically.
  - The cervical spine immobilisation guidelines should be followed if the patient’s cervical spine cannot be cleared clinically and this may involve removing or replacing the collar.
  - Removing or replacing the collar must be explained in a collegial manner to the other healthcare providers as a requirement under our CPGs.
  - The patient must receive an explanation that this is not a criticism of the clinical care they have already received.
  - If conflict occurs with the other healthcare providers, personnel should not persist with removing the collar and should begin transport from the scene. En route the ambulance should be stopped to enable the collar to be removed or replaced.

## Prophylaxis of nausea and vomiting

- Prophylactic administration of ondansetron is not routinely required for a patient with an immobilised cervical spine.
- Consider administering ondansetron if:
  - The patient has nausea or
  - The nature of the patient’s injuries or their position is such that vomiting would be particularly problematic.

See next page for flow chart 



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## Cervical spine immobilisation summary

