To Backboard or Not To Backboard?
Spinal Clearance Protocols

Will Smith, MD, EMT-P
Medical Director
Grand Teton National Park and Jackson Hole Fire/EMS, Jackson, WY

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Objectives

- Discuss current standard of care and protocols regarding spine injuries.
- Review research on spine injuries and evaluation/treatment standards.
- How to implement spine assessment protocols into your system.
Spinal Immobilization

- 1960-70’s
  - EMS standards developed
  - Consensus and Common Sense
- Thought to be best practice
  - Now changing?
Who needs to be immobilized?
Even if they walked away from this?
Spinal Immobilization

Do we immobilize for:

- Mechanism of Injury?
- Symptoms and/or Physical finding?
Spinal Immobilization

- Little research

- Never been shown to improve outcomes
  - Hauswald, Acad Emerg Med 1998
  - Malaysia vs. New Mexico
Spinal Immobilization

- BUT - Standard of Care (in U.S.)
  - One of the most common EMS procedures
  - Millions of patients immobilized each year
  - Not necessarily in other parts of the world
Most Current EMS Protocols

- Apply spinal immobilization to all patients with potential for spine injury based on mechanism of injury
- If in doubt - IMMobilize!
The Research

- No RCT to assess spinal immobilization on trauma patient mortality, neurologic injury, spinal stability, or adverse effects sustained

  - *Kwan, Cochrane Database 2001/2007 #2803*
The Research

- NEXUS
  - Hoffman, et. al. - NEJM, July 2000

- Canadian C-Spine Rule
  - Stiell, et. al. - JAMA, Oct 2001
NEXUS

- Major Research - moves to a standard of clinical spine clearance in emergency departments
- Decreased imaging in 12.6 % (4,309 pts)
  - N=34,069 patients
All 5 criteria met = No Xray
1. No midline cervical tenderness
2. No focal neurological defect
3. Normal alertness
4. No intoxication
5. No painful distracting injury
Canadian C-Spine Rule

- Major Research -
- Slightly different protocol - more if/then
  - Age listed as a factor
  - Mechanism still plays a role
  - Range of motion of neck final test
The Canadian C-Spine Rule

For alert (GCS = 15) and stable trauma patients where cervical spine injury is a concern

1. Any High-Risk Factor Which Mandates Radiography?
   - Age $\geq 65$ years
   - Dangerous mechanism
   - Paresthesias in extremities

   **Yes**

   **No**

2. Any Low-Risk Factor Which Allows Safe Assessment of Range of Motion?
   - Simple rear end MVC
   - Sitting position in ED
   - Ambulatory at any time
   - Delayed onset of neck pain
   - Absence of midline c-spine tenderness

   **No**

   **Unable**

   **Yes**

3. Able to Actively Rotate Neck?
   - 45° left and right

   **Able**

   **No Radiography**

   **Unable**

   **Radiography**

* Dangerous Mechanism:
- Fall from elevation $>3$ feet / 5 stairs
- Axial load to neck, e.g. diving
- MVC high speed ($>100$ km/h), rollover, ejection
- Motorized recreational vehicles
- Bicycle collision

** Simple Rearend MVC Excludes:
- Pushed into oncoming traffic
- Hit by bus / large truck
- Rollover
- Hit by high speed vehicle

*** Delayed:
- I.e. not immediate onset of neck pain
Malaysian /New Mexico Study

- 5 yr retrospective chart review of 2 university hospitals
- Less neurologic disability in unimmobilized Malaysian patients
- *Hauswald, Acad Emerg Med 1998*
- Disproves many theories that previously justified widespread spine immobilization
Taking this to the field...

- Wilderness EMS
- Rural EMS
- Urban EMS
Wilderness EMS

- Extended Transport
  - 2 hours to days
- Risks of Spinal Immobilization
  - Decubitus ulcers, pt. discomfort
  - Airway concerns - vomit, blood, etc.
  - Extrication problems, rescuer risks

- Risk vs. Benefit of Spinal Immobilization
Wilderness EMS

- Focused Spine Assessment
- Accepted protocol for Wilderness First Responders (WFR)
  - WMA, NOLS/WMI, SOLO
- Risk vs. benefit of spinal immobilization
Rural EMS

- Prolonged Transport
  - 15 minutes to 1-2 hours

- Pt. uncomfortable, no provider risk
  - Airway concerns - vomit, blood, etc.
  - Early stage 1 Decubitis Ulcers (redness)
Urban EMS

- Rapid Transport
  - Less than 15 minutes
  - Present to emergency departments
    - Spine clearing protocols
      - NEXUS, Canadian C-Spine Rule
    - Xrays or CTs
- Little risk to patients or EMS providers
  - Airway concerns - vomit, blood, etc.
Flight EMS

- Patient’s cleared in referral ED’s by CT and board certified EM physicians placed back on boards for transfer to trauma centers.
Why change what we’re doing?

- Patient Comfort
- Airway Compromise
- Breathing Compromise
- Skin Compromise
- Patient/Provider safety in certain settings
Some places have...

- Maine
- Michigan
- California
- National Park Service
- Malaysia (by default)
Focused Spinal Assessment
Protocol Implementation

- Review Research
  - References are a start
  - Do your own as well!
- Medical Director / Medical Control Support
  - Critical for success
Focused Spinal Assessment
Protocol Implementation

- Review Established Protocols
  - State of Maine
  - National Park Service
Figure 1. 2002 Maine EMS Spine Assessment Protocol.

Mechanism of Injury: Axial load (diving), Blunt trauma, MVC* or bicycle, fall>30, adult fall from standing ht.

Don’t Immobilize

Unreliable? ** (Intox/Alt. LOC/Acute Stress Reaction)

Yes

Immobilize

No

Spine Pain/Tenderness?

Yes

Distracting Injury?***

No

Abnormal Sensory/Motor Exam?

Yes

No

* MVC applies to crashes of all motorized vehicles: e.g. automobile, motorcycle, snowmobile, etc.
** Clearance of the spine requires the patient to be calm, cooperative, sober, and alert.
*** Distracting injury includes any injury that produces clinically apparent pain that might distract the patient from the pain of a spine injury – pain would include medical as well as traumatic etiologies of pain.

This protocol may be used by MEMS licensees, at the AA level or above, who have successfully completed the MEMS Spine Injury Management Course.

www.main.gov/dps/ems
Spine Immobilization

Scope of practice: EMT, Parkmedic

Indications: Spinal immobilization is indicated for any patient with a history of trauma or found in the setting of potential trauma (including near-drowning) who meets any of the following criteria:

1. Unstable Patient: See Adult and Pediatric Major Trauma Protocols
2. Pain: Complaining of neck or back pain (without language barrier)
3. Tenderness: Midline posterior neck or back tenderness
4. Altered mental status: either GCS less than 15 or evidence of intoxication (drugs or alcohol)
5. Distracting injury: Any injuries which appear to be distracting patient from identifying neck or back pain (ex: major fractures)
6. Neuro deficit: Any numbness, tingling or weakness not obviously explained by a co-existing extremity fracture
7. Restricted or painful range of motion: if a patient meets none of the above 5 criteria then they should be asked to move their head slowly from side to side and forward and backwards. If they are unable/unwilling to do so or describe pain or numbness/tingling in their arms or legs they should be immobilized.
Focused Spinal Assessment
Protocol Implementation

- Develop Protocol that works for your system
  - Age >65 get collar?
  - Peds excluded?
Focused Spinal Assessment
Protocol Implementation

✧ Good QA/QI program
✧ Education of EMS Providers
✧ Ongoing Review of Decisions and Outcomes
Summary

- Not everyone with blunt trauma needs spinal immobilization in the ED or in the field
- Selective immobilization can and should be done by prehospital providers
Questions???

 Copy of lecture notes
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