

Squad Review Mesa County EMS

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Indications for Prehospital Spinal Immobilization

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MCEMS

Goals:

- Review the MCEMS protocols regarding Spinal Trauma.
- Review the MCEMS protocols regarding Spinal Immobilization.
- Review history of decision making regarding C-Spine in EMS.
- Review some of the current literature regarding Spinal Immobilization in EMS arena.
- Discuss the value and importance of charting well.
- Avoid putting you to sleep.

SPINAL TRAUMA

- Any patient initially cleared in field who subsequently develops AMS or spinal pain should have a c-collar placed enroute; and should be lying flat on the gurney to stabilize the remainder of their spine.
 - They MAY NOT sit, stand or walk if this situation develops.
- Closed head injuries require C-spine immobilization as well.
- Make your error on the side of caution: if there is **ANY** doubt in your mind, immobilize the spine and let the EDP sort things out.

EMT BASIC

1. Maintain cervical spine immobilization during initial assessment.
2. Perform Spinal Immobilization Protocol- **See Trauma 16.**
3. Neurologic assessment should be completed, **and charted,** before and after immobilization, and after any moves.
4. Treat head or other injuries per their specific trauma protocols.
5. Administer O₂ as appropriate.
6. **EMT-B-IV:**
 - a. IV enroute.
 - b. Treat hypotension with a fluid challenge for target SBP of 90mmHg in adult, or age specific SBP in pediatrics- (age x 2) + 70. **See Peds 31- "Pediatric Vital Signs". See Trauma 13- "Hypovolemic Shock".**
 - i. Adult: 500cc-2000cc NS bolus.
 - ii. Peds: 20cc/kg NS bolus.

EMT INTERMEDIATE / PARAMEDIC

7. Cardiac monitor.
8. Avoid narcotics if there is altered mental status or neurologic deficits.
9. Fentanyl is preferred as the initial narcotic of choice in patients with ANY significant trauma or potential for instability.
10. Consider a longer acting narcotic (**morphine, Dilaudid**) if patient tolerates Fentanyl well, transportation times are long, etc.



EMT-I CONTACT EDP FOR



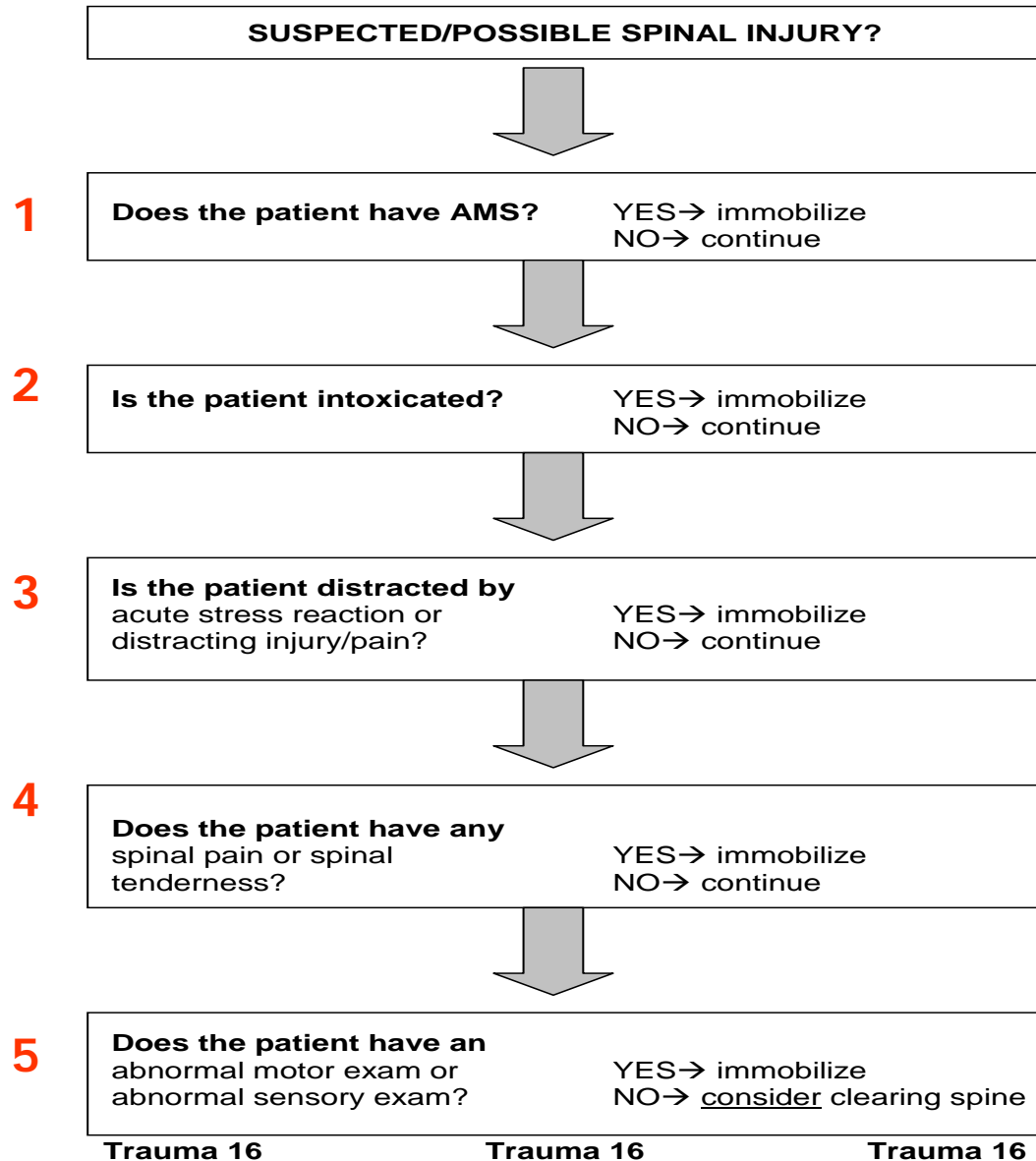
11. **Fentanyl- 25-100 mcg IV/IO/IM.**
 - a. Pediatrics: **Fentanyl- 1 mcg/kg IV/IO/IM.**
12. **morphine sulfate 2-10 mg IV/IO/IM-** consider if VS stable, long transport.
 - a. Pediatrics: **morphine sulfate- 0.1 mg/kg IV/IO/IM.** (max 4 mg)

Benchmark Box:

Please see Trauma 1 for EMS System "best practice" benchmarks for-Trauma Scene Times, Stat Trauma Pl.

SPINAL IMMOBILIZATION PROTOCOL

Spinal clearance requires patient to be calm, cooperative, sober and alert.



A bit of EMS History:

1971: American Academy of Orthopedic Surgeons issue first recommendations

- relied on symptoms and physical findings as indication for immobilization (no MOI).

Amer. Academy of Orthopedic Surgeons Committee on Injuries, 1971; pp 111-115

Outcome: A lot of missed injuries- it became clear this was not accurate or complete way to evaluate.

1979: Prehospital practice shifted to immobilization of essentially all patients with any potential for injury (i.e. only MOI).

Bohlman et al, J Bone Joint Surg. 1979

Outcome: Shifted emphasis from symptoms and physical findings to exclusively MOI.

A brief historical intermission

- MOI has persisted since the late 1970's as the primary indication for spinal immobilization in nearly all U.S. EMS systems
- Currently, in the U.S., immobilization by EMS providers is often performed based only on MOI (1979 era criteria) without consideration of symptoms and physical findings (1971 era criteria).
- But...

A bit (more) EMS History:

1984-1992: Many high quality ED (not EMS!) studies done regarding the indications/need for x-rays of c-spine in trauma patients.

Mower et al, Ann Emerg Med, 1990; Hoffman et al, Ann Emerg Med, 1992; 20 others.

Outcome: ALL of these studies support that symptoms and physical findings (1971), and MOI (1979) could/should be used to determine who needs an x-ray.

1994-1997: Prehospital studies done which support the use of clinical findings and MOI as indicators of the need for prehospital spinal immobilization.

Domeir et al, Acad Emerg Med 1997; 4 others.

Outcome: Some U.S. EMS systems began using these clinical criteria to clear/not clear C-spines.

A(nother) brief historical intermission

- The protocols we have in place in Mesa County are quite modern and are evidenced-based.
- But, they require the EMT to THINK...carefully. And to know and follow the protocols correctly.
- When I was an EMT it was easy- if they had a MOI of any sort, they got boarded. No thinking.
- But current protocols require quite a bit of assessment, judgment, and careful charting on the part of the EMS provider.

NAEMSP Position Paper

- “These criteria represent clinical judgments by the EMS personnel, and supporting and educational materials are critical to their accuracy.”
- “EMS systems adopting procedures for clearance from prehospital spinal immobilization must develop mechanisms for education and quality improvement to ensure safe and appropriate use of clearance protocols.”

The NEXUS Criteria

National Emergency X-Radiography Utilization Study

- Large ED-based study to determine who does, and who does not, need an X-ray.
- Developed criteria which are now used world-wide (except in Canada!) to “clear” the spine in both the ED and the EMS setting.
- These 5 criteria are the gold–standard in ED and EMS medicine.
- Except in Canada, where the Canadian C-Spine Rule is more prevalently used.

The NEXUS Criteria...

National Emergency X-Radiography Utilization Study

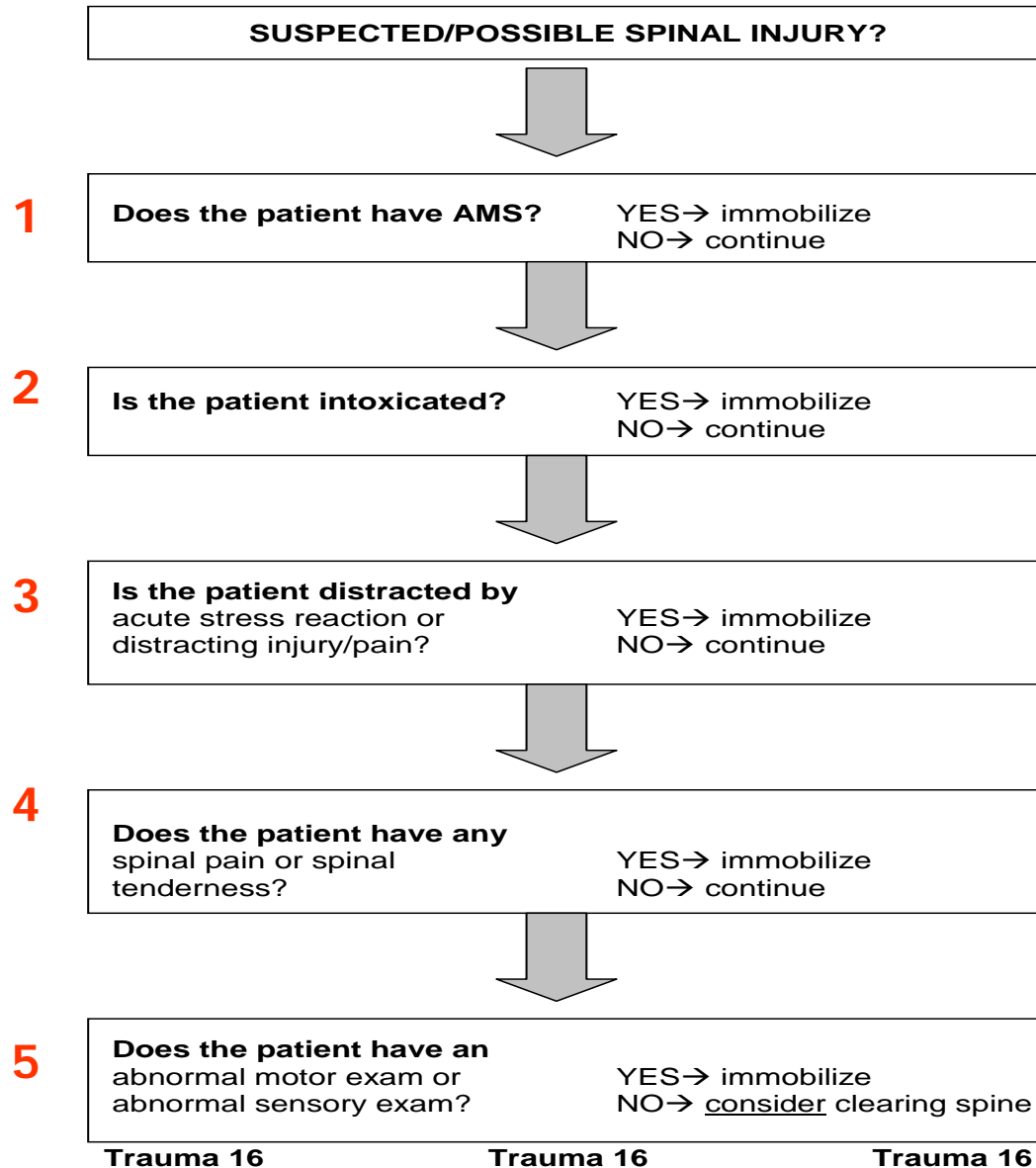
“Excluding a cervical spine requires clinical judgment and training.

When a significant MOI is present, a cervical spine is determined to be stable if:

- 1) The patient is alert and oriented to person, place, time and event.
- 2) There is no evidence of intoxication.
- 3) There are no painful distracting injuries.
- 4) There is no posterior midline cervical tenderness.
- 5) There is no focal neurological deficit.”

SPINAL IMMOBILIZATION PROTOCOL

Spinal clearance requires patient to be calm, cooperative, sober and alert.



So:

- EMS spinal immobilization is indicated if:
 - 1) MOI has the potential for causing spinal injury;

AND


 - 2) at least one of the NEXUS criteria is present

- EMS spinal immobilization may be omitted if:
 - 1) MOI does not have the potential for causing spinal injury;

OR

 - 2) none of the NEXUS criteria are present

So: Here is where it gets tricky

- EMS spinal immobilization may be omitted if:
 - 1) MOI does not have the potential for causing spinal injury;
 -  OR
 - 2) none of the NEXUS criteria are present
-
- Example: Patient crashed his bicycle; ? Speed but we think slow; “only had” 3 beers and is not overtly drunk or altered; head contusions; normal exam (“CTLS clear”).
 - What to do?...what would you do?

Charting

1. If you “clear” the spine in any patient with either an MOI that *has the potential* to injure the spine (judgment call) OR any of the NEXUS criteria (judgement call) you better chart very, very thoroughly as to how you decided this.
2. Charting “CTLS clear to palp” and nothing more is indefensible.
3. These charts need not only the facts of the incident and your exam, they also need the details of your *clinical decision making*.
4. The PCR will be your best friend or your worst enemy if you are ever wrong in your choices- make it your friend.

Some EMS NEXUS pitfalls:

AMS:

- ~ is there a language or communication barrier (hearing impairment)?
- ~ extremes of age have been shown to make your assessment unreliable- be careful.

Intoxication:

- ~ many studies show it may be difficult to tell if patient is intoxicated in the EMS environment.
- ~ *SEE Maio et al; EMS Providers do not accurately note motor vehicle crash victims with positive serum alcohol concentrations. Prehosp Disaster Med; 1995.*

Some EMS NEXUS pitfalls....:

Distracting Injury:

- ~ there has never been a prospectively validated definition in the literature for what constitutes this- so what is a distracting injury? (judgment...again).

Midline spinal pain or tenderness:

- ~ often variably interpreted.
- ~ right on the midline, or just off of it? Etc.

EMS non-NEXUS pitfalls....:

Pediatrics:

- ~ there is very little actual literature regarding the use of clearance protocols in children and infants.
- ~ so it is hard to know what is the best way to proceed.
- ~ in general, be more careful and treat more aggressively.
- ~ if you cannot effectively communicate with the child due to age, they functionally have "AMS".
- ~ spinal fractures and cord injury are rare, and most manifest as overt clinical findings- i.e. not subtle.

Geriatrics:

- ~ all of the above applies to the elderly as well.

Take Home points:

1. When in doubt- over treat the spine and let the EDP sort it out. Make your error on the side of caution!
2. Your PCR is critical- it needs to show what you thought (and why) as much as what you found and did. (Especially if you choose to NOT treat the spine).
 - ~ Why are they not intoxicated, or distracted, in your opinion?
 - ~ Why does their MOI not have the potential to cause spine injury in your opinion?
 - ~ "CTLS clear" in a patient with a MOI and a NEXUS criteria (ETOH) is useless.
3. Applying our protocols **REQUIRES** a lot of thought and judgment on your part- this is why you, not a robot, are doing this job. Be smart. Be thorough.