

EM CASE OF THE WEEK.

BROWARD HEALTH MEDICAL CENTER
DEPARTMENT OF EMERGENCY MEDICINE



Care Warriors

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Initial Management of Cervical Spine Injury

A 52-year-old female is brought into the emergency department by EMS after a slip and fall injury while she was getting off of a city bus. She is currently conscious with a Glasgow coma scale of 15. Vital signs reveal a heart rate of 90 bpm, respiratory rate of 20/min, blood pressure of 95/50mmHg, and an oxygen saturation of 98% on room air. Physical exam reveals a 2cm laceration over her right maxillary bone with surrounding erythema. After assessing the patient's airway, breathing, and circulation, what would be the most appropriate next step in management?

- A. Non-contrast CT scan of the head and neck
- B. IV placement and administration of fluids
- C. Observation
- D. Neuromuscular testing
- E. Placement of a cervical collar



Figure 1 : Application of a Cervical Collar (i.pinimage.com)

EM Case of the Week is a weekly "pop quiz" for ED staff.

The goal is to educate all ED personnel by sharing common pearls and pitfalls involving the care of ED patients. We intend on providing better patient care through better education for our nurses and staff.

BROWARD HEALTH MEDICAL CENTER

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Correct answer: **E. Placement of a cervical collar.**

Explanation:

Stabilization of the cervical spine with a cervical-collar in any head or neck injury should always be the priority. The patient in the above scenario should immediately be placed in a cervical-collar to prevent further damage to her cervical spine until a CT scan can be performed to rule out any skeletal or soft tissue injury. There are screening modalities in place that can be utilized to assess the cervical spine for possible injury prior to imaging. These include the NEXUS Low-risk Criteria and the Canadian C-spine Rules.

Initial Management:

First responders should always be wary of possible spinal injury in trauma patients, especially in the setting of a motor vehicle collision, assaults, falls from elevated surfaces, or sports-related injuries. If spinal injury is suspected, spinal immobilization should be initiated at the scene.

Spinal immobilization includes a backboard, rigid cervical-collar, and lateral head supports. Some state protocols omit the backboard for cervical spine injuries and use only a rigid cervical-collar and padded stretcher with the patient in a supine or Semi-Fowler position (head of bed inclined 30°).

Common Issues:

Airway management: Orotracheal intubation is the preferred method of airway management for patients with traumatic cardiopulmonary arrest, even with evidence of spinal injury. In-line spinal stabilization should be maintained throughout intubation to minimize spinal column movement. This presents a challenge as it impairs the clinician's view during direct laryngoscopy, increasing the risk for failed intubation and severe hypoxia. However, there are other ways of maintaining an airway, such as glidescope intubation or fiberoptic intubation, that can be attempted on difficult patient before in-line stabilization should be compromised.

Helmet removal: It is a 2-person job!

1. Open any facemask or face shield to access the airway.
2. Rescuer 1 positioned above the head and places one palm along each side of the helmet with fingers over the mandible.
3. Rescuer 2 positioned beside the patient then loosens any straps and places one hand at the angle of the mandible and the other at the cephalad portion of the posterior neck, just below the brim of the helmet.
4. As rescuer 1 gradually removes the helmet 1/2 way, rescuer 2 slides their hand from below the helmet rim to the occiput, preventing the head from falling back.

Cervical Spine Imaging Following Trauma:

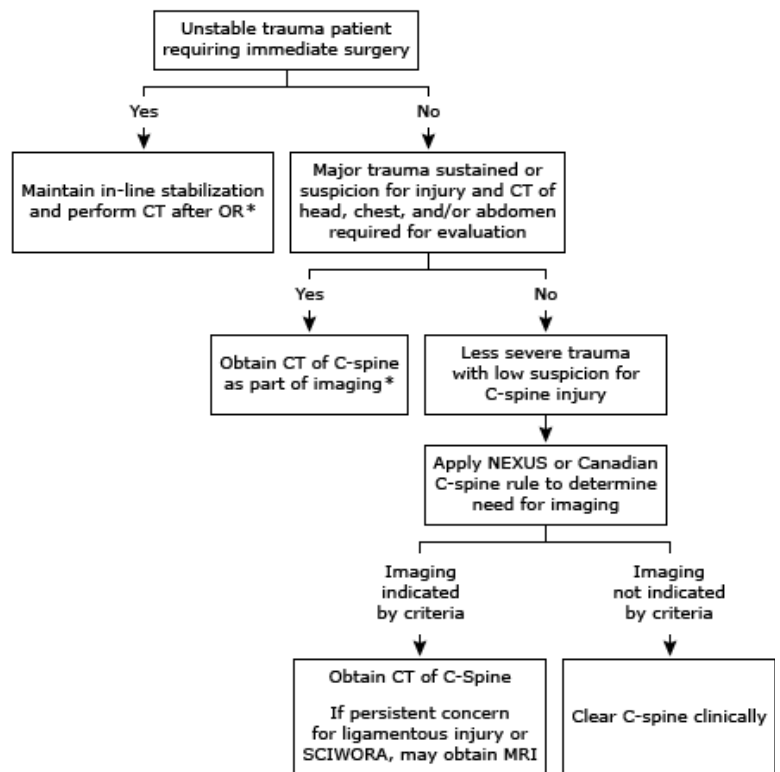


Figure 2: Cervical Spine Imaging Algorithm
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All are welcome to attend!

NEXUS Low-risk Criteria (NLC): Sensitivity 99.6%, Specificity 12.9%

Imaging is NOT necessary if patient satisfy ALL 5 of the following low-risk criteria.

1. Absence of posterior midline cervical tenderness
2. Normal level of alertness
3. No evidence of intoxication
4. No abnormal neurologic findings
5. No painful distracting injury

Canadian C-spine Rules (CCR): Sensitivity 100%, Specificity 42.5%

Condition 1 (High-risk): perform imaging in patients WITH any of the following:

- Age \geq 65-years-old
- Dangerous mechanism of injury:
 - Fall from 1m (3ft) or five stairs
 - Axial load to the head (e.g. diving accident)
 - Motor vehicle collision as high speed ($>100\text{km/hr}$ or $> 65\text{mph}$)
 - Ejection from a vehicle
 - Bicycle collision with an immovable object
- Paresthesias in extremities.

Condition 2 (Low-risk): Perform imaging in patients WITHOUT any of the following:

- Simple rear end motor vehicle accident
- Sitting position in emergency department
- Ambulatory at any time
- Delayed onset of neck pain
- Absence of midline cervical spine tenderness

Condition 3: if patients meet ANY of the previously mentioned low-risk criteria, then range of motion testing is indicated. Perform imaging on patients NOT able to actively rotate their neck 45° both left and right. Patients who are able to rotate their neck, regardless of pain, do NOT require imaging.

Of Note: In 2003, the CCR was prospectively studied, which demonstrated a sensitivity of 99.4% and specificity of 45.1%. Also, in a subsequent Canadian study, the NLC demonstrated a lower sensitivity of 90.7% and a specificity of 36.8%.

Take Home Points

- Suspect spinal injury in any trauma victim, especially in the setting of MVA, falls, assaults, and sports-related injuries.
- Spinal immobilization: backboard, rigid cervical collar, and lateral head supports should be initiated at the scene.
- Use the NLC and/or CCR to assess and further stratify patients who are stable following traumatic injury.
- If indicated, a CT-scan is the preferred imaging modality for any patient who meets clinical criteria for radiologic evaluation.



ABOUT THE AUTHOR

This month's case was written by Michael Pham. Michael is a 4th year medical student from NSU-COM. He did his emergency medicine rotation at BHMC in July 2018. Michael plans on pursuing a career in Physical Medicine and Rehabilitation after graduation.

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