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Trauma Spine Assessment and Cord Injury Practice Management Guideline

1. Process/Procedure Description

Develop a regimented approach to screening and treatment for spinal injuries in the trauma patient.

2. Who Should Read This Process/Procedure?

Emergency Department Attending, Emergency Department Residents, Trauma Residents, Trauma Attending

3. Definitions:

Both penetrating and blunt trauma patients can be at risk for injury to the bony or ligamentous spine. Blunt patients fall into four categories: awake, awake with neck or back pain/tenderness, obtunded and patient with neurologic deficits. Penetrating spine patients make up the fifth category of traumatic spine. Each category requires a different workup.

1. Awake blunt trauma patients can undergo clearance of the spine by physical exam and active range of motion exercises (AROME) if they have no distracting injuries, are not intoxicated or do not have altered sensorium from traumatic brain injuries (TBI) etc.

2. Patients with spine pain or tenderness are at risk for spine injury and require radiological evaluation.

3. Obtunded blunt trauma patients are patients who may be intubated or are otherwise unable to communicate or interact with a physical exam or range of motion exercise. These patients required computed tomography (CT) under a set of specific requirements for clearance of the

cervical spine.

4. Patients with neurological deficits have motor and/or sensory deficits corresponding to specific nerve roots resulting in paresis, paraplegia and/or sensory deficits. Penetrating spine patients have a ballistic wound that has proximity or trajectory involving the spine.

4. Process/Procedure

Step:	Process Instructions/Description:
1.	Awake blunt trauma patients - without distracting injuries or conditions can be cleared clinically without any need for imaging studies. a. The cervical, thoracic and lumbar spine is palpated i. If the thoracic and lumbar spine is free of midline bony tenderness, then these areas are cleared clinically by palpation alone. ii. If the cervical spine is free of bony midline tenderness, an AROME is performed. Have the patient flex and extend the head forward and backward, and then turn head right and left, touching the chin to each shoulder. iii. If the AROME is completed without difficulty, the c-spine is cleared and the collar may be removed. b. If the patient has bony spine tenderness or fails the AROME, then proceed to "Patients with spine pain". c. The presence of a c-collar does not preclude patients from participating in physical therapy unless stated otherwise in activity orders.
2.	Patients with spine pain require work up by CT scan of the area in question. a. Due to overlap of anatomic zones and the high number of bony injuries in the thoracolumbar area, patients with tenderness anywhere in the back should undergo CT scanning of the entire T & L spine. b. If bony spine tenderness is detected after the patient has undergone a CT scan of the thorax, abdomen and pelvis (TAP), a "bony spine" series can be reformatted from the CT-TAP. c. Patients with step-off deformities or bony back pain detected on secondary survey should undergo a dedicated T & L spine series d. Awake patients with bony neck pain or fail cervical AROME require a CT scan of the cervical spine and a two-view active flexion-extension plain film series of the cervical spine. e. Post mobilization films do not require full, independent, weight-bearing status. Any issues with this can be elevated to the radiology team leader in real time for a quick resolution.
	Flexion Extension Procedure for Awake Patients i. Patients sit upright in a wheelchair ii. The cervical collar is removed iii. The patient flexes his head forward until neck pain limits motion or the chin touches the chest and an x-ray is taken.

	iv. The patient then extends the head backwards until the patient experiences pain or the occipital skull touches the upper back and a second film is taken. v. The collar is then replaced until the official x-ray report demonstrates stability vi. Patients who do not have visualization of the C7/T1 disc space or at least 30 degrees range of motion, should have the case reviewed with the trauma Attending and may require an MRI of the cervical spine.
3.	Obtunded blunt trauma patients present a management dilemma in that patients with TBI can have prolonged periods of AMS and cannot undergo AROM. Performing MRI of the cervical spine as a screening tool on this large group of patients is not cost efficacious. Leaving cervical collars on for extended periods of time can result in skin care problems and decubitus ulcers. a. A high quality cervical spine CT as defined by <3 mm axial cuts, can be used as a screening tool to clear the cervical spine in Obtunded patients without further testing. b. All CT scanners at EMC meet the necessary requiriements for high resolution CT scans and can be used to clear the cervical spine in obtunded patients. CT scans of the cervical spine from outside facilities that have axial slice listed on the study as < 3.0 mm. If there is no official outside read that can be uploaded into the Epic, an overread by Erlanger radiology should be obtained. Outside CT scans that do not state the axial slice size and do not contain sagittal and coronal recons do not suffice to clear the obtunded patient's cervical spine.
4.	Patients with neurologic deficit should receive a thorough neurologic exam documenting level of sensory and motor deficit on the right and left sides. a. Motor score scale is described as follows: i. 0 - no contraction ii. 1 - flicker of contraction iii. 2 - active movement but can't resist gravity iv. 3 - active movement against gravity v. 4 - active movement against resistance vi. 5 - normal strength b. Sensory exam should be recorded according to dermatone level. c. A CT scan of the entire spine looking for the injury causing the neurological deficit and any other concomitant spine injury, should be obtained. d. Once the level of the SCI is determined , an MRI may be considered. e. Neurosurgical service should be consulted on an URGENT basis in the case of an acute SCI.
5.	Penetrating spine patients - The trajectory on the bullet should be considered (including entrance and exit wounds) and the location of the bullet(s) on plain films. a. A thorough neurologic exam should be performed assessing for any evidence of motor or sensory deficit. b. A CT scan of the appropriate anatomic area determined by bullet trajectory analysis should be obtained.

	c. Spine immobilization should be maintained until the patient is evaluated by neurosurgery.
6.	Operative cervical spinal injuries requiring surgical management should be admitted to the ICU for close monitoring in both the pre-operative and post-operative periods.

References:

American College of Surgeons. (2018). Advanced trauma life support: student course manual. Chicago, IL. doi: 0996826238

Approval Signatures

Step Description	Approver	Date
COO	John Winks: Executive Vice President-COO	07/2024
Trauma Services Committee Approval	Stephanie Spain: Trauma Program Manager	06/2024
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Applicability

Erlanger Health - Baroness