Spinal Immobilization

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Objectives

- Anatomy and Physiology
- Spinal Trauma
- In Line Stabilization
- Movement of the Patient
- Packaging

Introduction

- 15,000 permanent spinal cord injuries annually
- Commonly men 16-30 years old
- Mechanism of Injury
  - MVC's: 50%
  - Falls: 20%
  - Penetrating Trauma: 15%
  - Sport Injuries: 15%

Introduction Continued...

ASSUME based upon MOI that patient's have a spinal injury

Manage ALL spinal injuries with immediate and continued care

Anatomy

- Function
  - Skeletal support structure
  - Major portion of axial skeleton
  - Protective container for spinal cord (spinal canal)
- Vertebral Body
  - Major weight-bearing component
  - Anterior to other vertebrae components

Anatomy

- The **spinal cord** extends from the midbrain at the base of the skull to the level of L1 or L2 in most adults
### Spinal Column

- Spinal Column

### Spinal Cord

- **Function**
  - Transmits sensory input from body to the brain
  - Conducts motor impulses from brain to muscles and organs
  - Reflex Center
    - Intercepts sensory signals and initiates a reflex signal

### Types of Injuries

#### Spinal Column Injuries

- Movement of vertebrae from normal position
- Fractures
  - Spinous process and Transverse process
  - Vertebral body
  - Ruptured intervertebral disks
- Common sites of injury
  - C-1/C-2: Delicate vertebrae
  - C-7: Transition from flexible cervical spine to thorax
  - T-12/L-1: Different flexibility between thoracic and lumbar regions

#### Spinal Cord Injuries

- Concussion
  - Similar to cerebral concussion
  - Temporary and transient disruption of cord function
- Contusion
  - Bruising of the cord
  - Tissue damage, vascular leakage and swelling
- Compression
  - Secondary to:
    - displacement of the vertebrae
    - hemiation of intervertebral disk
    - displacement of vertebral bone fragment
    - swelling from adjacent tissue
- Laceration
  - Causes:
    - Bony fragments driven into the vertebral foramen
    - Cord may be stretched to the point of tearing
- Hemorrhage into cord tissue, swelling and disruption of impulses
  - Associated with contusion, laceration, or stretching
Signs and Symptoms

- Extremity paralysis
- Pain with and without movement
- Tenderness along spine
- Impaired breathing
- Spinal deformity
- Priapism
- Posturing
- Loss of bowel or bladder control
- Nerve impairment to extremities

Neurogenic Shock Signs and Symptoms

- Bradycardia
- Hypotension
- Cool, moist and pale skin above the injury
- Warm, dry and flushed skin below the injury
- Male: Priapism

Assessment

- Consider spinal precautions
  - Head injury
  - Intoxicated patients
  - Injuries above the shoulders
  - Distracting injuries
- Maintain manual stabilization
  - Vest style versus rapid extrication
  - Maintain neutral alignment
  - Increase of pain or resistance, restrict movement in position found

Rapid Assessment

- Focused versus Rapid Assessment
- Rapid Assessment
  - Suspected or likely spinal cord/column injury
  - Multi-system trauma patient
  - Evaluate
    - Neck
      - Deformity, Pain, Crepitus, Warmth, Tenderness
    - Bilateral Extremities
      - Decorticate/Decerebrate posturing
      - Push, Pull, Grips
    - Motor & Sensory Function
    - Babinski Sign Test

Initial Size-Up

- Scene Size-up
  - Evaluate MOI
  - Attempt to determine type of spinal trauma
  - Maintain suspicion with sports injuries
  - If unclear about MOI take spinal precautions

Assessment

- Vital Signs
  - Body Temperature
    - Above and below the site of injury
  - Pulse
  - Blood Pressure
  - Respirations
  - Pulse Oximetry (if available)
  - Pupils
Spinal Immobilization

- Move patient to a neutral, in-line position
  - Position of function
- Hips and knees should be slightly flexed for maximum comfort and minimum stress on muscles, joints, and spine
  - Place a rolled blanket under the knees
- ALWAYS support the head and neck
- Contraindications to neutral position
  - Movement causes a noticeable increase in pain
  - Noticeable resistance met during procedure
  - Increase in neurological deficits occurs during movement
  - Gross deformity of spine
    - LESS MOVEMENT IS BEST

Cervical Immobilization

- Seated Patient
  - Approach from front
  - Assign a care giver to hold GENTLE manual traction
  - Reduce axial loading
  - Evaluate posterior cervical spine
  - Position patient’s head slowly to a neutral, in-line position

- Supine Patient
  - Assign a care giver to hold GENTLE manual traction
  - Adult
    - Lift head off ground 1-2”: Neutral, in-line position
  - Child
    - Position head at ground level: Avoid flexion
    - THEN pad under shoulders as appropriate for age

Cervical Immobilization

- Apply the c-collar as soon as possible
- Assess neck prior to placing
  - Crepitus
  - Deformity
  - Tracheal Deviation
  - JVD
- DOES NOT completely prevent movement of the neck

Cervical Immobilization

- Size and Apply according to the Manufacturer’s Recommendation
  - Collar should fit snug
  - Collar should NOT impede respirations
  - Head should continue to be in neutral position
  - SIZE IT TO THE COLLAR
  - DO NOT RELEASE manual control until the patient is fully secured in a spinal restriction device
Moving the Patient

- Any movement MUST be coordinated
- Move patient as a unit
- NO LATERAL PUSHING
  - Move patient up and down to prevent lateral bending
- Rescuer at the head “CALLS” all moves
- ALL MOVES MUST be slowly executed and well coordinated
- Consider the final positioning of the patient prior to beginning move

Moving the Patient

- Log Roll
- Straddle Slide
- Rapid Extrication vs. KED placement
- Final Patient Positioning

Log Roll to Backboard

Helmet Removal

- Techniques
- 2 Rescuers
- Have a plan
  - Remove face mask and chin strap
  - Immobilize head
    - Slide one hand under back of neck and head
    - Other hand supports anterior neck and jaw
  - Remove helmet
    - Gently rock head to clear occiput
  - All actions should be slow and deliberate
- TRANSPORT HELMET with patient

Reassessment

- Continued Reassessment
  - after packaging
  - continued through transport
- Comparing vitals vs. Trending Vitals
  - more is better
  - GCS, Distal circulation, sensation and movement, repeated pain scales.

Post-Test

1. The spinal cord is encased in and protected by the:
   a. Spinal canal
   b. Vertebral body
   c. Vertebral arch
   d. Intervertebral disc
Post-Test

2. When immobilizing a trauma patient’s spine, the EMT manually stabilizing the head should not let go until:
   a. An appropriately sized cervical collar has been applied
   b. The patient has been secured to the ambulance stretcher
   c. The head has been stabilized with lateral immobilization
   d. The patient has been completely secured to the backboard

Post-Test

3. If you do not have an appropriately sized cervical collar, you should:
   a. Use rolled towels to immobilize the patient’s head
   b. Place sandbags on either side of the patient’s head
   c. Ask the patient to keep his or her head in a neutral position
   d. Defer cervical immobilization and apply lateral head blocks.

Post-Test

4. Signs and Symptoms of Neurogenic shock includes all except:
   a. Hypotension
   b. Tachycardia
   c. Cool, moist and pale skin above the injury
   d. Warm, dry and flushed skin below the injury

Post-Test

5. The function of the spinal column includes all except:
   a. Spinal support
   b. Protection for the spinal cord
   c. Major weight-bearing component
   d. Major portion of axial

Special thanks to Sheila Crow of Stitchin’ Dreams Embroidery

For providing our Secret Question prize

Questions/Comments?
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Updates Please

Starting in November, all Certificates of Completion will be emailed to each participant. Please be sure to provide a current email address on the sign-in roster. Please also email any organization contact information changes to:

- Michelle Ensminger – ensminm@inhs.org

NEW THIS SEASON!!

- NEW THIS SEASON – Web based EMS Live@Nite Recordings, DVD’s will no longer be available. Agencies can now access the recorded series by registering through the Health Training website.

- Once an agency registers for this course, an online access code will be emailed to the email listed on the registration account. This access code is to be shared with employees of the purchasing agency throughout the 2013-2014 training season.

  Videos will be posted within 1 week of the live program.

- To register visit: https://courseregistration.inhs.org/CourseListing.aspx

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