Chapter 31

Head Trauma

Objectives

1. Define key terms introduced in the chapter.
2. Explain the importance of recognizing and providing emergency medical care to patients with injuries to the head.
3. Identify the anatomy of the skull (slides 13-14).
4. Identify the meningeal layers and the spaces into which intracranial bleeding can occur in relationship to the meninges, skull, and brain (slides 15-16).
5. Associate each of the major anatomical portions of the brain with its functions (slides 16-17).

Objectives

6. Explain the pathophysiology and key signs and symptoms of injuries to the scalp, skull, and brain, including (slides 18-35):
   a. Scalp lacerations
   b. Skull fractures
   c. Cerebral concussion and diffuse axonal injury
   d. Cerebral contusion
   e. Coup/contrecoup injury
   f. Cerebral and intracranial hematomas
   g. Cerebral laceration
Objectives

7. Identify and, where possible, manage factors that can worsen traumatic brain injuries, including (slide 34):
   a. Hypoxia
   b. Hypercarbia
   c. Hypoglycemia
   d. Hyperglycemia
   e. Hyperthermia
   f. Hypotension

8. Describe the goals of emergency treatment of patients with traumatic brain injuries (slides 36-44).

Objectives

9. Describe the pathophysiology and key signs of increased intracranial pressure and brain herniation (slides 38-39).
11. Discuss the focus of history taking and assessment for patients with injuries to the head (slide 41).
12. Assess and provide emergency treatment to patients with injuries to the head (slide 42-44).
13. Explain the importance of reassessment of the patient with an injury to the head (slide 42-43).
14. Document information relevant to the assessment and management of patients with injuries to the head.

Multimedia Directory

Slide 44  Applying a Cervical Collar Video
CASE STUDY

Dispatch

Respond to 2516 Elmwood Street for an unresponsive 18-year-old male.

Time out 1230
Upon Arrival

- An anxious woman meets you outside and explains that they cannot wake up her son
- Patient bumped his head earlier in a basketball game
- Just came home 20 minutes ago

How would you proceed to assess and care for this patient?

Anatomy of the Skull and Brain
Types of injuries
• Bleeds heavily

Skull Injuries

• Linear
• Depressed
• Closed
• Open
• Basilar
Brain Injuries

Motor vehicle crashes
Assaults and violence
Falls
Sports and recreation

Pathophysiology of Traumatic Brain Injury
Pathophysiology of Traumatic Brain Injury

Concussion

• Closed head injury
• Open head injury
• Diffuse axonal injury

• Definition
• Signs and symptoms
Subdural Hematoma

- Definition
- Acute
- Occult
- Signs and symptoms

Pathophysiology of Traumatic Brain Injury

Epidural Hematoma

- Definition
- Severity
- Signs and symptoms
Laceration

- Definition
- Severity

Assessment-Based Approach: Head Injury

Scene Size-Up
Scene Size-Up

- Scene safety
- Mechanism of injury

Assessment-Based Approach: Head Injury

Primary Assessment

- In-line stabilization
- Open airway
- Mental status
- Flexion posturing
- Extension posturing

Back to Objectives
Assessment-Based Approach: Head Injury

Secondary Assessment

- Physical exam
- Vital signs
- History
- Signs and symptoms
- Transport

Assessment-Based Approach: Head Injury

Emergency Medical Care and Reassessment
Emergency Medical Care

- Standard Precautions
- Manual in-line spine stabilization
- ABCs
- Control bleeding
- Be prepared for seizures
- Transport
- Reassessment

Applying a Cervical Collar

Click here to view a video on applying a cervical collar.

Follow-Up
**Primary Assessment**
- Establish in-line spine stabilization; open airway with jaw-thrust
- Patient breathes rapidly and deeply
- Arms flex, back arches, and legs stiffen with painful stimuli
- Insert OPA without a problem
- PPV at 20 breaths per minute

**Secondary Assessment**
- Left pupil dilated and nonreactive
- BP: 190/72mmHg; P: 62; RR: 20 assisted; SpO₂ 99 percent
- Mike was knocked unconscious for three minutes two weeks ago while rollerblading; sought no medical care

**Secondary Assessment**
- Today patient was playing basketball and was hit with an elbow; complained of being tired; went home and lay down
- Immobilize patient on spine board with cervical collar
Treatment and Reassessment

- Monitor ABCs
- No change en route
- Upon arrival transfer care to ED staff
- Write report and prepare ambulance for another call
- Months later you see Mike walking toward school

CASE STUDY

- 33-year-old male, victim of a stabbing
- Per police on scene, the patient startled an intruder when he arrived home
- The intruder stabbed the patient in the head with a screwdriver

Critical Thinking Scenario

Rapid trauma assessment:

- The screwdriver is impaled in the skull
- Patient responds to painful stimulus by flexing his arms, arching his back, and contracting his legs
- He has blood in his mouth, and you hear gurgling sounds
Critical Thinking Scenario

Vital signs:
• HR: 42 bpm, radial pulse is strong
• RR: 22 per minute, irregular with minimal
  chest rise and fall

Critical Thinking Questions

1. What immediate emergency care would you provide for the patient?
2. What do the vital signs indicate?
3. Would you hyperventilate the patient or not? What criteria would you use to make the decision?
4. How would you manage the impaled screwdriver?

Reinforce and Review

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