ASSESSMENT & EARLY MANAGEMENT OF SEVERE HEAD INJURY

24 February 2023

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10 THINGS TO KHOW ABOUT ASSESSMENT & EARLY MANAGEMENT OF SEVERE HEAD INJURY

Objective

- To provide up-to-date clinical practices
- For safe and effective patient care
- And reduce complications

1. Time is brain!!

Time is brain means..

- Human nervous tissue is rapidly lost as intracranial disease progresses and emergent evaluation and therapy are required.

It is dynamic

- Intracerbral hemorrhages are dynamic processes and early hematoma expansion is common
- Among patients undergoing head CT within3 hours of onset, about 1/3 have hematoma expansion.

2. Classification

- Based on the **mechanism**, head trauma is classified as
  - (1) Blunt (most common mechanism)
  - (2) Penetrating (most fatal injuries)
  - (3) Blast

Types of Traumatic Brain Injury

- **Concussion** – transient interruption in brain activity; no constructural injury noted on radiographics.
- **Cerebral contusion** – bruising of brain with associated swelling.
- **Intracerebral hematoma** – bleeding into the brain tissue.
- **Epidural hematoma** – blood between the inner table of the skull and dura.
- **Subdural hematoma** – blood between the dura and arachnoid caused by bleeding commonly associated with additional brain injury.
- **Diffuse axonal injury** – axonal tears within the white matter of the brain, high speed motor vehicle accident.

Causes

- The leading causes of traumatic brain injury (TBI) are
  - (1) Motor vehicle-related injuries
  - (2) Falls
  - (3) Assaults

- TBI is 3 times more common in males than females.
- Although only 10% of TBI occurs in the elderly population, it accounts for up to 50% of TBI-related deaths.

3. Assessment

- Airway & Cervical Spine
- Breathing
- Circulation
- Disability & Neurological examination
- Exposure

- Follow trauma life support protocol and perform primary, secondary, and tertiary surveys.
- Once the patient is stabilized, a neurologic examination should be conducted.
- A good history concerning the mechanism of injury is important.
- CT scan is the diagnostic modality of choice in the initial evaluation of patients with head trauma.

4. Neurological Assessment

- Disability & Neurological examination
- Exposure

Disability & Neurological examination

- **Focused** Neurological exam
- In **all patients** presenting with a head injury, an accurate **Glasgow Coma Scale** must be recorded on admission.

Consciousness has a two-level structure

1. Level :
    1. Description : drowsy stupor coma
    2. GCS
2. Content : orientation

Glasgow Coma Scale

EYE OPENING			VERBAL RESPONSE			MOTOR RESPONSE		
								
Spontaneous	>	4	Orientated	>	5	Obey commands	>	6
To sound	>	3	Confused	>	4	Localising	>	5
To pressure	>	2	Words	>	3	Normal flexion	>	4
None	>	1	Sounds	>	2	Abnormal flexion	>	3
			None	>	1	Extension	>	2
						None	>	1

GLASGOW COMA SCALE SCORE

Mild	Moderate	Severe
13-15	9-12	3-8

- Based on the Glasgow Coma Scale (GCS) score, it is classified as:

1. Mild = GCS 13 to 15
2. Moderate = GCS 9 to 12
3. Severe = GCS 3 to 8

The Acceptable Ways to Apply Painful Central Stimuli

1. Supraorbital pressure
2. Trapezius Squeeze
3. Sternal pressure

nail bed pressure??

- Muscle response (M) in GCS Vs Motor power

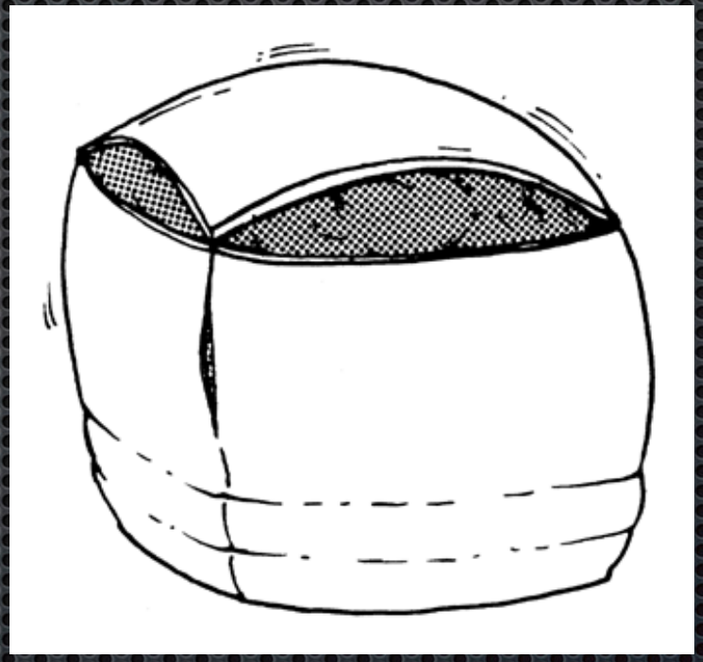
Grade	Muscle Power
0 - Zero	No muscle contraction is seen
1 - Trace	Flicker or Trace of contraction is seen
2 - Poor	Active movement only with gravity eliminated
3 - Fair	Active movement against gravity but not resistance
4 - Good	Active movement against gravity with some resistance
5 - Normal	Active movement against gravity with full resistance

- The patient's **pupils** : **size** and **response to light***
- **focal neurological deficit, Brain stem signs**
- Measure the **blood glucose level** and avoid hypoglycaemia. Glucose is the primary energy source used in aerobic metabolism for the brain and this demand can often increase depending on the severity of the head injury.

Exposure

- Examine for **lacerations**, evidence of **facial fractures**, or **depressed skull fractures**.
- check for signs of **basal skull fractures**, such as bruising around eyes (‘Racoon eyes’), bruising behind the ears (Battle’s sign), clear discharge from nose or ear (CSF rhinorrhoea or CSF otorrhoea), blood bulging from middle ear (Haemotympanum), or any obvious penetrating injury.

5. Management of Increased ICP Patients



For acute patients with/at risk for raised intracranial pressure, nursing care is including:

- Maintain good head and neck alignment
- Maintain HOB elevation at 30 degrees

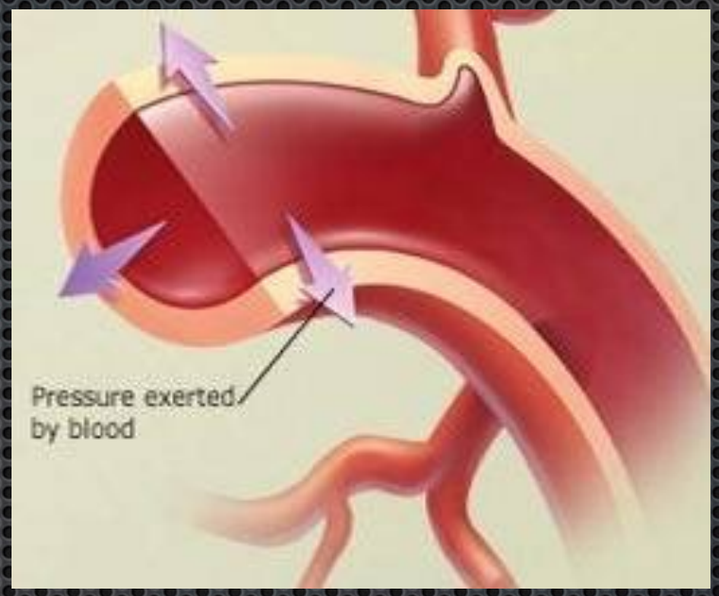
- Insert gastric drainage tube to maintain gastric decompression (nasal tubes may contraindicated)
- Avoid positions that may increase abdominal or intrathoracic pressures
- Minimize stimulation and lighting; space nursing care out to avoid prolonged periods of stimulation

- Maintain euvolemia.
  - Hypovolumia —>
    - decrease cerebral perfusion
    - renal impairment
    - thrombosis
  - Hypervolumia —> cerebral edema
- If mannitol is ordered or hypertonic saline is used, measure urine specific gravity, keep 1.015-1.025
- Monitor for increased/dilute urine output to assess for Diabetes Insipidus.

- Correct hyper/hyponatremia slowly Monitor carefully for signs of seizure activity.
- Monitor blood sugar closely. Avoid hyper or hypoglycemia. Review target glucose with physician if insulin is required for an increase in the lower limit range.
- Monitor for **seizure** activity.

- Otorrhea indicating posterior fossa skull fracture
- Rhinorrhea indicating anterior fossa skul fracture.
- Pain control
- Turn the patient every 2 hours
- Feed the patient as soon as possible after a head injury and administer histamine-2 blockers to prevent gastric ulceration and hemorrhage from gastric acid hypersecretion.

6. HT



- Elevated BP is very common in neuro patients : stress, pain, increased ICP, and premorbid persistent elevations in BP
- High SBP is associated with greater hematoma expansion, neurological deterioration, death and dependency after ICH

- acute lowering of SBP to 140 mm Hg is safe and can be effective for improving functional outcome
- Avoid hypotension (SBP < 90 mmHg)

7. Seizure

- Seizures increase brain metabolic rate and can lead to ischemic injury if not treated promptly.

Status Epilepticus

- Definition :
- A seizure that lasts longer than 5 minutes, or having more than 1 seizure within a 5 minutes period, without returning to a normal level of consciousness between episodes

8. Surgery

Craniotomy Vs Craniectomy

- **Craniotomy** : Once the surgery is completed, the bone flap is returned to its previous position.
  - ใส่กะโหลกกลับ
- **Craniectomy** differs from craniotomy in that the bone is not replaced to its previous position. This results in a cranial defect.
  - ไม่ ใส่กะโหลกกลับ

Safety Considerations

- Positioning may be supported with towels, pillows, and positioning devices to prevent pressure onto the craniectomy side and attempt to stay off the site.

- Signage above the patients bed allows all health care providers to recognize that patient has no bone flap.

- Patients who have had a bone flap removed may still have their hair washed.

- Be gentle when handling this area and do not rub too vigorously.

- Use a mild shampoo with no strong perfumes.

- Do not direct shower head directly to site.

9. Wound Care

- Inspect the incision on the head and abdomen (if present) to ensure edges remain well approximated, and staples/sutures are intact.
- Monitor for redness around the incision, discharge, and any other signs of infection.
- Sutures are usually removed in 2 weeks; however, practice differs between physicians.

10. Falling : Post-op craniectomy patients are at an increased risk for falls.

- Ensure patient is supervised at all times during mobilization
- Purposeful rounding (e.g. assess patient's need to use bathroom prior to bedtime).
- Others falls prevention strategies