



# Recall the nursing management of a patient with head trauma

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ผศ.ดร.กรองไต่ อุณหสูต EdD (Higher Education)  
Post Doctoral Fellow Trauma

ผศ.ดร.กรองไต่ อุณหสูต | 24 กันยายน 2565

# Brain injury

Compensatory mechanism

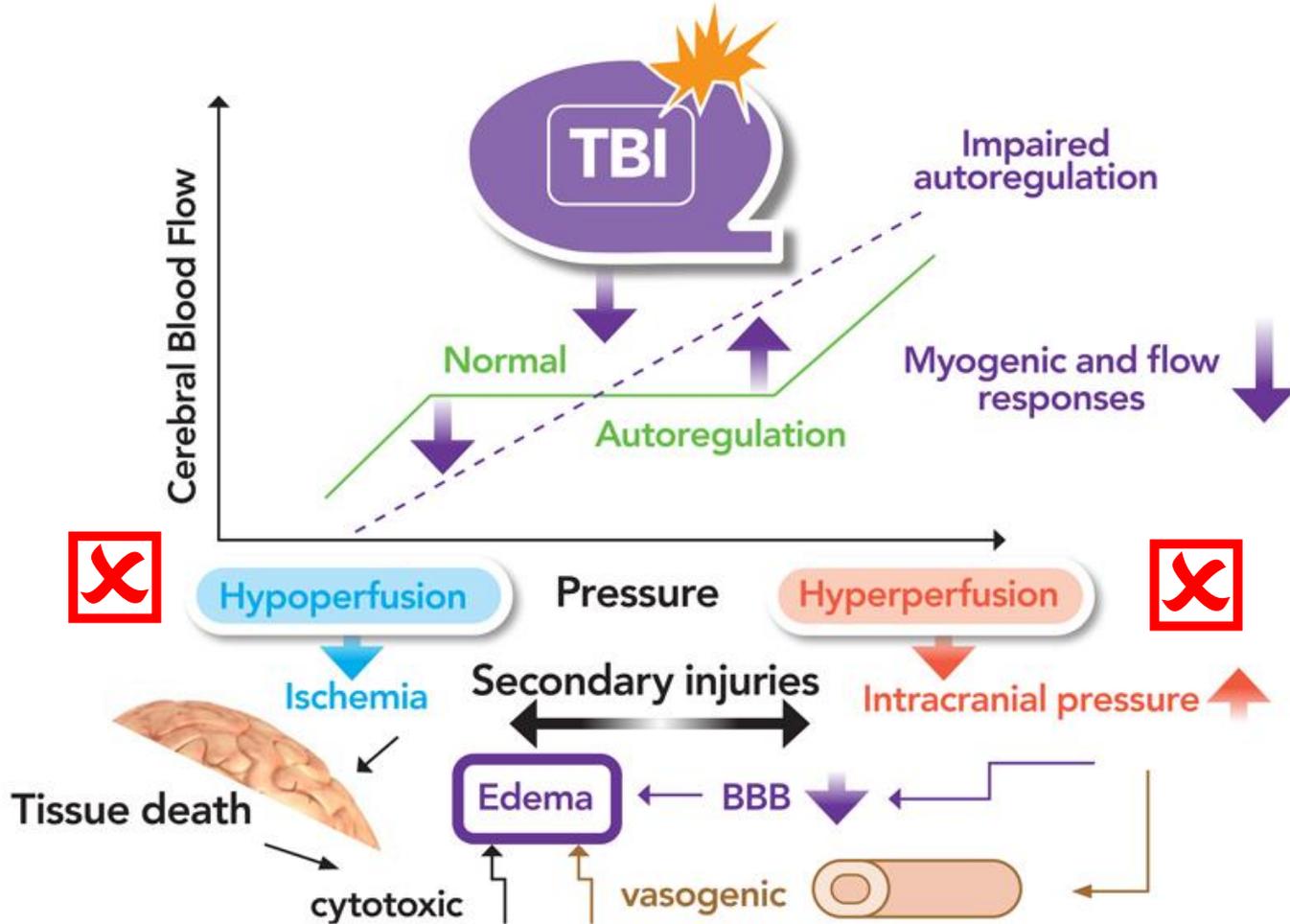


IICP, CPP↓

Hypoxia, Cerebral ischemia

- Headache
- Amnesia
- Altered LOC
- Restlessness, drowsiness, change in speech, loss of judgment

# Cerebral autoregulation



<https://researchoutreach.org/articles/blow-head-impairs-autoregulation-brain-blood-flow-neural-consequences/>

# Cerebral Perfusion

**Cerebral  
perfusion  
pressure**

$$\text{CPP} = \text{MAP} - \text{ICP}$$

**Maintain CPP > 60 mmHg**

**Altered  
cerebral  
autoregulation**

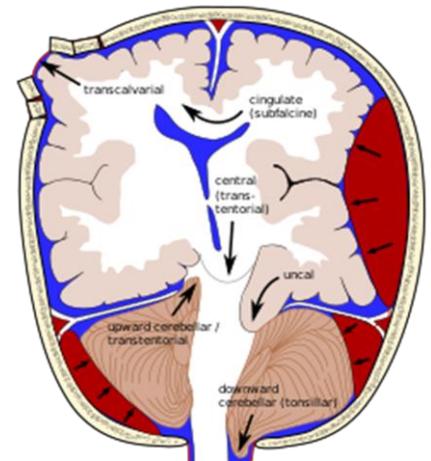
**IICP**

**CPP ↓**



# Ineffective Cerebral Tissue Perfusion

- Ineffective Tissue Perfusion
  - Mental status changes
  - Decreased LOC
  - Pupillary changes
  - Changes in motor response
  - Difficulty swallowing or speaking



# Ineffective Cerebral Tissue Perfusion Assessment

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- Assess an accurate patient history
- Assess and monitor neurological status frequently
- Assess and monitor vital signs
- Evaluate diagnostic studies

# Recommendations

## Loss of consciousness or posttraumatic amnesia

### Level A;

- Headache
- Vomiting
- Age > 60 years
- GCS score < 15
- Coagulopathy
- Focal neurologic deficit
- Physical findings suggestive of trauma above the clavicle
- Deficits in short-term memory
- Drug or alcohol intoxication
- Posttraumatic seizure

### Level B;

- Severe headache
- Vomiting
- Age > 65 years
- GCS score < 15
- Coagulopathy
- Focal neurologic deficit
- Physical signs of basilar skull fracture
- Dangerous MOI
- Ejection from a motor vehicle > 3 feet or a fall from a height > 5 stairs)

# Important data

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- Age, MOI, Time of injury
- Respiratory and BP status
- GCS and motor response
- Other injuries
- **CT scan**

# Concurrent Injuries



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art by Giovanni Rimasti

- Cervical spine
- Facial injuries
- Other system

# Ineffective Cerebral Tissue Perfusion Interventions

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- Evaluate and monitor pupillary responses
- Monitor the patient's bilateral motor responses
- Maintain head or neck in midline or neutral position

# Ineffective Cerebral Tissue Perfusion Interventions

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- Administer IV fluids
- Administer supplemental oxygen as needed
- Administer medications as indicated
- Prepare for surgical intervention as indicated
- Provide rest periods between care activities and limit the duration of procedures

# Airway and Breathing

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## Targets:

- Oxygen saturation  $> 90\%$
- PaO<sub>2</sub>  $> 60$  mmHg
- PCO at 35 - 45 mmHg

# Circulation

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## Target:

- SBP > 90 mm Hg
- MAP > 80 mm Hg

# When to seek help

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- Unresponsive
- Fluid coming from the nose or ear
- Persistent fever
- Unstable vital signs
- Presence of new neurological deficit
- Unequal pupils

# Traumatic Brain Injury

- ABCs
- Airway management & restriction of c-spine motion
- Assess: LOC, V/S
- Incident history: mechanism of injury

Notify Trauma Physician / General Physician

**Severe TBI (GCS = 3-8)**

**Moderate TBI (GCS = 9-12)**

**Mild TBI (GCS = 13-15)**

- Hold mask with reservoir bag 10-15 LPM
- Assisted in endotracheal tube or definite airway
- Fluid management
- Trauma lab, G/M
- Prepare adjuncts: foley catheter, ECG
- Prepare for: diagnostic imaging
- Prepare for: emergency operation, medical administration, consent form
- Monitor: V/S, GCS, O<sub>2</sub> sat, ECG
- Keep warm
- Inform caregiver, mental support
- Nursing record

- O<sub>2</sub> mask with reservoir bag 10-15 LPM
- Prepare for: definite airway
- Fluid management
- Trauma lab, G/M
- Prepare adjuncts: foley catheter, ECG
- Prepare for: diagnostic imaging, CT, MRI, CTA
- Prepare for: emergency operation, medical administration, consent form
- Monitor: V/S, GCS, O<sub>2</sub> sat, ECG, keep O<sub>2</sub> sat ≥ 98%
- Keep warm
- Inform caregiver, mental support
- Nursing record

## With risk factor

- Severe headache, vomiting, drowsy, paresis, seizure, loss of conscious
- Alcohol intoxication
- Fracture skull
- Risk of coagulopathy

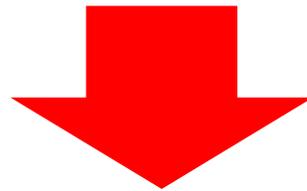
## Without risk factor

- O<sub>2</sub> mask with reservoir bag 10-15 LPM
- Fluid management
- Trauma lab, G/M
- Prepare for: diagnostic imaging, CT, MRI, CTA
- Monitor: V/S, GCS, O<sub>2</sub> sat
- Keep warm
- Inform caregiver, mental support
- Nursing record

Reassessment

Definite care to: OR / ICU / Transfer

# Goal Attainment; Head Injured Patient



**Prevent  
secondary brain injury**

# Outcomes

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- **Awake, oriented and alert**
- **Able to eat**
- **Moves all extremities**
- **Able to ambulate**

# Problems

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- Ineffective airway clearance
- Risk of aspiration
- Impaired gas exchange
- Alteration in tissue perfusion
- Risk of; IICP, Hyperthermia, Infection

# Moderate to Severe Head Injury

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- Loss of conscious
- Severe headache
- Repeated nausea / vomiting
- Loss of short term memory
- Slurred speech
- Difficulty with walking .....

# IICP

## Late signs

Dilate,  
non-reactive pupils

Unresponsive to  
verbal  
or painful stimuli

Abnormal motor  
posturing

Changes in  
respiratory rate  
and pattern

## Latest signs; Cushing's reflex

SBP↑,  
widening PP

Bradycardia

Diminished  
respiratory effort

## Herniation syndromes

Unilateral or bilateral  
pupillary dilation

Asymmetric pupillary  
reactivity

Abnormal motor  
posturing

Changes in BP,  
cardiac deceleration,  
asystole



# THAI TRAUMA NURSES

Online training



0957847929 (thaitraumanurse) เฉพาะส่งข้อความ



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