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# Scalpel Erasmus 2nd online session

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PROF. SMRČKA M., M.D., PH.D., MBA

MRLJAN A., M.D., PH.D.

UNIVERSITY HOSPITAL BRNO

FAKULTY OF MEDICINE MASARYK UNIVERSITY BRNO

# Case report 1

- MALE 68 YEARS OLD
- NEGATIVE MEDICAL HISTORY
- COLLAPSE OF UNKNOWN ETIOLOGY
- FOUND WITH LOSS OF CONSCIOUSNESS
- RAPID RIGHT SIDE ANISOCORIA AND NEUROLOGICAL DETERIORATION
- OTORRHEA
- RESPIRATORY DISORDER DUE TO THE LOSS OF CONSCIOUSNESS → ENDOTRACHEAL INTUBATION
- COAGULOPATHY & THROMBOCYTOPENIA



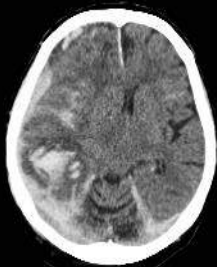
Suggestion of any exam?



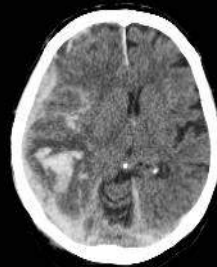
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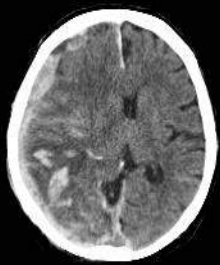
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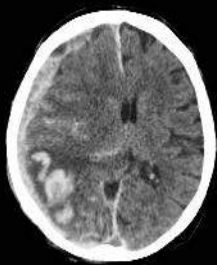
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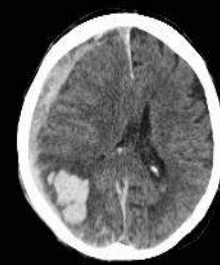
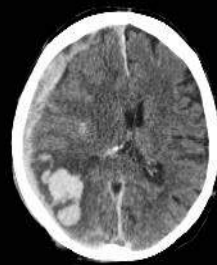
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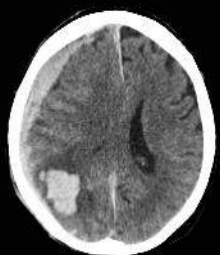
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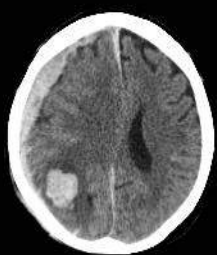
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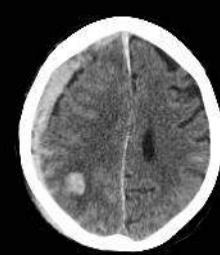
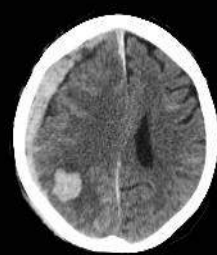
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# CT exam description

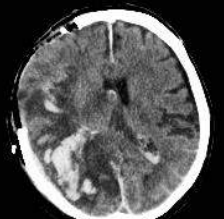
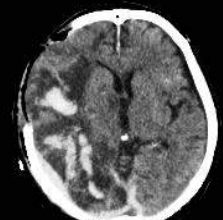
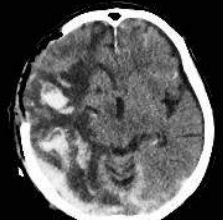
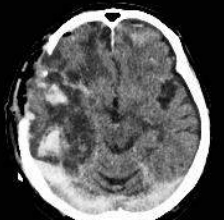
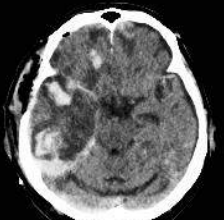
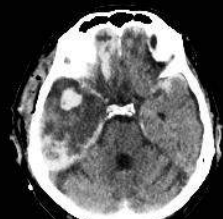
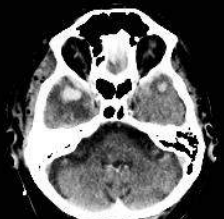
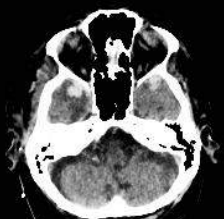
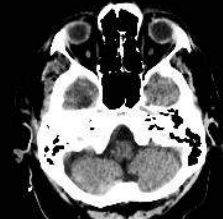
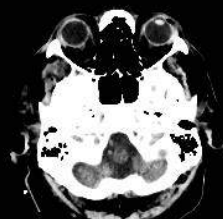
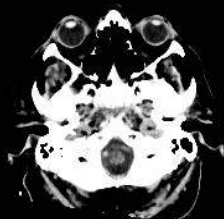
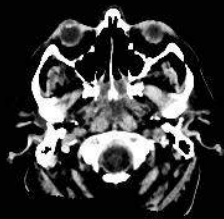
- ▶ Type of bleeding
- ▶ Size of bleeding
- ▶ Midline shift
- ▶ Suggestion of any intervention

# Suggestion of any intervention

1. Single ICP monitoring
2. Urgent single subdural haematoma evacuation
3. Urgent subdural haematoma and contusion evacuation
4. Single decompressive craniectomy
5. Koagulation parameters improvment and urgent surgery
6. Everything from above

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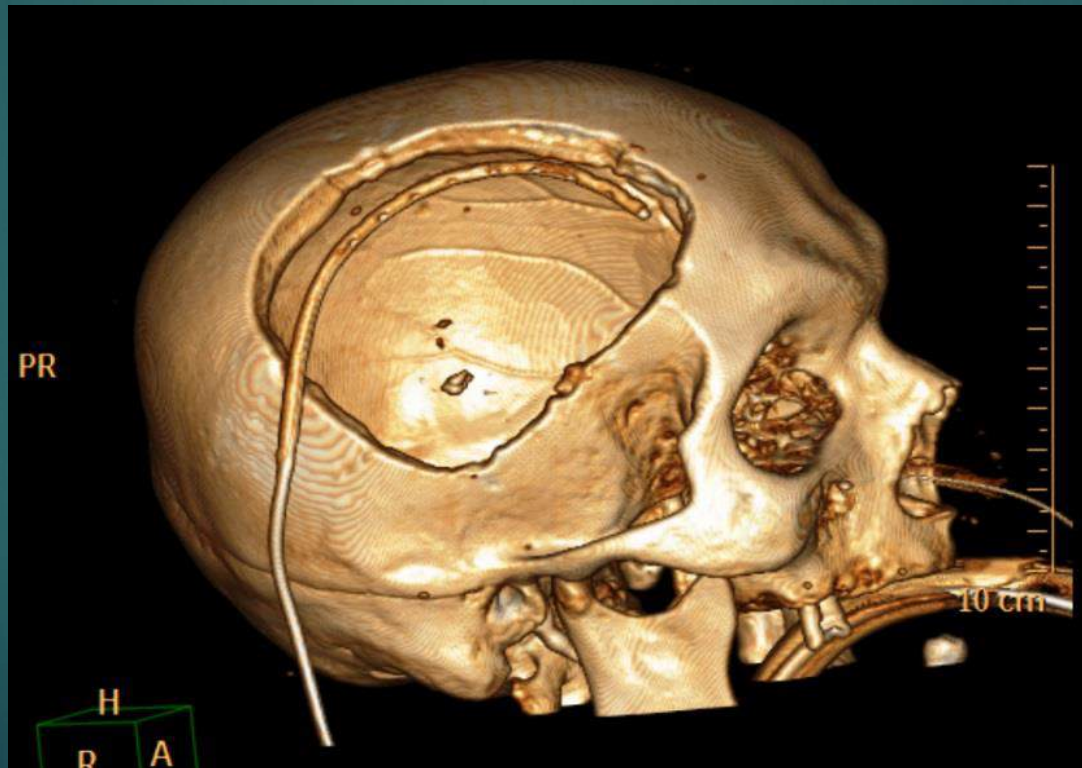


# Solution?

- ▶ Persistent anisocoria
- ▶ Analgosedation & artificial ventilation
- ▶ Blood pressure support (Noradrenaline)
- ▶ CRP elevation

# Discussion

- ▶ Further indication to the ICP monitoring
- ▶ Further indication to another surgery
- ▶ Size of decompressive craniectomy

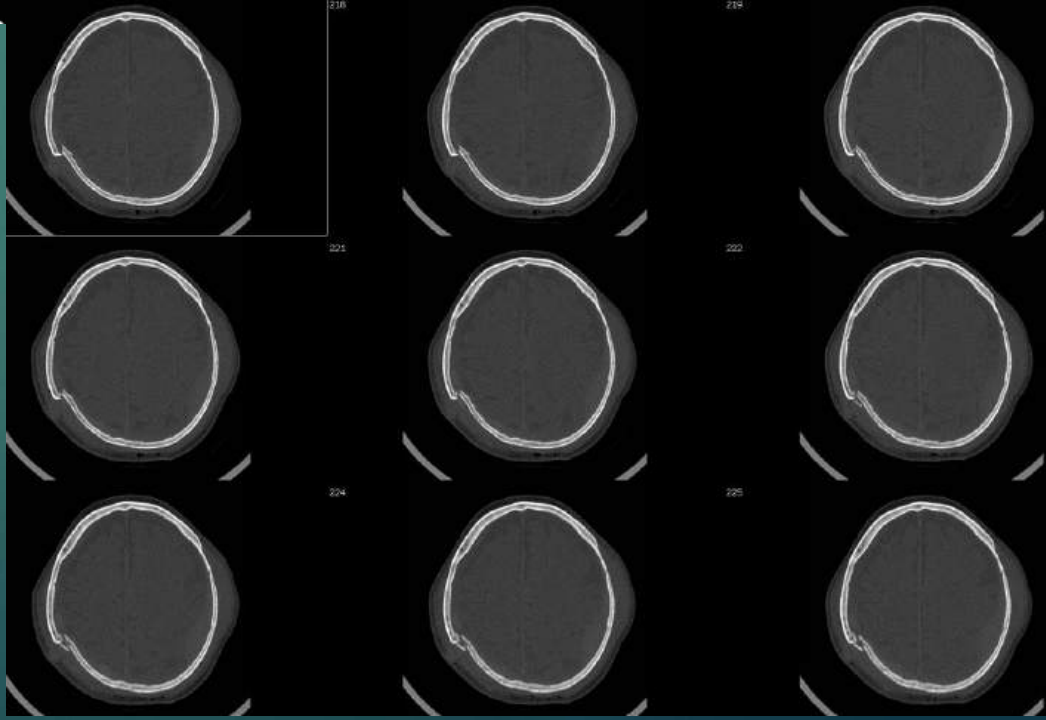
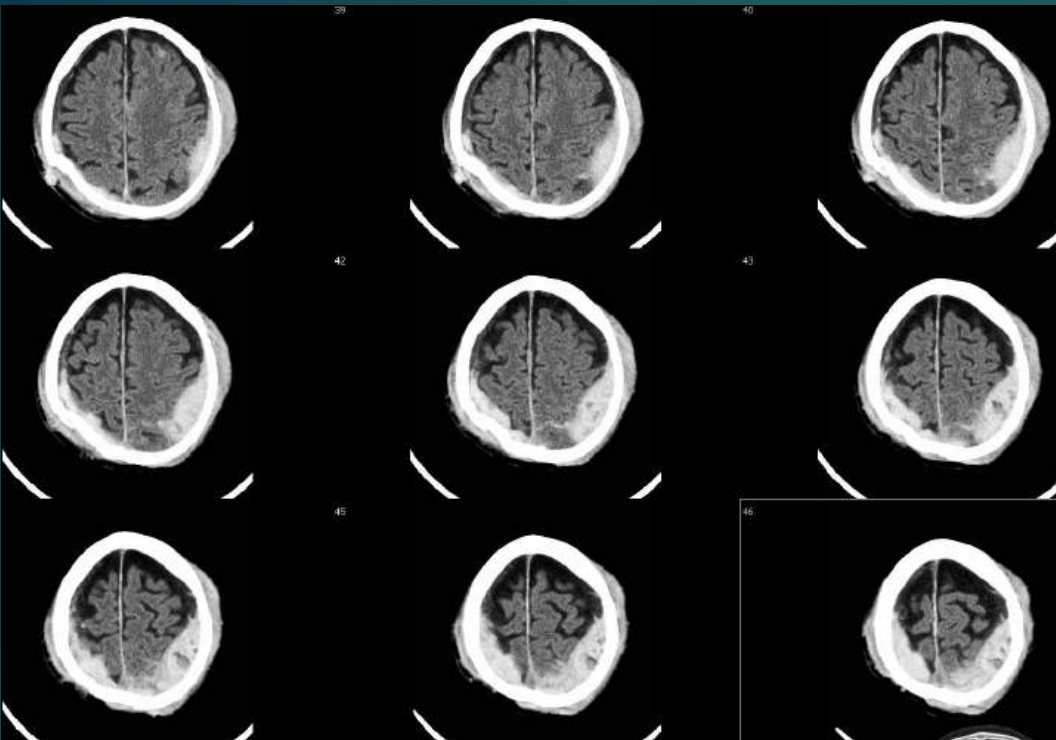


# Case report 2

- ▶ Male 71 years old
- ▶ Hypertension, peptic ulcer
- ▶ Collapse after alcohol abuse
- ▶ Found the day after with mild concussion symptoms, no neurological deficit
- ▶ According to his wife's opinion he seems to be more odd than usual
- ▶ After physical exam scalp laceration and skull deformation has been found
- ▶ Initially only single suture of scalp laceration has been performed



Suggestion of any exam?



# CT exam description

- ▶ All types of injury
- ▶ Midline shift
- ▶ Suggestion of any intervention
- ▶ Indication criteria for haematomas evacuation and skull fracture elevation

# Suggestion of any intervention

1. Single ICP monitoring
2. Urgent single subdural haematoma evacuation & skull fracture surgery
3. Urgent single epidural haematoma evacuation
4. Single decompressive craniectomy – if yes, then which side?
5. Possibility 2 and 3

# Suggestion of any intervention

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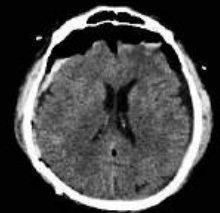




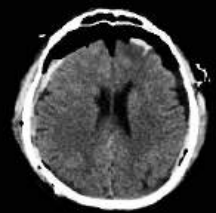
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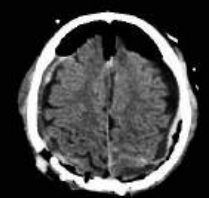
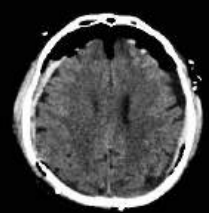
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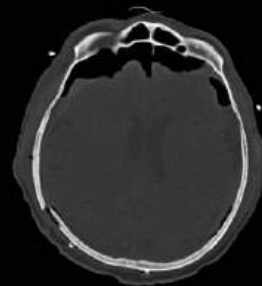
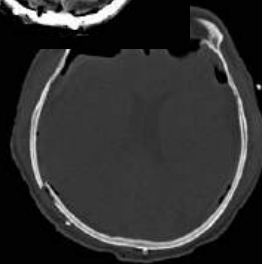
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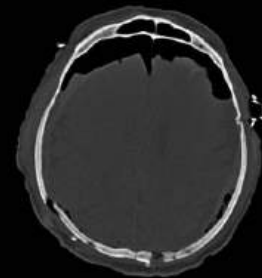
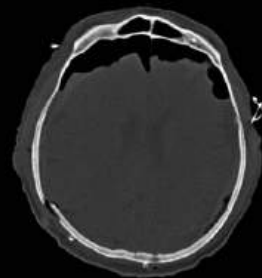
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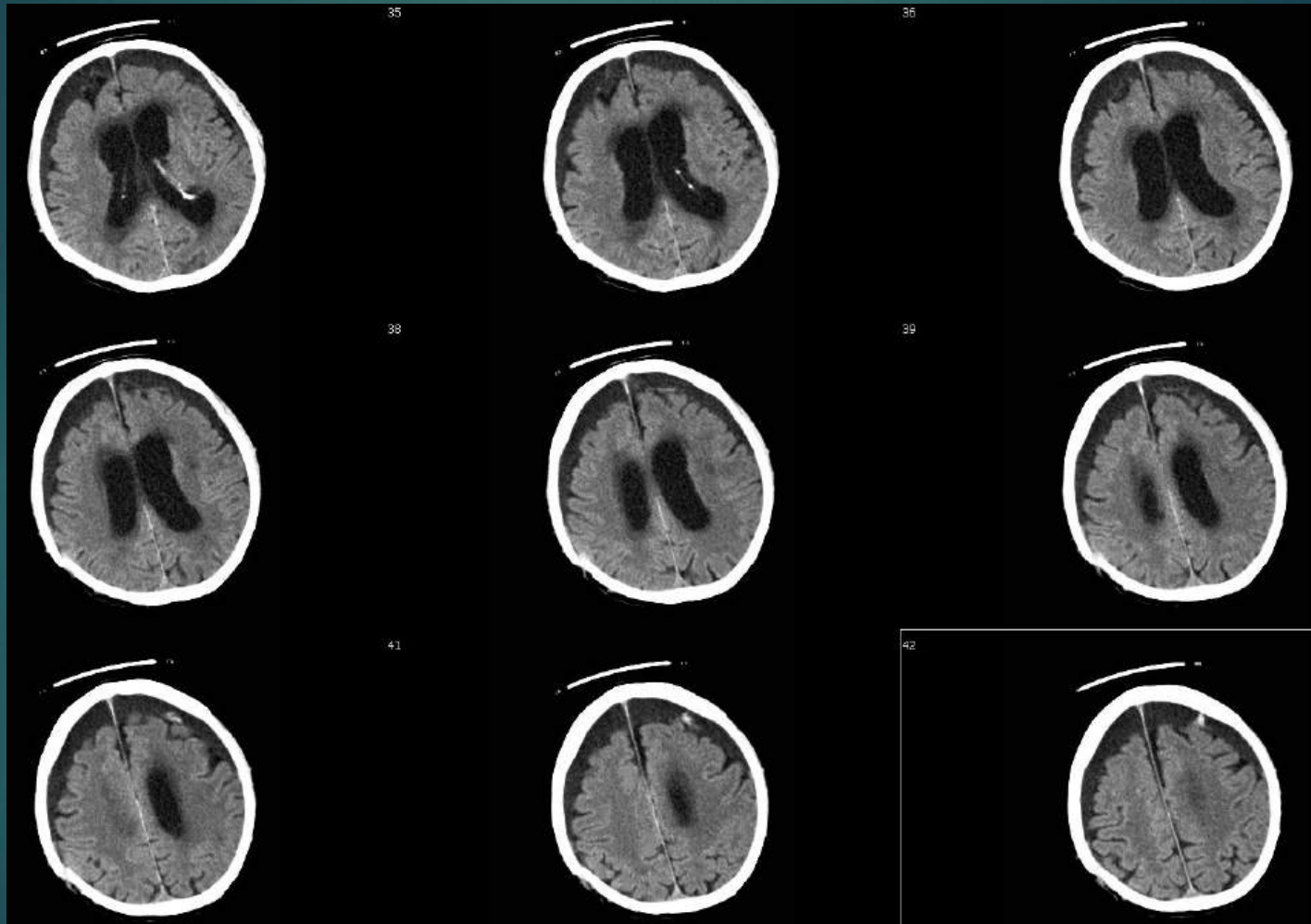
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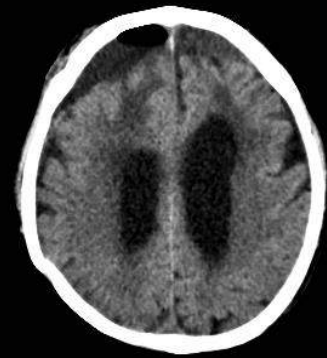
# CT scan after 8 weeks



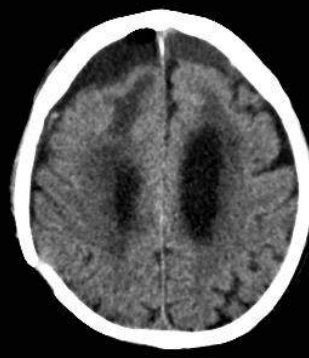
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- ▶ Psychoorganic syndroma
  - ▶ Cephalea
  - ▶ Dizziness

# Suggestion of any other intervention

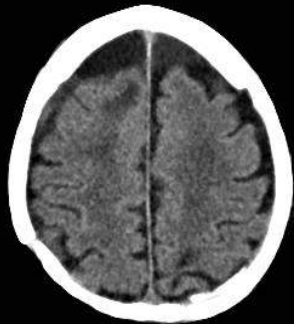
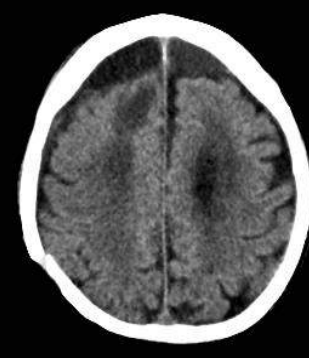
- ▶ Observation
- ▶ Bilateral evacuation of subdural collections



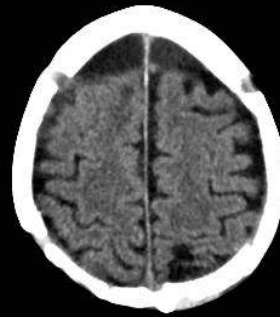
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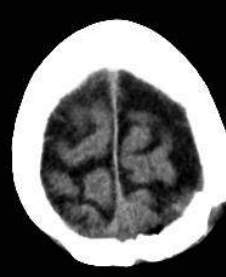
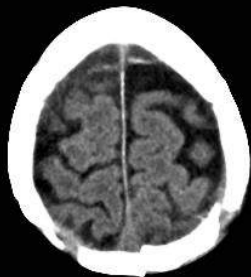
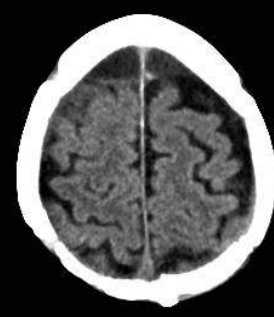
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# Solution

- ▶ Small and slow clinical improvement
- ▶ Psychoorganic syndrome persistence, gait disturbances, hypobulia & depression
- ▶ Is this patient suffered from posttraumatic hydrocephalus?
- ▶ Which examination will make this diagnosis true?
- ▶ Which type of treatment/surgery will you offer to him?

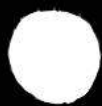
# Case report 3

- MALE 63 YEARS OLD
- NEGATIVE MEDICAL HISTORY, ALCOHOL ABUSER
- FALL FROM A LADDER (APPROXIMATELY 4 M)
- LOSS OF CONSCIOUSNESS (GCS-8)
- EPISTAXIS AND & BLEEDING FROM RIGHT EAR
- ENDOTRACHEAL INTUBATION AND ANALGOSEDATION



Suggestion of any exam?





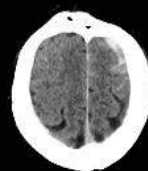
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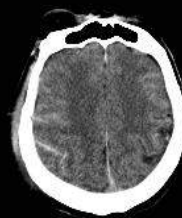
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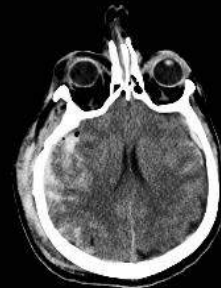
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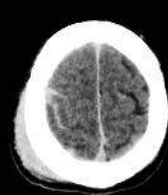
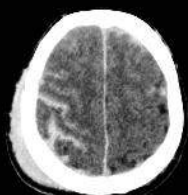
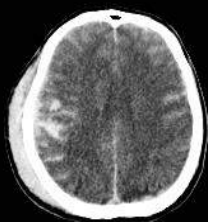
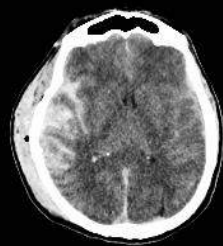
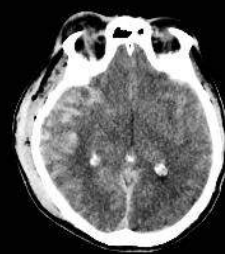
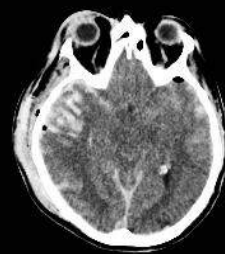
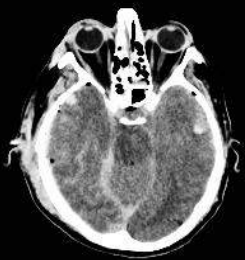


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# Suggestion of any intervention

1. Single ICP monitoring
2. Repeat a CT scan after 2 hours
3. Urgent single decompressive craniectomy




# Other suggestions?

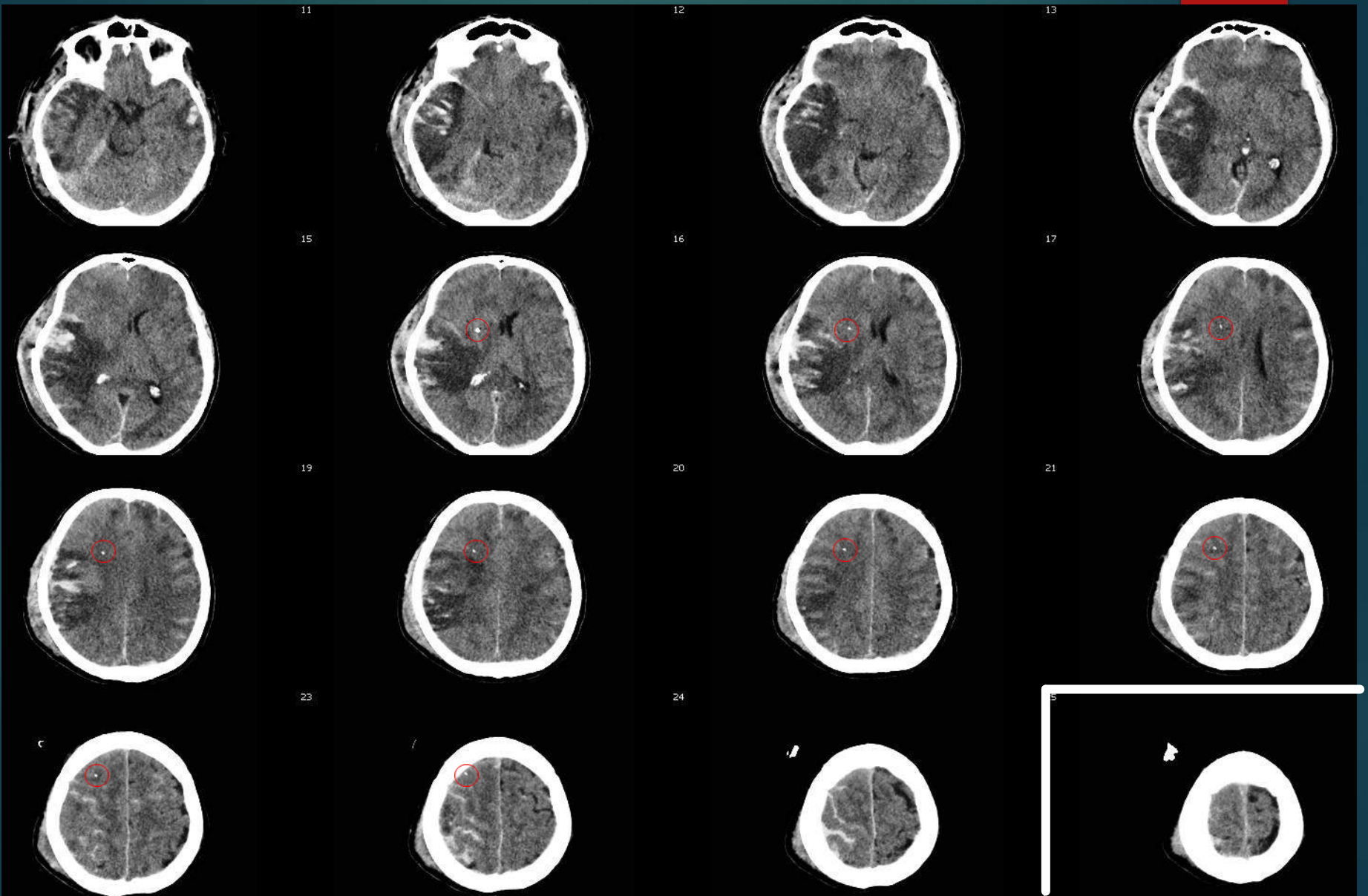
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# Other suggestions?

1. Single ICP monitoring
- ~~2. Repeat a CT scan after 2 hours~~
3. Urgent single decompressive craniectomy

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- ▶ Normal values of ICP for two days
  - ▶ Then elevation to 35 mm Hg, refractory to the medication
  - ▶ Repeated CT scan

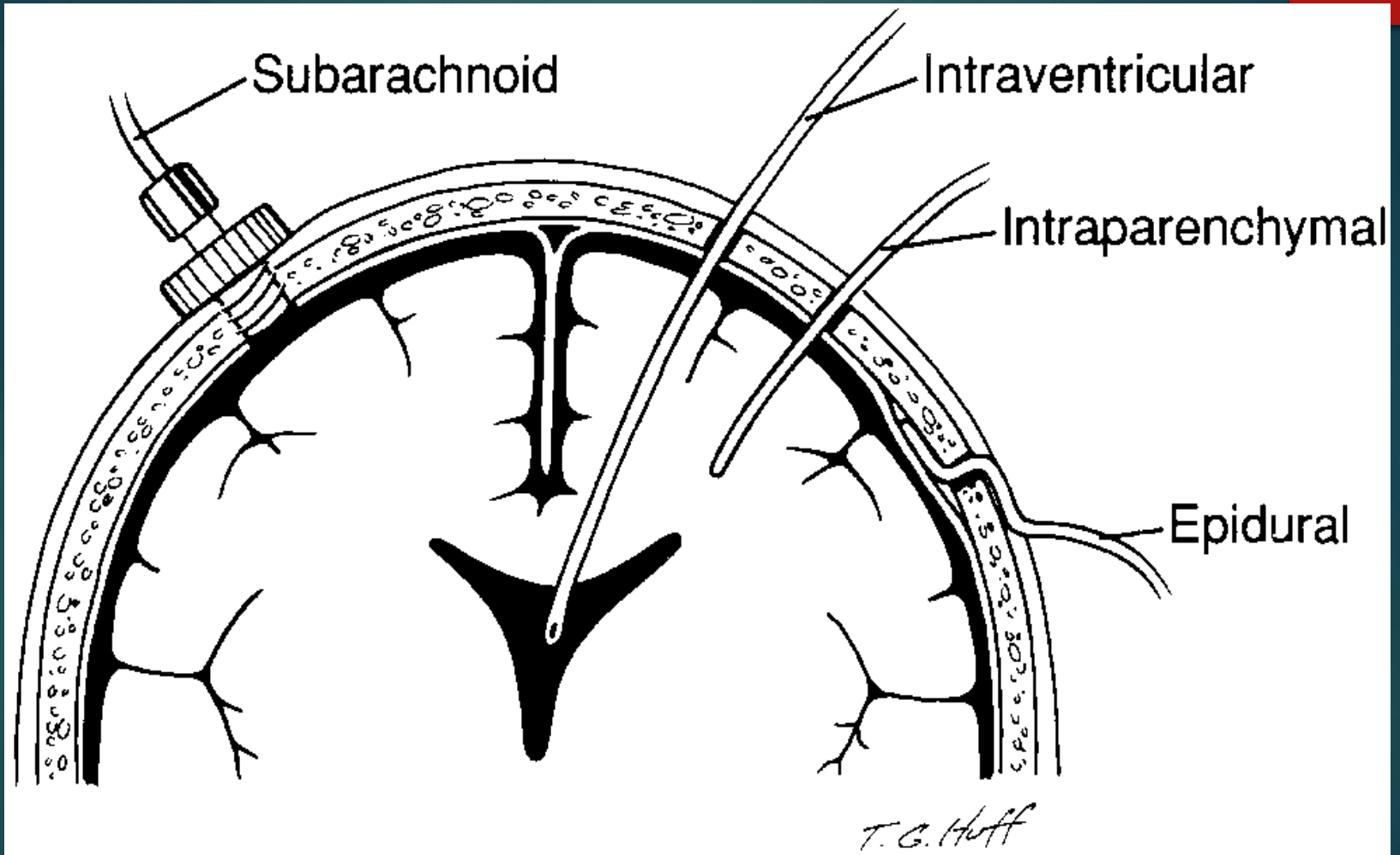




# Indication for ICP sensor insertion

- GCS  $\leq 8$  and pathological CT scan
- GCS  $\leq 8$ , normal CT and at least 2 of the following factors:
  - age above 40
  - decerebrate or decortication limbs reaction
  - syst. TK  $< 90$  mmHg
- Within multiple trauma, where the therapy of other injuries disables a monitoring of a neurological state





Suggestion for any  
intervention?

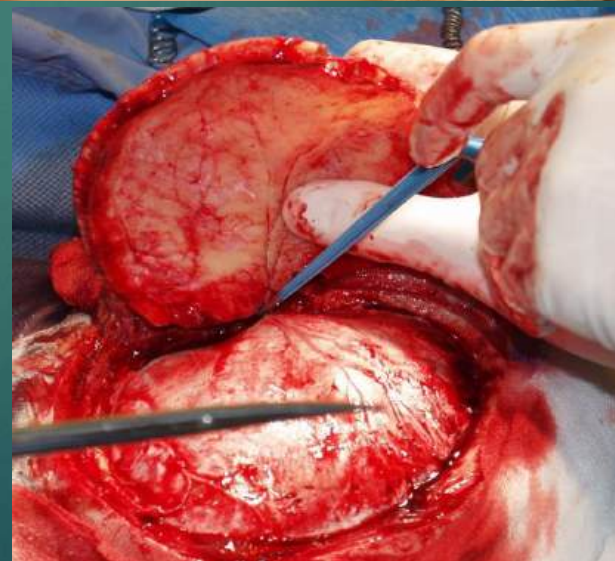
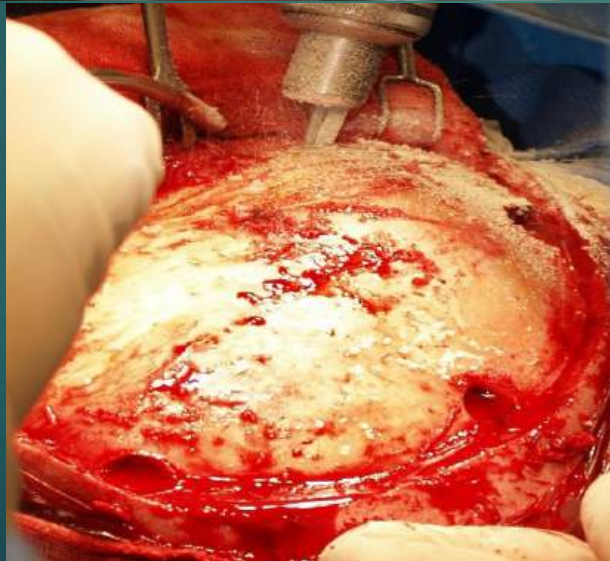
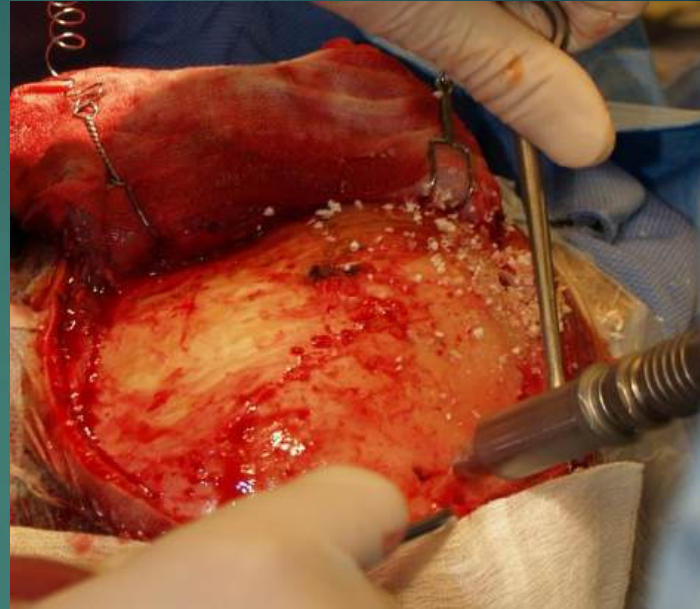




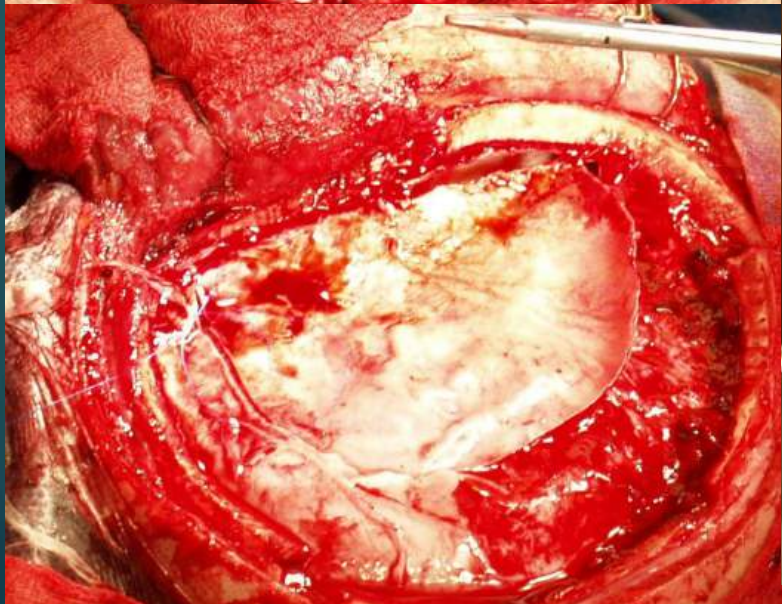
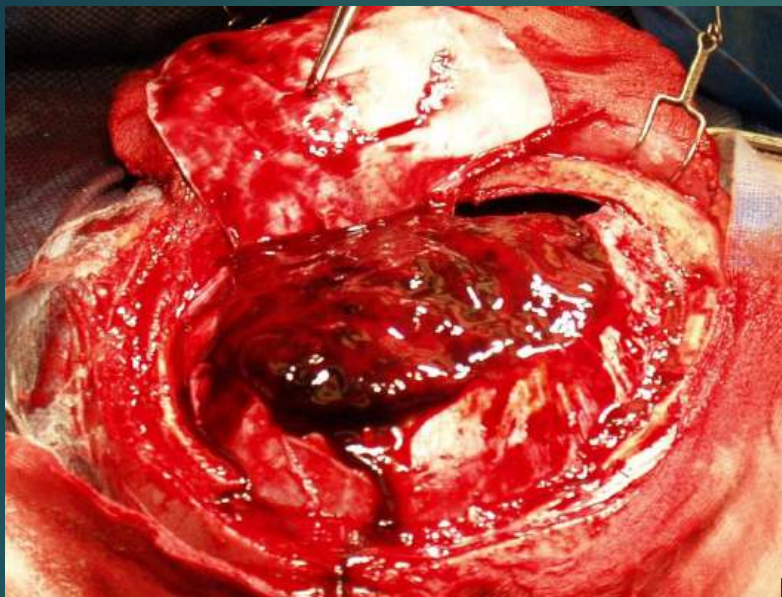
Suggestion for any intervention?

Decompressive craniectomy

# Surgery

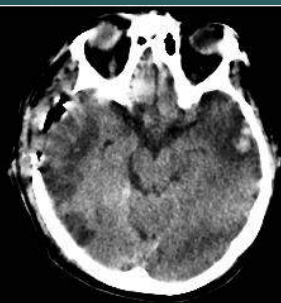




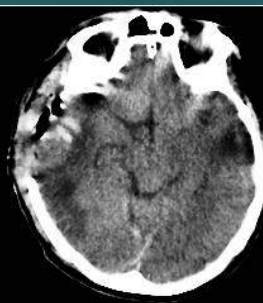




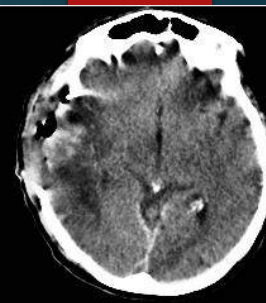
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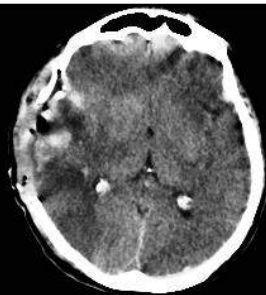
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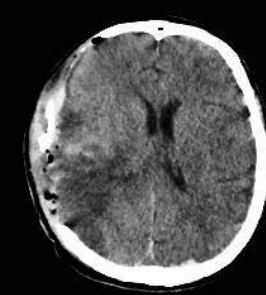
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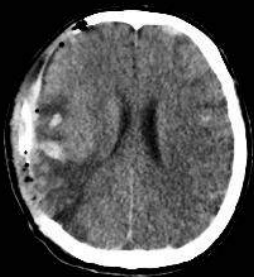
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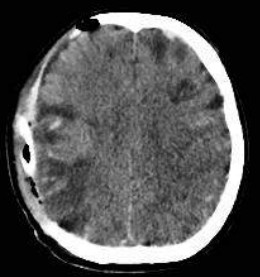
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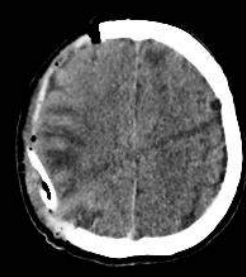
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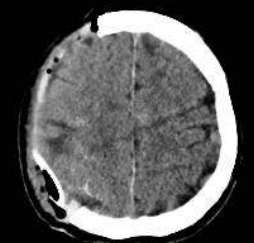
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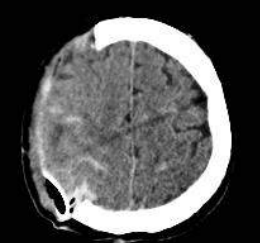
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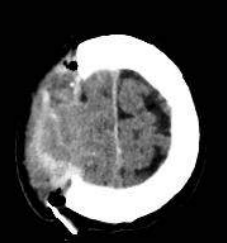
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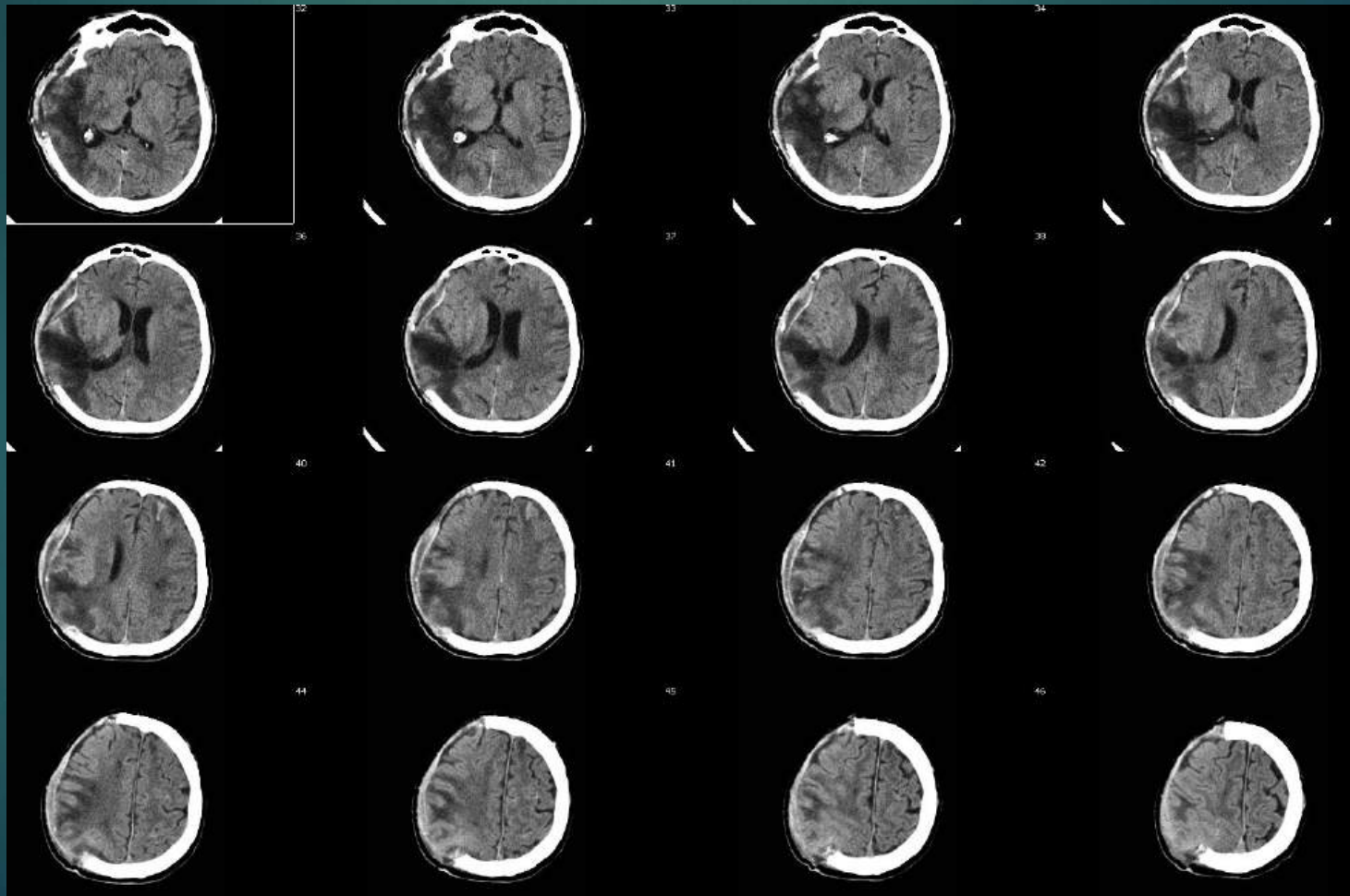


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- ▶ Two weeks after DC several signs of persistent vegetative state syndrome have been occurred
- ▶ A bone replantation is considered



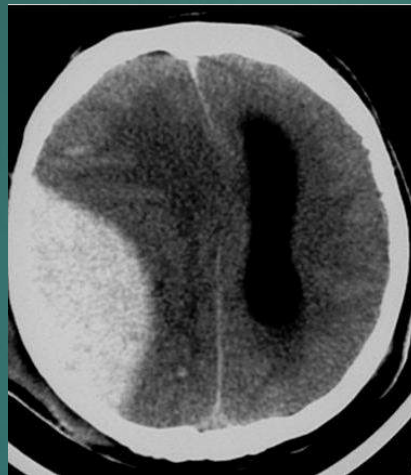
# Discussion

- ▶ Secondary brain injury and its prevention



# TBI pathophysiology

- ▶ **Primary** brain injury - the damage of brain tissue at the moment of injury – **unaffectedable** – only prevention of trauma?



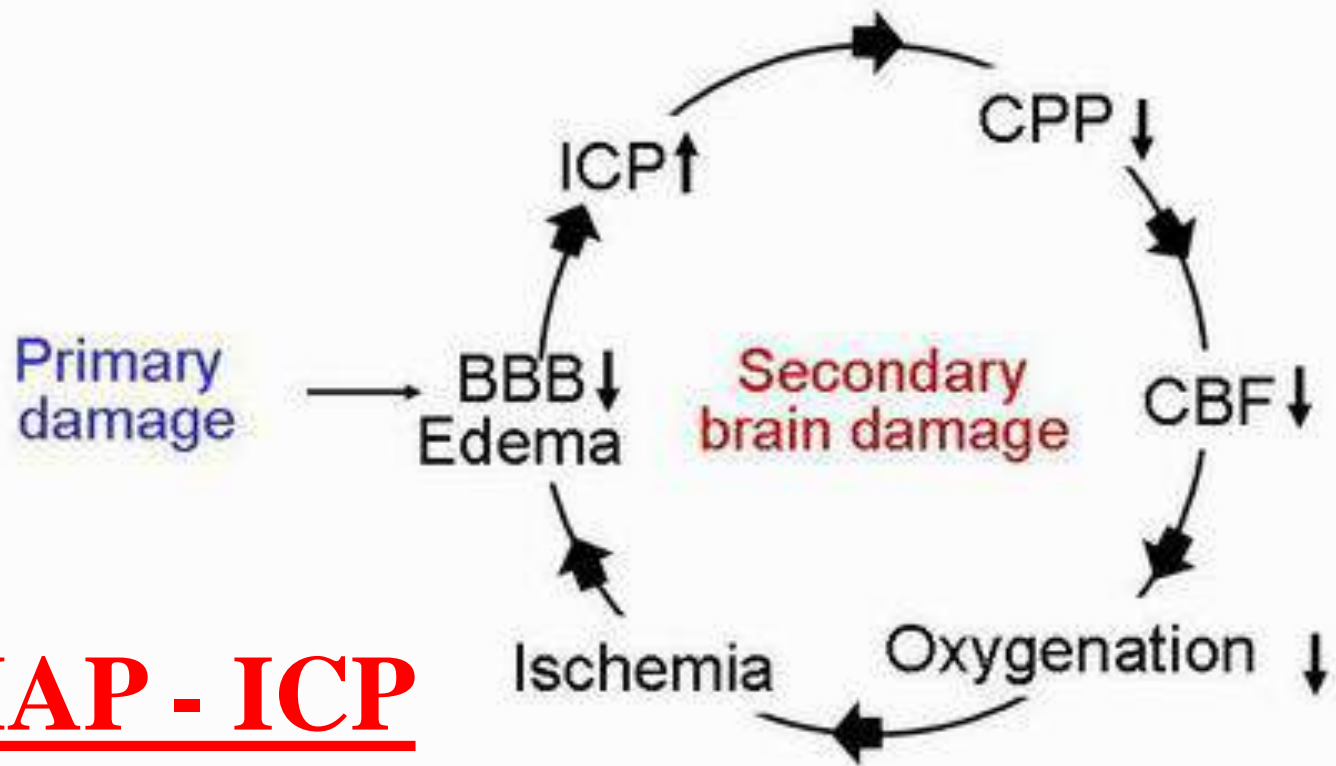
- ▶ **Secondary** = ischemic brain injury - the destruction of brain tissue due to the low oxygenation in compressed tissue and/or low blood supply – **affectable**

# Secondary brain injury

- **elimination:** hypotension, hypoxia, hyperthermia, hypercapnia, hypocapnia, hyperglycaemia, infection, hypoglycaemia
- **neuromonitoring:**
  1. Non invasive: GCS, CT,
  2. Invasive: ICP, CPP, PtbO<sub>2</sub>, CBF

# Secondary – ischemic damage

## Pathophysiology



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