



INTRACRANIAL PRESSURE(ICP)

5TH YEAR MEDICAL STUDENTS



Prof.Abdulrahman Al-Shudifat MD,PhD
Neurosurgery Department
THE UNIVERSITY OF JORDAN,AMMAN

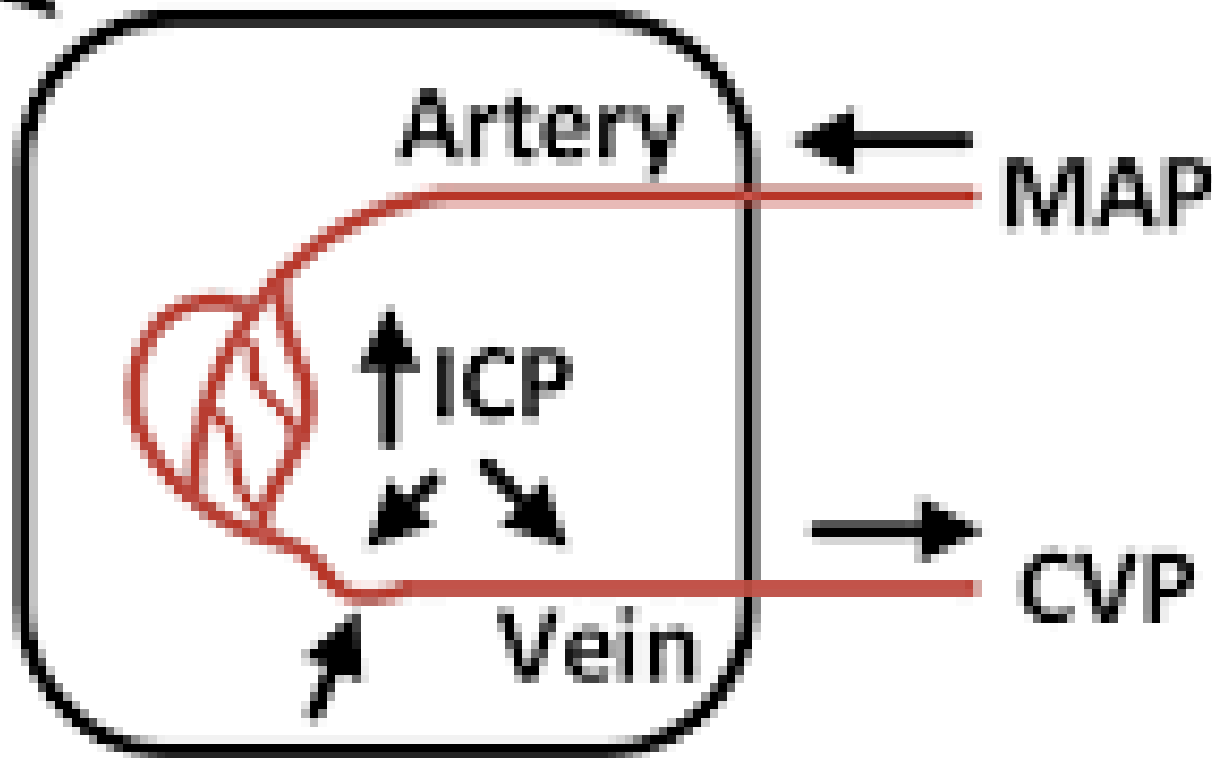
CONCEPT

- **The Monro-Kelly doctrine and components of ICP:**

$$V_{\text{brain}} + V_{\text{blood}} + V_{\text{CSF}} = K$$

Where V_{brain} = brain volume, V_{blood} = blood volume, V_{CSF} = cerebrospinal fluid volume, K = constant

Rigid Cranium



$$CPP = MAP - ICP$$

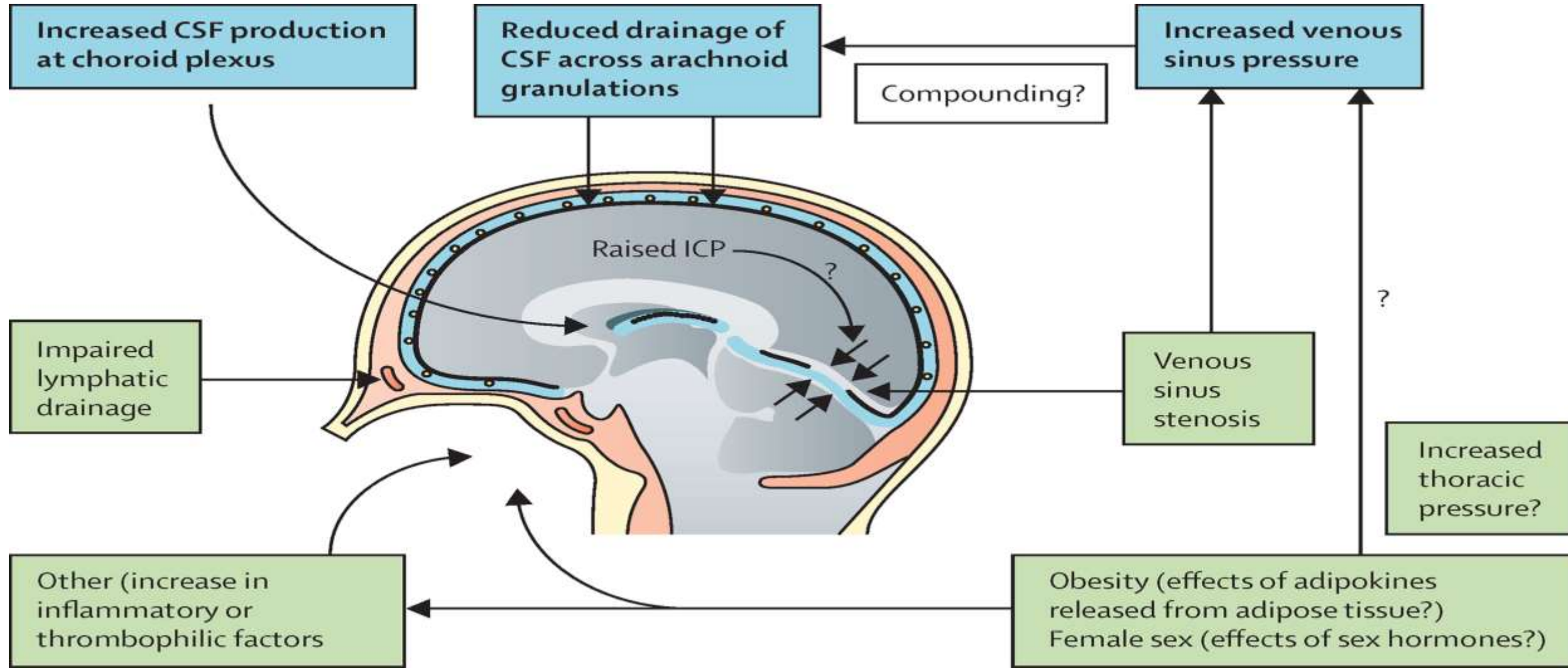
ICP increased by:

1. Intracranial bleeding
2. Cerebral edema
3. Tumor

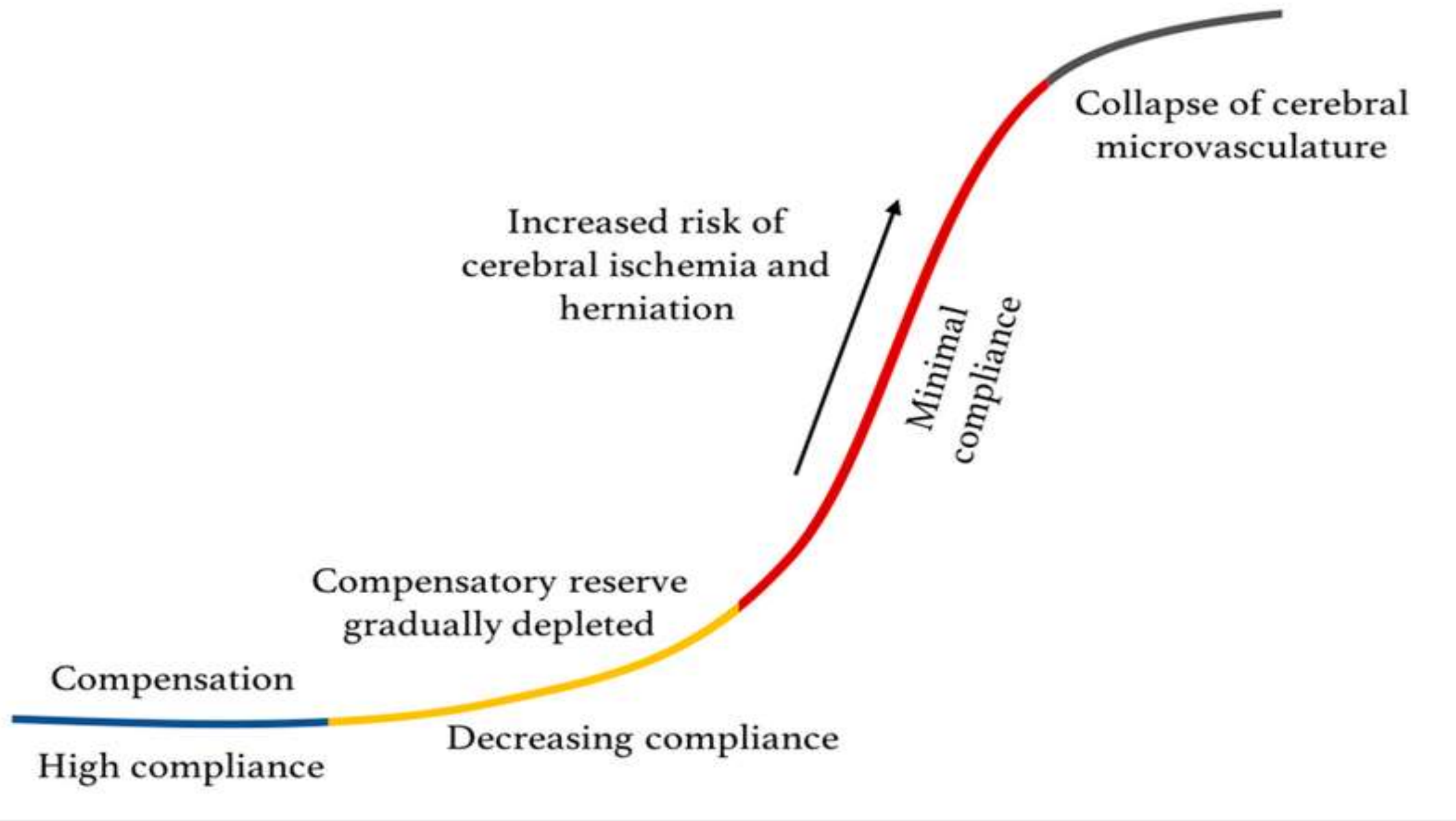
Consequences:

1. Collapsed veins
2. Compromised CPP
3. Reduced blood flow

PATHOPHYSIOLOGY OF INCREASED ICP

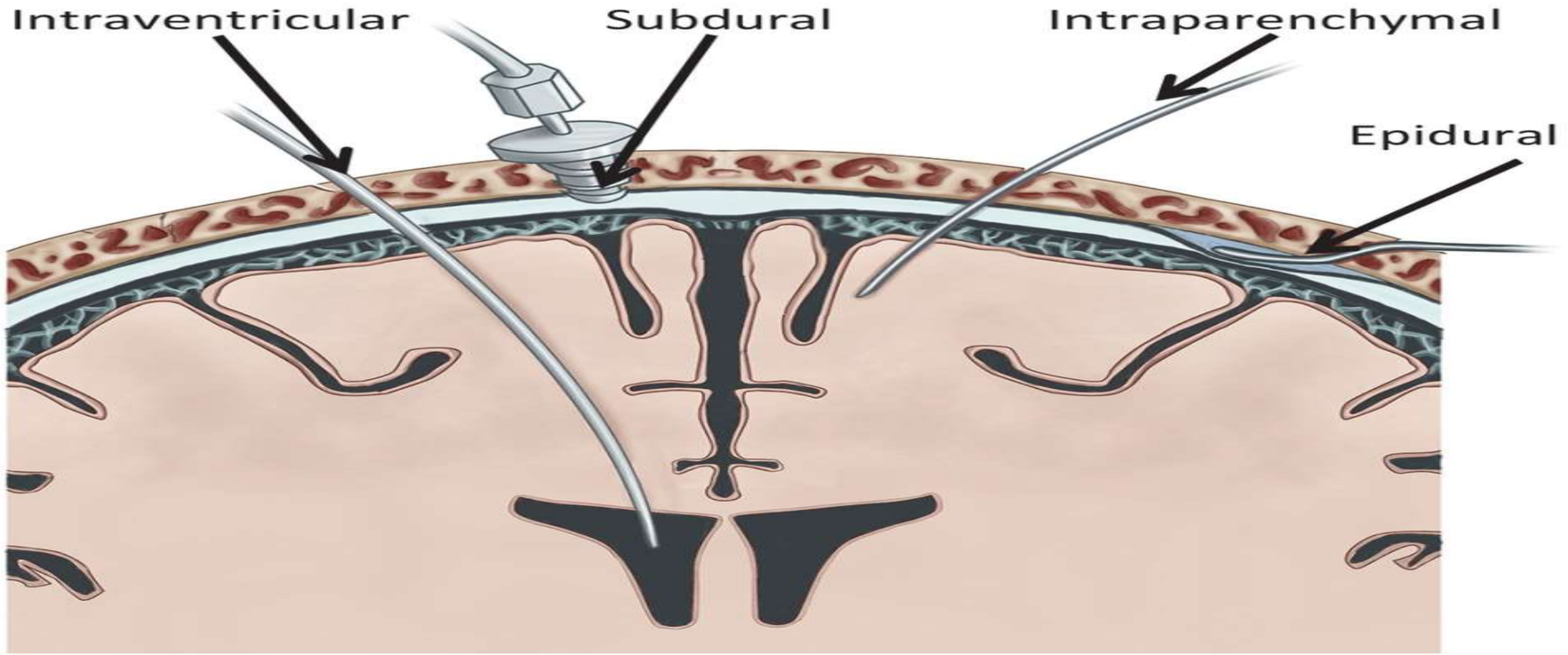


Intracranial Pressure



Intracranial Volume

MEASUREMENTS & MONITORING



LUNDBERG B WAVES



Rhythmic Spikes in ICP every 30-120 seconds suggestive of **cerebral vasospasm**

LUNDBERG C WAVES



Low amplitude Oscillations in ICP every 7-15 seconds that represent normal CNS homeostasis.

ICP (cmH₂O)

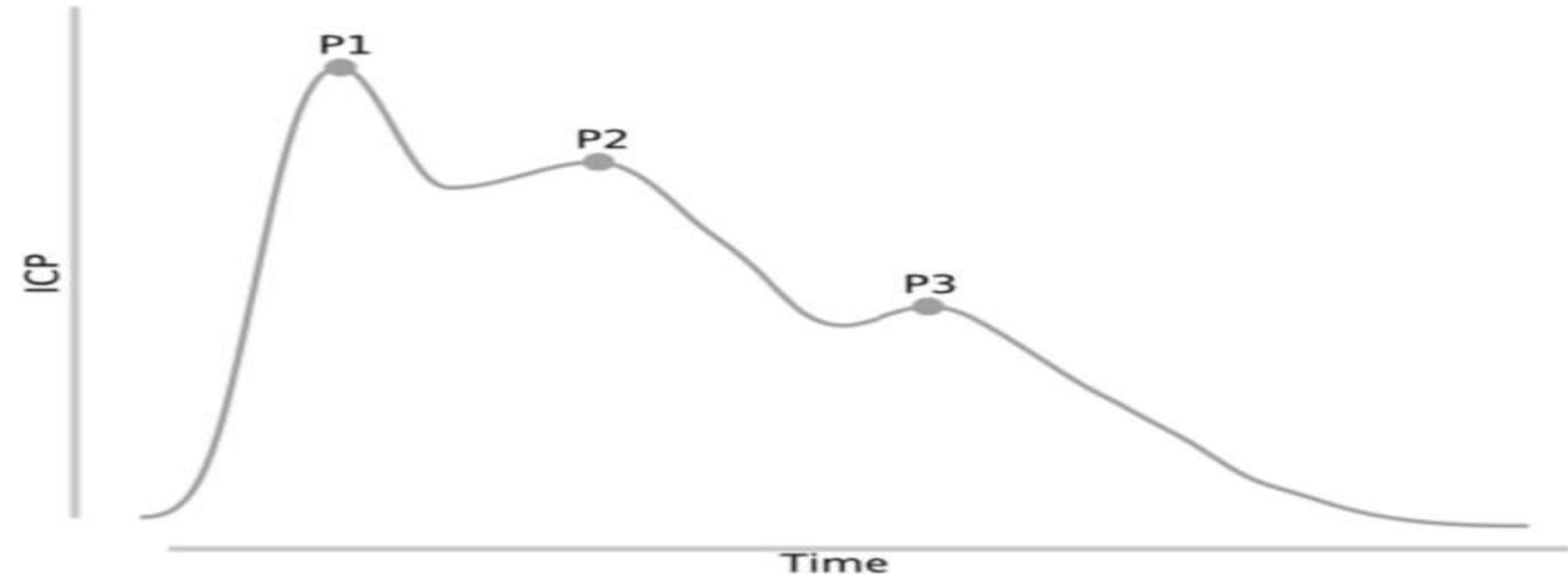
TIME (minutes)

LUNDBERG A WAVES



Plateaus up to 50mmHg lasting 5-20 minutes; suggestive of impending **brain herniation**

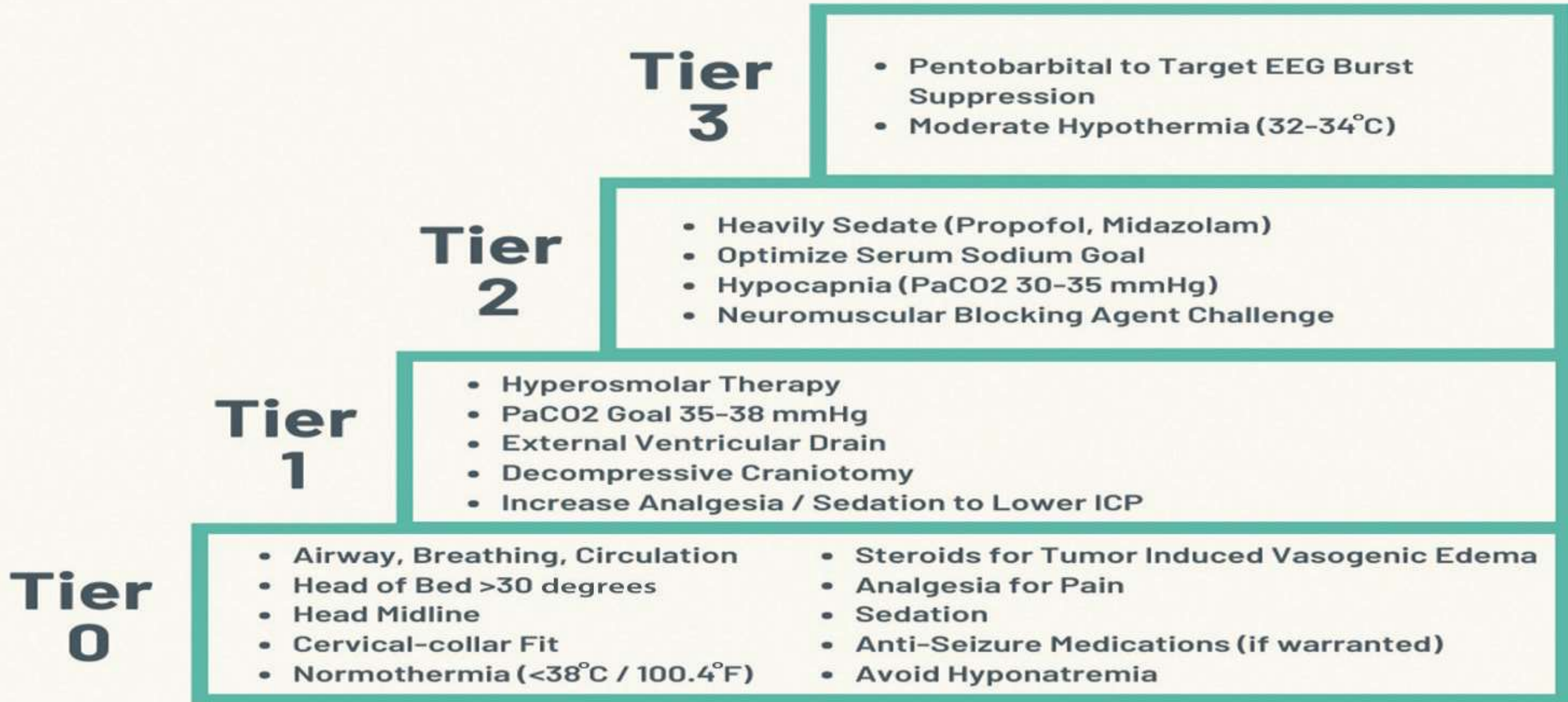
WAVES



VALUES

Age group	Normal range (mm Hg)
Adults	<10–15
Children	3–7
Term infants	1.5–6

MX OF INCREASED ICP



Idiopathic Intracranial Hypertension

Diagnostic criteria for IIH

*If there is no papilloedema, then diagnosis can still be confirmed if 2-5 are present and if the patient has unilateral or bilateral abducens nerve palsy.

1

Papilloedema

2

**Normal neuro examination
except for cranial nerve
abnormalities**

3

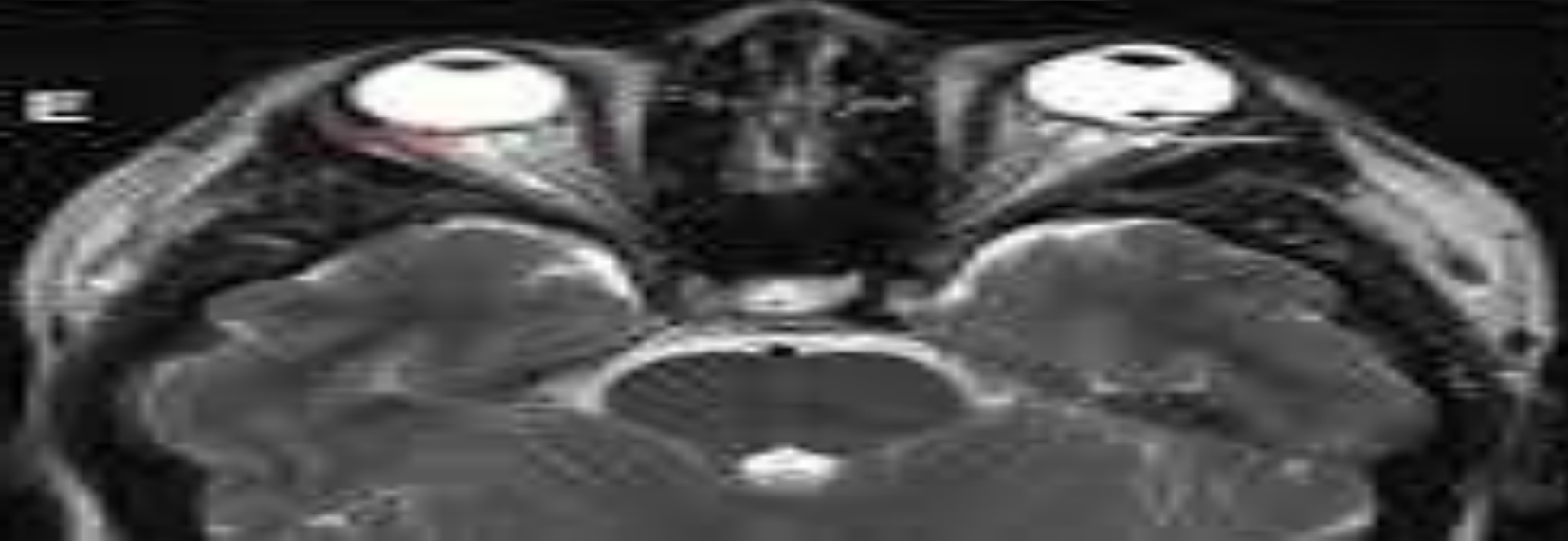
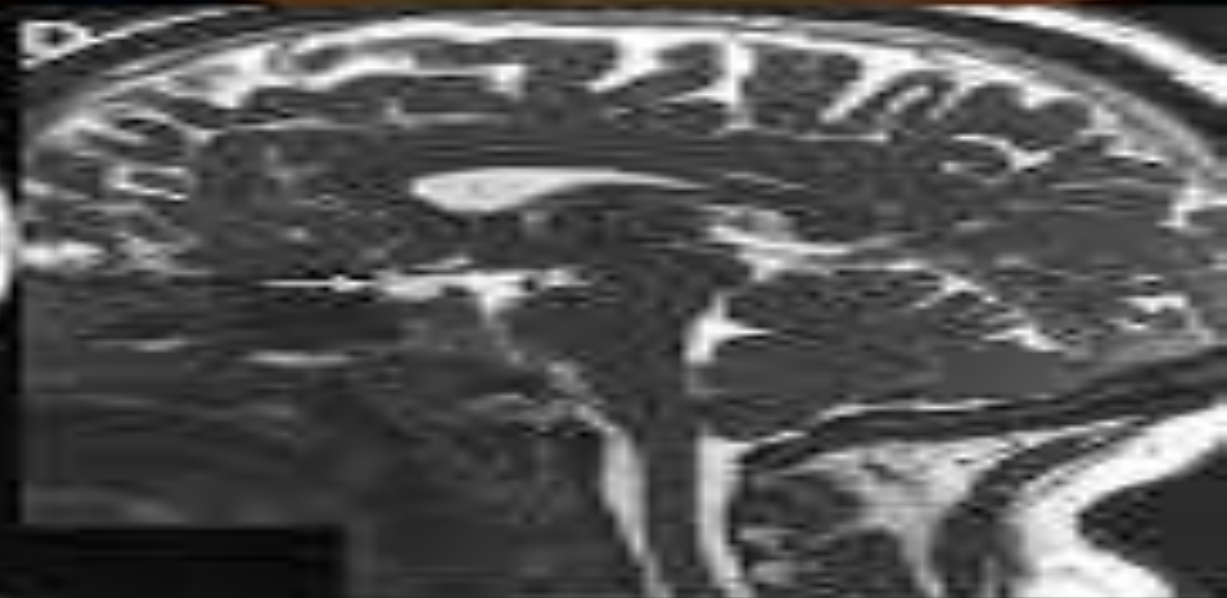
**Normal brain imaging
(ie no hydrocephalus/mass +
normal meningeal enhancement)**

4

**Normal CSF
composition**

5

**Elevated lumbar
puncture opening pressure**



Mx of IIH

Hyperosmolar therapy

Lifestyle

Weight loss (11)

Medical management

Acetazolamide (89)

Topiramate (90)

Furosemide (89)

Intravenous methylprednisolone^a (91)

Intervention

Repeated lumbar puncture^b (92,93)

Cerebral transverse sinus stenting (94)

Shunts (95–97)

Ventriculoperitoneal

Lumboperitoneal

Lumbar drain

Optic nerve fenestration (98)

^aNot recommended unless sight-threatening fulminant disease.

^bShould be used only if no alternatives are available, for example, during pregnancy.

CLINICAL CASE

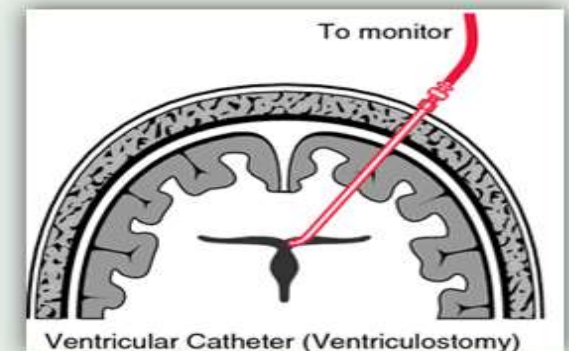
Increased Intracranial Pressure (IICP)



Other Interventions

- **Hyperventilation:**
Target **PaCO₂** **30-35 mmHg** for 1-2 hours
- Neurosurgical **EVD placement:**
Continuously drain CSF to relieve ICP

EVD: External Ventricular Drain



THANK YOU
ALL FOR
ATTENTION

