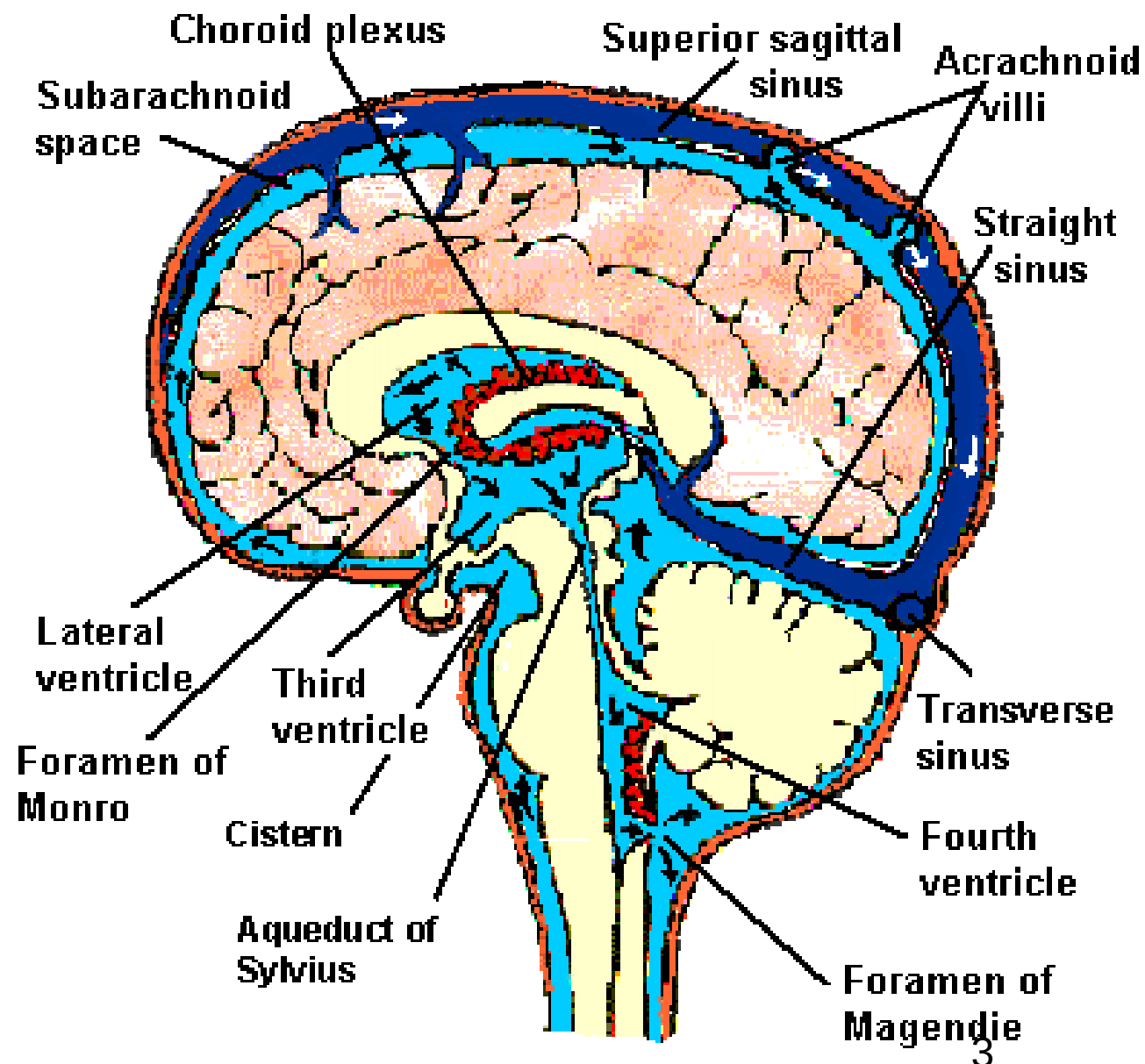




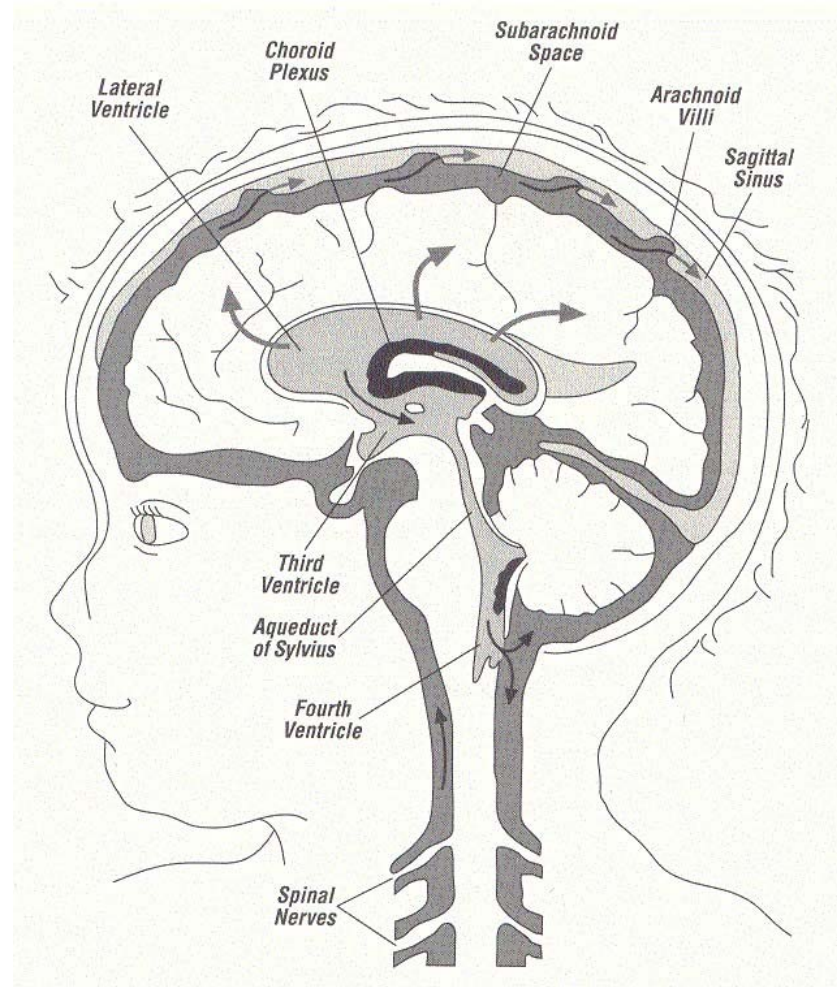
HYDROCEPHALUS



NORMAL CSF PATHWAY



NORMAL CSF PATHWAY



HYDROCEPHALUS



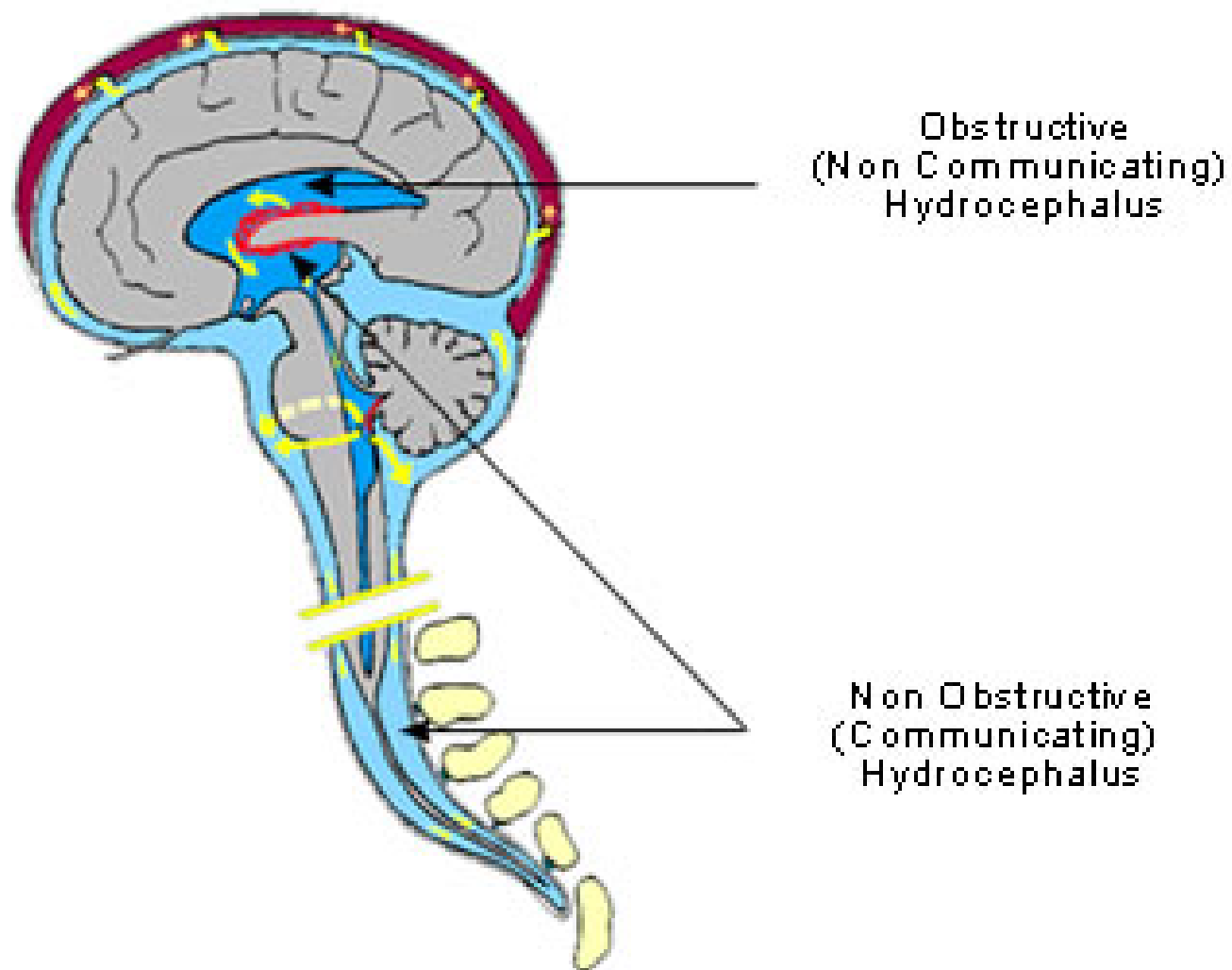
- Increased ventricular size due to increase in volume of CSF due to either
 - Increased production
 - Obstruction
 - Impaired absorption

HYDROCEPHALUS



1. Obstructive type/non communicating
 - Obstruction in ventricular system

2. Non obstructive/communicating
 - Obliteration of subarachnoid cisterns or decreased absorption



CAUSES



– OBSTRUCTIVE TYPE

- CONGENITAL

- Aqueductal stenosis,
- Arnold Chiari malformation,
- Dandy walker malformation
- Spina bifida
- Vein of Galen aneurysm

CAUSES



- OBSTRUCTIVE TYPE
 - SPACE OCCUPYING LESION
 - Intra-ventricular tumor,
 - Posterior fossa tumor
 - VENTRICULAR HEMORRHAGE
 - Prematurity
 - AV malformation



CAUSES

- COMMUNICATING TYPE
 - DEFECTS IN SUBARACHNOID SPACE
 - Infections
 - Congenital
 - Meningitis (Pyogenic or tubercular)
 - Hemorrhage
 - Subarachnoid
 - Trauma

CAUSES



- COMMUNICATING TYPE
 - ABNORMALITIES OF THE CSF
 - Overproduction – Choroid plexus papilloma

CAUSES



- COMMUNICATING TYPE
 - DEFECT OF CSF ABSORPTION
 - Congenital deficiency of Arachnoid Granulation



PATHOPHYSIOLOGY

Obstruction to CSF flow



Reversal of ventricular fluid into periventricular white matter



Demyelination and progressive gliosis



Damage to periventricular white matter and later gray matter

CLINICAL FEATURES



- Increased Head Circumference at Birth.
- Rapidly increasing head size



CLINICAL FEATURES

- Neonates and infants
 - Irritability
 - Poor appetite,
 - Vomiting
 - Poor head control
 - Sun Setting sign
 - Tense fontanelle, Delayed fusion of sutures
 - Dilated scalp veins
 - Macewans or crack pot sign positive (>1 yr of age)







CLINICAL FEATURES

- Older children
 - Sign S/S raised ICT
 - Headache, worst in the morning
 - Nausea and vomiting
 - Papilledema
 - Blurred vision
 - Drowsiness/depressed level of consciousness
 - Personality and behavioral disturbances
 - Gait abnormalities

CLINICAL FEATURES



- Serial HC measurement/HC more than 2 std. deviation
- Papilledema
- Abducens palsy
- Pyramidal tract lesions (lower extremities)



ARNOLD CHIARI MALFORMATION



1. TYPE - I

2. TYPE - II

ARNOLD CHIARI MALFORMATION



TYPE – I

- Not associated with Hydrocephalus
- Seen in adolescence
- Headache, Neck pain
- Progressive spasticity

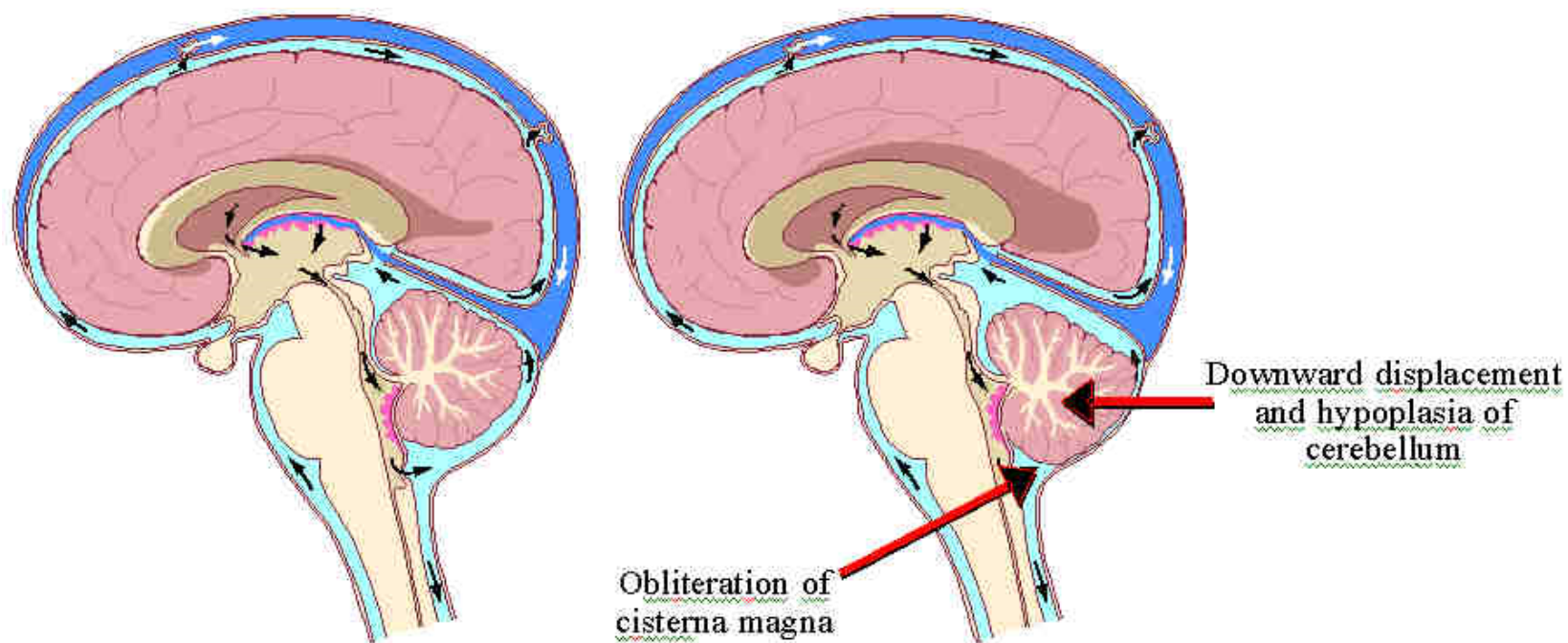
ARNOLD CHIARI MALFORMATION



TYPE – II

- LESION- failure of pontine flexure in embryogenesis
- Elongation of 4th ventricle /kinking of brain stem
- Displacement of medulla, pons, vermis- cervical canal

ARNOLD CHIARI MALFORMATION II



ARNOLD CHIARI MALFORMATION



TYPE - II (CL. FEATURES)

INFANCY

- weak cry
- stridor
- apnea

ARNOLD CHIARI MALFORMATION



TYPE - II (CL. FEATURES)

- Progressive hydrocephalus
- Myelo-meningocele
- Abnormality of gait
- Spasticity
- Incoordination



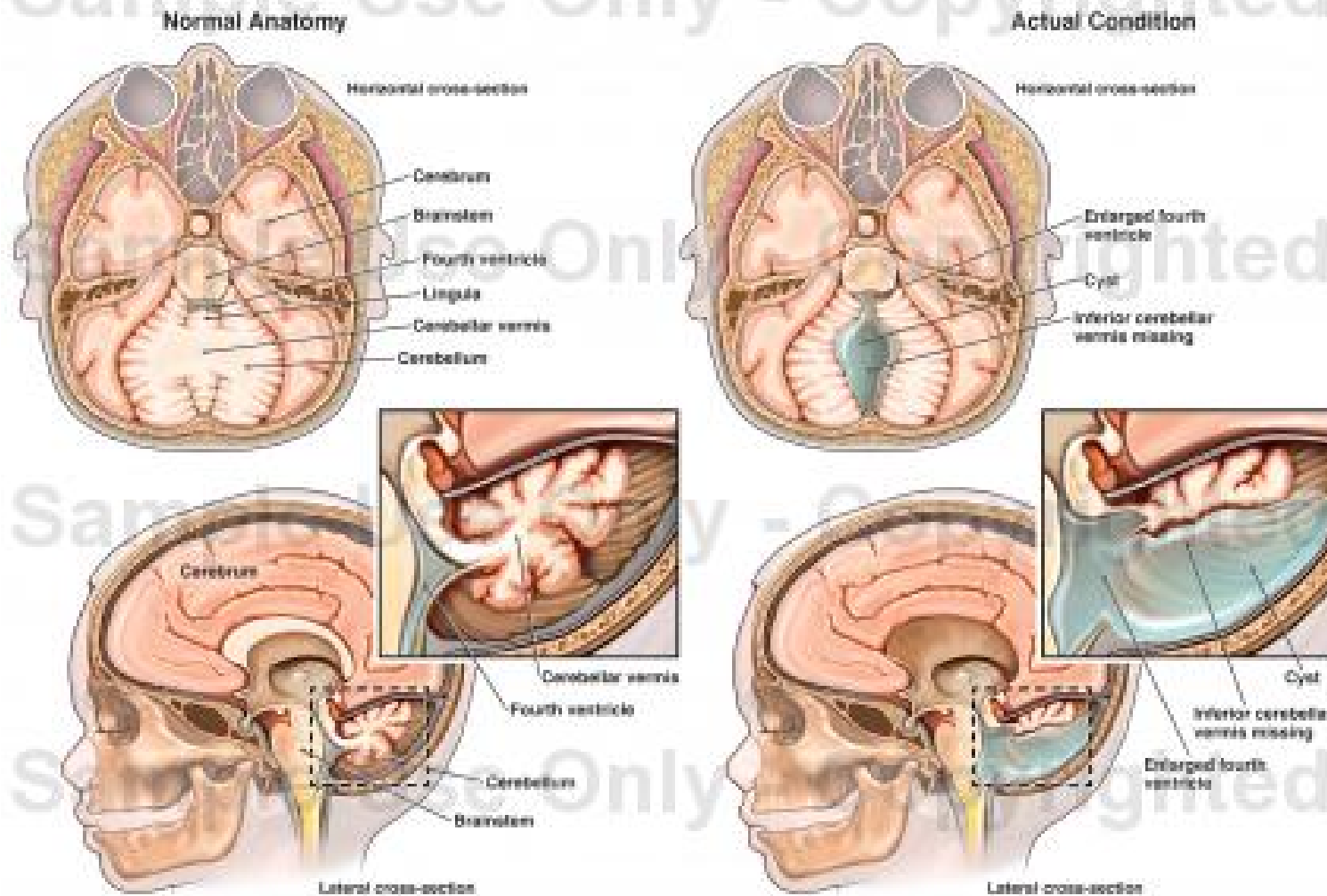
DANDY WALKER MALFORMATION

- Failure of development of roof of 4th ventricle
- Cerebellar hypoplasia
- Cystic dilatation of 4th ventricle
- Ass. Anomalies- absence of corpus callosum

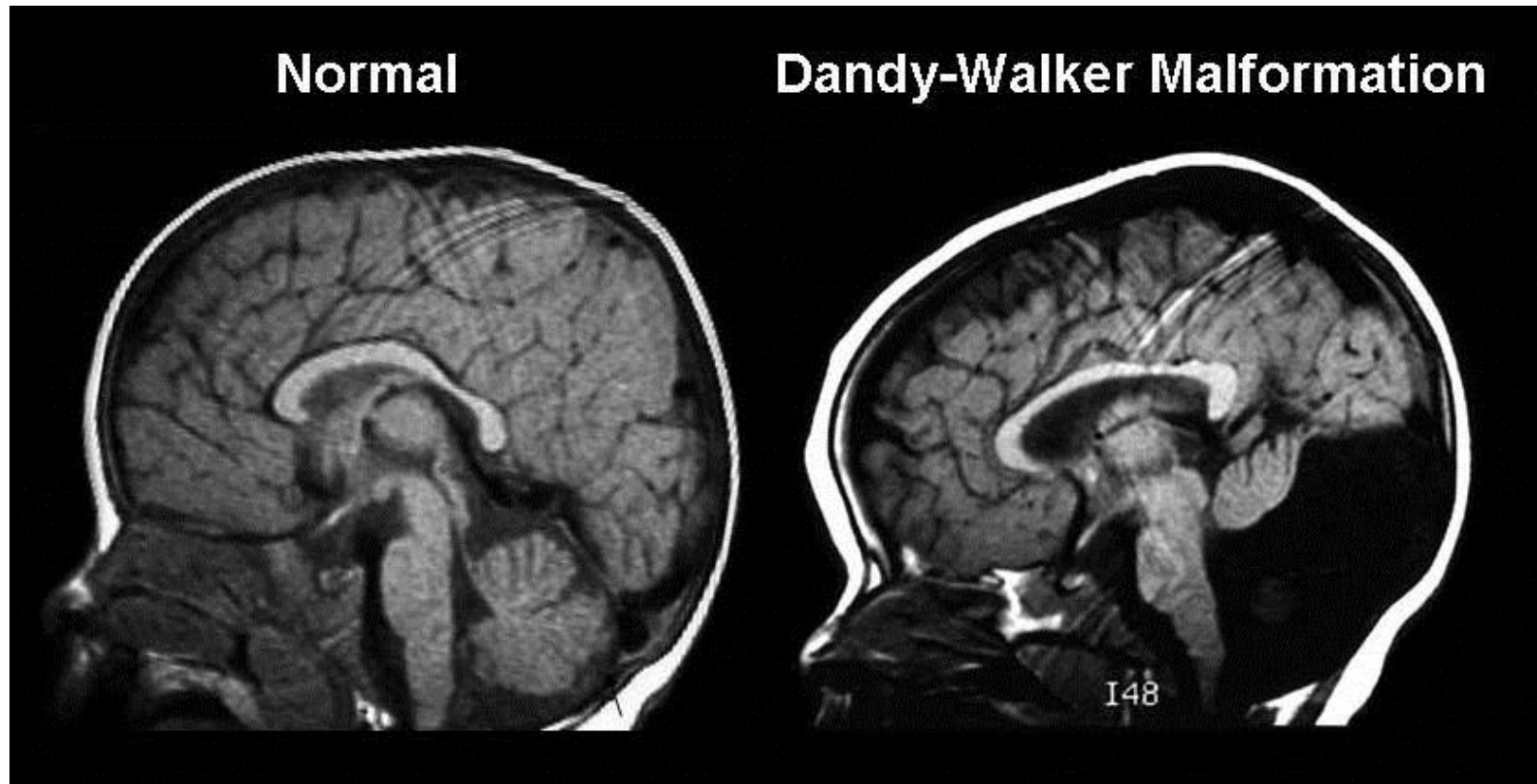
DANDY WALKER MALFORMATION



Evidence of Dandy Walker Variant



DANDY WALKER MALFORMATION



DANDY WALKER MALFORMATION



Clinical features

- Increasing head size
- Prominent occiput
- Cerebellar ataxia
- Delayed motor & cognitive development
- Trans-illumination

TRANSILLUMINATION



DIAGNOSIS OF HYDROCEPHALUS



Increased velocity of head growth

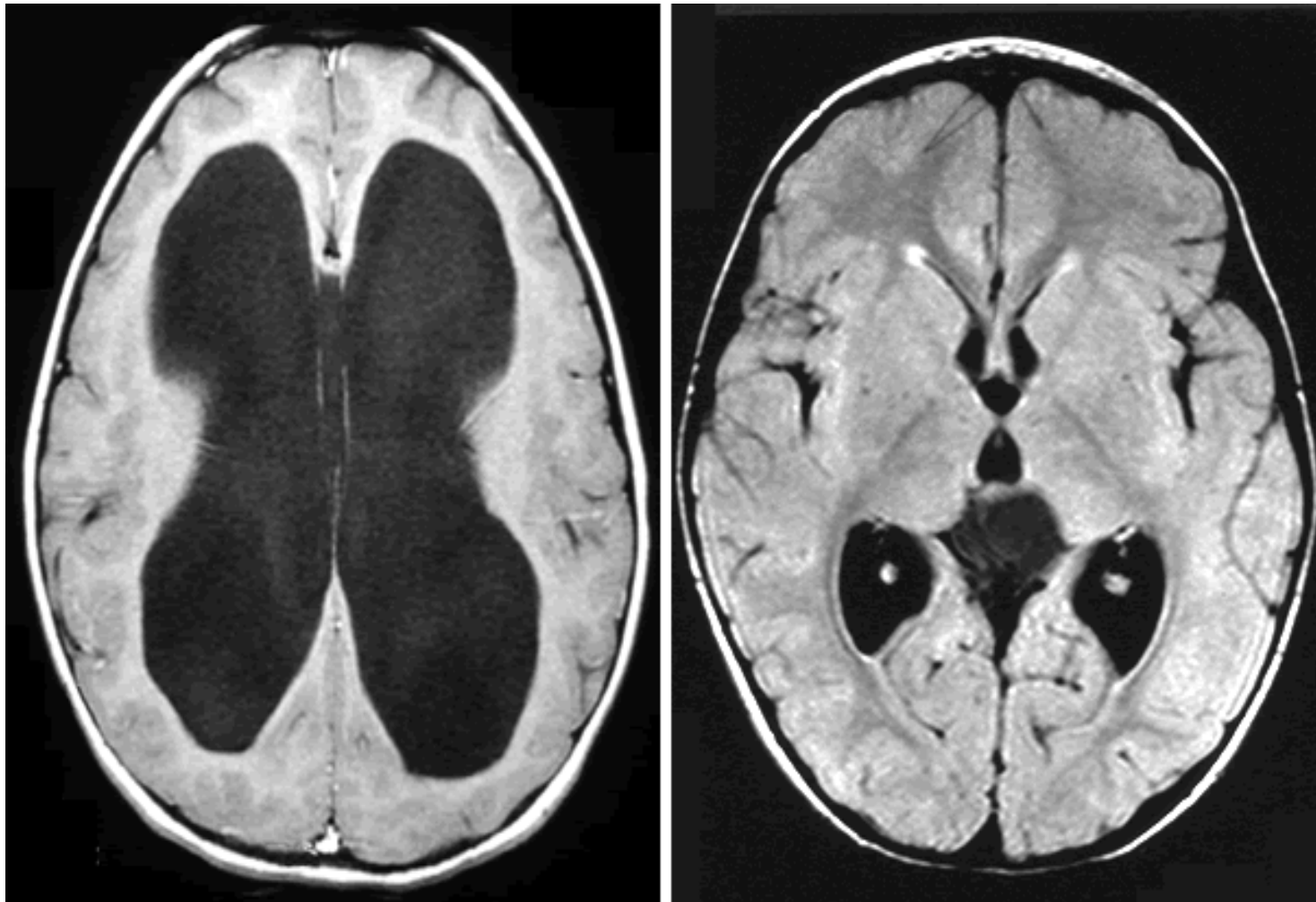
< 15 months – Neurosonogram (Cranial
ultrasonogram)

X-RAY SKULL

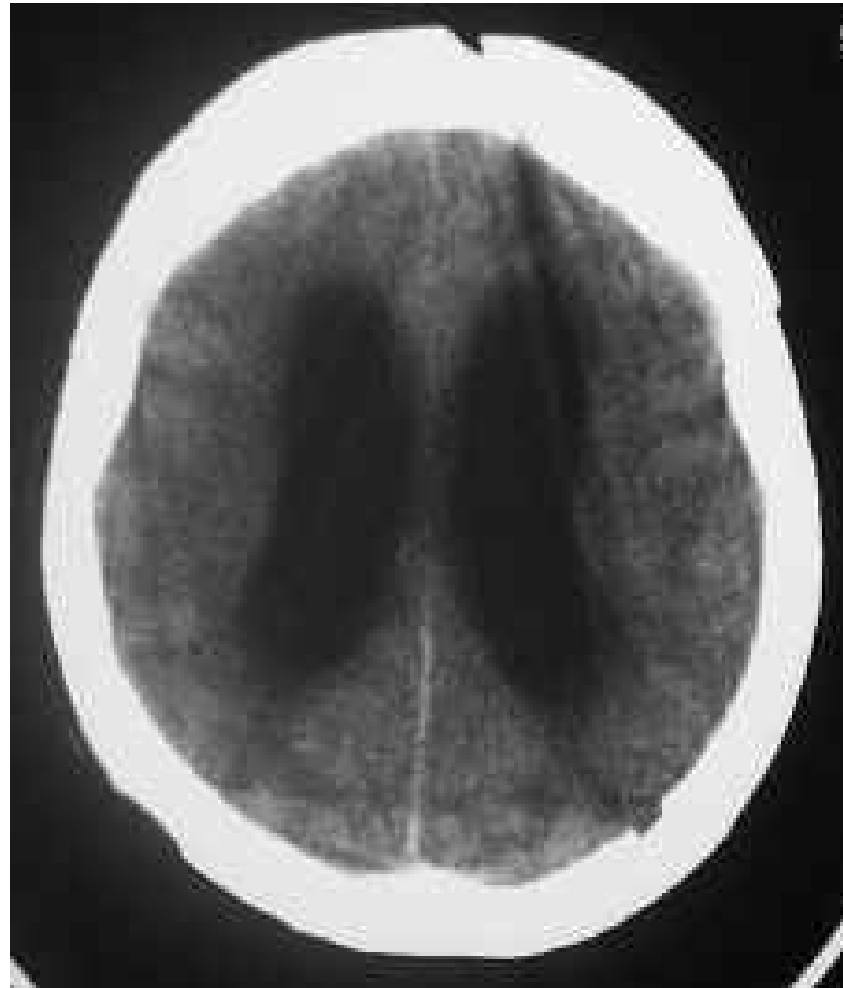


- Separated sutures
- Silver beaten appearance
- Shallow orbit

CT SCAN/MRI – DILATED VENTRICLES



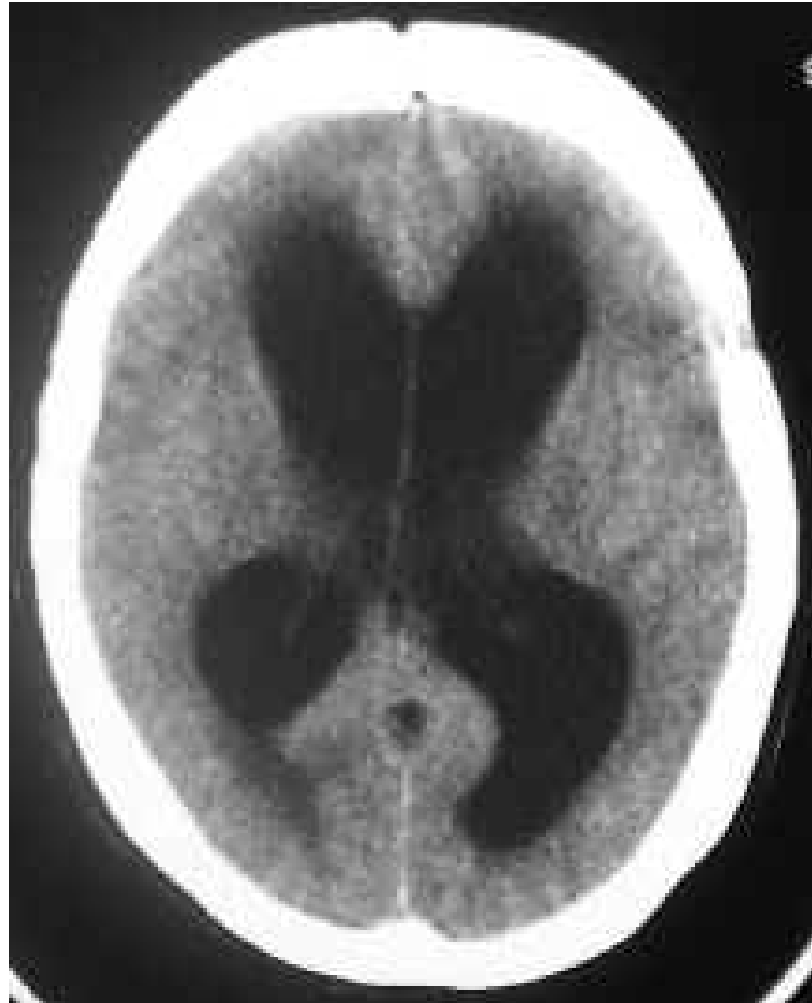
CT SCAN/MRI – DILATED VENTRICLES



CT SCAN/MRI – DILATED VENTRICLES



CT SCAN/MRI – DILATED VENTRICLES



TREATMENT



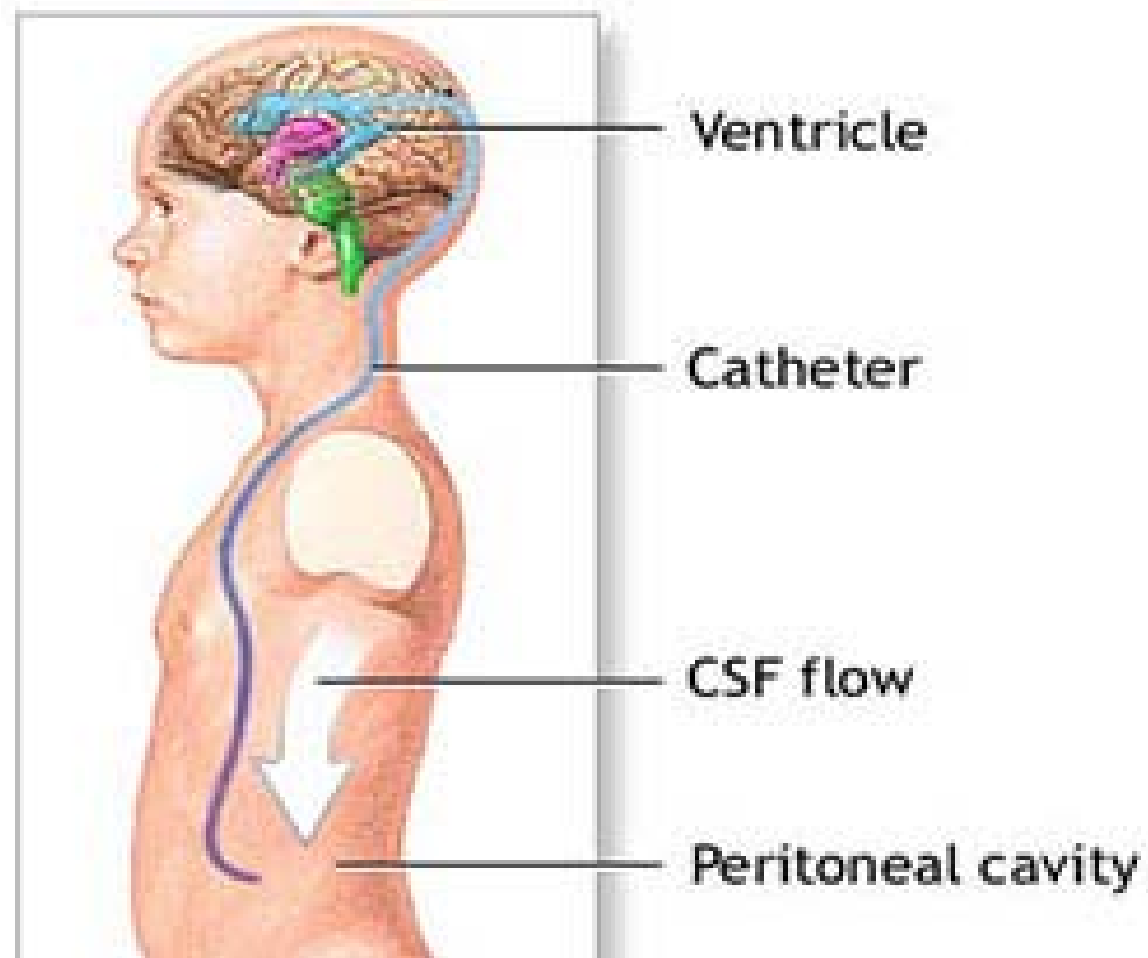
- MEDICAL
 - Reduction of CSF production
 - Acetazolamide 50mg/kg/day

TREATMENT

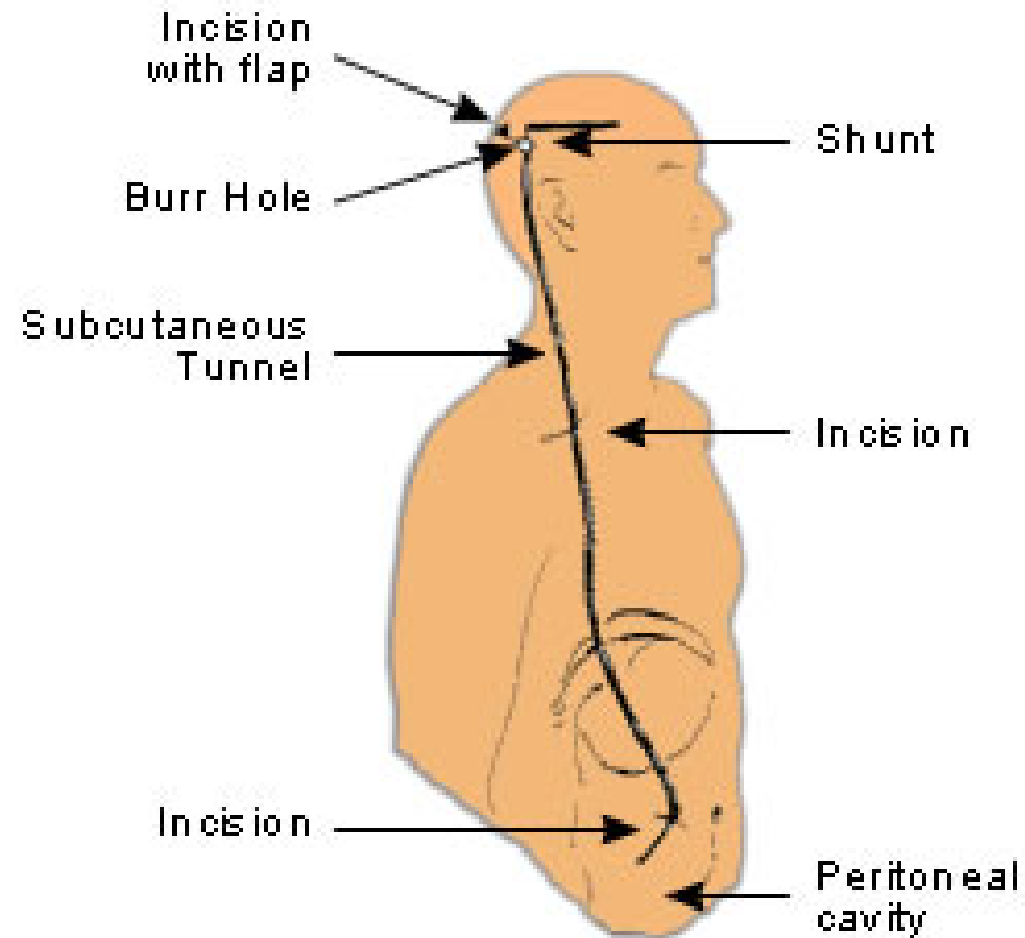


- SURGICAL
 - Reconstruction within cranium
 - Diversion of CSF to extra cranial sites using shunts
 - Ventricular atrial
 - Ventriculo azygous
 - Ventriculo peritoneal
 - Theco peritoneal

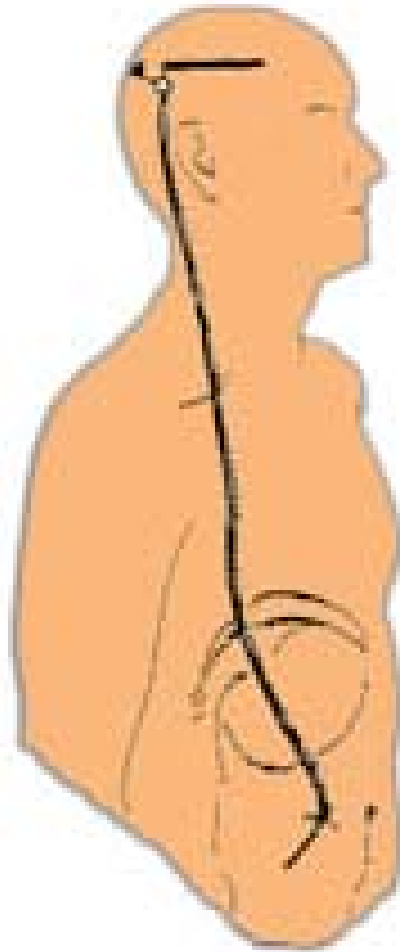
VENTRICULOPERITONEAL SHUNT



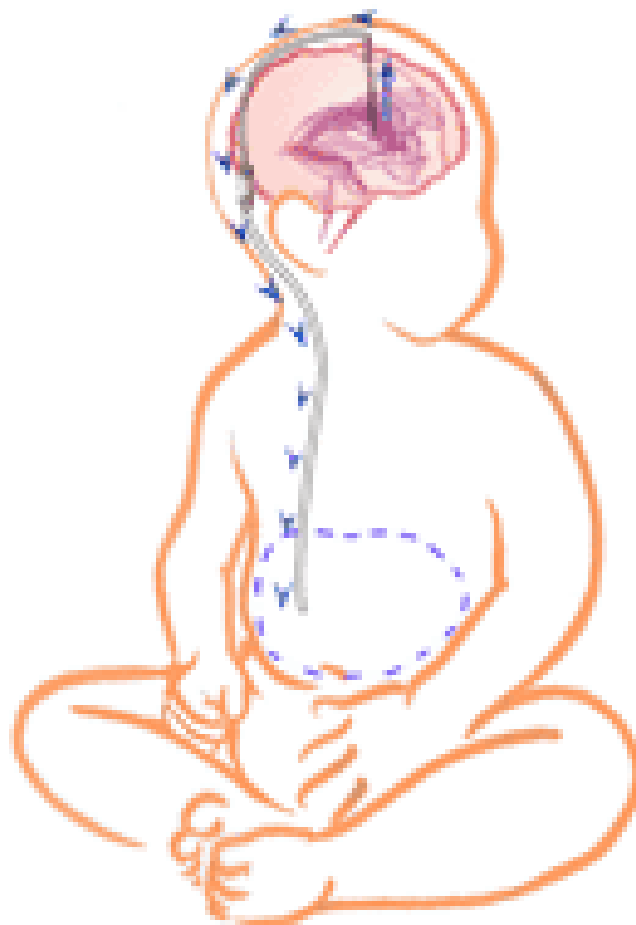
VENTRICULOPERITONEAL SHUNT



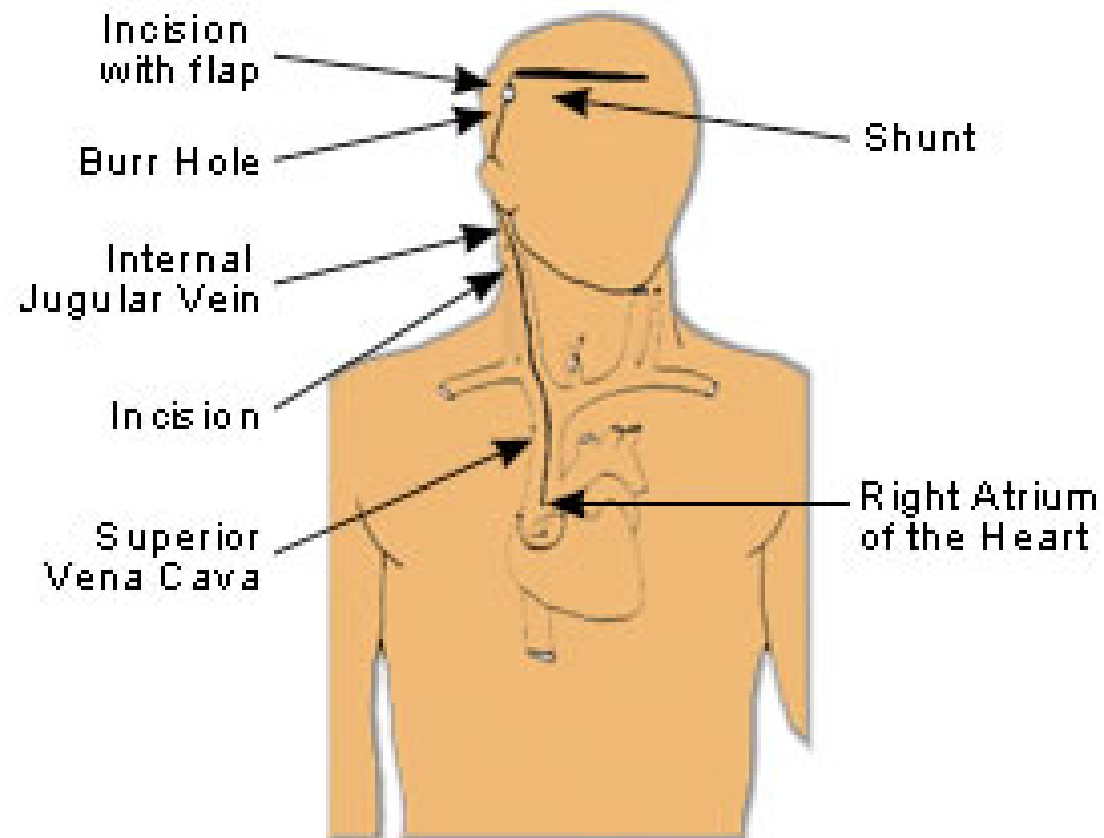
VENTRICULOPERITONEAL SHUNT



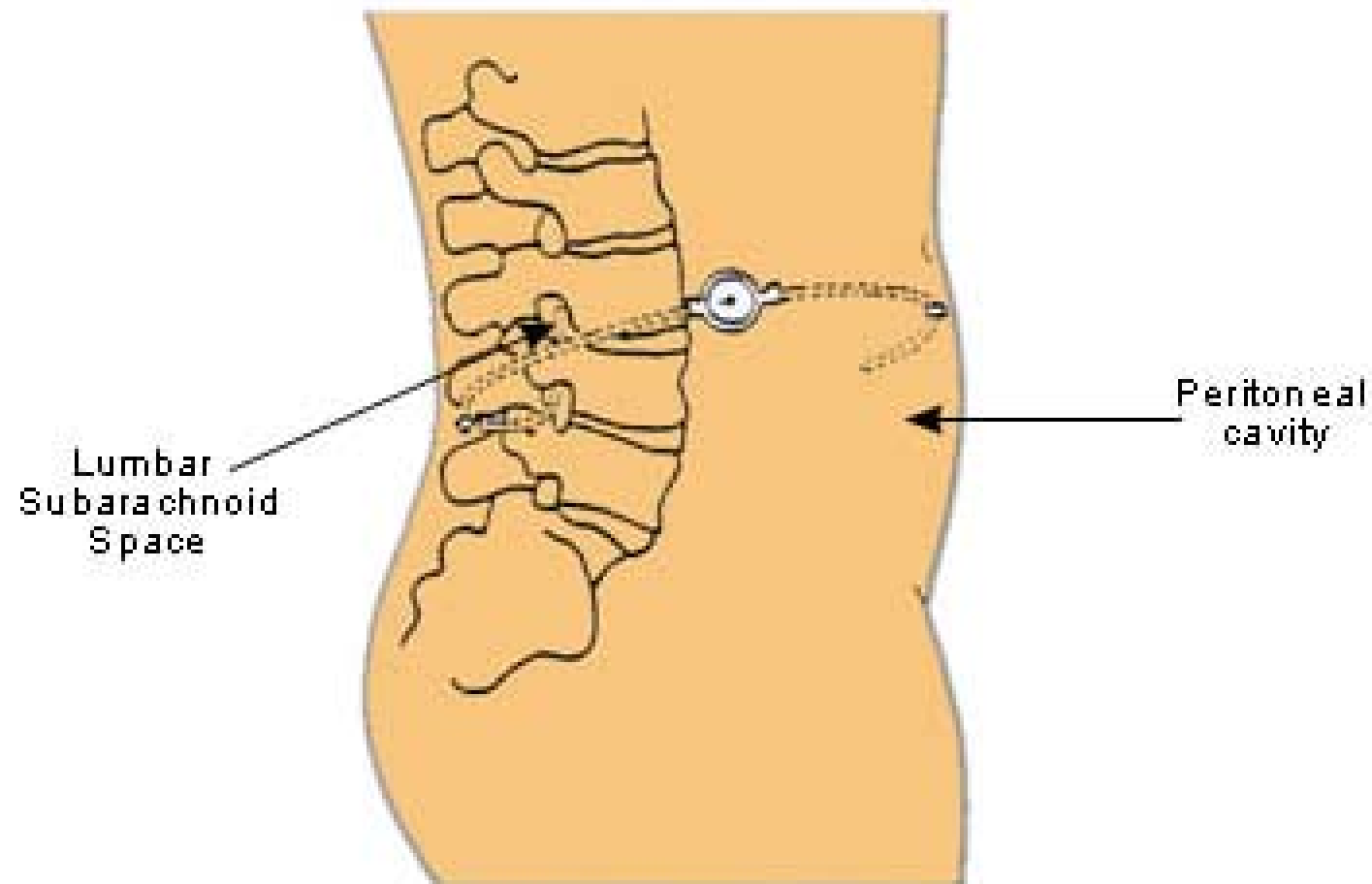
VENTRICULOPERITONEAL SHUNT



VENTRICULOATRIAL SHUNT



THE COOPERITONEAL SHUNT



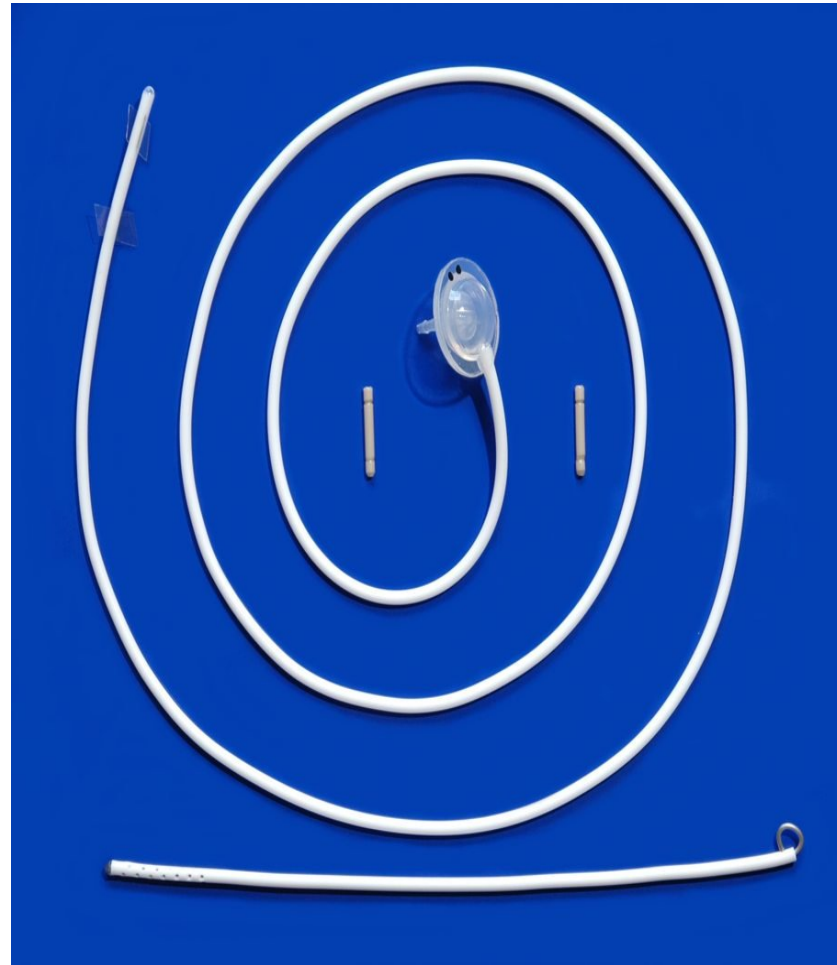
POST SHUNT SURGERY



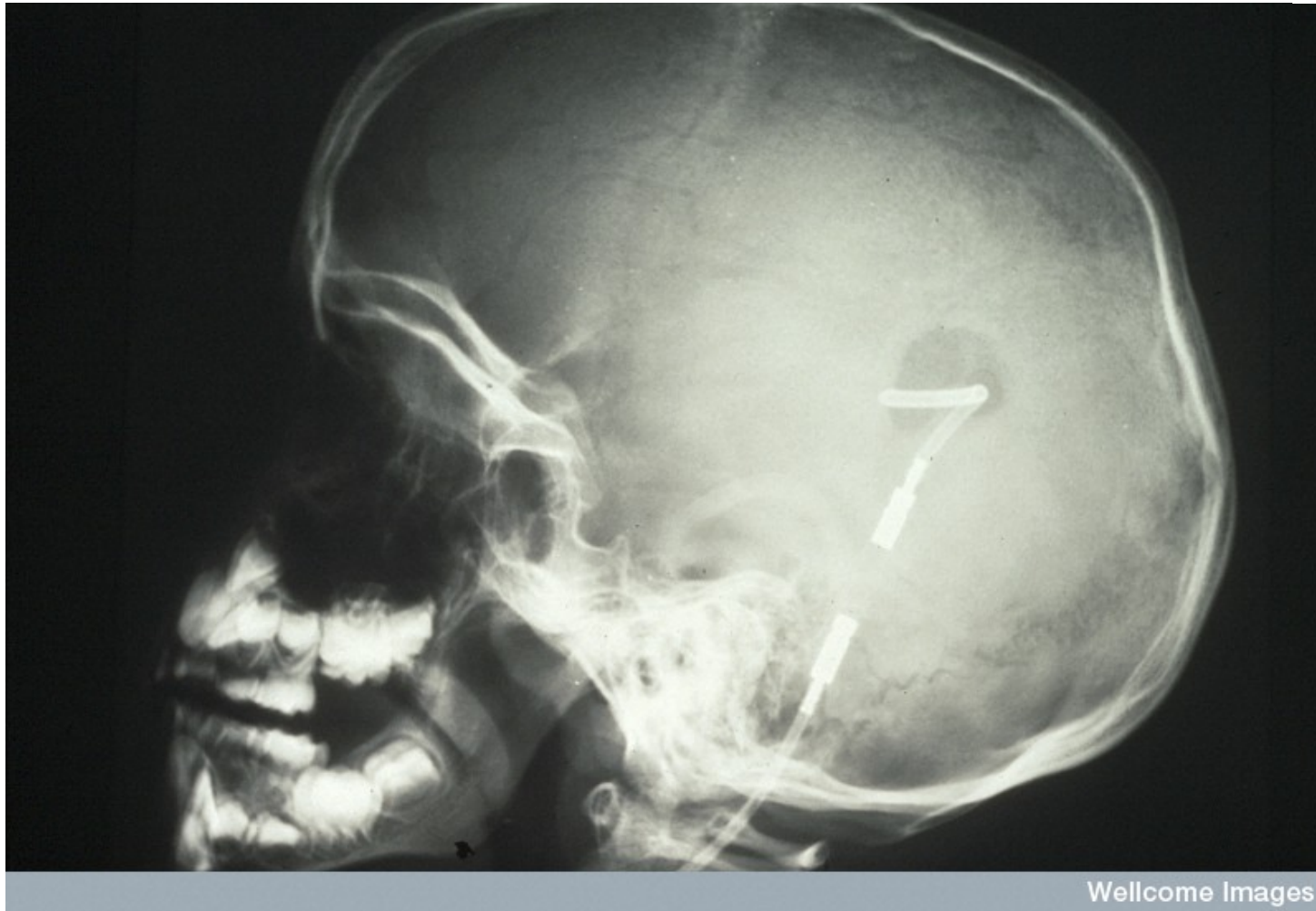
TYPES OF VP SHUNT



- 1) Chabra's
- 2) Pudenz – Hakin
- 3) Splitz – Holter valve



SPLITZ HOLTER VALVE



TREATMENT



1) Ventriculostomy

- Opening of ventricular system into subarachnoid space via lamina terminalis.

2) Treatment of cause :

- TB meningitis – ATT
- Pyogenic Meningitis - Antibiotics



COMPLICATIONS OF VP SHUNT

- Blockage
- Infection
- Shunt dependence
- Slit Ventricle Syndrome

COMPLICATIONS OF VP SHUNT



- Migration of tube
- Intestinal obstruction
- Peritonitis
- Arrhythmias

D/D OF LARGE HEAD

- Chronic Anemia
- Rickets
- Osteogenesis Imperfecta
- Epiphyseal Dysplasia
- Chronic Subdural Collection
- Metabolic Disorders
- Cerebral Gigantism
- Familial Megalencephaly
- Hydrancephaly



SECONDARY
TO THICKENED
CALVARIUM

Thank You

