

CLINICAL APPLICATIONS USING MRI SPIN- LABELING TO MONITOR CSF MOVEMENT

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Can be used anywhere in the
central nervous system where
there is CSF

HYDROCEPHALUS

- Aqueductal stenosis
- Obstruction at the foramina of Monro
- Outlets of fourth ventricle
- Within the ventricular system (multi-loculated)

HYDROCEPHALUS

Define CSF drainage pathways and physiological factors that may alter drainage routes

- Superior sagittal sinus
- Basal cisterns/nerve sheaths

NORMAL PRESSURE HYDROCEPHALUS

- CSF flow through aqueduct
- ? Candidate for ETV
- ? Better determine which patients would benefit from shunting

THIRD VENTRICULOSTOMY (ETV)

- Preoperative evaluation of CSF flow through aqueduct & basal cisterns
- Success of ETV
- Follow-up of patency of ostium

THIRD VENTRICULOSTOMY (ETV)

- ? Subset of patients with hydrocephalus secondary to repaired open neural tube defects (myelomeningocele) who might be a candidate for ETV

VENTRICULOSTOMIES

- Placed for sub-arachnoid hemorrhage, trauma, tumors
- ? help to determine which patients will require a shunt

LOW OR NEGATIVE PRESSURE HYDROCEPHALUS

- Need to drain CSF at zero or a negative pressure, otherwise ventricles enlarge & patient becomes more symptomatic
- Need to decrease size of ventricles
- ? related to change in compliance

CSF LEAKS

- Can be difficult to pinpoint site of leak
- Sometimes not sure if CSF leak is present

ARACHNOID CYSTS

- ? why do they enlarge
 - ? Ball-valve mechanism
- Widened SAS over tip of temporal lobe, or an arachnoid cyst ?
- Determine presence of communication with SAS
- ? large cisterna magna or cyst

ARACHNOID CYSTS

- Monitor success of fenestration
- Why, with what appears to be a good fenestration at the time of surgery, one still needs to place a shunt ?

TUMOR CYSTS

- ? loculated

COLLOID CYSTS

- ? degree of obstruction
- ? movable

PSEUDOTUMOR CEREBRI (BENIGN INTRACRANIAL HYPERTENSION)

- ? CSF problem
- ? Venous drainage problem
- ? Other factors
- ? Multiple causes with various substrates
- ? Effect of optic nerve fenestration

SHUNTS

- ? Able to visualize CSF flow within shunt
- ? Detect shunt malfunction
- ? Overdrainage

CHIARI I

- Observe CSF flow anterior/posterior to spinal cord
- ? Relate to symptoms - headache
- ? Relate to development of syrinx formation
- Post-operative success - especially as to syrinx size

CHIARI I

- ? Movement of CSF in syrinx & relation to change in size
- Determine if CSF movement at cranio-cervical junction subsequently becomes impaired
- Function of syringo-pleural/peritoneal shunt

SPINAL ARACHNOID CYSTS

- **Diagnosis**
- **Success of fenestration**

CSF MOVEMENT IN RELATION TO POSITION OF PATIENT

- With, but few exceptions, can only image horizontally
- See what changes occur:
 - Sitting
 - Standing
 - Head down

Thank you

