Hydrocephalus and Shunts

Life with Chiari – 4th November 2017

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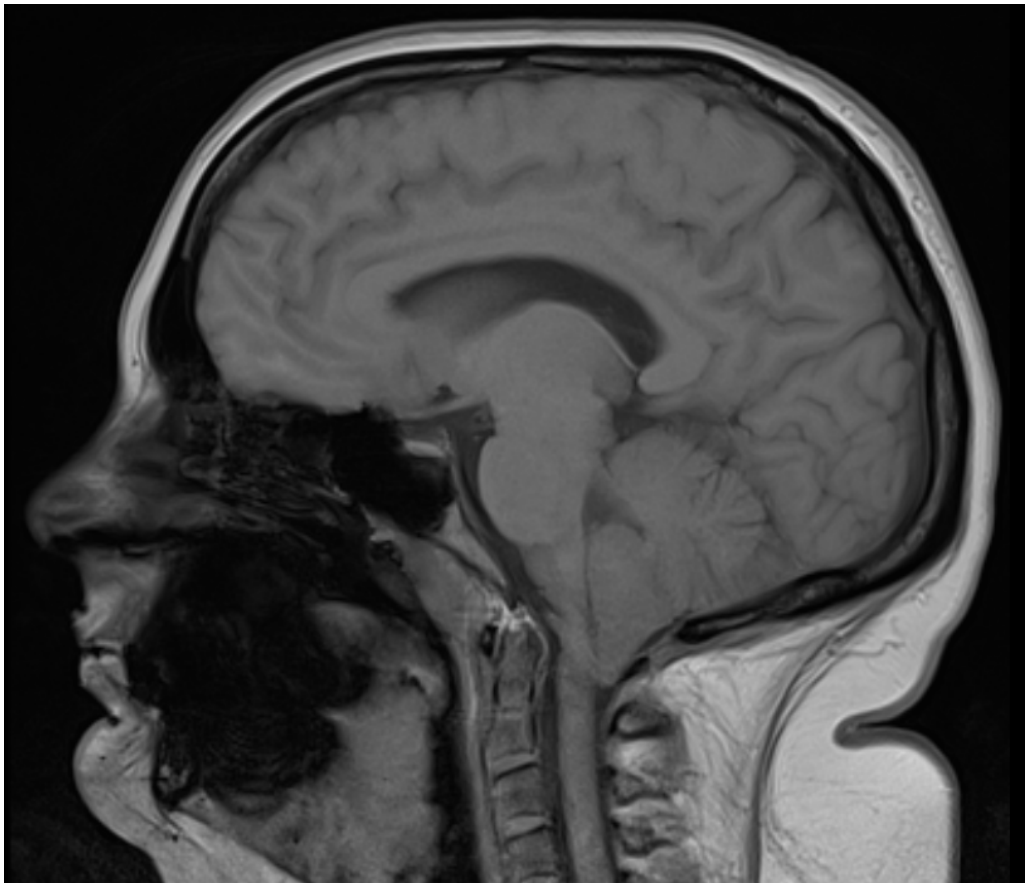
Chiari Malformation

- Type I Chiari Malformation involves decent of the cerebella tonsils (lower part of the brain)
- Can be congenital or acquired
- This can cause issues with CSF laving the head and thus raise intracranial pressure (ICP)
- It can also cause nerve complications though putting pressure on the spinal column

Side effects include:

- Headaches
- Neck Pain
- Numbness or tingling in arms / legs
- Nausea (feeling sick)
- Dizziness / balance difficulties

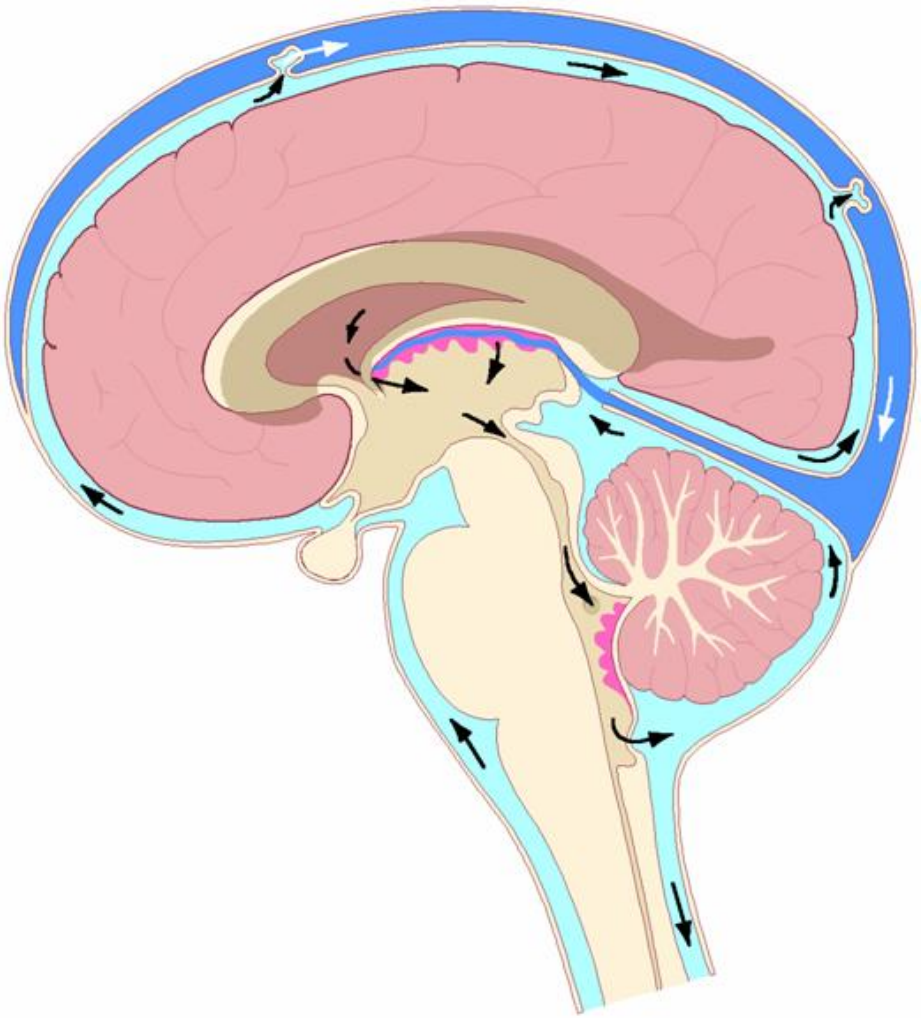
Chiari Malformation



Hydrocephalus

- Involves an increase in cerberospinal fluid (CSF) inside the head.
- Term Hydrocephalus comes from the Greek words for water (hydro) and head (kephalos).
- This increase in CSF often casues a susquent increase in intracranial pressure (ICP)

Hydrocephalus – CSF flow



Hydrocephalus - Types

Communicating

- An increase in CSF volume throughout the CSF system

- NPH
- IIH / BIH
- SAH
- Congenital

Non-communicating

- An increase in CSF due to a blockage in the flow of CSF

- SOL
- Aqueduct Stenosis
- Chiari Malformation

Hydrocephalus - Treatment

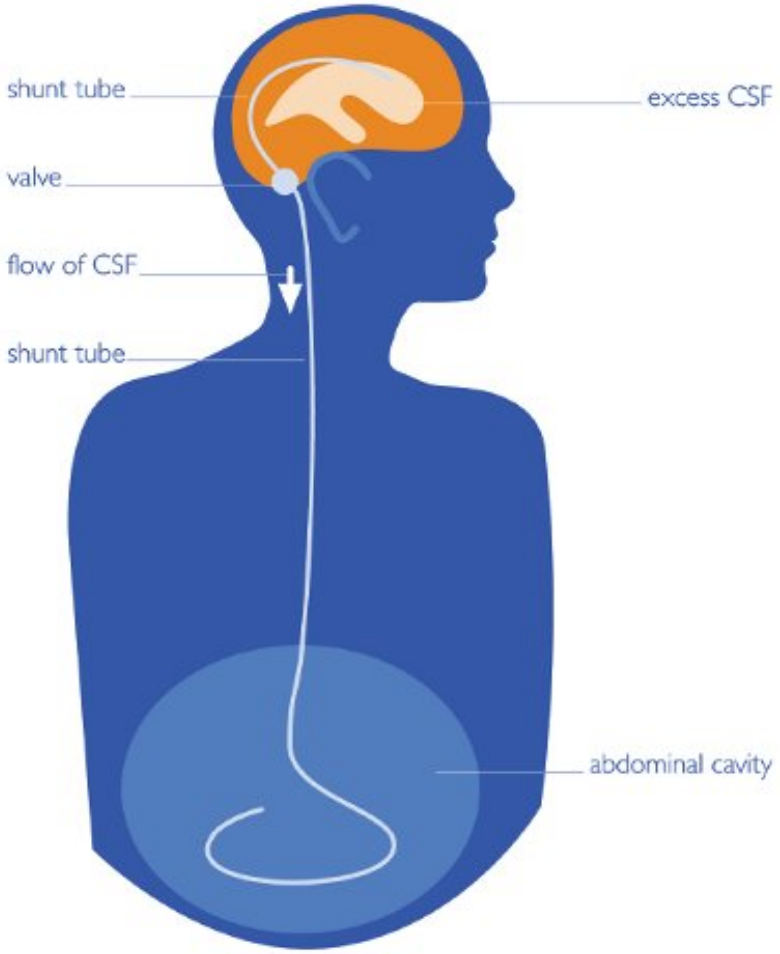
Short Term = External Ventricular Drain (EVD)

Long Term = Permanent Shuntage of CSF or resolution of primary cause

Type of shunts

- Ventricular-Peritoneal shunt
- Ventricular-Pleural Shunt
- Ventricular-Atrial Shunt
- Lumbar-Peritoneal Shunt
- Endoscopic Third Ventriculostomy (ETV)

Hydrocephalus - Treatment



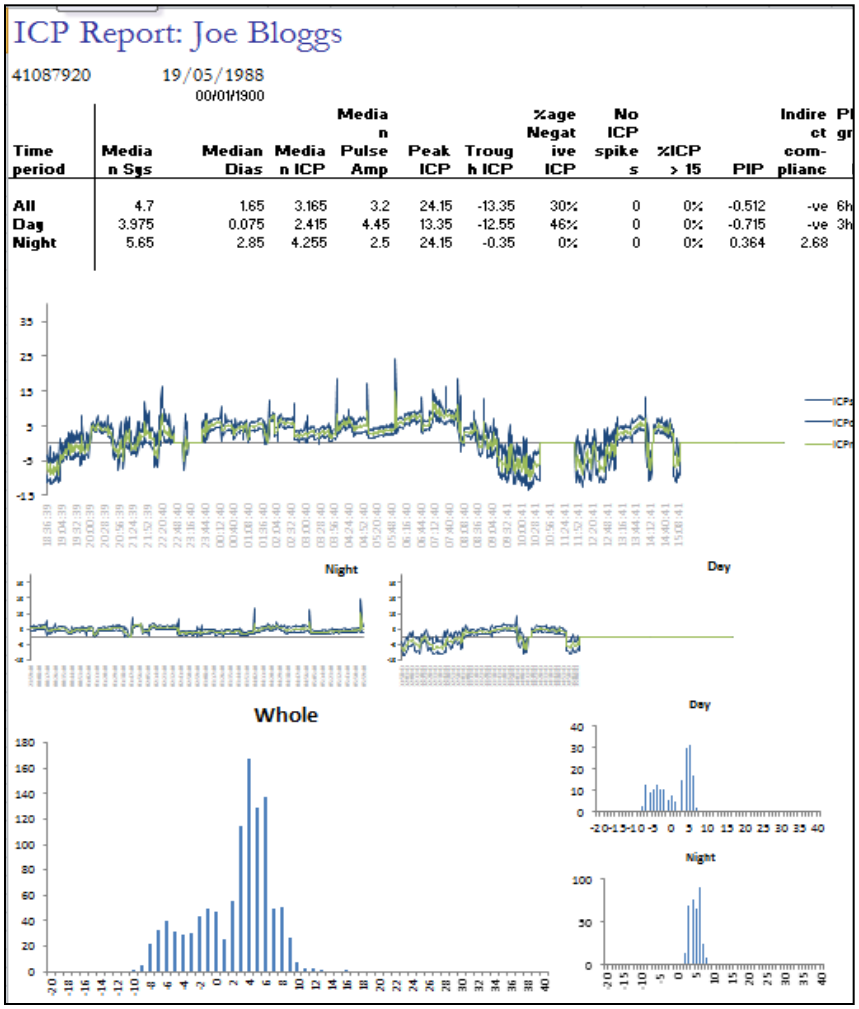
Hydrocephalus & ICP

- ICP and hydrocephalus are linked.
- Any significant increase in CSF causes a change in ICP dynamics
- Thus, at NHNN, ICP monitoring is commonly undertaken as a diagnostic procedure prior to further treatment
- This can then be repeated post shunt insertion

ICP monitoring

- Inserted under local anaesthetic
- Requires 24hours monitoring and expert analysis
- Associated with minimal risk (<2% at our unit).

ICP monitoring

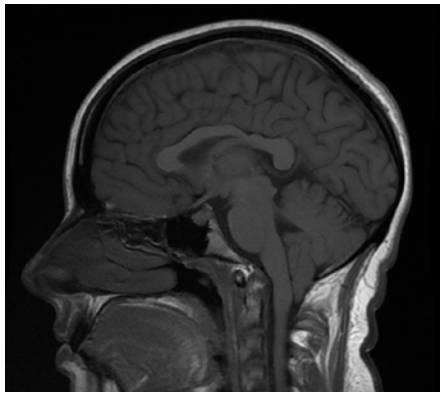


ICP Report: Joe Bloggs

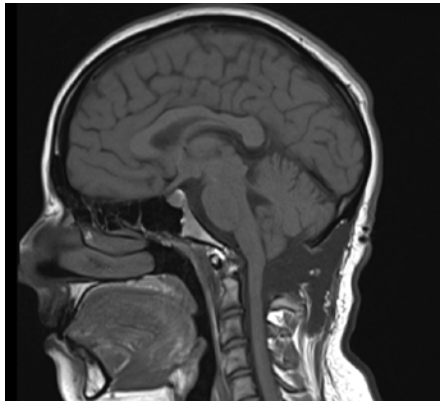
41087920 19/05/1988
00/01/1900

Time period	Mean Sys	Median Dias	Mean ICP	Mean Pulse Amp	Peak ICP	Trough ICP	%age Negative ICP	No ICP spikes	%ICP > 15	PIP	Indirect com-pliance	Pt gr
All	4.7	1.65	3.165	3.2	24.15	-13.35	30%	0	0%	-0.512	-ve	6h
Day	3.975	0.075	2.415	4.45	13.35	-12.55	46%	0	0%	-0.715	-ve	3h
Night	5.65	2.85	4.255	2.5	24.15	-0.35	0%	0	0%	0.364	2.68	

Potential complications from FMD?

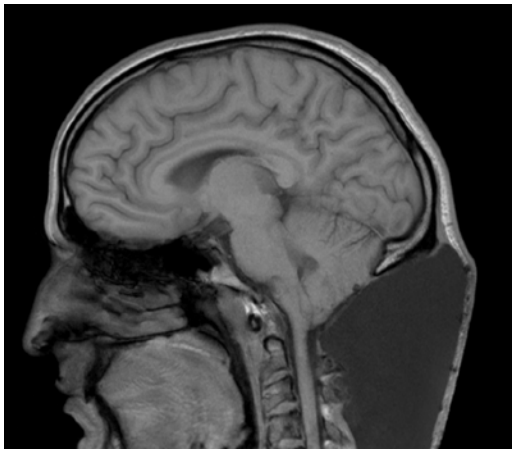


Pre



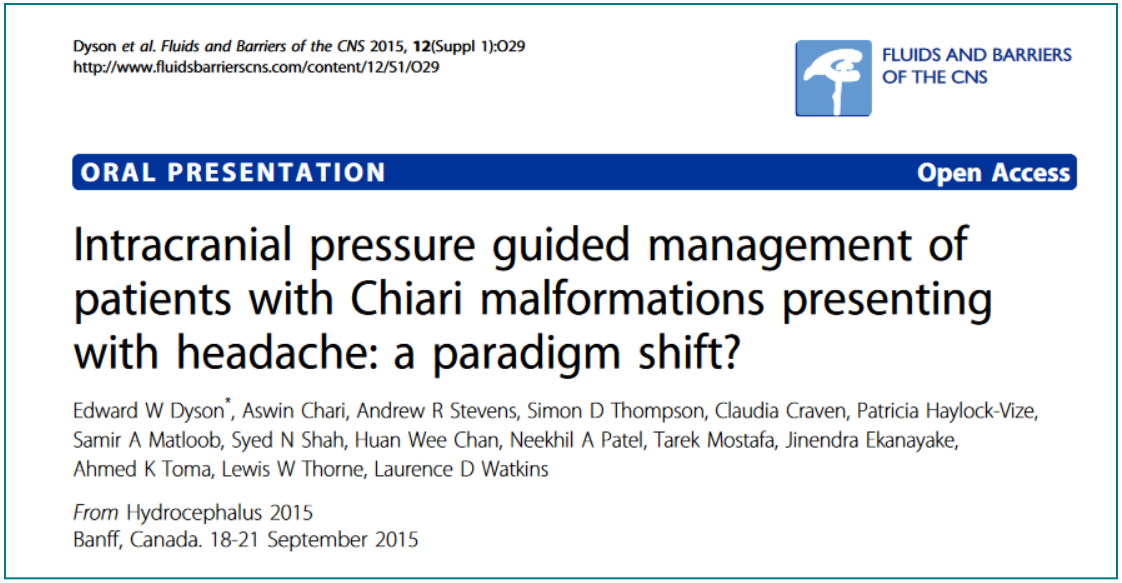
Post

Extreme



VPS for Chiari

- If ICP is abnormal, then a Ventricular shunt can be inserted to act as a diversion for CSF to exit the head.
- The hope is that this will reduce CSF volume inside the head and improve ICP dynamics and thus a patients symptoms



Dyson *et al. Fluids and Barriers of the CNS* 2015, **12**(Suppl 1):O29
http://www.fluidsbarrierscns.com/content/12/S1/O29

FLUIDS AND BARRIERS OF THE CNS

ORAL PRESENTATION **Open Access**

Intracranial pressure guided management of patients with Chiari malformations presenting with headache: a paradigm shift?

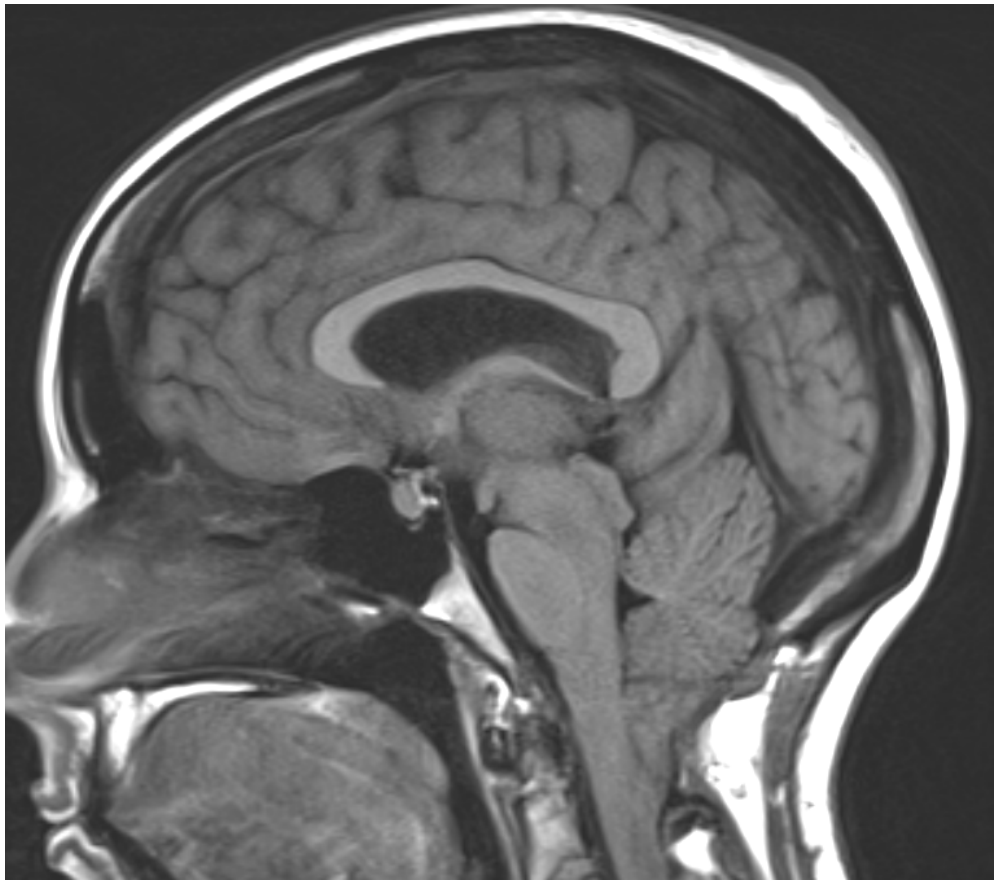
Edward W Dyson*, Aswin Chari, Andrew R Stevens, Simon D Thompson, Claudia Craven, Patricia Haylock-Vize, Samir A Matloob, Syed N Shah, Huan Wee Chan, Neekhil A Patel, Tarek Mostafa, Jinendra Ekanayake, Ahmed K Toma, Lewis W Thorne, Laurence D Watkins

From Hydrocephalus 2015
Banff, Canada. 18-21 September 2015

Potential complications from shunt

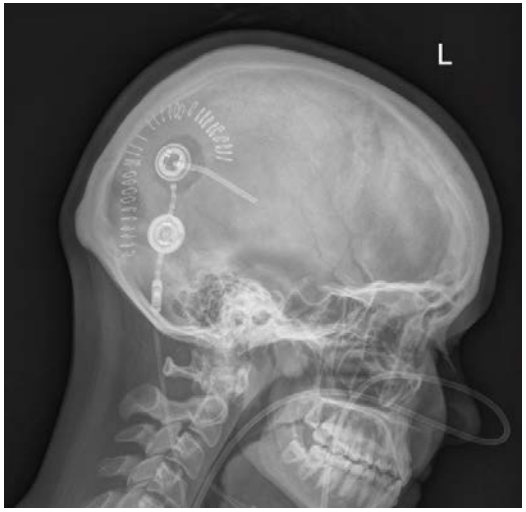
- Infection
- Intracranial bleed
- Seizure
- Patients remain symptomatic and thus require FMD as well

Potential complications from shunt



LP shunt

Future developments?



Patient reflection on experience

- We have inserted 18 shunts for Chiari malformation, mixture of pre and post FMD
- All patients reported an improvement in symptoms post shuntage
- Adjustable valves are felt to be key in order to manage ICP appropriately for each individual patient

Conclusion

- VP shunting is not appropriate for all Chiari malformation patients.
- However there is a group of patients who have abnormal ICP which CSF shunting can help.
- The team at NHNN feel the ICP has to be treated first and if symptoms remain, undertake FMD at a later stage