SIH Percutaneous Treatment: Duke Approach

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No disclosures except for confusion and ignorance

The more I know, the more I know I don’t know

(paraphrased) Aristotle

We are getting smarter
Advantages of CT Guided Interventions

- Technique that is accessible to the majority of medical centers
- Direct high-resolution imaging guidance
- Ability to identify the spread of patch
- Amount of mass effect on the adjacent cord
- Ability to perform ventral and circumferential patches
- Potential site of leak can be accessed and targeted to assess response
Diagnostic Approach to CT Fluoroscopic Guided Technique: 1) Localize LP site
Precise CT Fluoroscopic Guided CSF Pressure Measurement: lateral decubitus, legs extended, relaxed, with atraumatic 24g needle, standard and digital manometer, Elliots B
Distributing the contrast: CT Yoga Bridge (30 secs) and Log Roll, Initial Scan Prone, may modify to Dynamic Scan prone or lateral decubitus; .6mm slices helically
Prone or lateral positioning: dynamic imaging for ventral or lateral leak
Normal Brain MRI, OP25
Diffuse leak 3 possible discs
Prone dynamic CT myelogram
70-year-old male HAs began 3-4 years ago, left occipital HA every 4\textsuperscript{th} day, headaches in the past but these are more intense, moderate in severity; migraines in the past at the top of his head, HAs are worse in AM and can wake him from sleep at 2-5 a.m. every morning, nonpositional
31 yo positional HAs x 1.5 years; prior bloodpatches only lasted 2-3 days; caffeine of no help

Floor of 3\textsuperscript{rd} ventricle is downwardly displaced

CSF Venofistula confirmed with lateral decubitus positioning
51-year-old woman with 2 week history of positional headaches that started abruptly; no inciting event
Leak originated at the site of the smaller disc

*Courtesy Peter Kranz*
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  - spatial and temporal
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negotiate complicated anatomy and assess spread of patch and mass effect
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Ventral Patch: Nontargeted lumbar patch is unlikely to reach a ventral leak 29 yo S/P LP without relief from bloodpatch
Circumferential Patch:
21 yo s/p 4 attempts at lumbar epidural for delivery presents obtunded and intubated with acute SIH.

Normalizing brain 2 days later
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This 55-year-old male presenting with C/O headaches starting 2012, blurry and double vision, short-term memory loss, swallowing problems and disequilibrium causing falls, sleeping 18 hours per day, he would fall asleep driving, unable to add 2+2
From 2012-2016 worsening herniation
What do you treat when you don't see the leak?

Small Disc no obvious leak
With patching he improves for 1 month
6 mos later post surgery; improved brain sagging
67 yo with diagnosis of frontotemporal dementia x 1 year, worsened in December and now in a cognitively impaired facility. He has associated speech difficulties and inability to find words, he also has left sided tinnitus. MOC 12 (normal >26)
Calcified Disc Potentially Penetrates Dura - no obvious leak

Post patch MOC from 12-22
44 yo with 10 years of HAs that came on suddenly: associated blurry vision, N/V, worse at the end of the day, rates the pain at 15/10: subtle fistula; targeted patch completely relieves HA for 2 weeks; post surgery now HA free
56 yo sitting on her porch in the mountains of NC suddenly develops a 10/10 HA sitting or standing and 0/10 when lying down

***12 days between symptoms and treatment***

*These problems will always be with us*

*We want early recognition and treatment*
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Wish List for CSF Leaks

- Find a clinical test that will help clinicians identify patients
- Find a test (blood?) that will detect leakers
- Higher resolution imaging that can detect undetectable leaks
- Develop minimally invasive techniques for treating all leaks
- Early recognition and treatment of those with leaks
Thank you!
58 yo with prior headaches that resolved, now with dysarthria and dysequilibrium, no precipitating event, has probably been progressing over 9 yrs
No leak seen on conventional myelography; seen on MR myelography, posterior osteophytes causing leaks: op 15.5

MRI + intrathecal Gd for detecting slow leaks
Imaging: post op resection of facet osteophytes
32-year-old female C/O positional headache for several months no leak seen on myelogram; OP 4; MRI negative 1 blind BP with temporary relief

No MR imaging findings to suggest leak
Subtle disc penetrates dura causing subtle leak
Patient cured for 4 years s/p targeted patch
HX of Breast CA

? Metastatic Disease to the Dura
In the setting of “Acquired Chiari I” or Chiari occurring later in adulthood exclude SIH
This 55-year-old male presenting with C/O headaches starting 2012, blurry and double vision, short-term memory loss, swallowing problems and disequilibrium causing falls, sleeping 18 hours per day, he would fall asleep driving, unable to add 2+2.
This 55-year-old male presents today with C/O headaches, double vision, short-term memory loss, swallowing problems and disequilibrium causing falls, hypersomnia.

Disc required surgery for repair.
From 2012-2016 worsening herniation
Small Disc no obvious leak
s/p 1st Surgery: Disc increased in size
Oct 2017 MRI :s/p 2nd surgery repeat MRI 6 mos later; improved downward herniation
26 yo patient with HA given dx of sarcoid and pituitary tumor undergoes pituitary biopsy; missed findings of SIH
26 yo patient with HA given dx of sarcoid and pituitary tumor undergoes pituitary biopsy
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SIH is defined by low CSF pressure

46-year-old female C/O 2yrs debilitating HA, with cranial neuropathies that started after Zumba and Boot Camp class, she was doing "burpees". Required prolong hospitalization; negative MRI
Extrathecal collection OP: 31.20
A negative brain MRI excludes SIH

31 yo with sudden onset of HAs since 2/21/18; NDPH; she gets a rush of pressure when sitting up, HAs are positional, they can wake her at night; a lumbar bloodpatch did not help; she was seen by another neurologist who told her she was not sick enough to have a CSF leak
CT Myelogram: diffuse CSF leak caused by tiny calcified disc at T2-3
68 yo with double vision: CSF veno fistula originating from a cyst
46 yo with 6 yr history of positional HAs: web of fistula

A web of CSF venofistula
CSF Venofistula: these can have many different appearances & enhancement of adjacent vein
67 yo with 4 yrs of HAs and dementia fistula seen on the 2nd myelogram and not on the 1st