

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

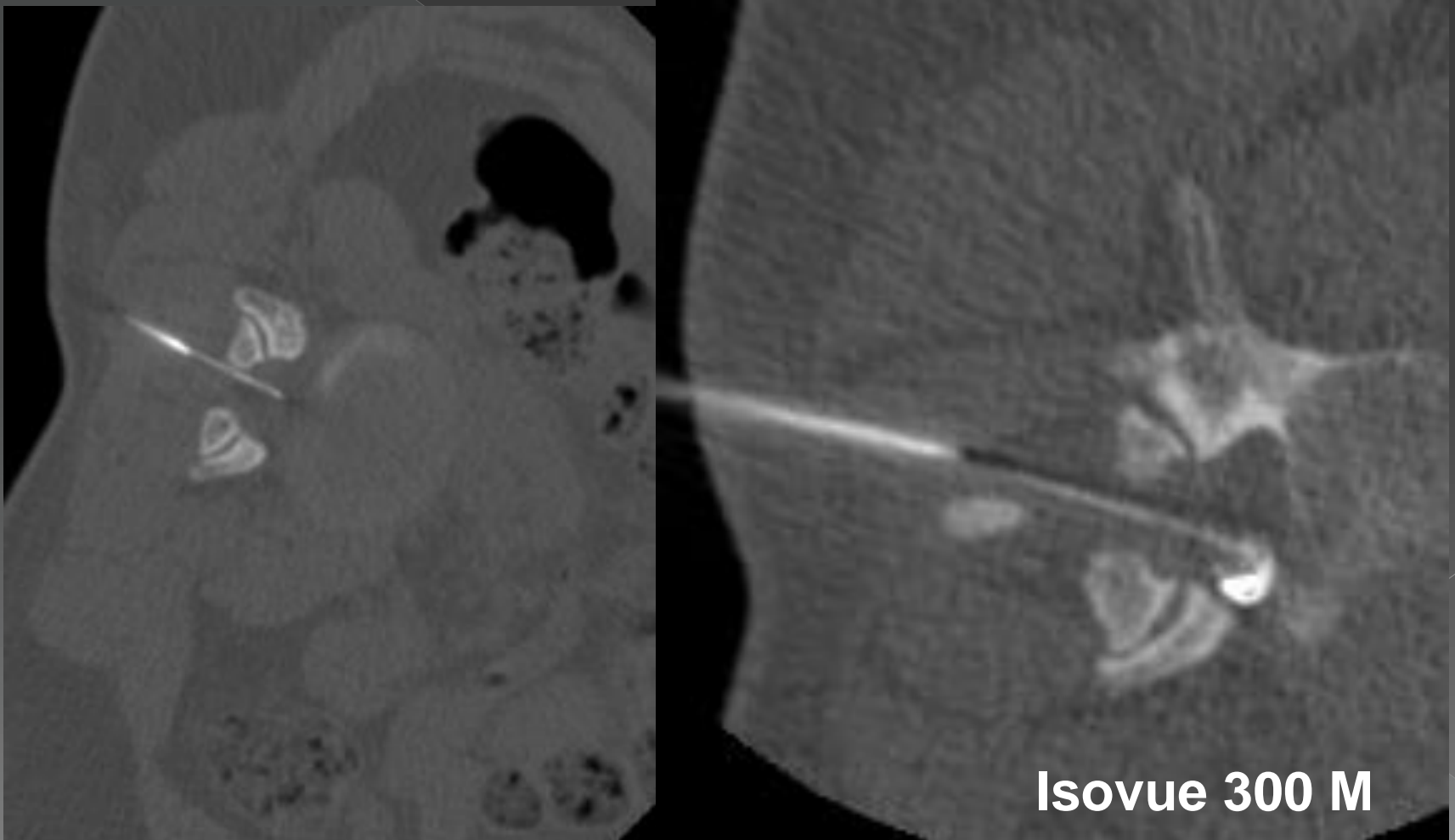
Advantages of CT Guided Interventions

- Technique that is accessible to the majority of medical centers
- Direct high-resolution imaging guidance
- Ability to identify the spread of patch
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Diagnostic Approach to CT Fluoroscopic Guided Technique: 1) Localize LP site



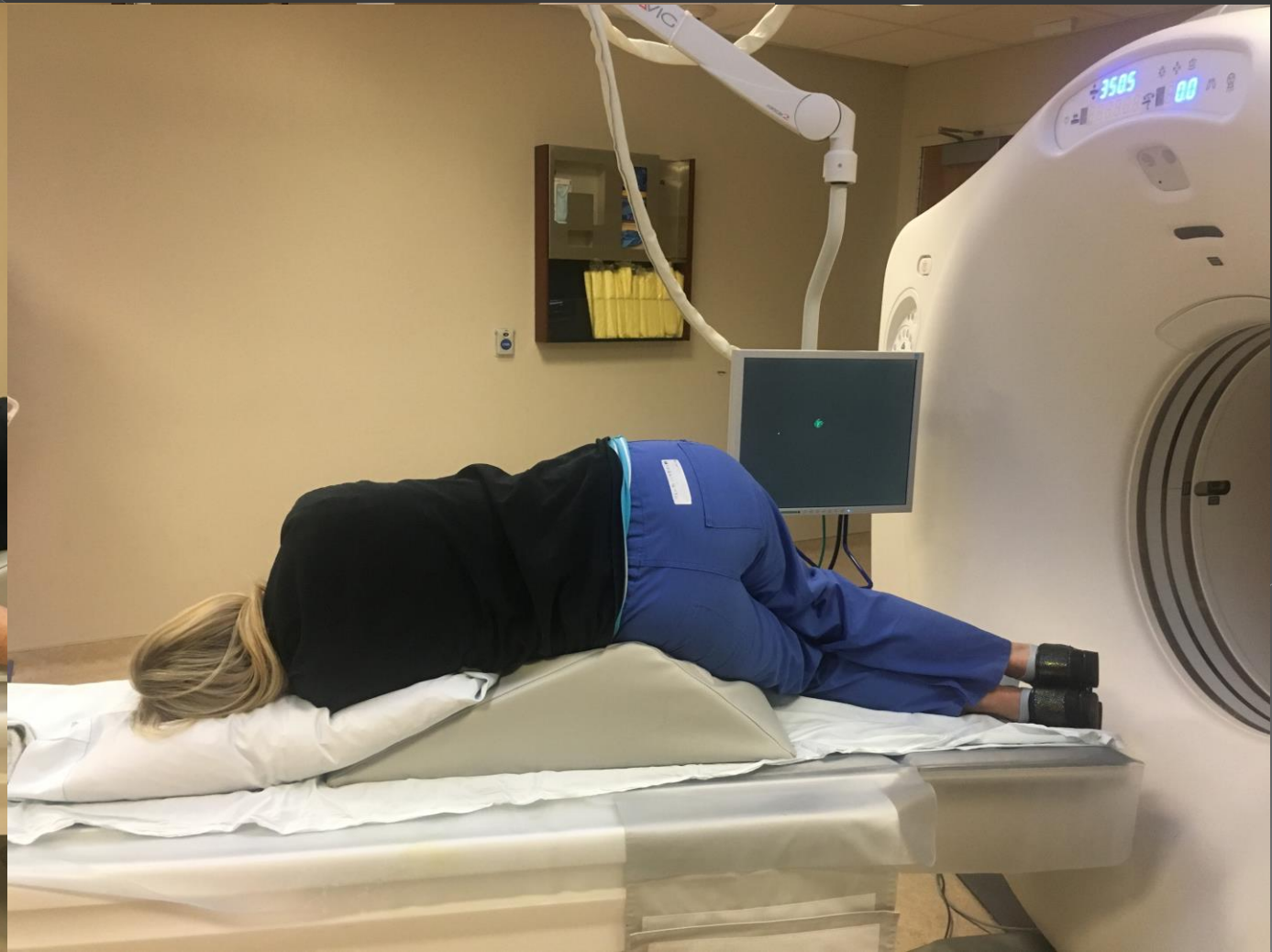
Precise CT Fluoroscopic Guided CSF
Pressure Measurement: lateral decubitus, legs
extended, relaxed, with atraumatic 24g needle,
standard and digital manometer, Elliot's B



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

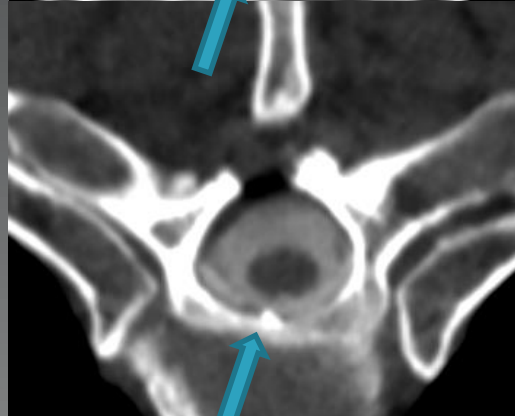
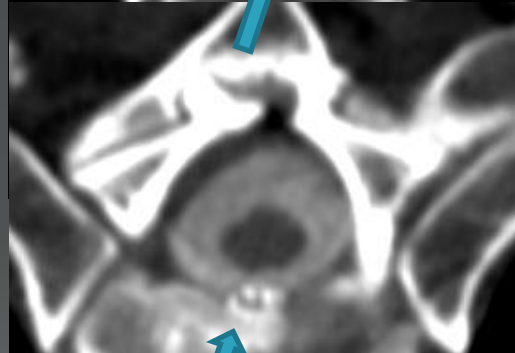
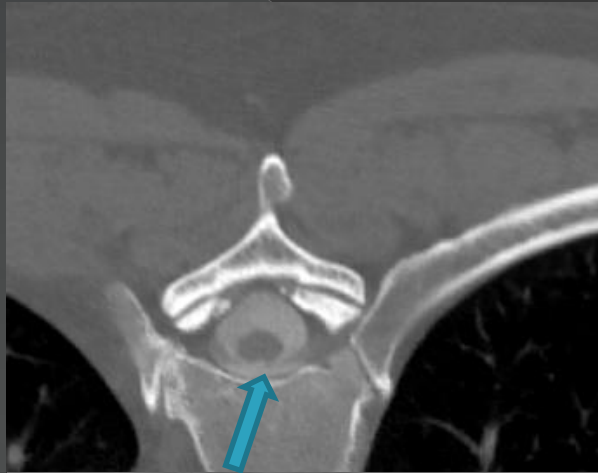


Prone or lateral positioning :dynamic imaging for ventral or lateral leak

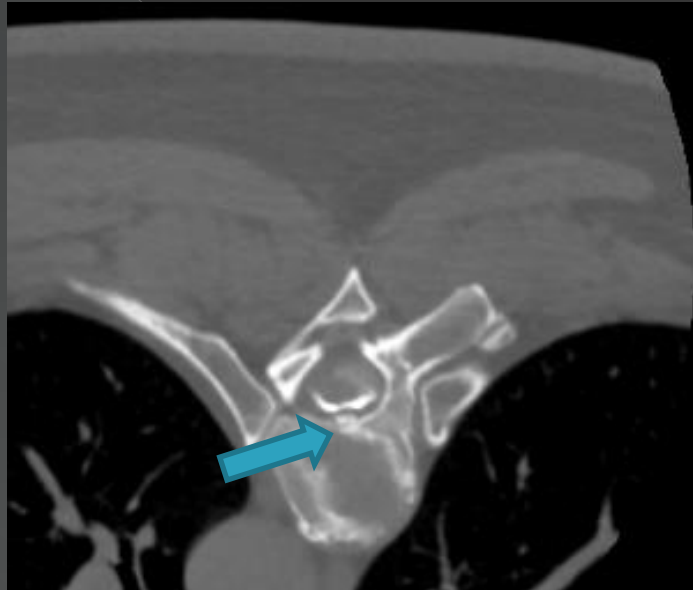


Normal Brain MRI, OP25

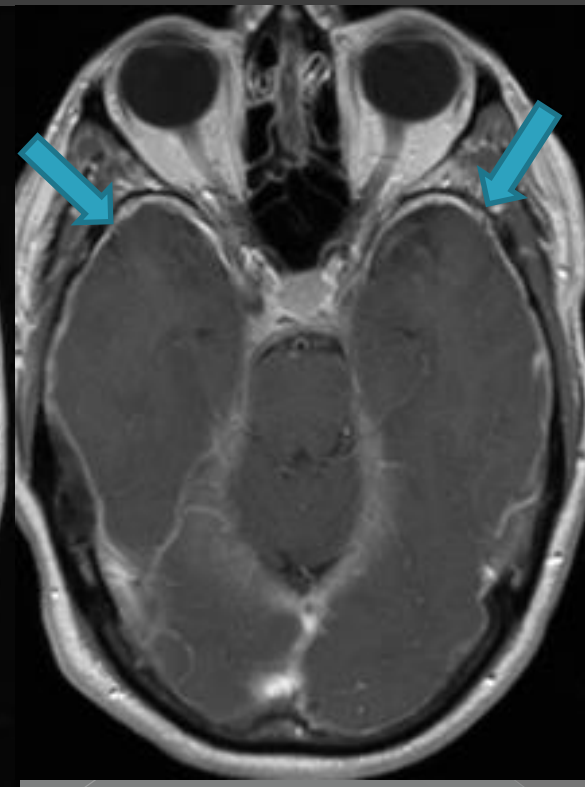
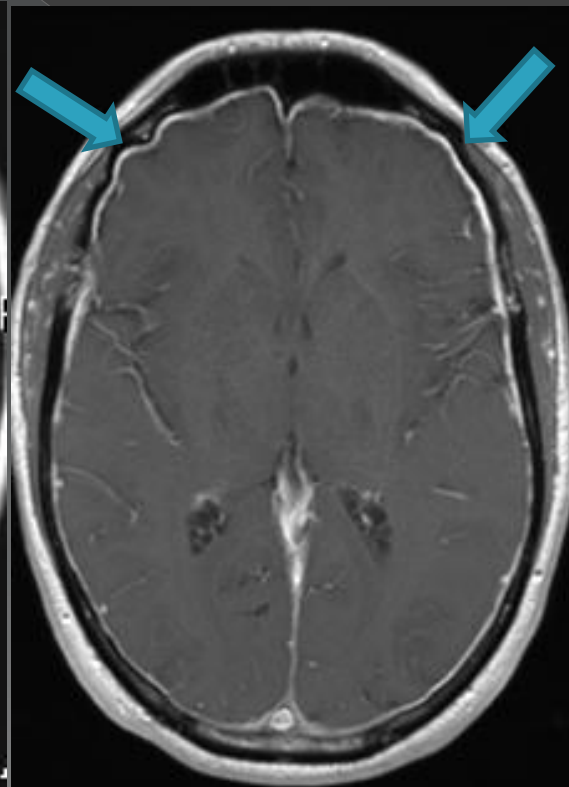
Diffuse leak 3 possible discs

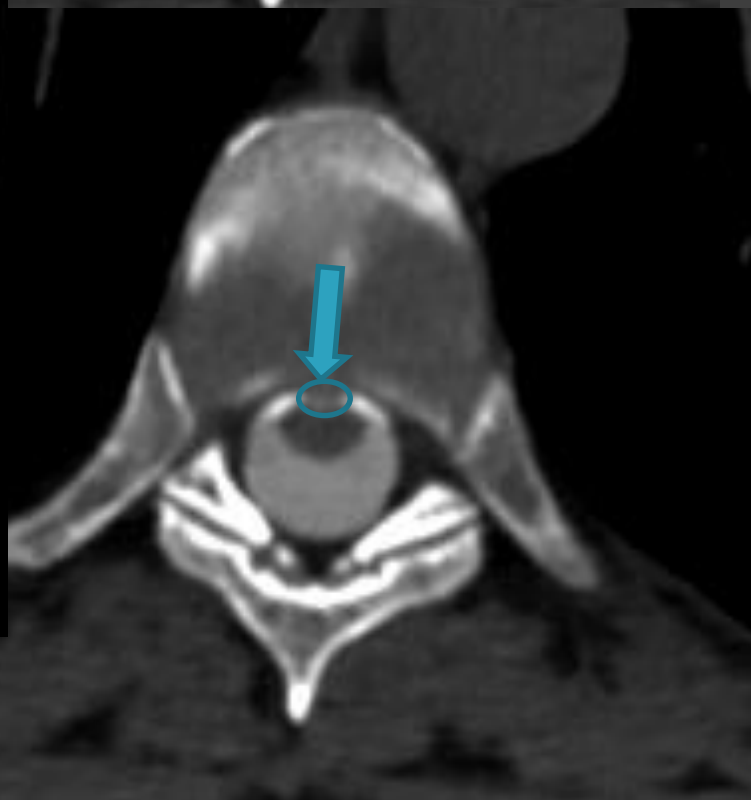
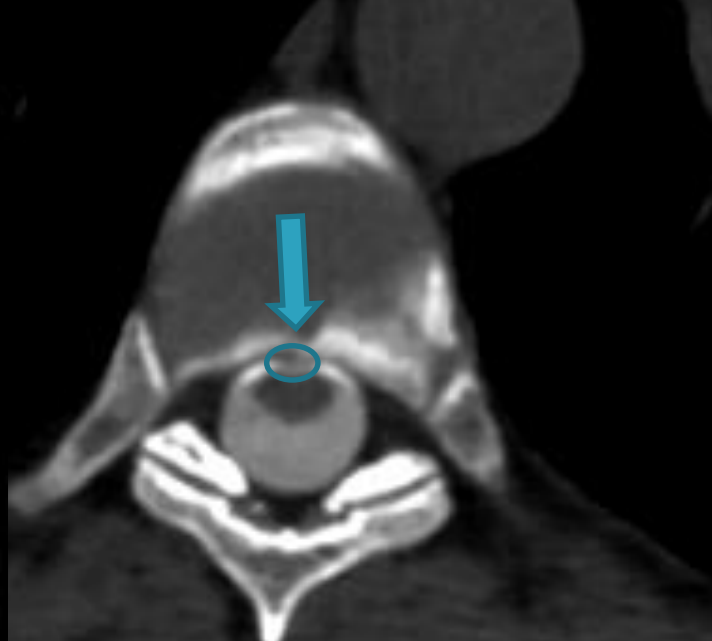


Prone dynamic CT myelogram



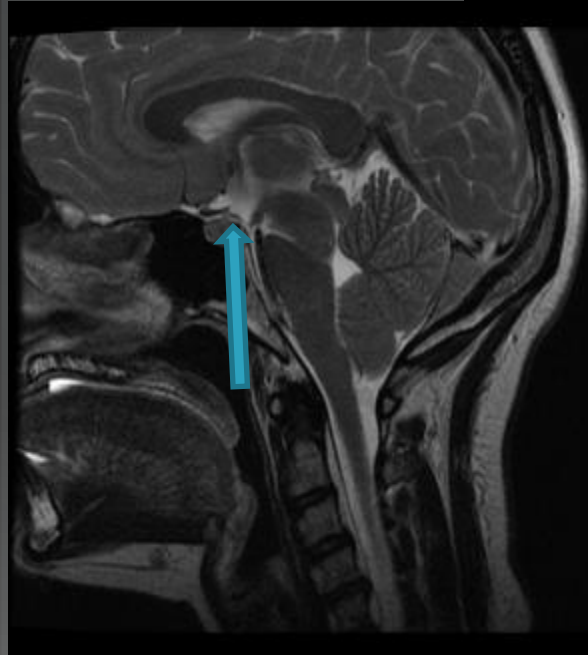
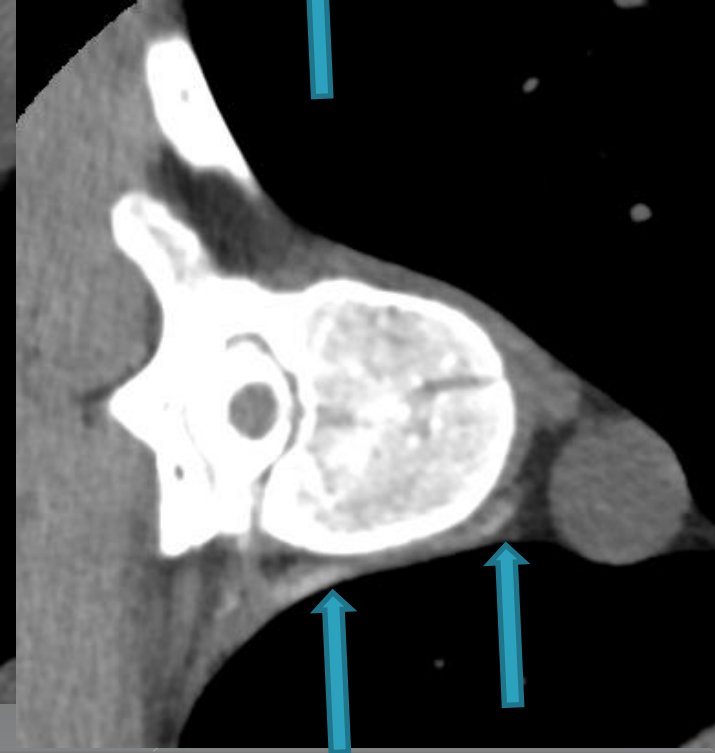
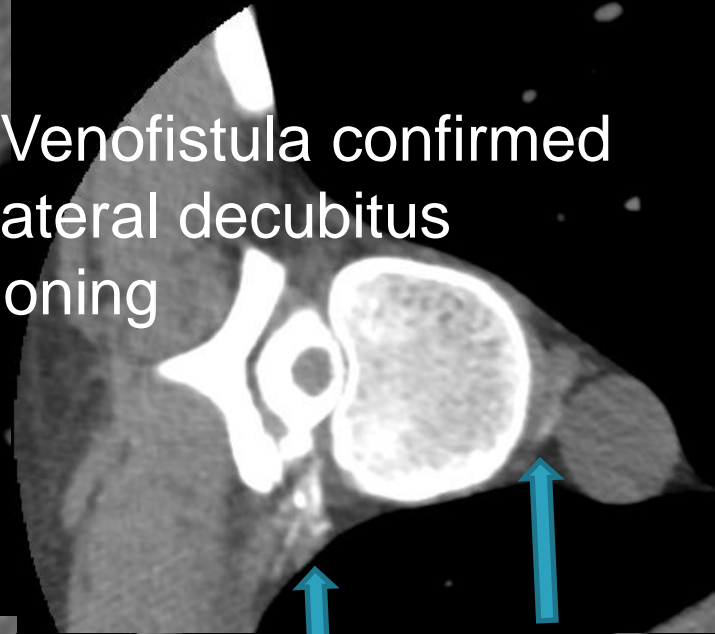
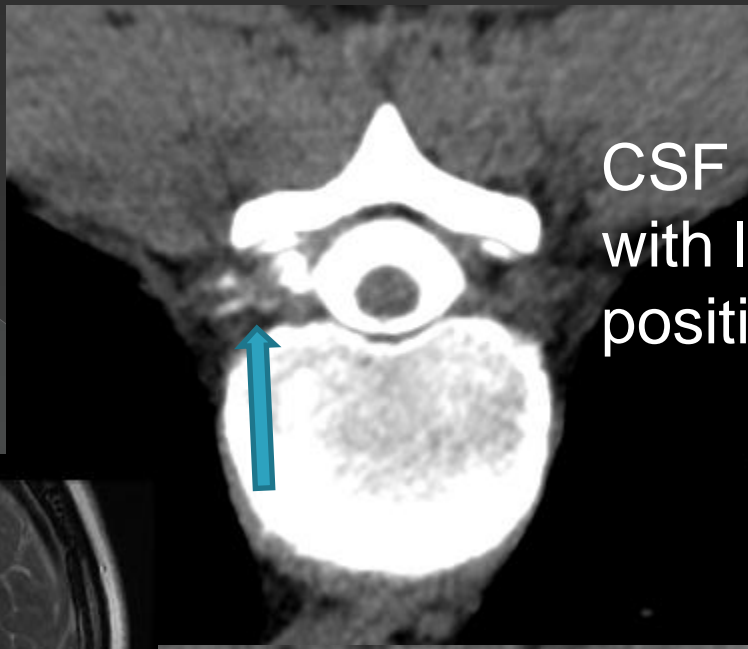
70-year-old male HAs began 3-4 years ago, left occipital HA every 4th day, headaches in the past but these are more intense, moderate in severity; migraines in the past at the top of his head, HAs are worse in AM and can wake him from sleep at 2-5 a.m. every morning, nonpositional





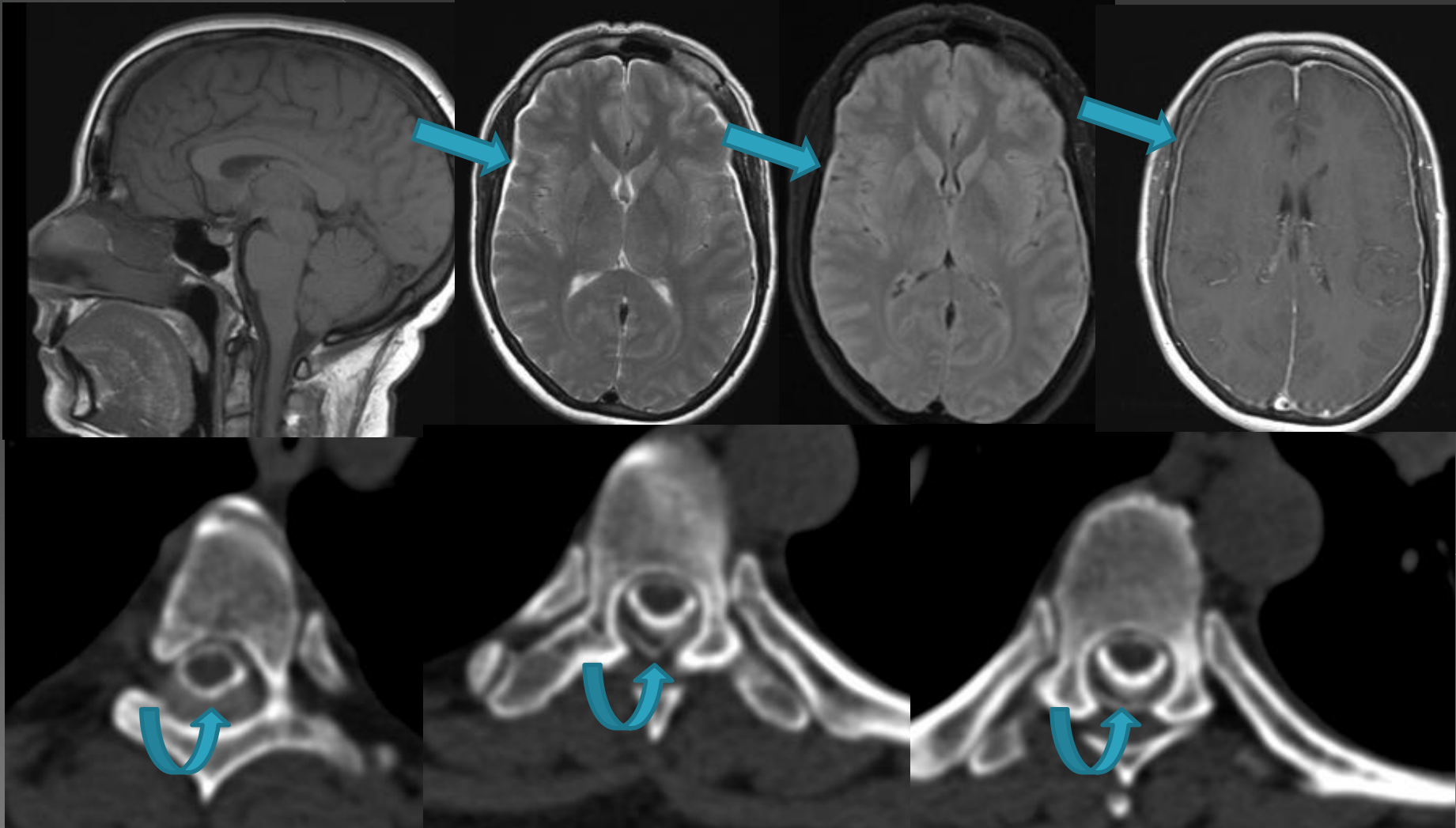
31 yo positional HAs
x 1.5 years; prior
bloodpatches only
lasted 2-3 days;
caffeine of no help

CSF Venofistula confirmed
with lateral decubitus
positioning



Floor of 3rd ventricle
is downwardly
displaced

51-year-old woman with 2 week history of positional headaches that started abruptly; no inciting event



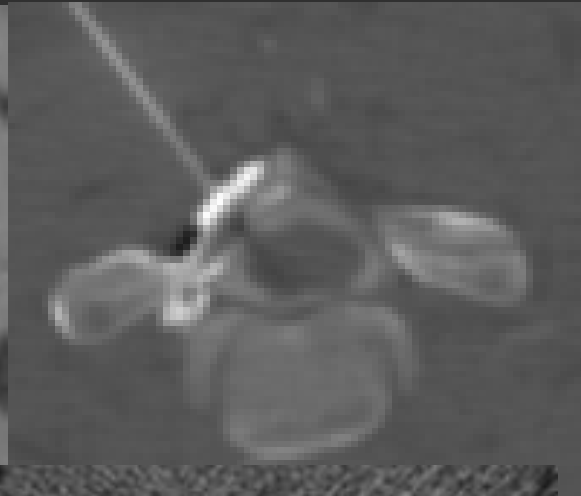
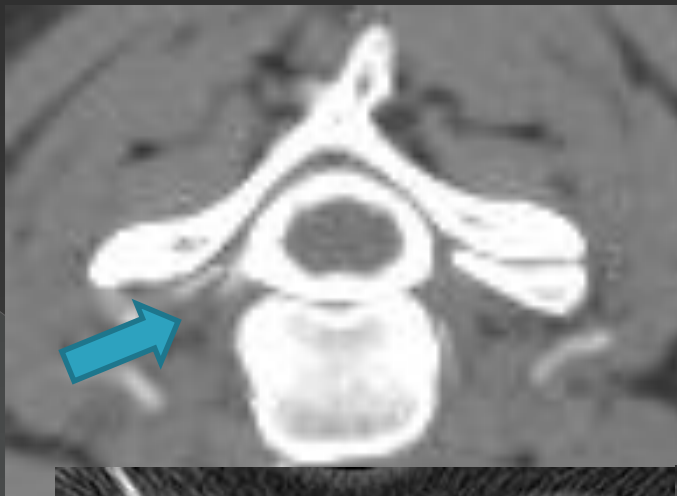


Leak originated at the site
of the smaller disc
Courtesy Peter Kranz

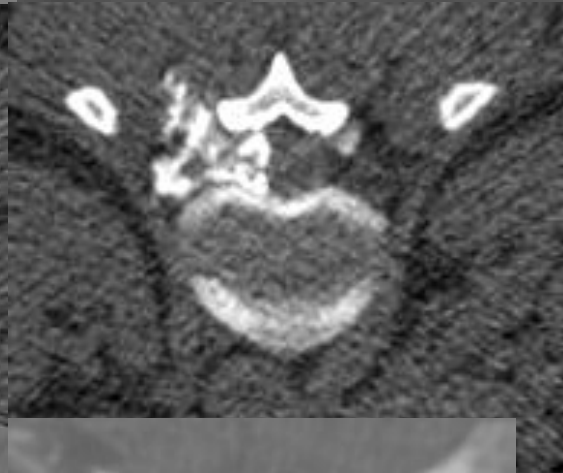
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- Technique that is accessible to the majority of medical centers
- **Direct high-resolution imaging guidance spatial and temporal**
- Ability to identify the spread of patch
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- Ability to perform ventral and circumferential patches
- Potential site of leak can be accessed and completed to assess response

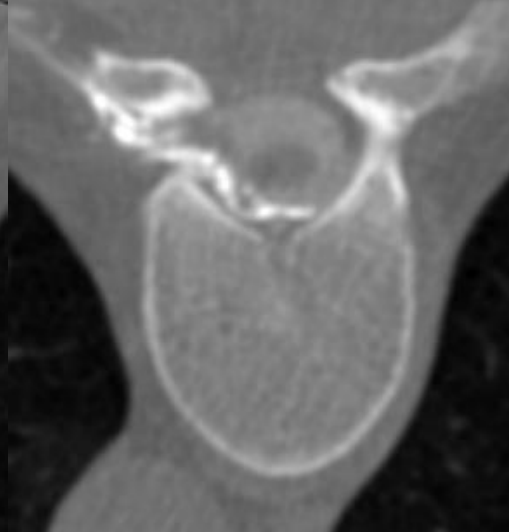
cervical



transforaminal



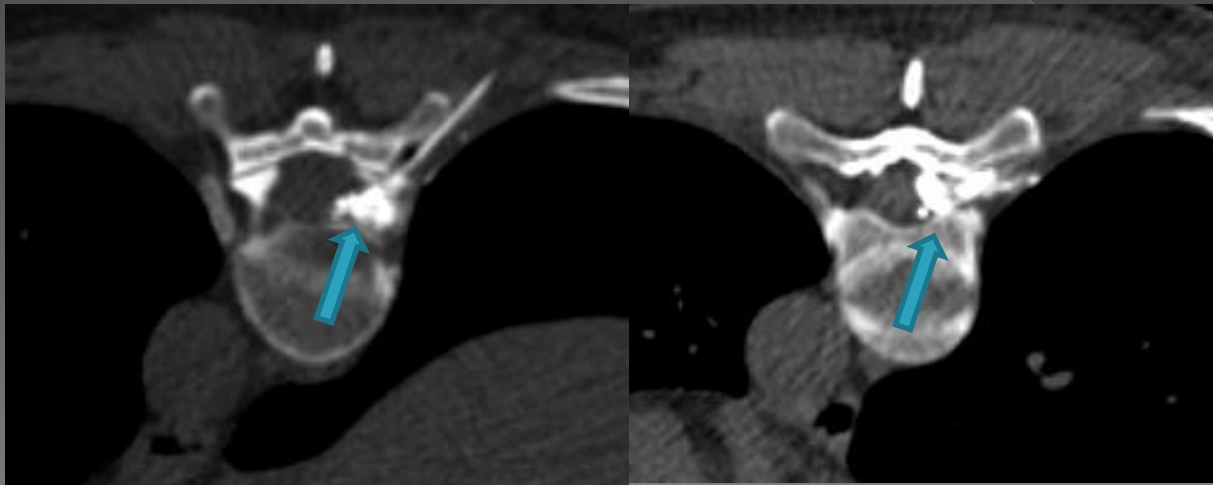
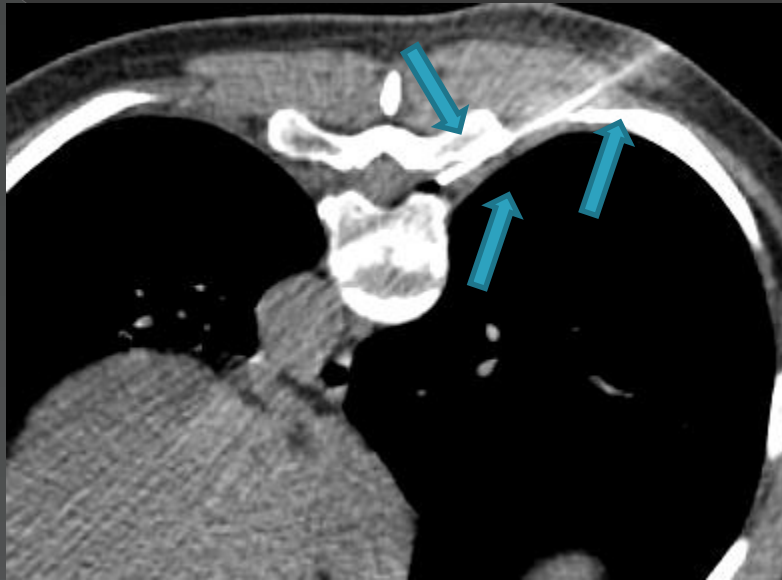
ventral



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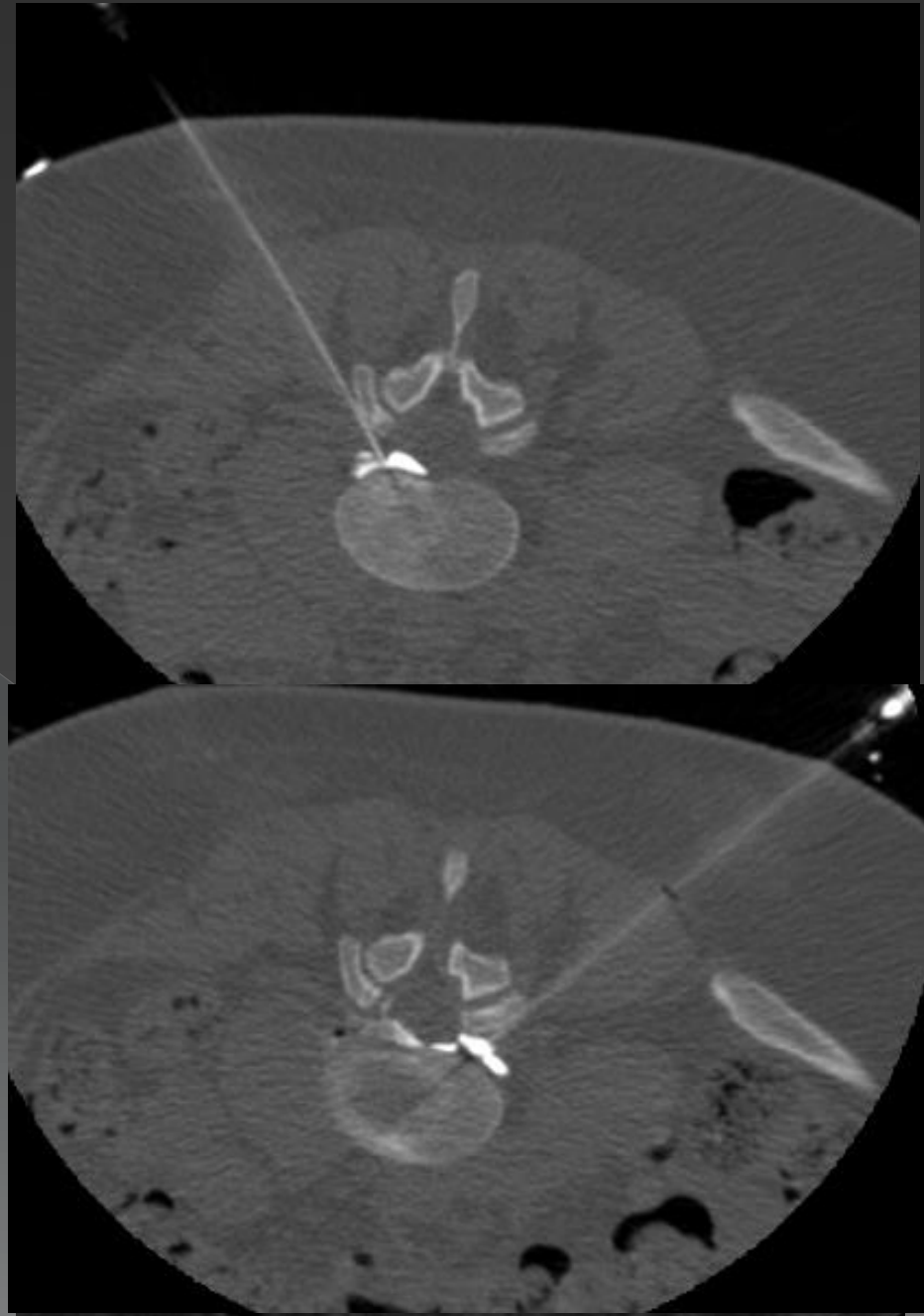
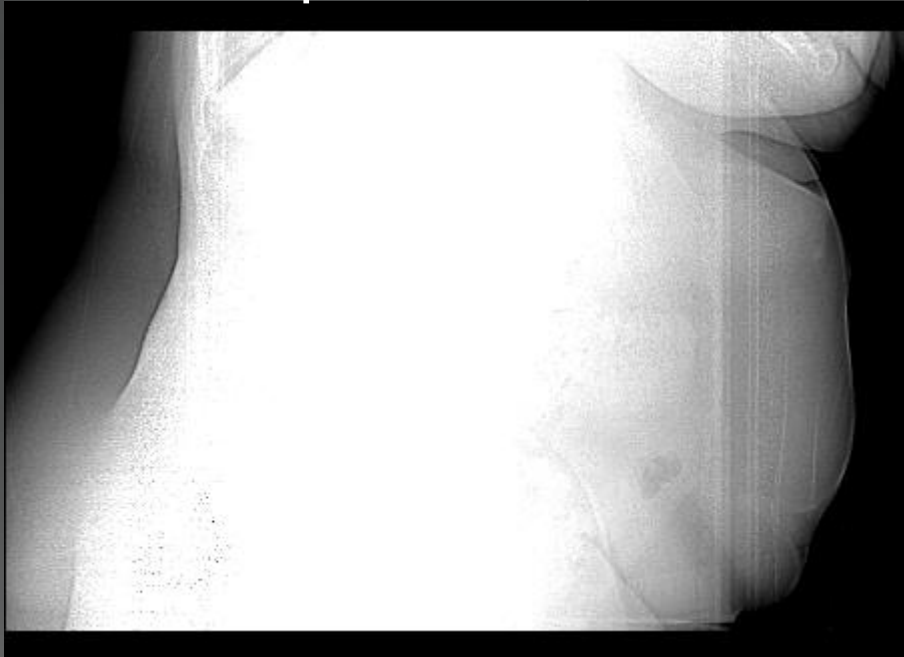
negotiate complicated anatomy and
assess spread of patch and mass effect



Advantages of CT Guided Interventions

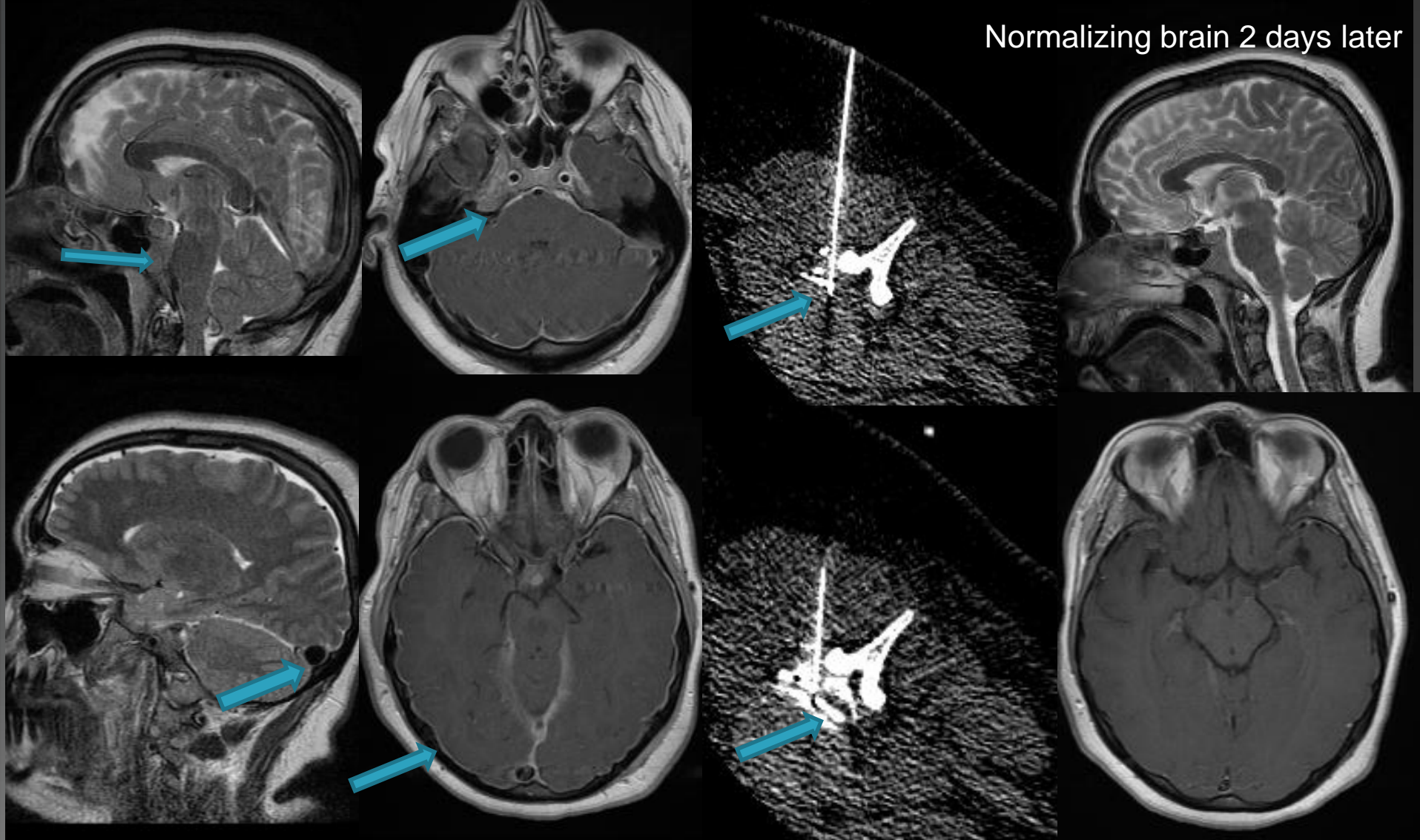
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Ventral Patch: Nontargeted lumbar patch is unlikely to reach a ventral leak
29 yo S/P LP without relief from bloodpatch



Circumferential Patch:

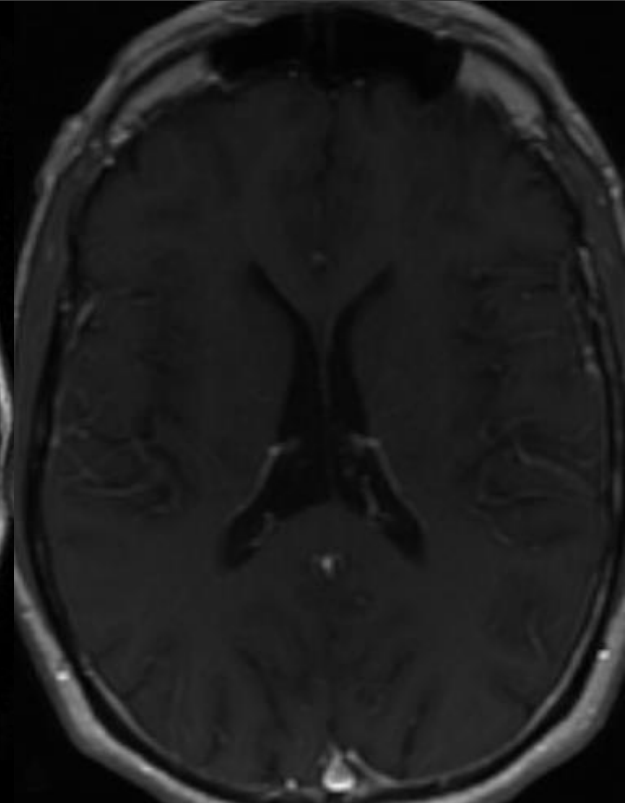
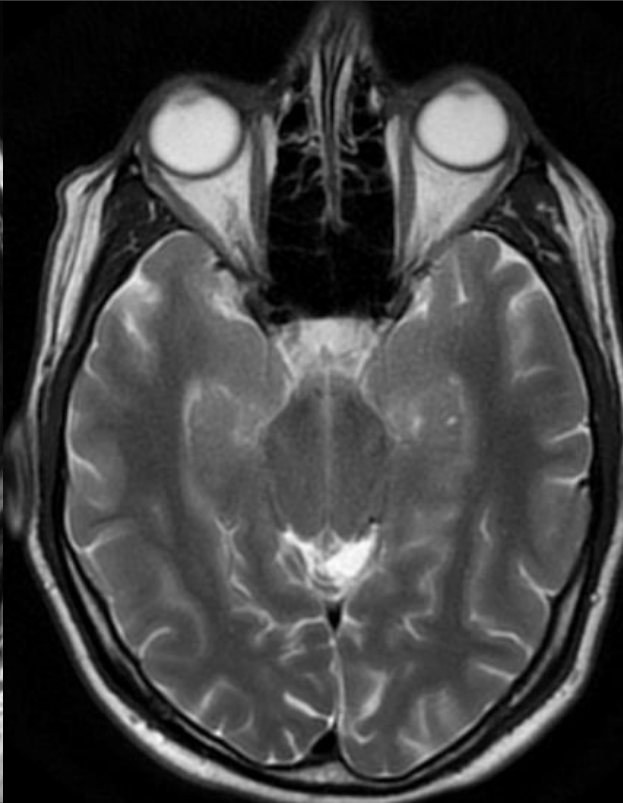
21 yo s/p 4 attempts at lumbar epidural for delivery presents obtunded and intubated with acute SIH.



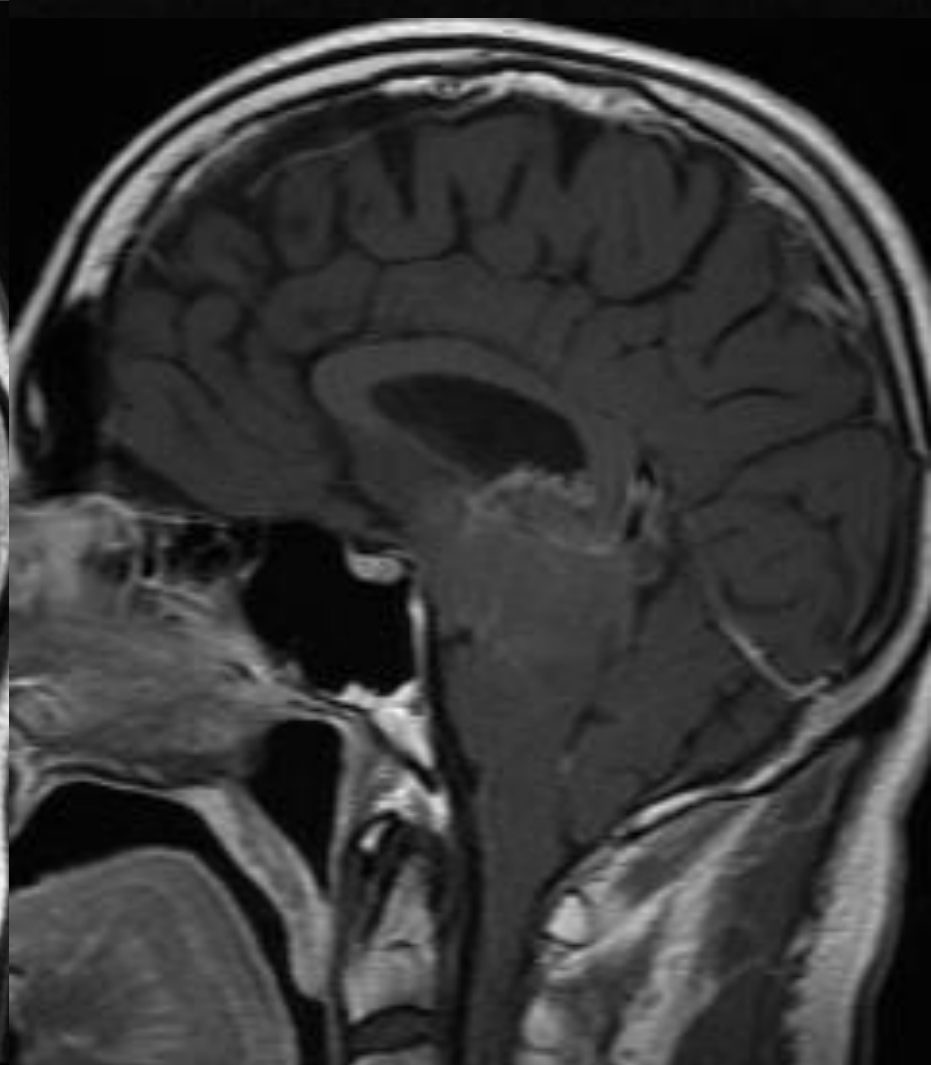
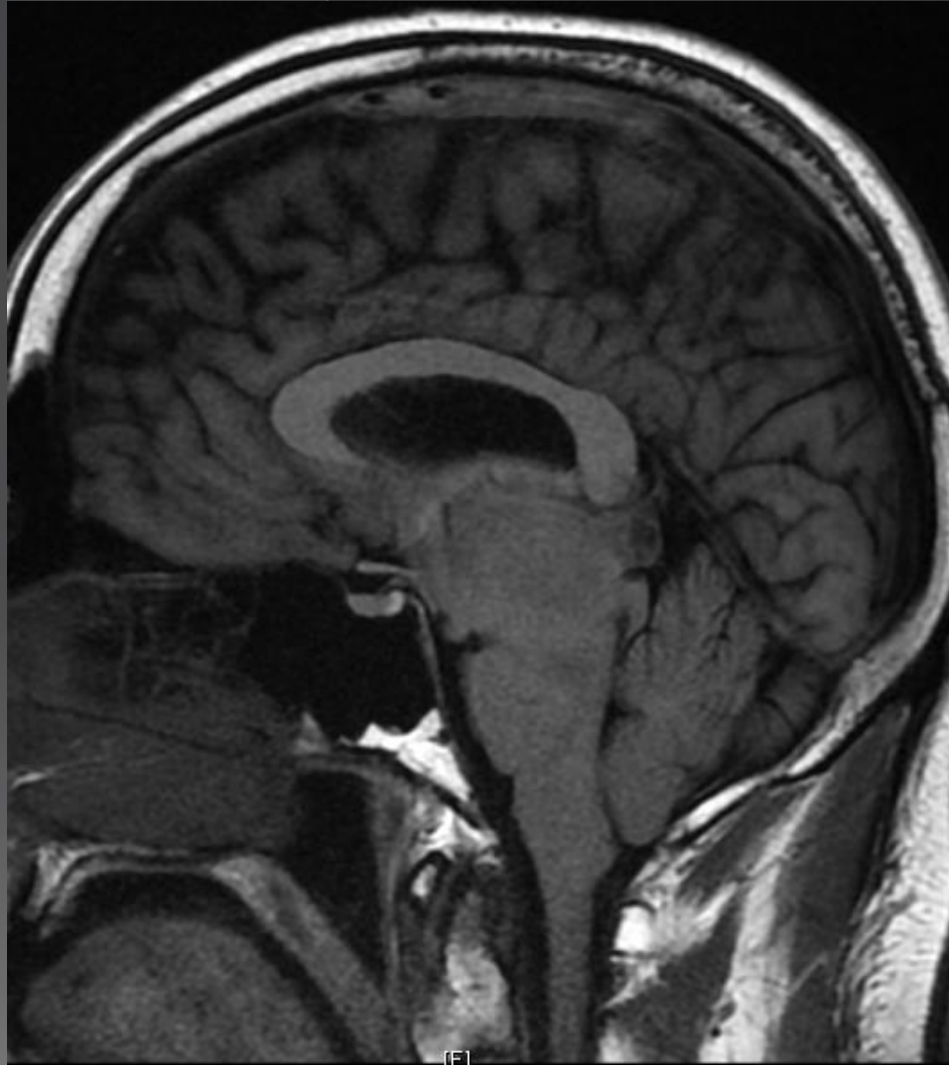
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This 55-year-old male presenting with C/O headaches starting 2012, blurry and double vision, short-term memory loss, swallowing problems and disequilibrium causing falls, sleeping 18 hours per day, he would fall asleep driving, unable to add $2+2$



From 2012-2016 worsening herniation

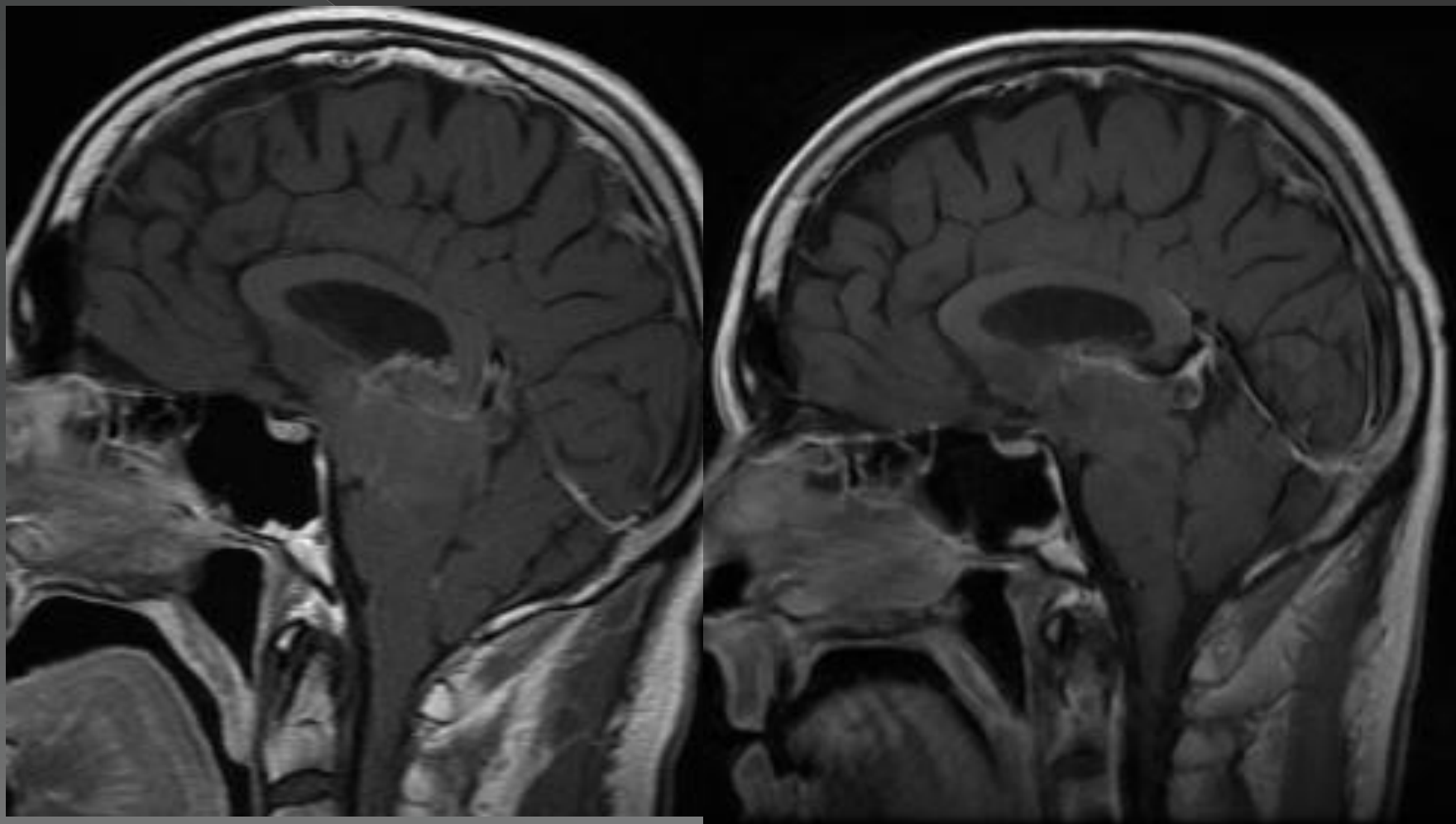


What do you treat when you don't see the leak ?

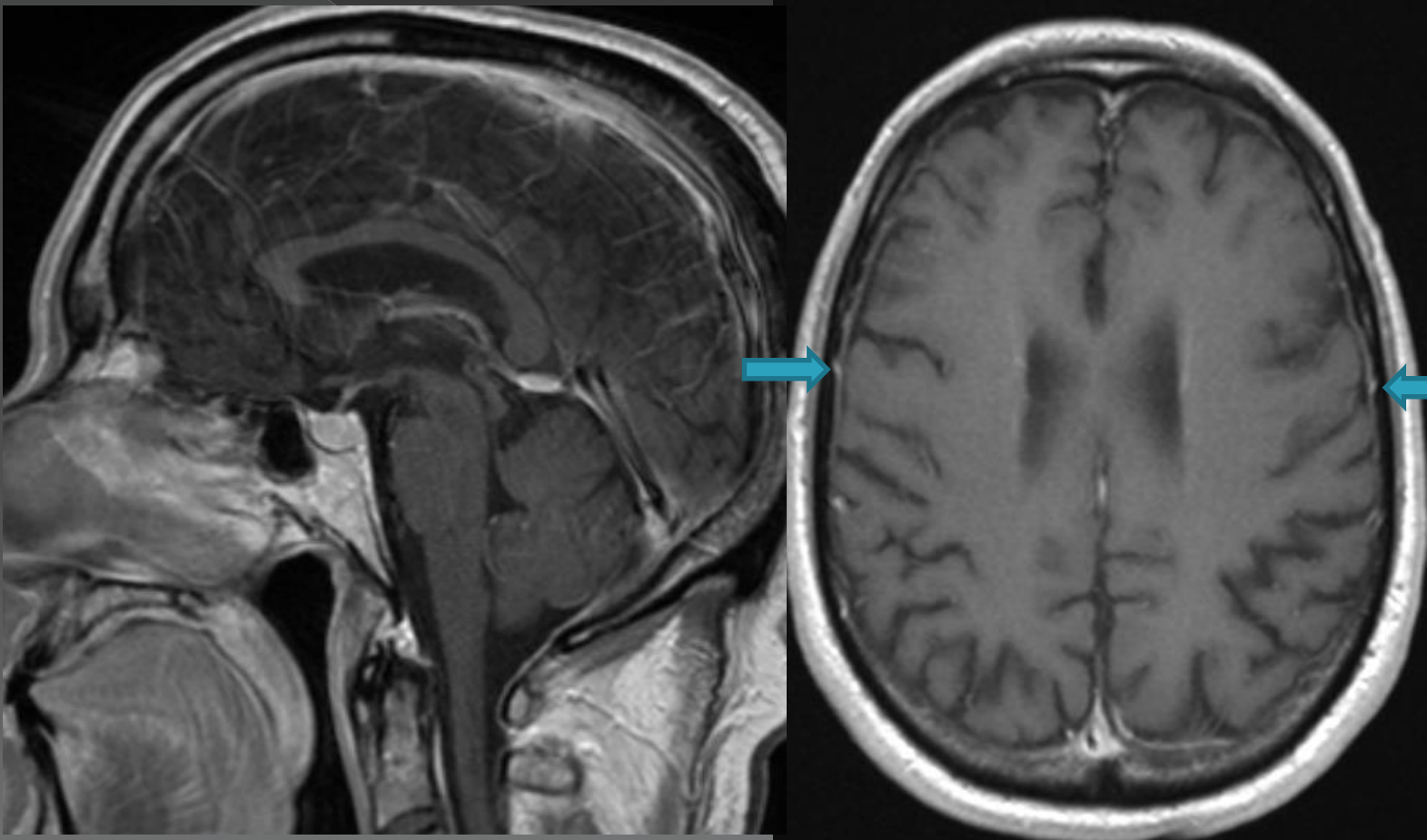


Small Disc no obvious leak
With patching he improves for 1 month

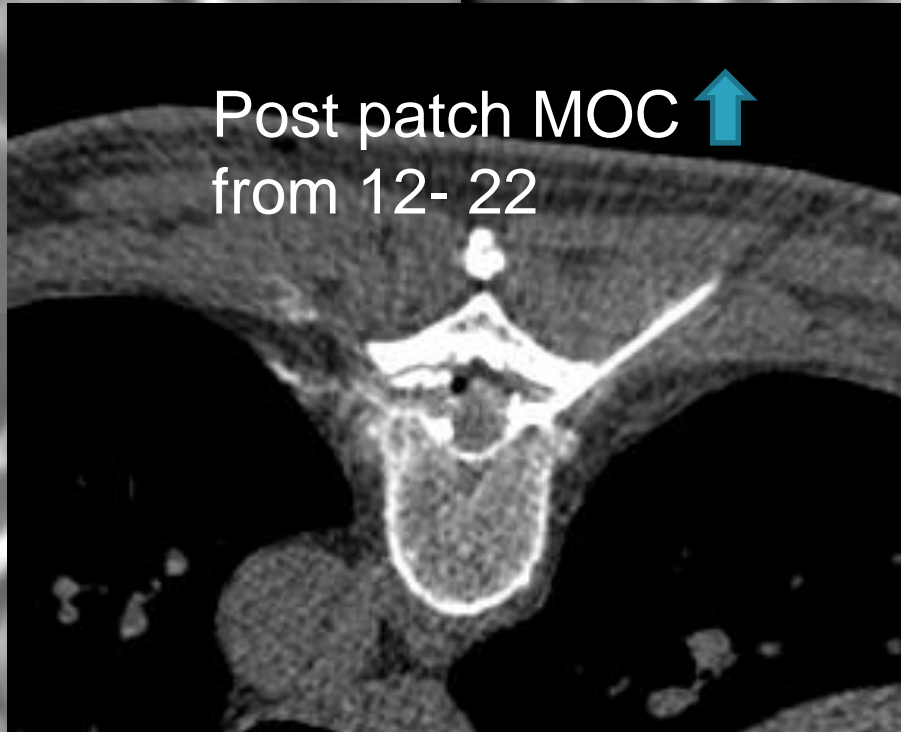
6 mos later post surgery; improved brain sagging



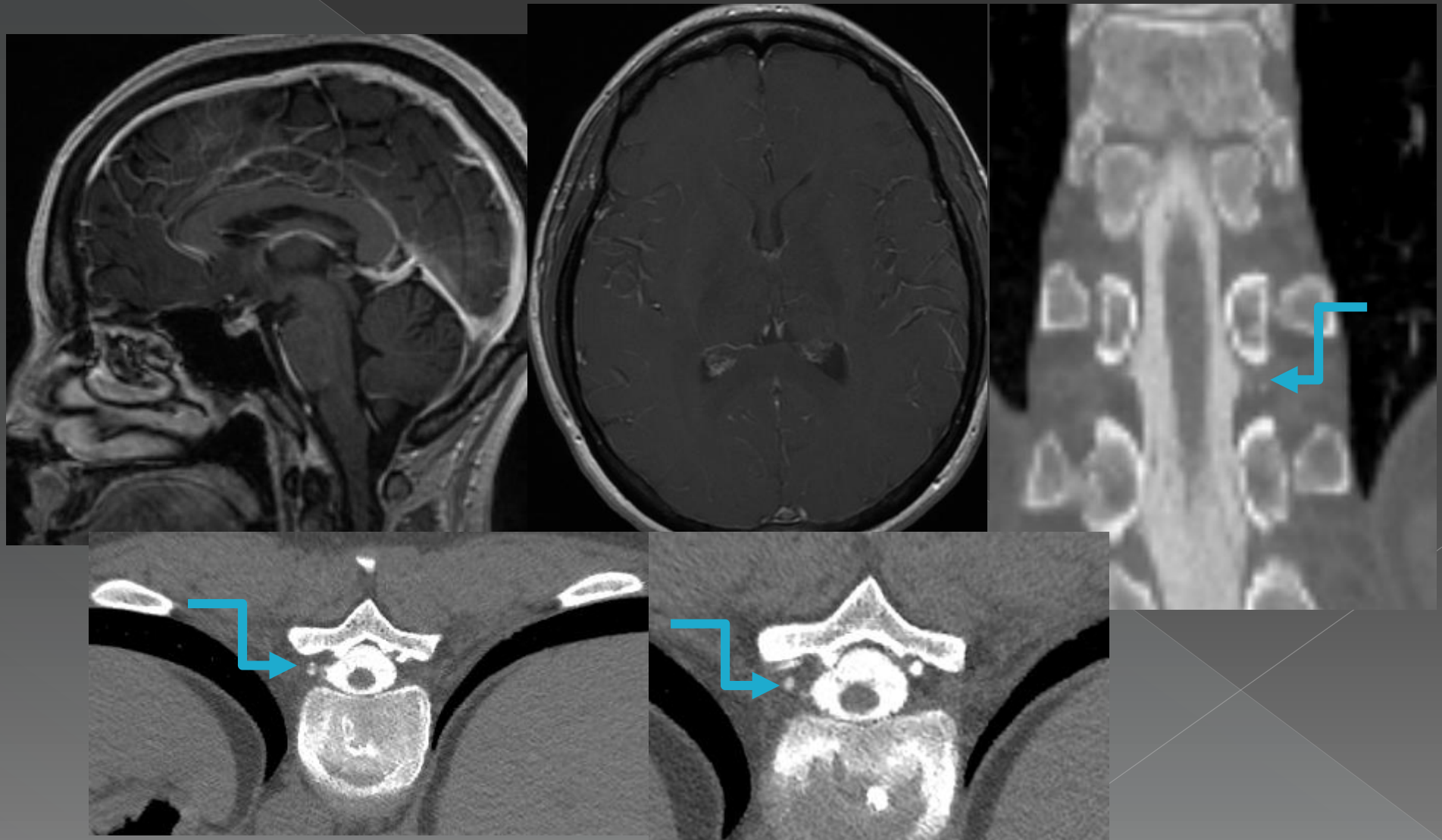
67 yo with diagnosis of frontotemporal dementia x 1 year, worsened in December and now in a cognitively impaired facility. He has associated speech difficulties and inability to find words, he also has left sided tinnitus. MOC 12 (normal >26)



Calcified Disc Potentially Penetrates Dura- no obvious leak

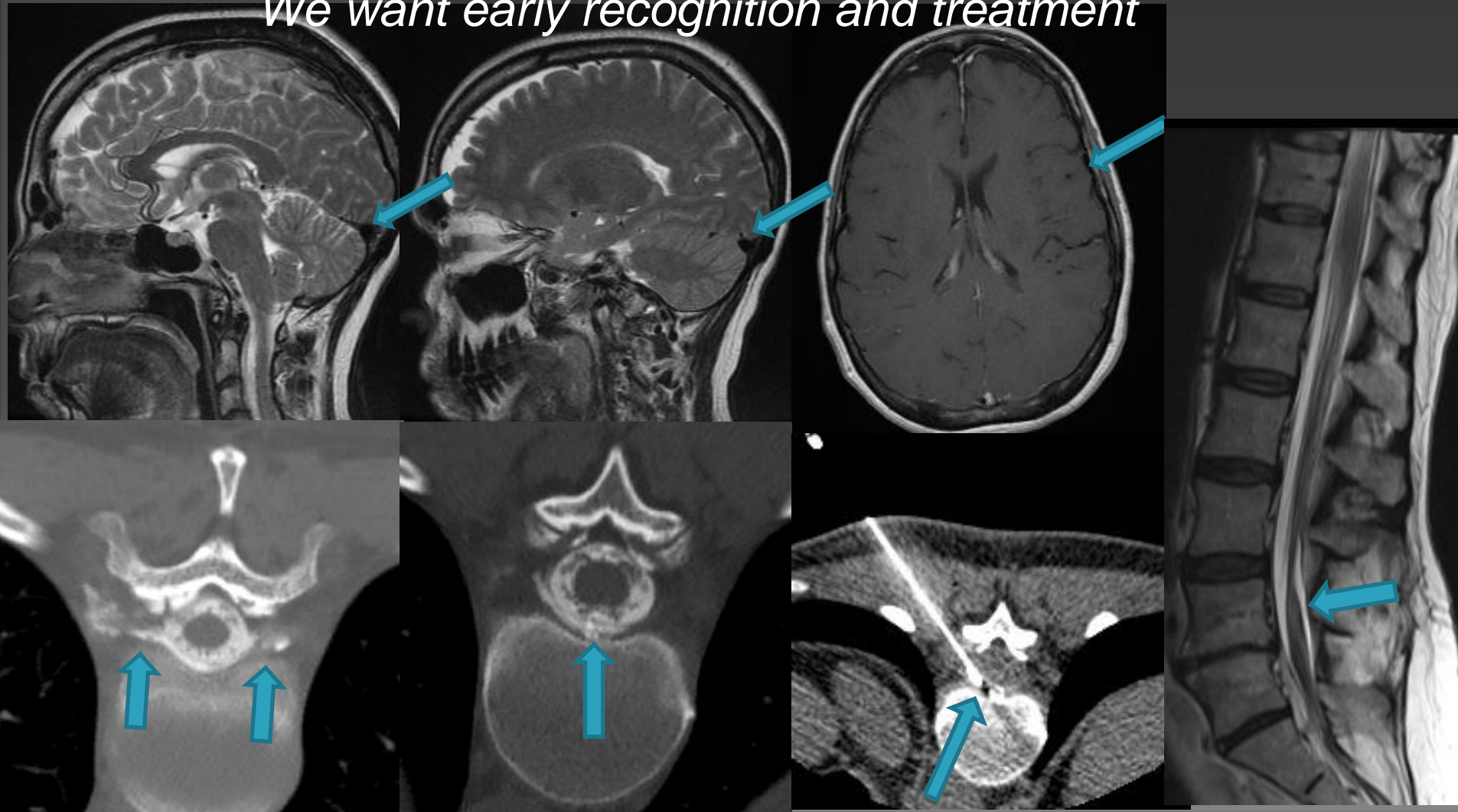


44 yo with 10 years of HAs that came on suddenly: associated blurry vision, N/V, worse at the end of the day, rates the pain at 15/10: ? subtle fistula; targeted patch completely relieves HA for 2 weeks; *post surgery now HA free*



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*



Advantages of CT Guided Interventions

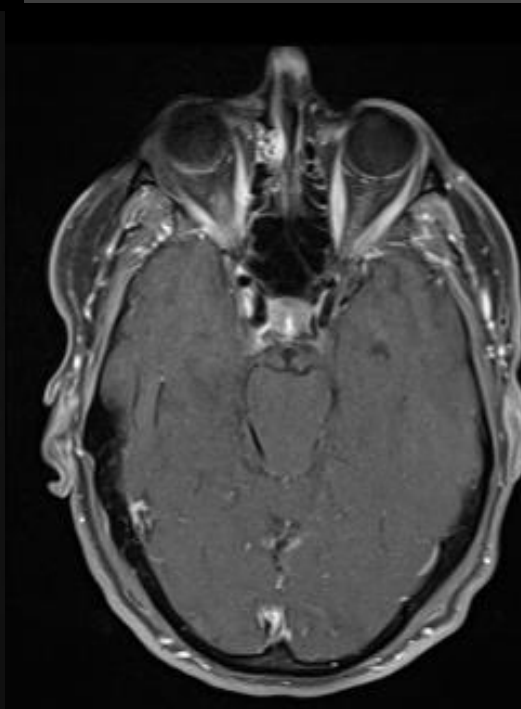
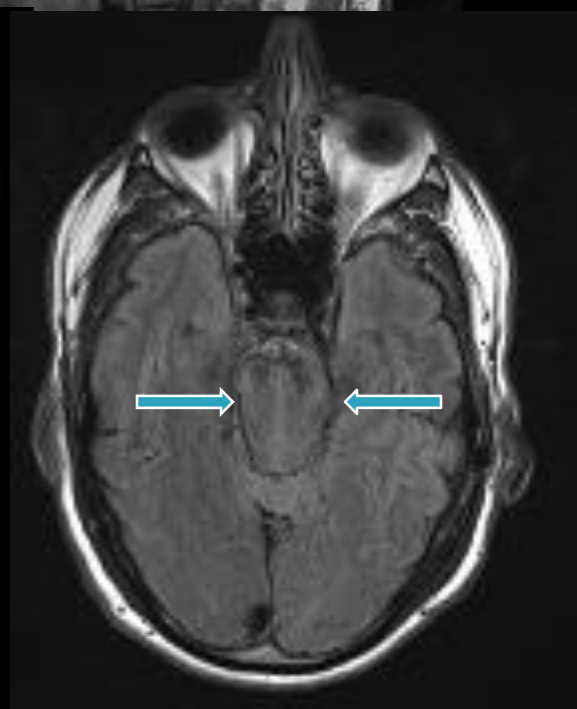
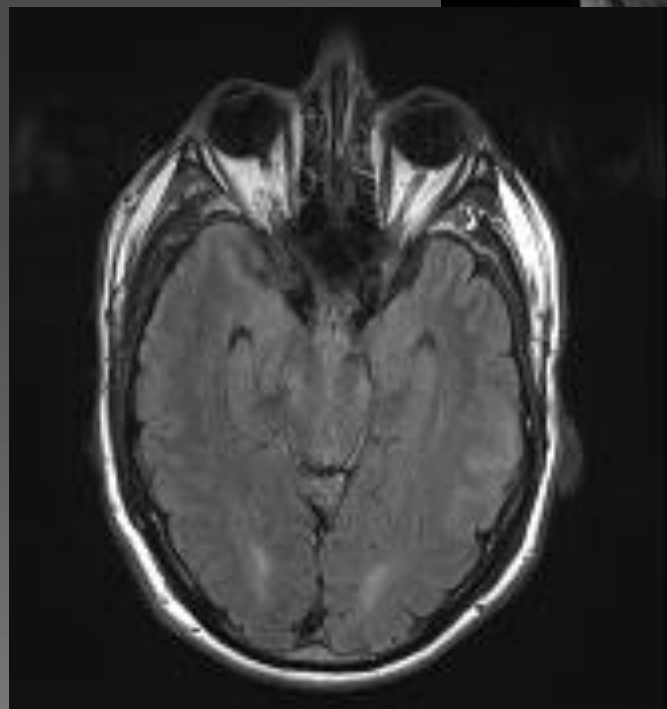
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Wish List for CSF Leaks

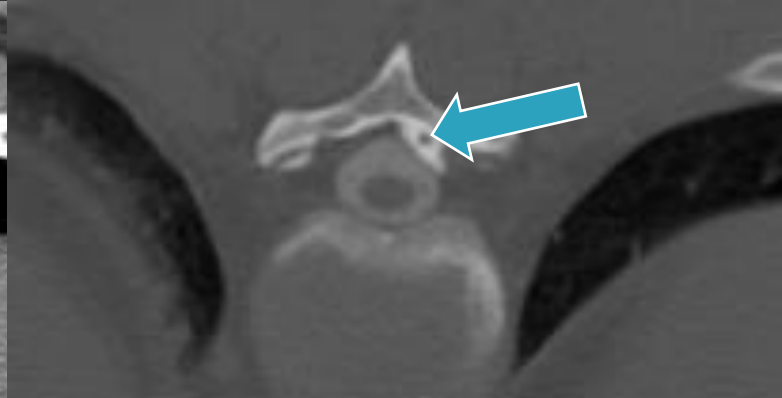
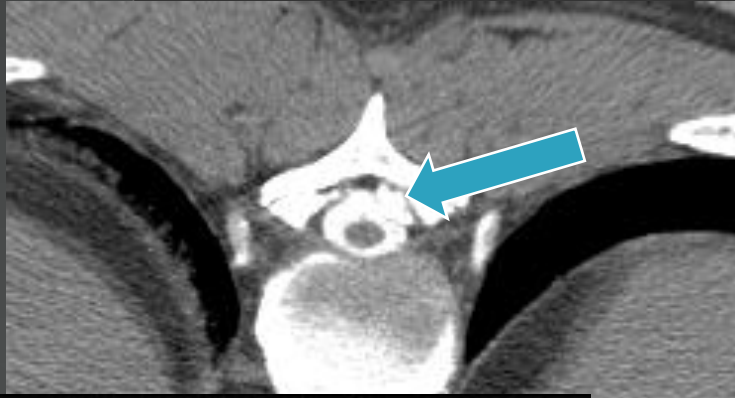
- Find a clinical test that will help clinicians identify patients
- Find a test (blood?) that will detect leakers
- Higher resolution imaging that can detect undetectable leaks
- Develop minimally invasive techniques for treating all leaks
- Early recognition and treatment of those with leaks

Thank you!

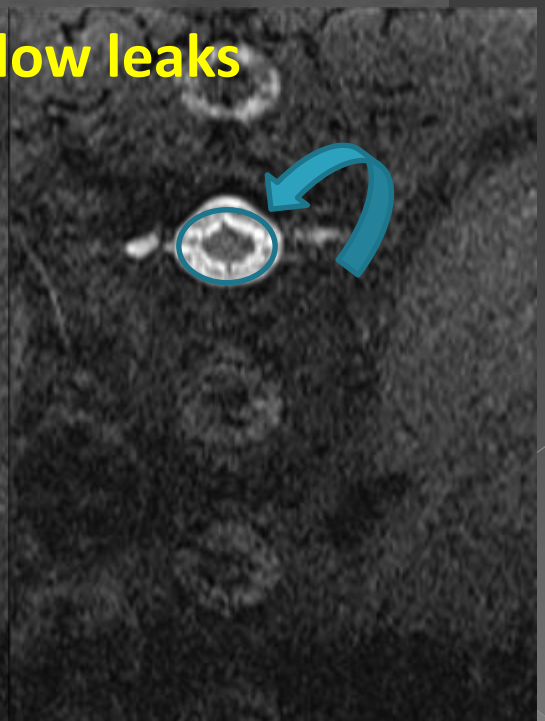
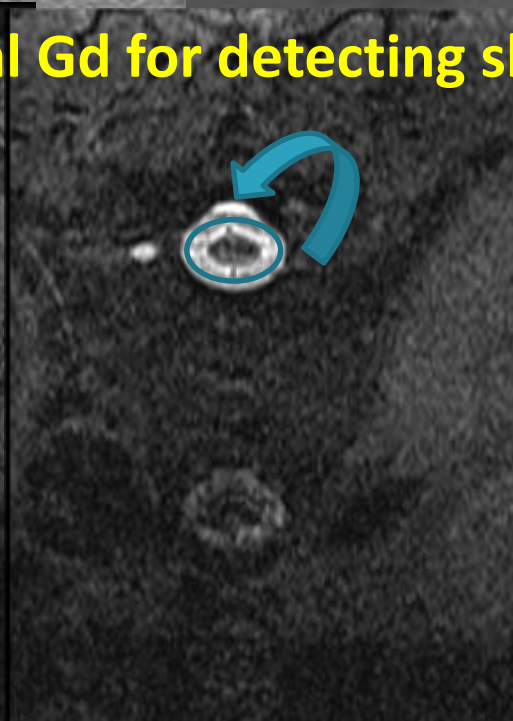
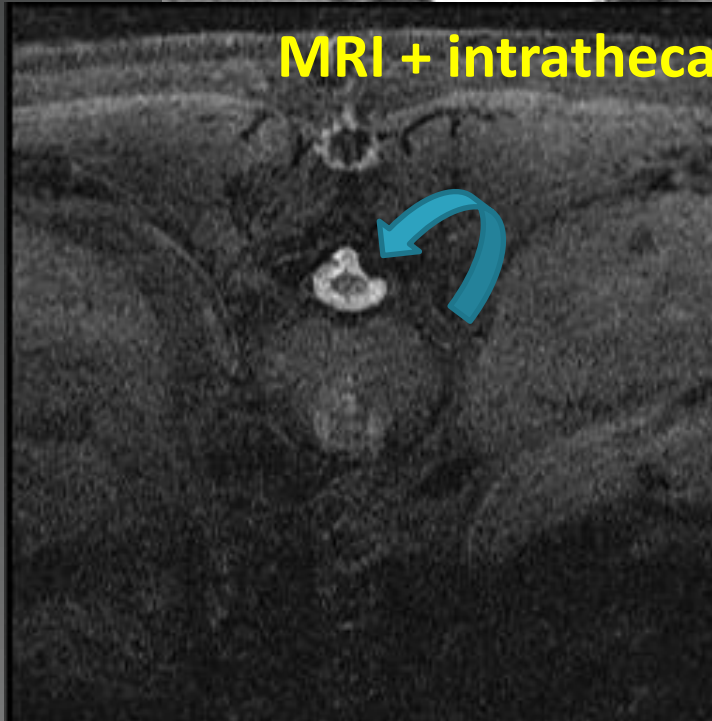
58 yo with prior headaches that resolved, now with dysarthria and dysequilibrium, no precipitating event, has probably been progressing over 9 yrs



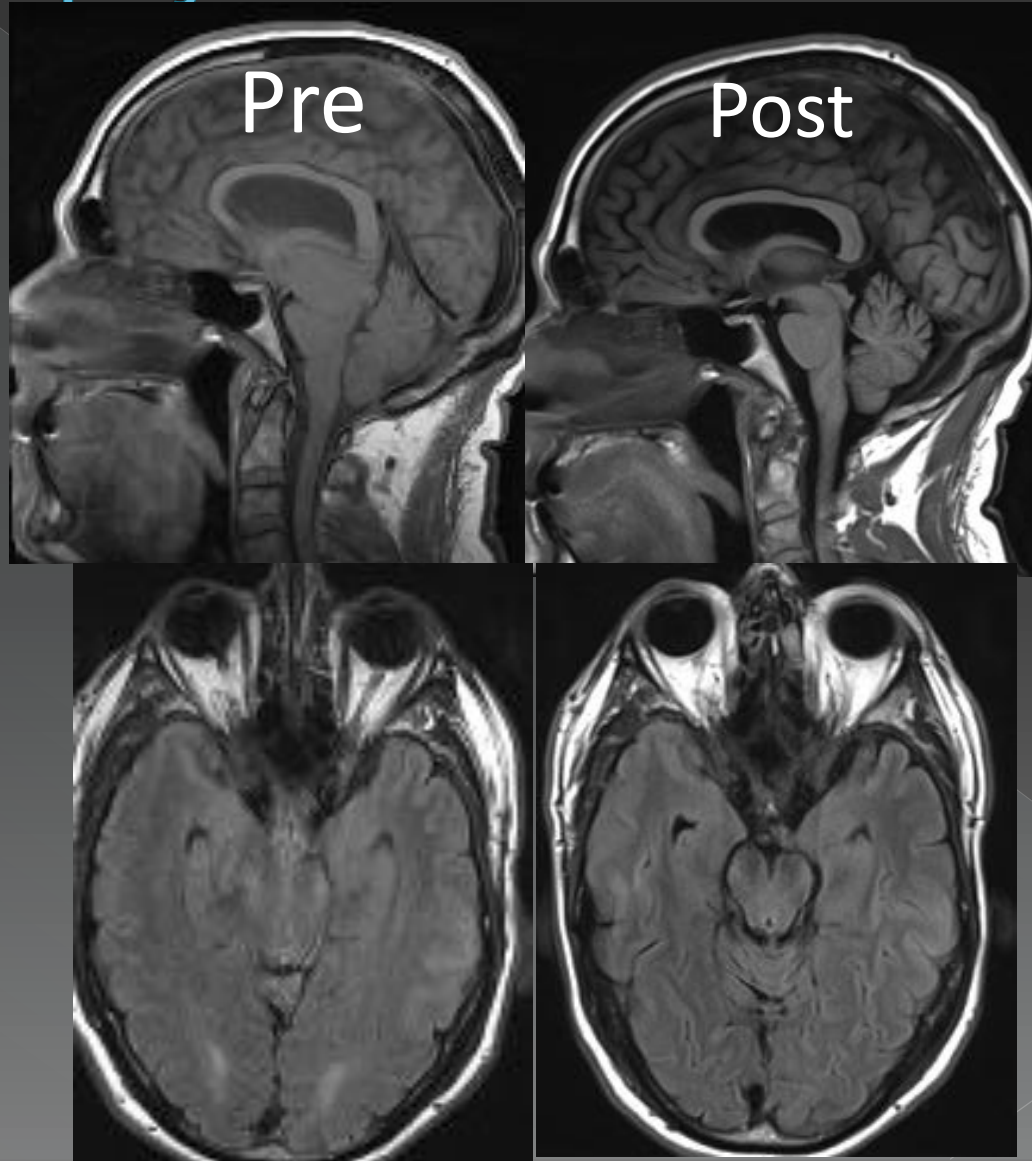
No leak seen on conventional myelography; seen on MR myelography, posterior osteophytes causing leaks: op 15.5



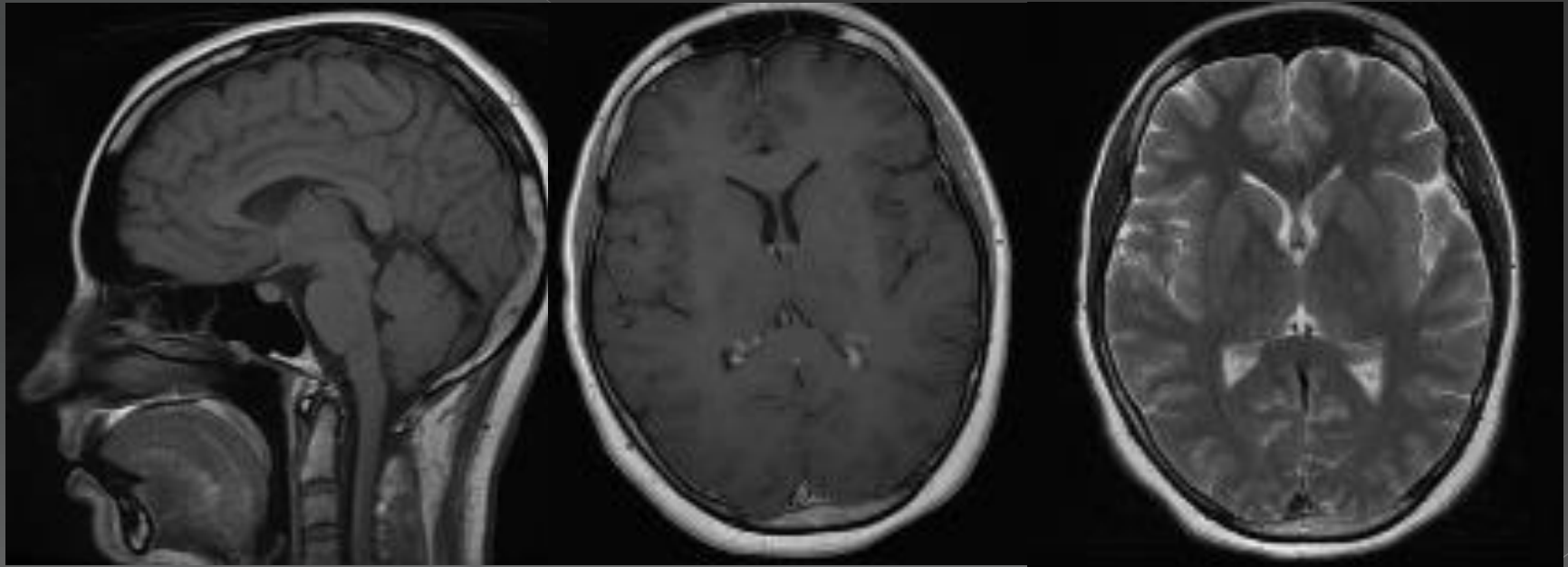
MRI + intrathecal Gd for detecting slow leaks



Imaging: post op resection of facet osteophytes

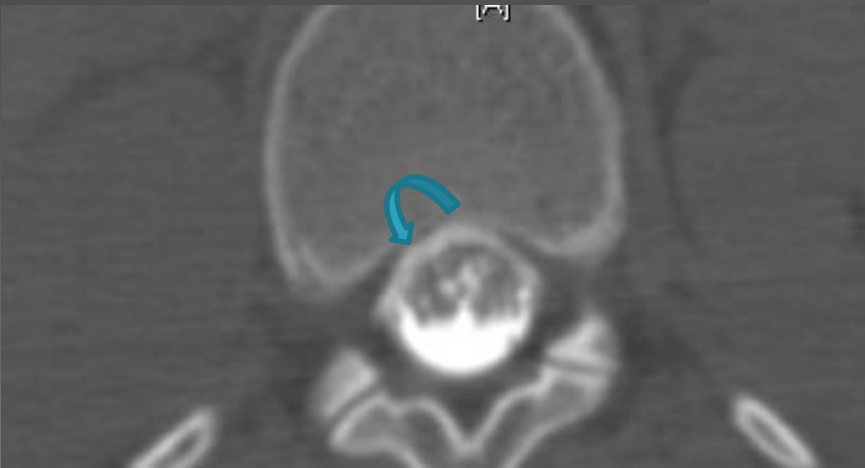
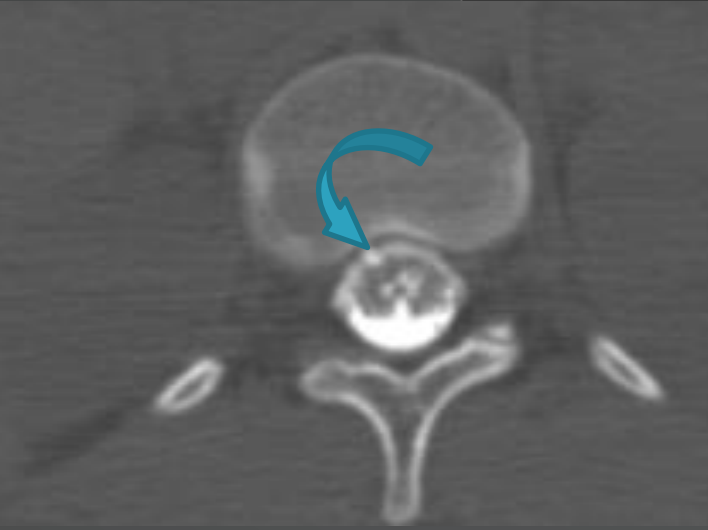


32-year-old female C/O positional headache for several months no leak seen on myelogram; OP 4; MRI negative
1 blind BP with temporary relief



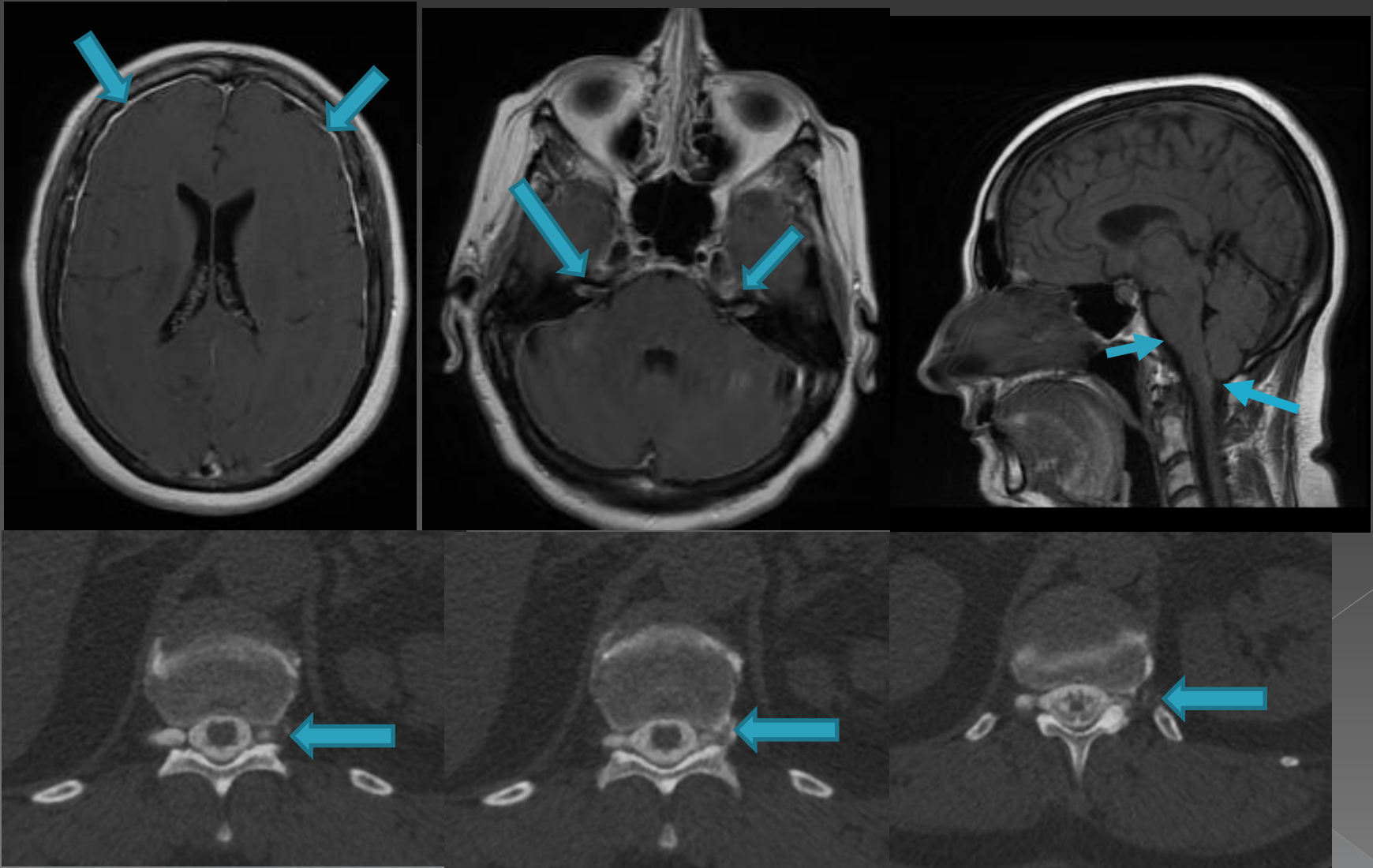
No MR imaging findings to suggest leak

Subtle disc penetrates dura causing subtle leak
Patient cured for 4 years s/p targeted patch

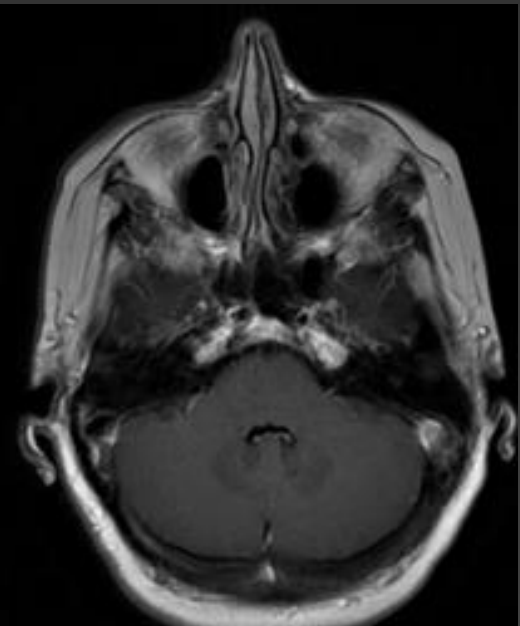
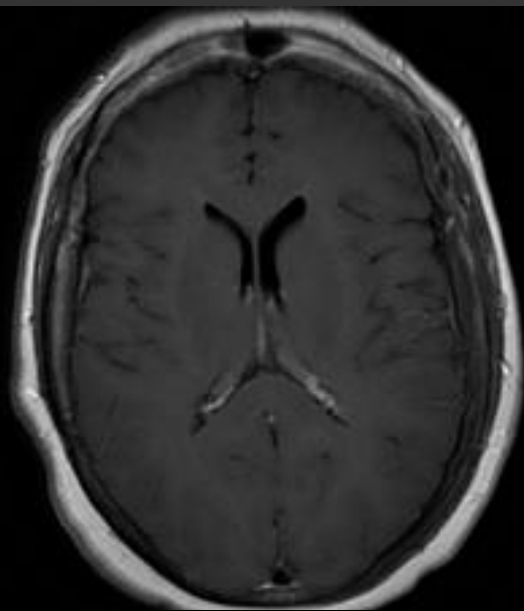


HX of Breast CA

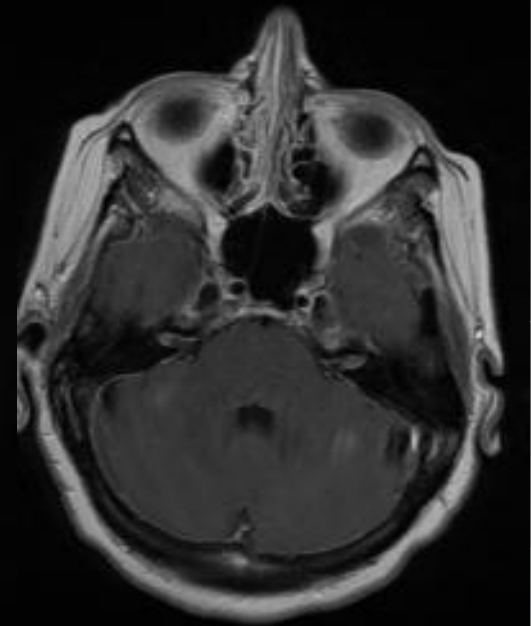
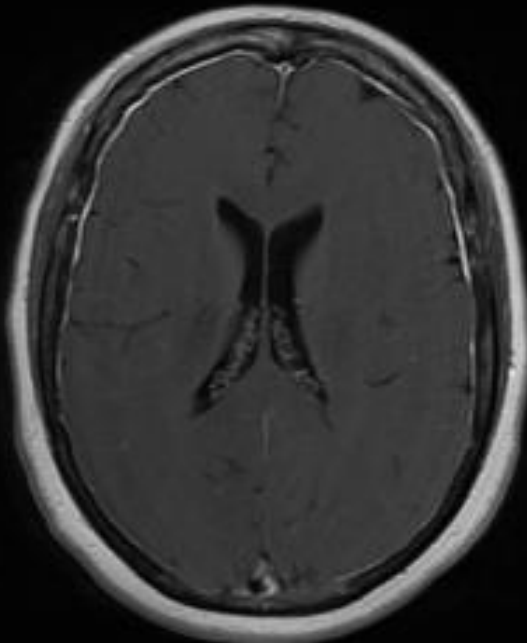
? Metastatic Disease to the Dura



POST 2017

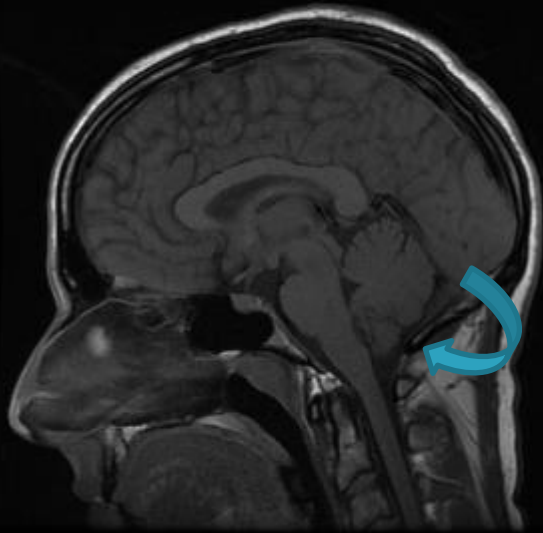


PRE 2012

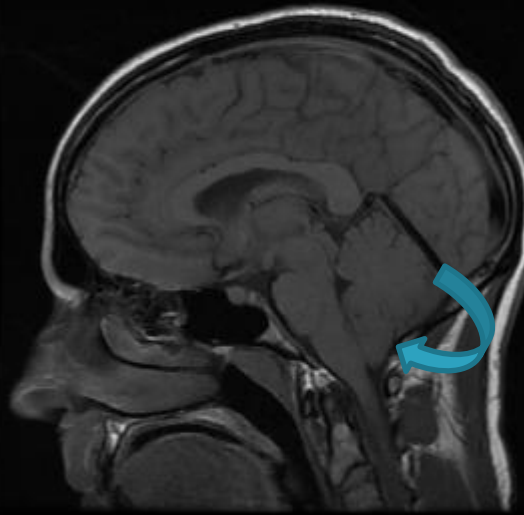


In the setting of “Acquired Chiari I” or Chiari occurring later in adulthood exclude SIH

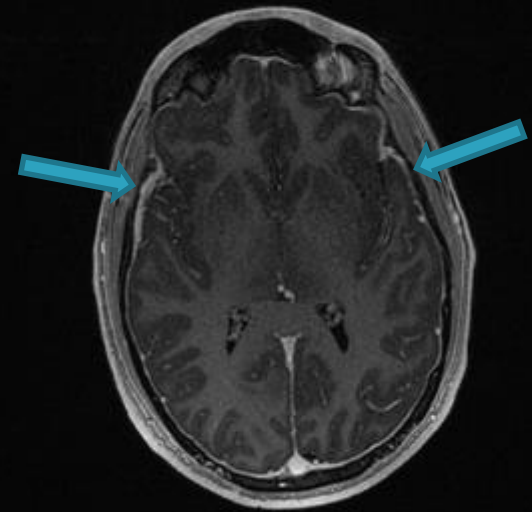
4/2017



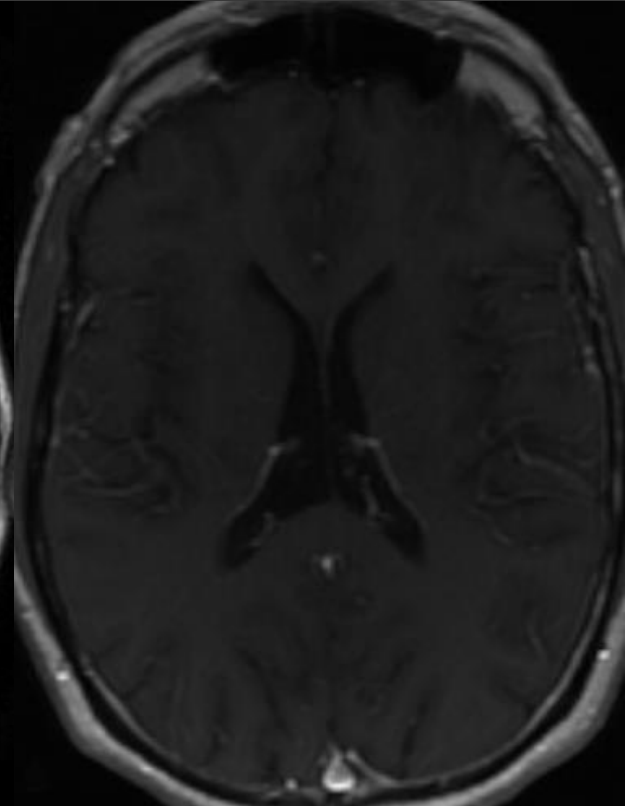
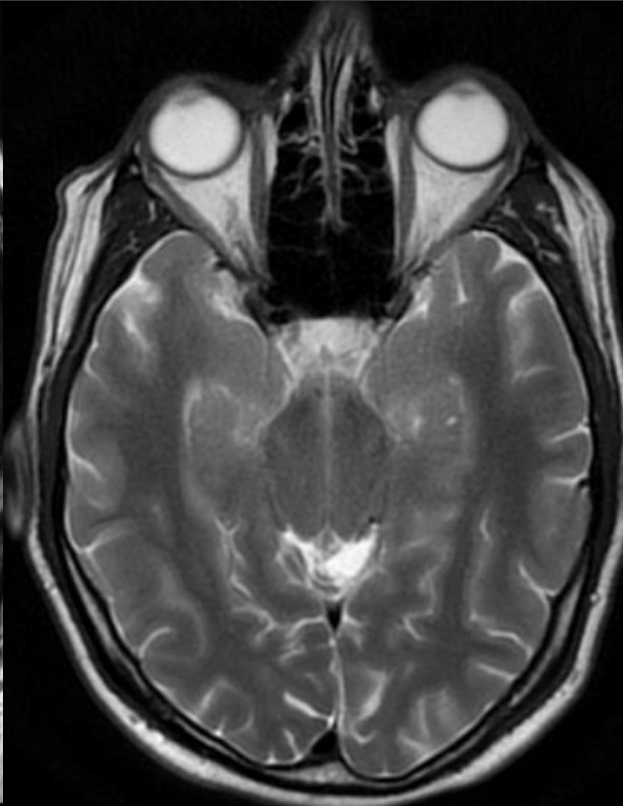
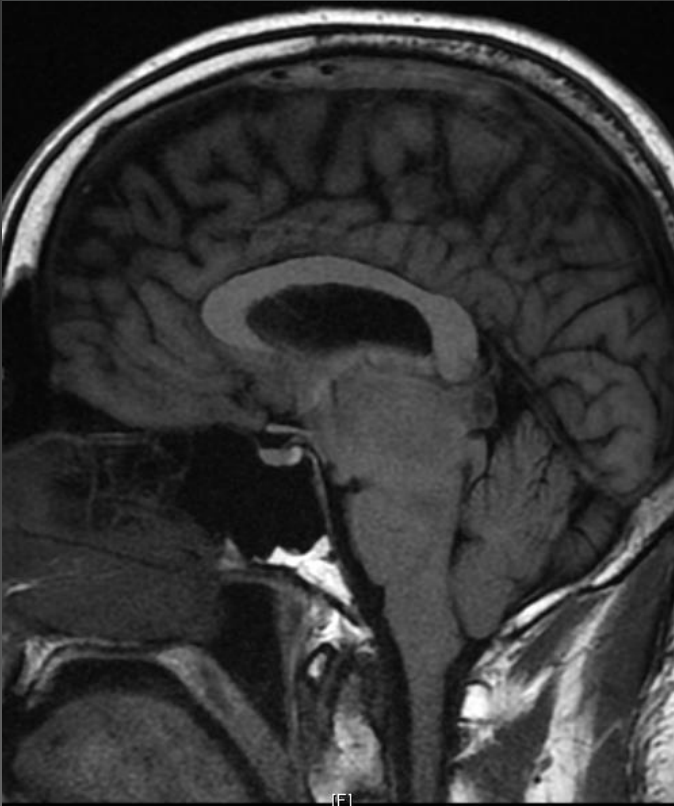
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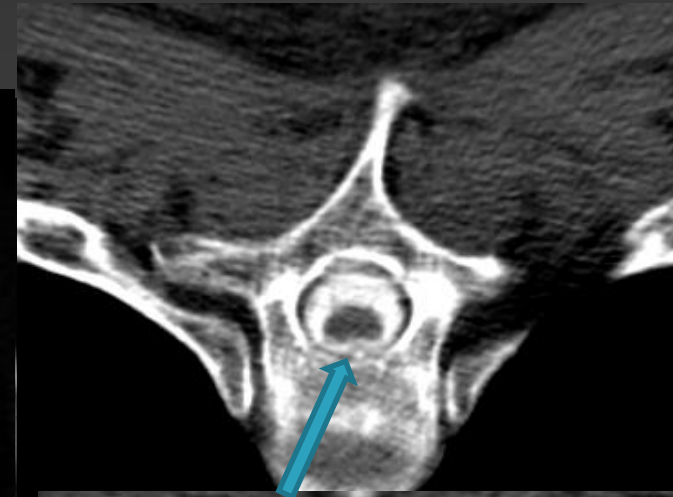
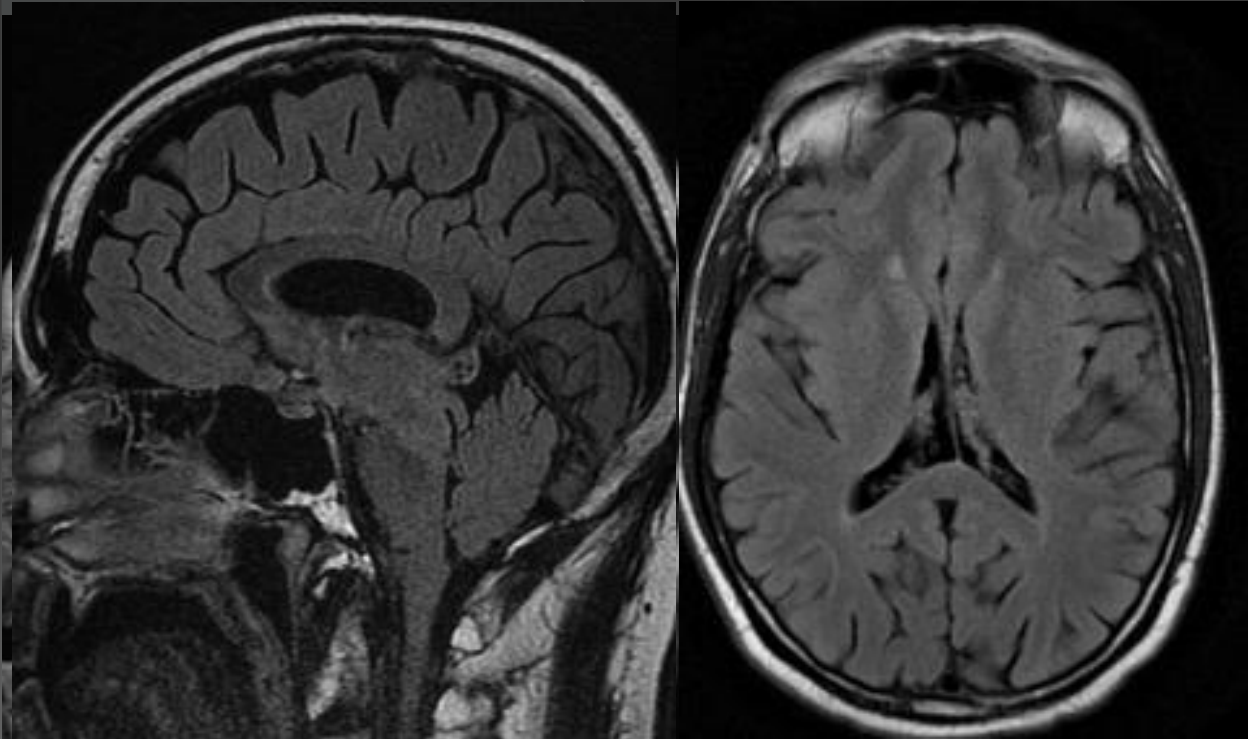
11/2017



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 $2+2$

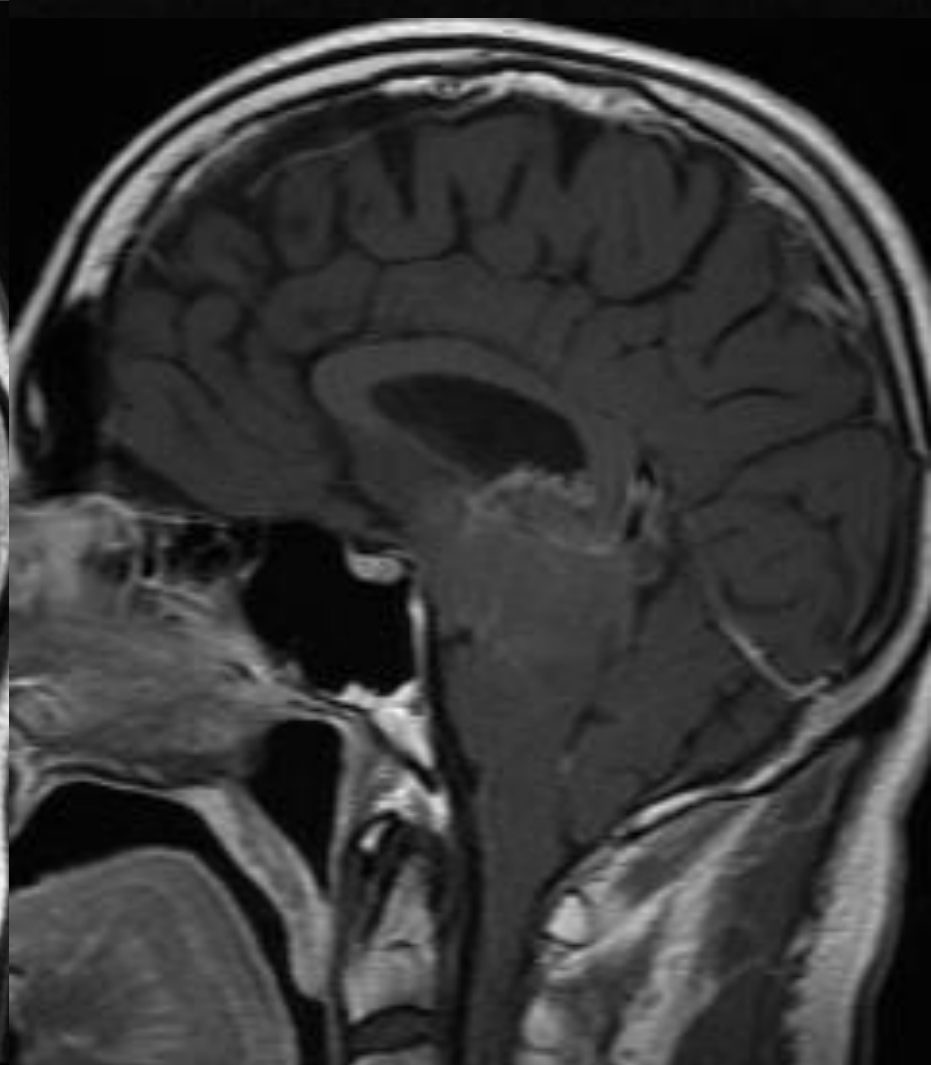
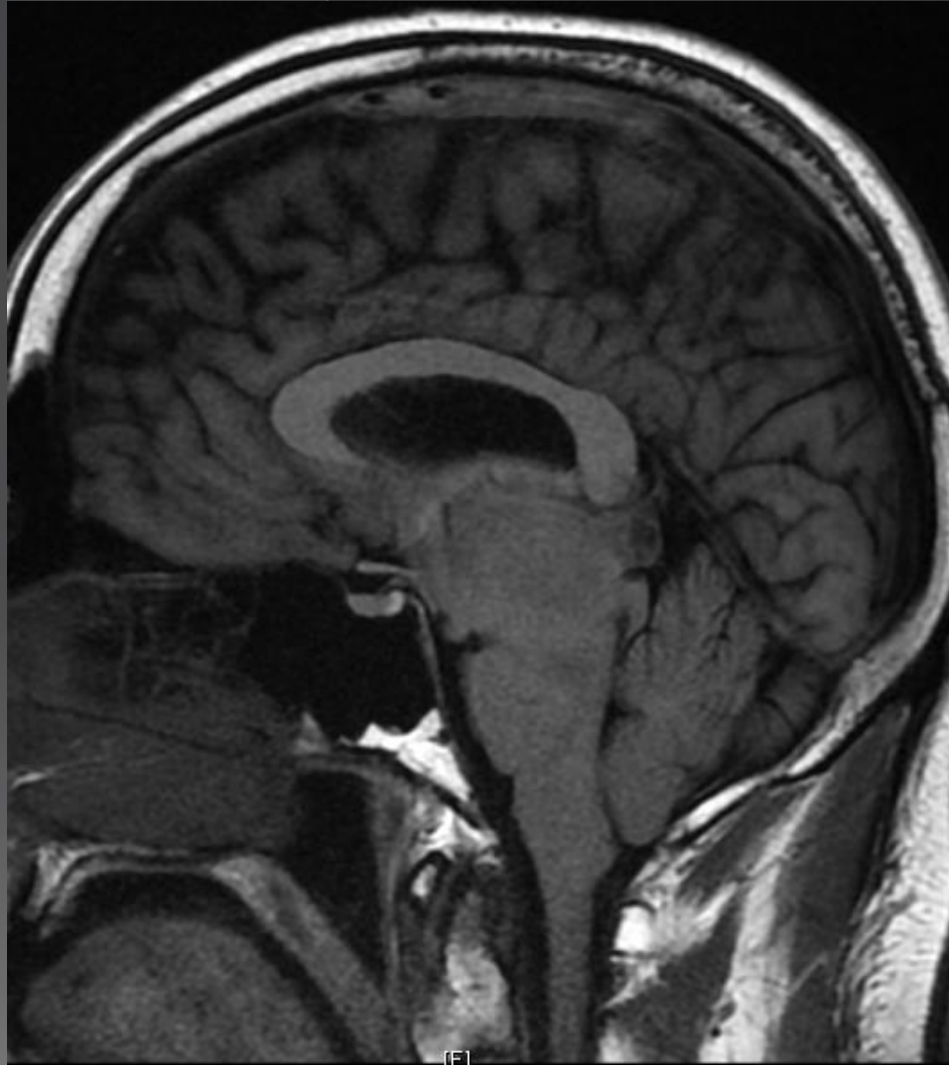


This 55-year-old male presents today with C/O headaches, double vision, short-term memory loss, swallowing problems and disequilibrium causing falls, hypersomnia

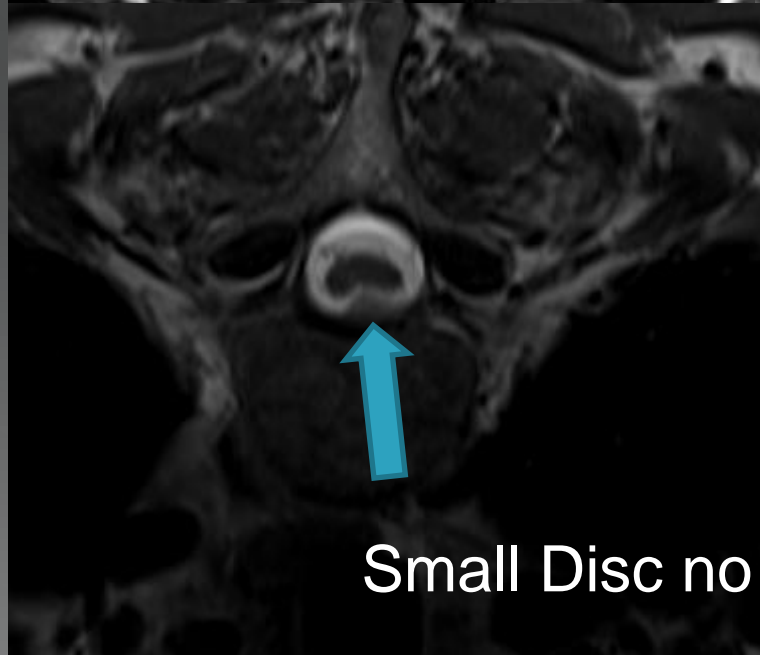
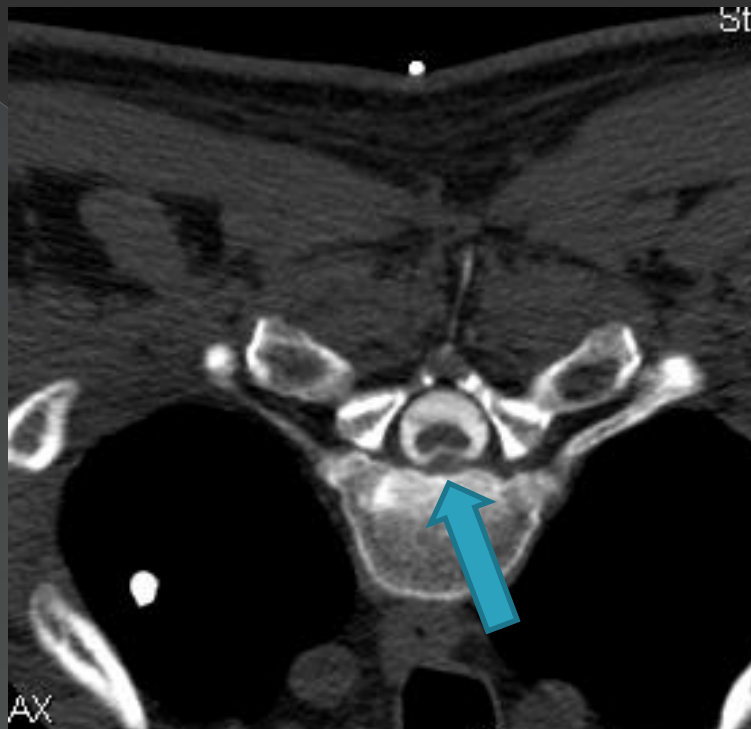


Disc required surgery for repair

From 2012-2016 worsening herniation

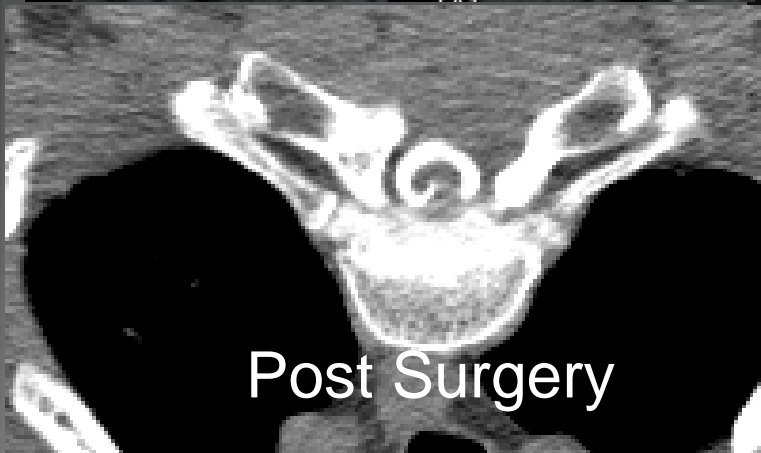


Study

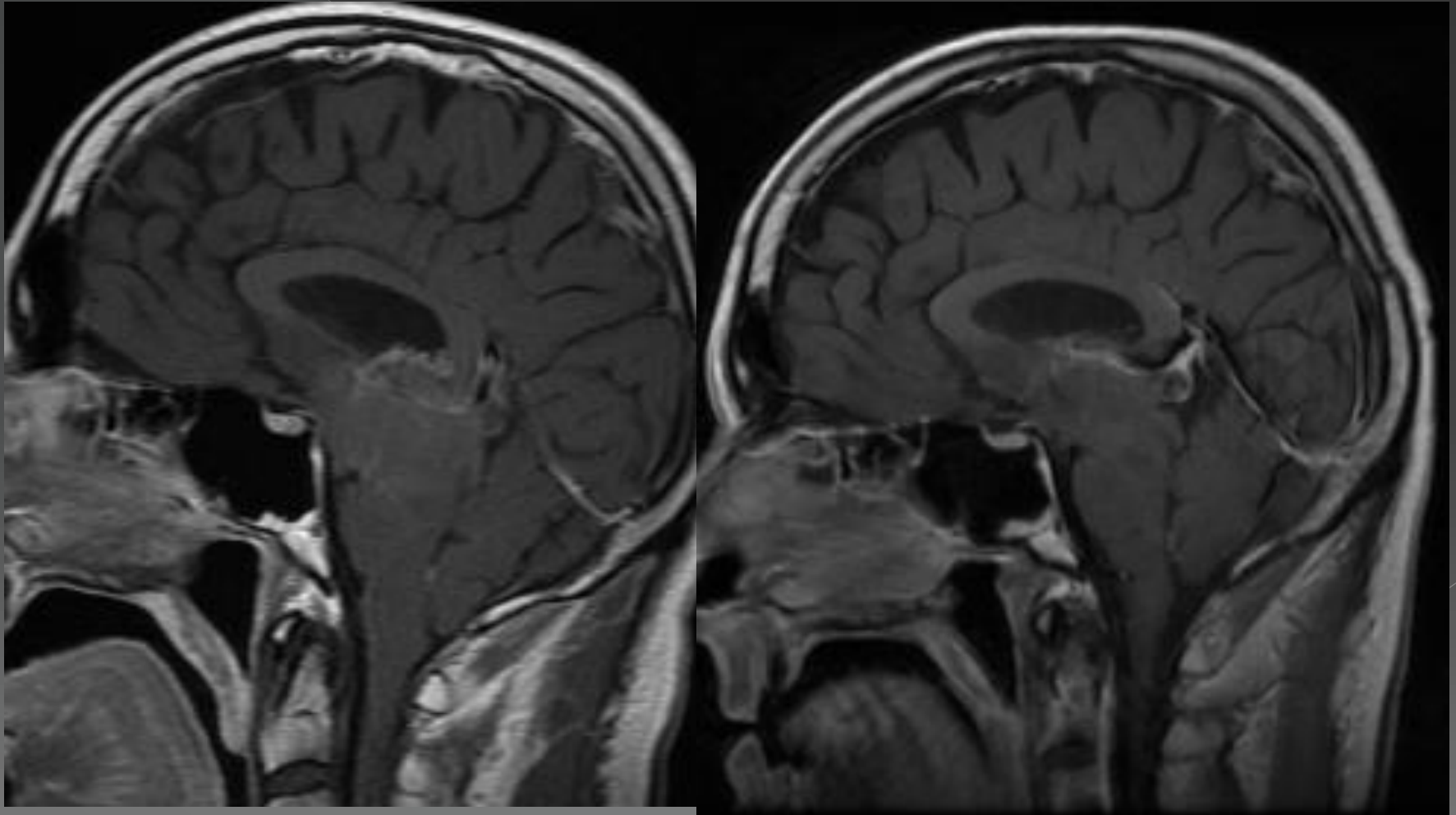


Small Disc no obvious leak

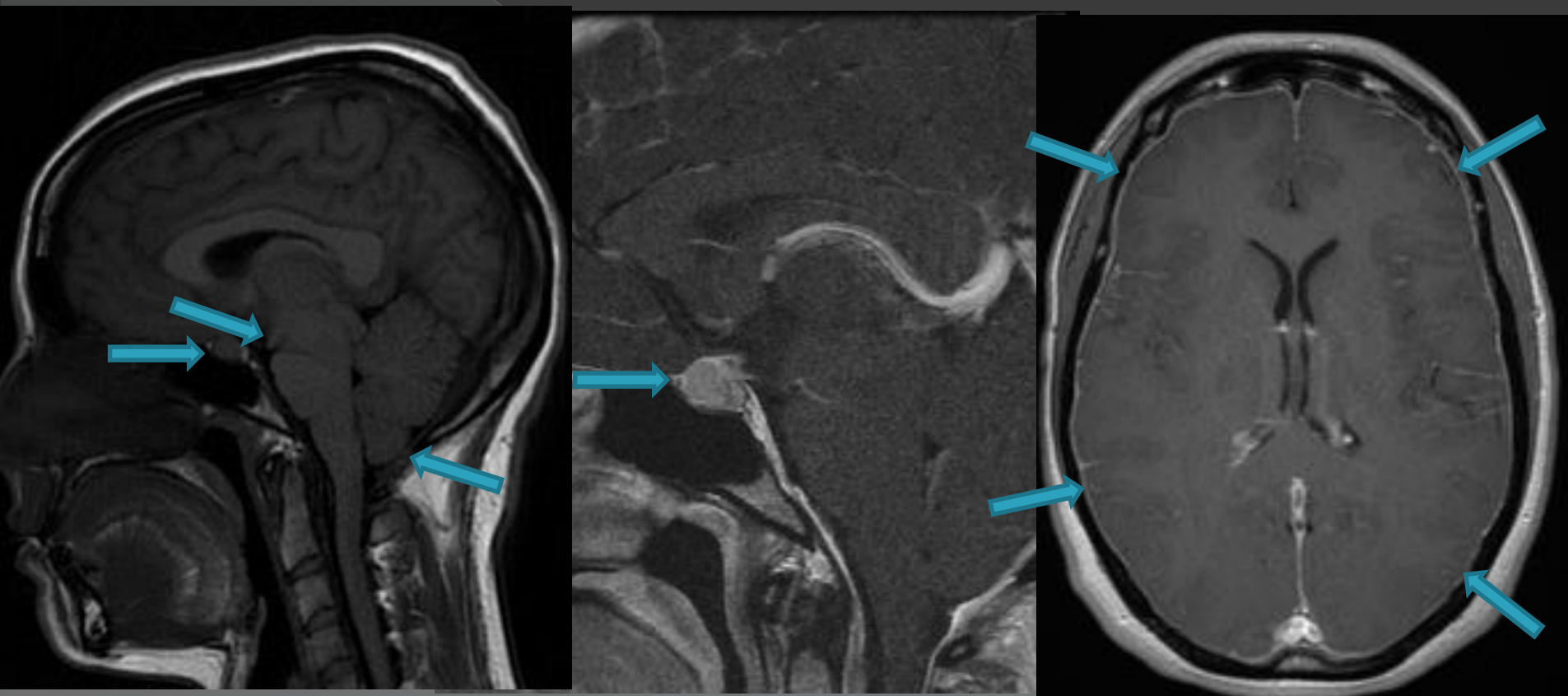
s/p 1st Surgery: Disc increased in size



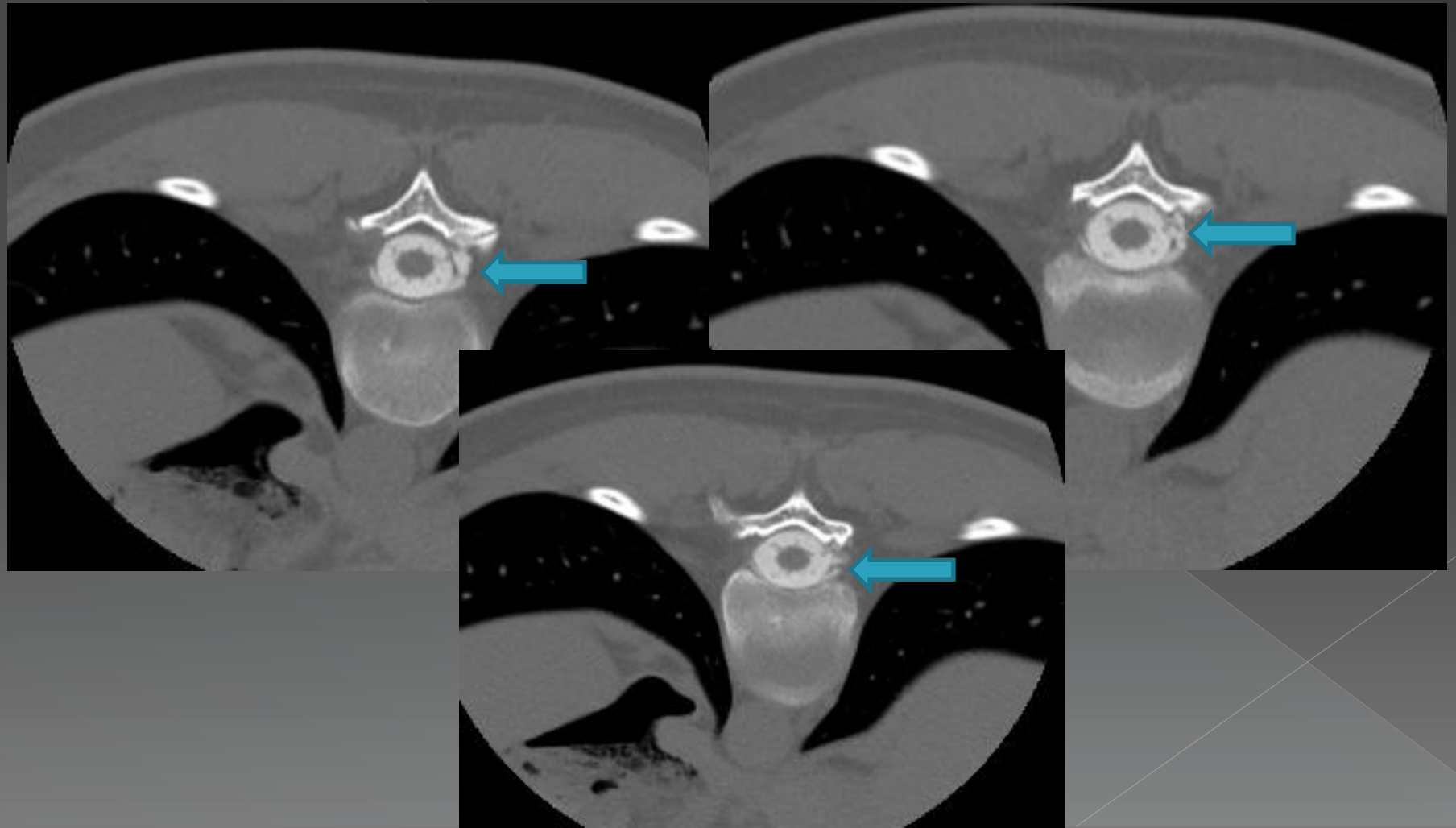
Oct 2017 MRI :s/p 2nd surgery repeat MRI 6 mos later; improved downward herniation



26 yo patient with HA given dx of sarcoid and pituitary tumor undergoes pituitary biopsy; missed findings of SIH

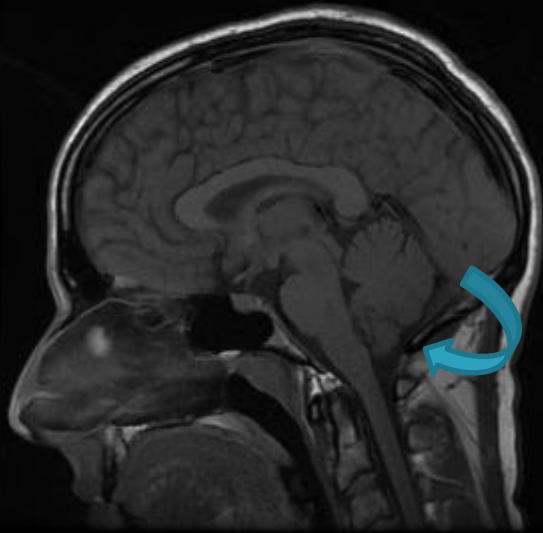


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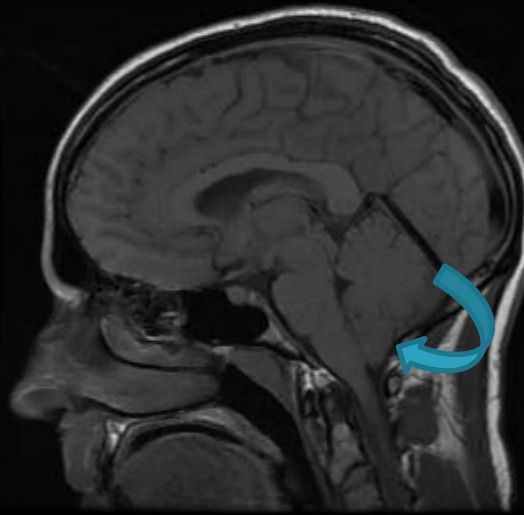


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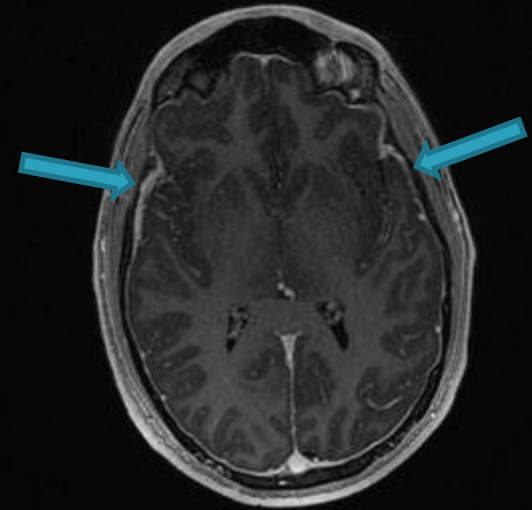
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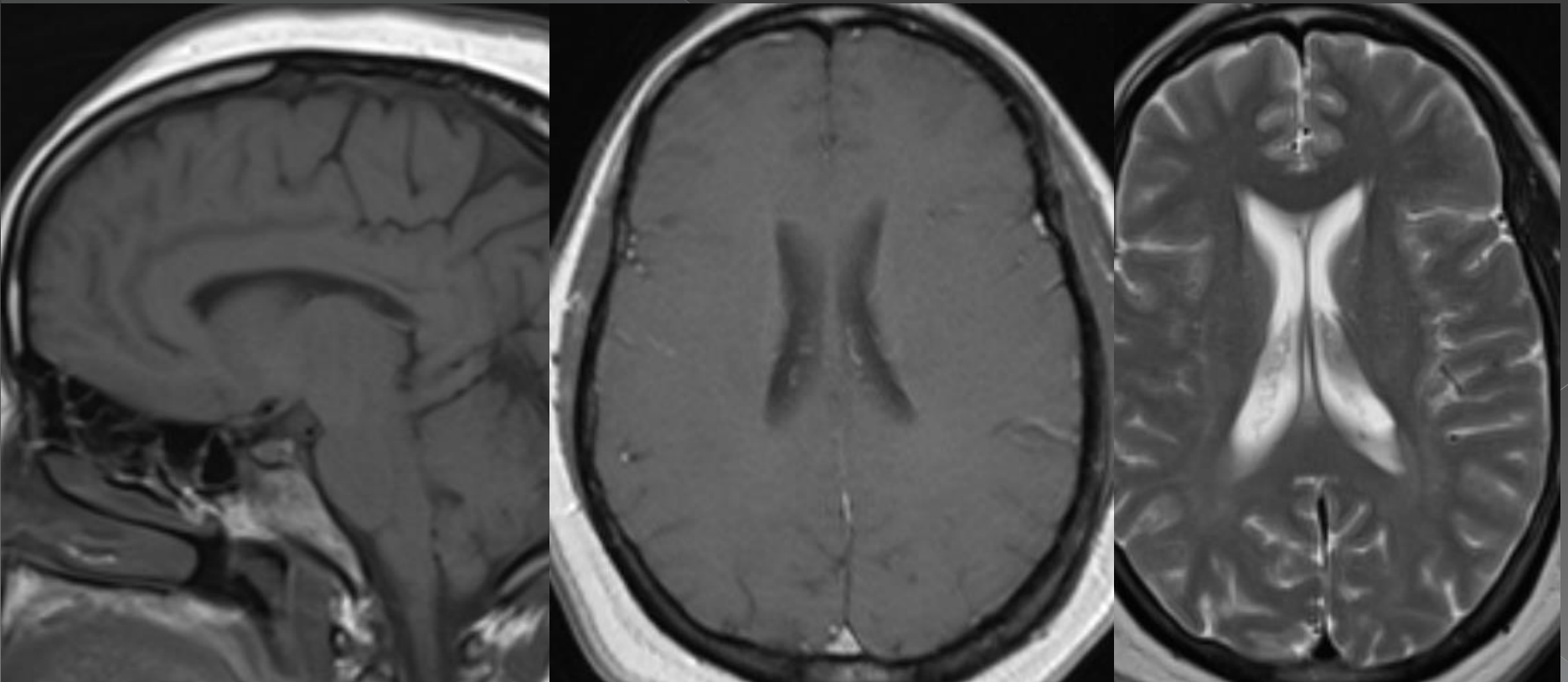


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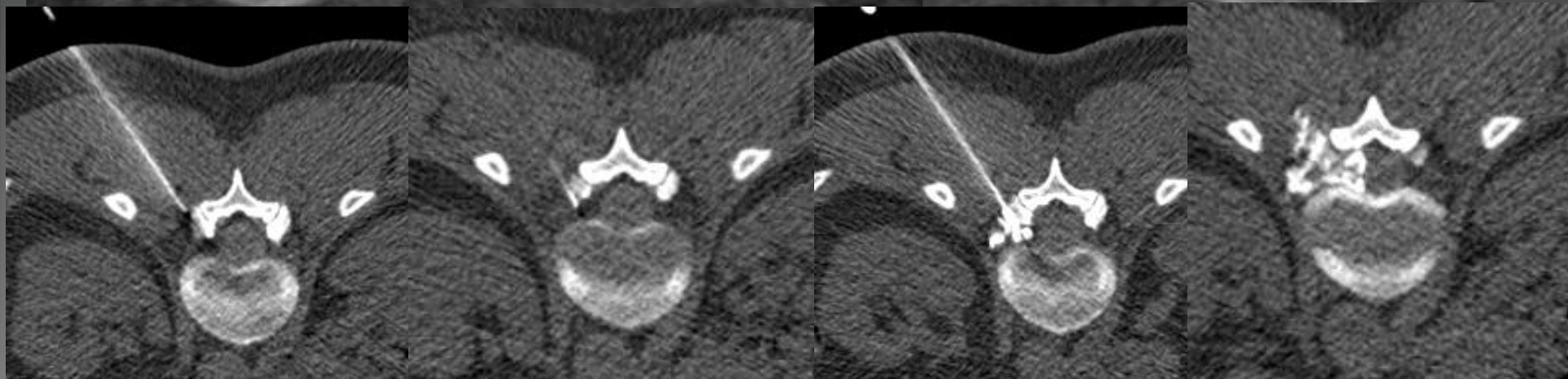
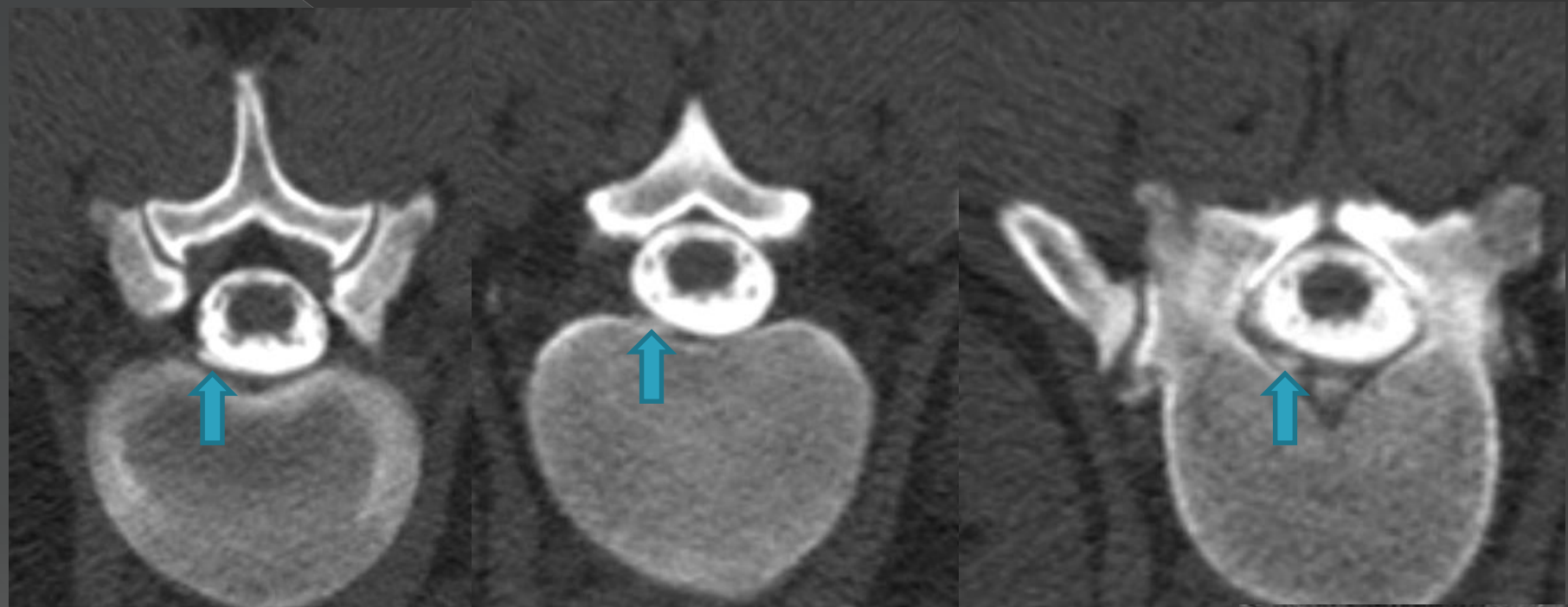


SIH is defined by low CSF pressure

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

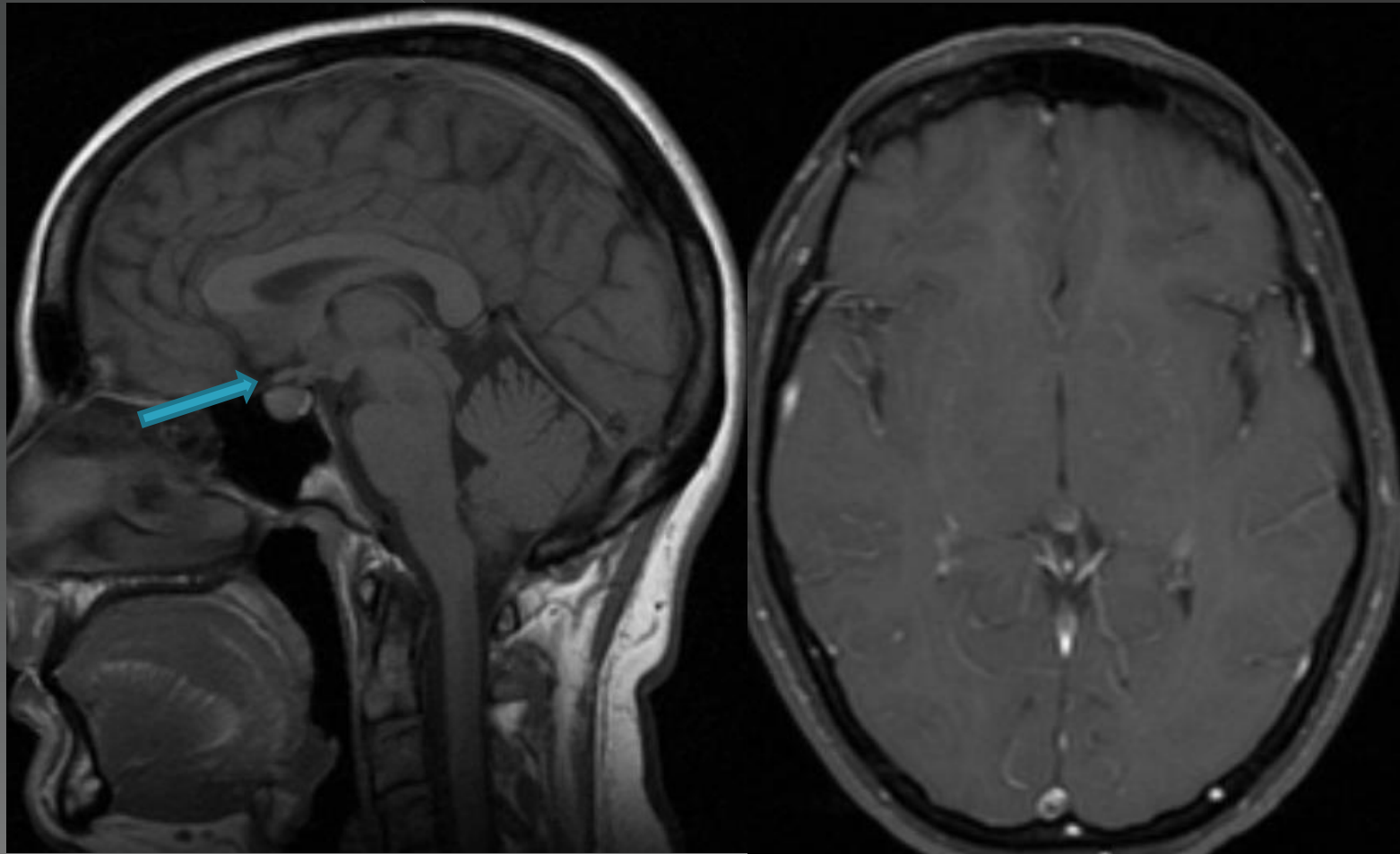


Extrathecal collection OP: 31.20

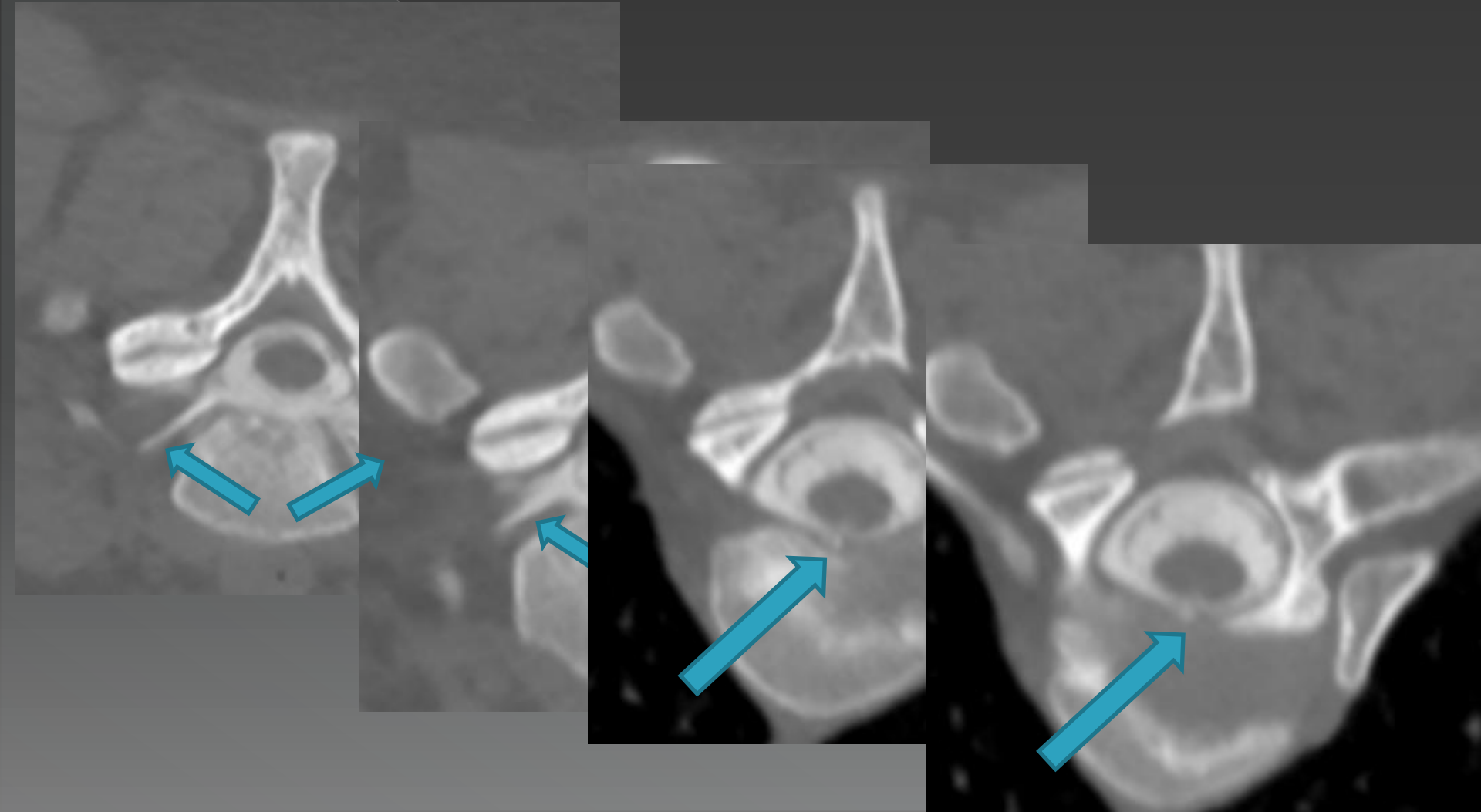


A negative brain MRI excludes SIH

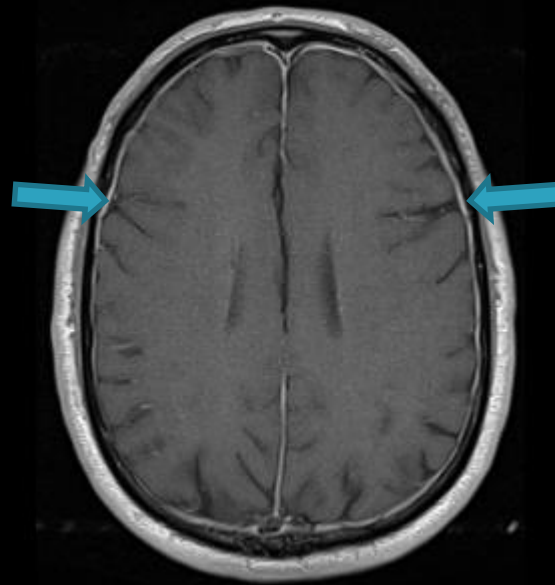
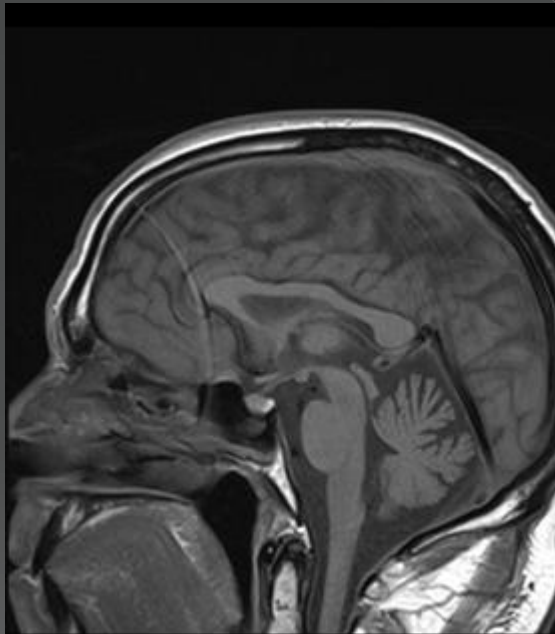
31 yo with sudden onset of HAs since 2/21/18; **NDPH**; she gets a rush of pressure when sitting up, HAs are positional, they can wake her at night; a lumbar bloodpatch did not help; she was seen by another neurologist who told her she was not sick enough to have a CSF leak



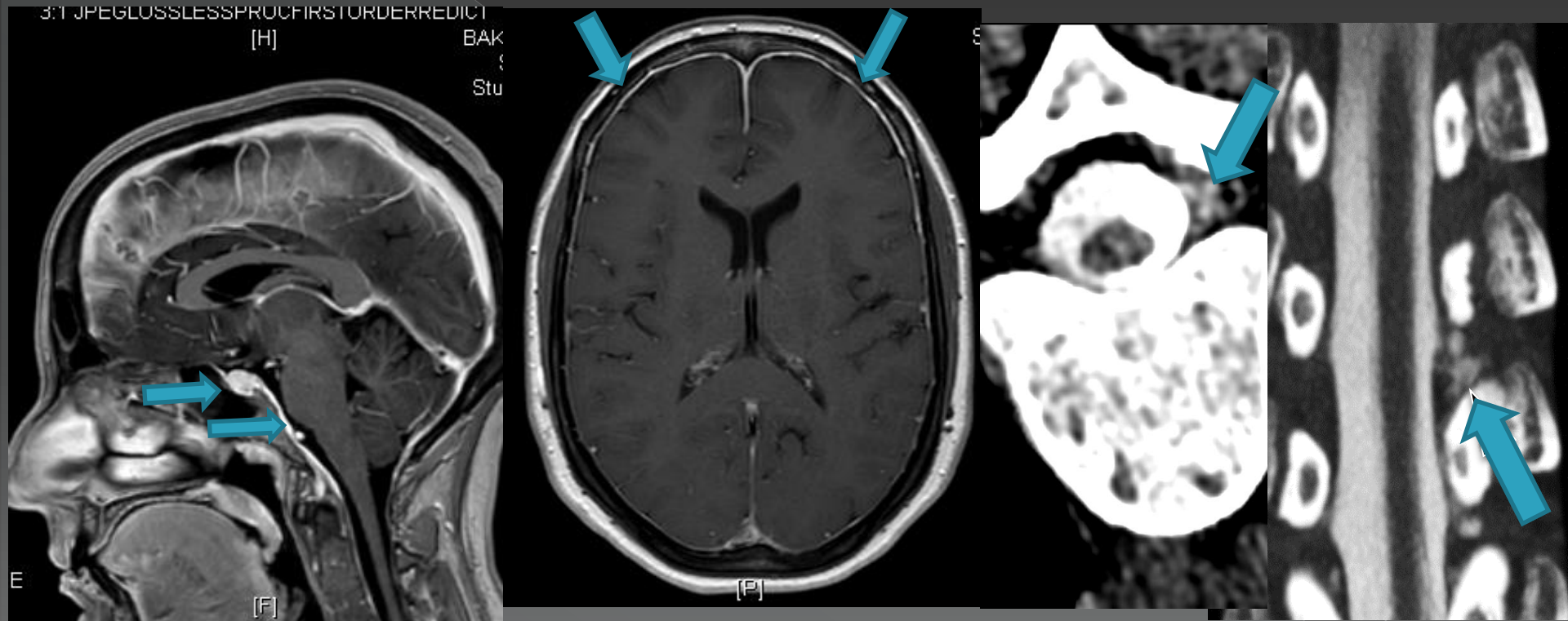
CT Myelogram: diffuse CSF leak
caused by tiny calcified disc at T2-3



68 yo with double vision: CSF veno fistula originating from a cyst

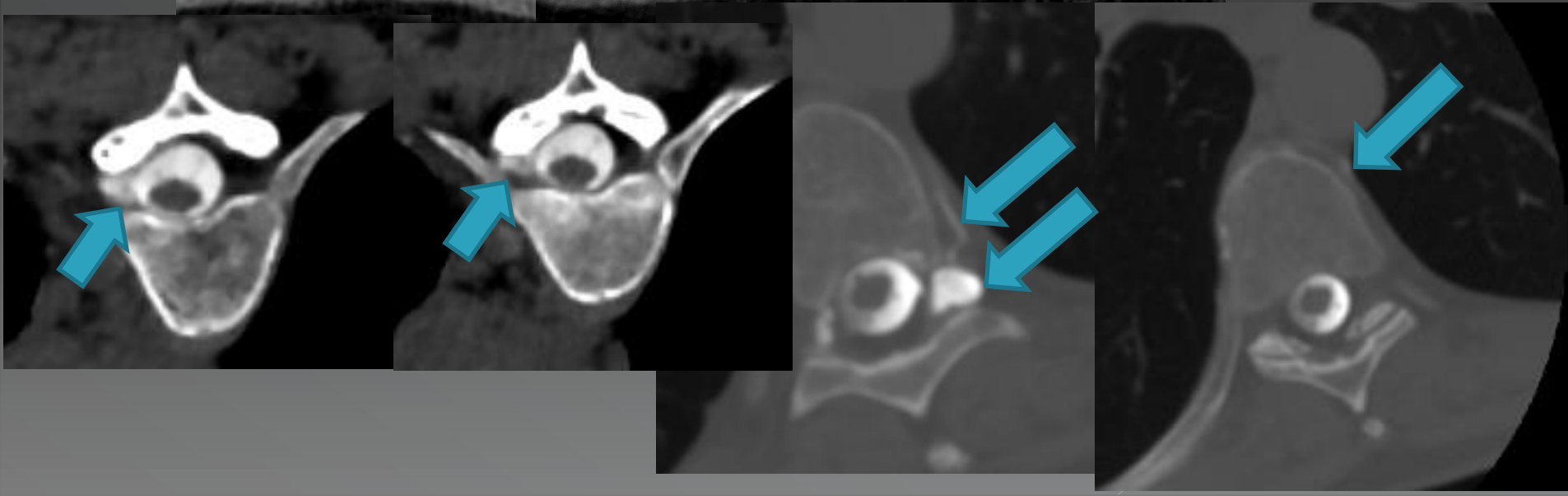
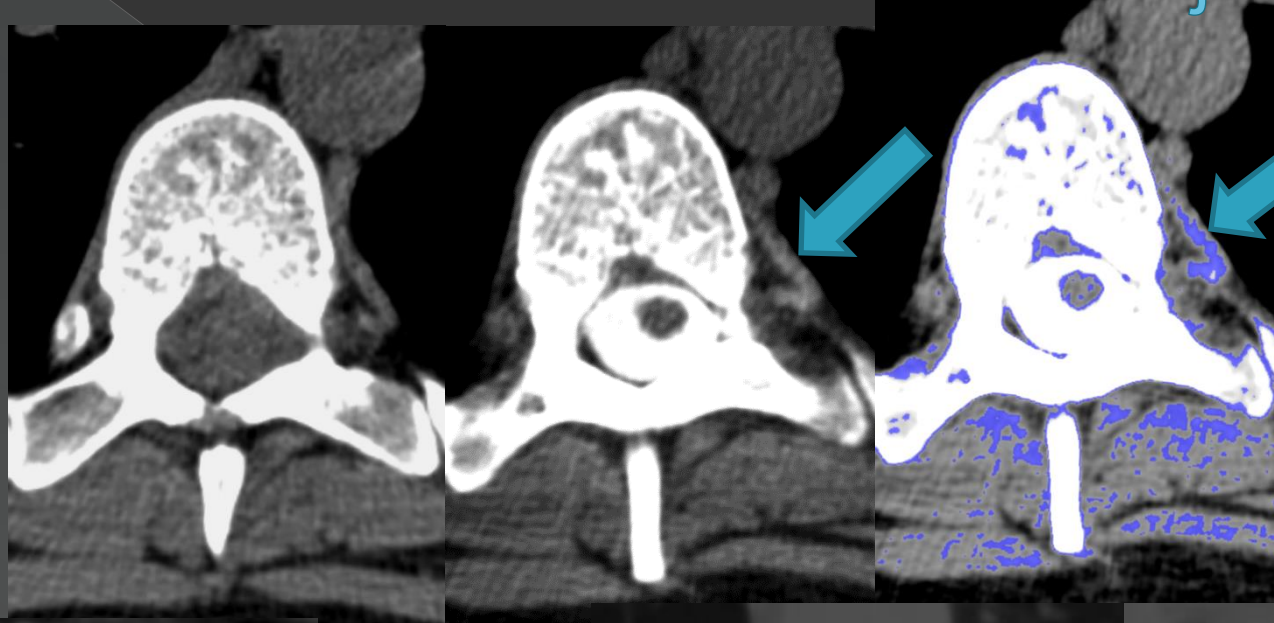


46 yo with 6 yr history of positional HAs: web of fistula



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

