

# 10 Myths and Misconceptions about Spontaneous Intracranial Hypotension

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**DukeHealth**

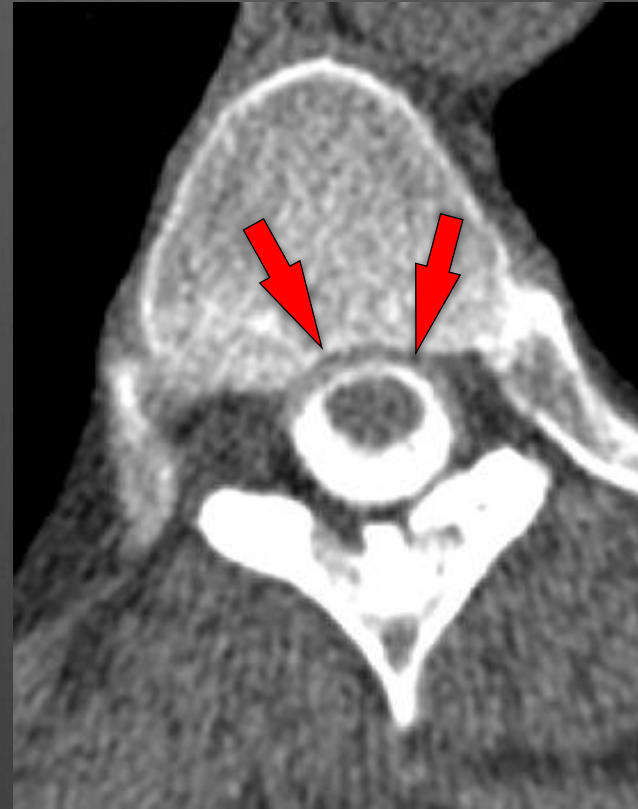
# Disclosures

1. No conflict of interest
2. Use of fibrin glue for epidural injection is off label

# 10 Myths and Misconceptions

1. SIH defined by low pressure
2. SIH always characterized by orthostatic HA/ orthostatic HA is always SIH
3. Negative brain MRI excludes SIH
4. Patients w/ dural enhancement need workup for infectious meningitis first
5. Chiari I is a feature of SIH
6. All leaks are caused by spinal diverticula /Tarlov cysts
7. Spinal Imaging rarely reveals the leak
8. Skull base CSF leaks cause SIH
9. Blood patch immediately cures SIH
10. After the blood patch, the job is done

# Myth #1: SIH is defined by low pressure



## Case example:

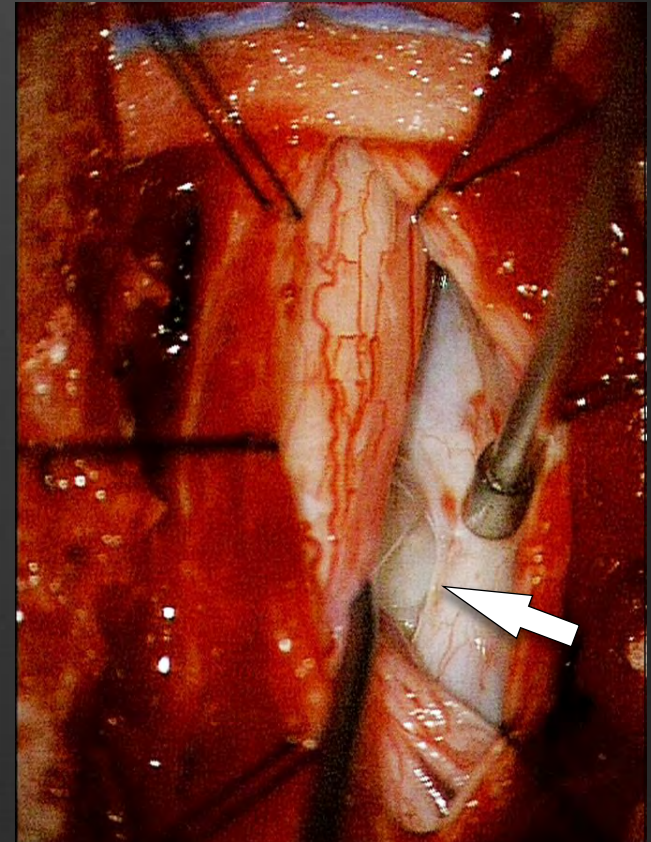
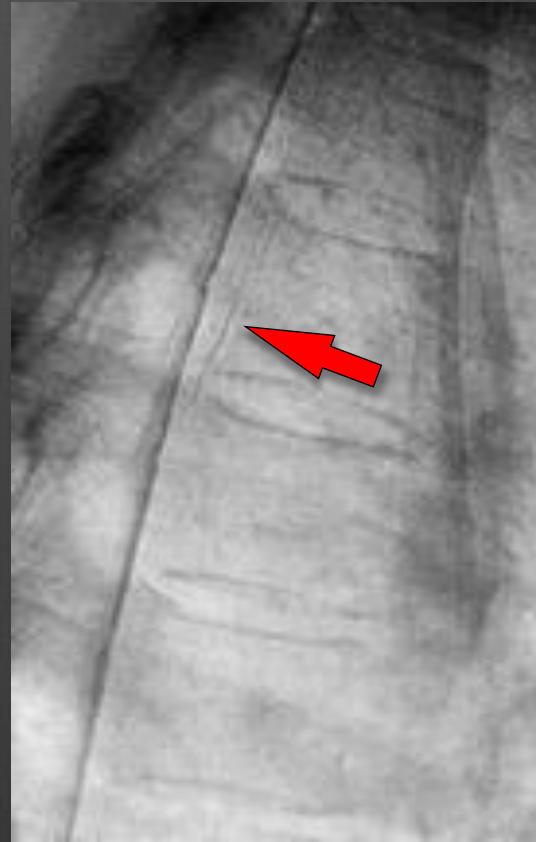
- 57 y.o. female with positional headache
- Opening pressure: 25.4 cm H<sub>2</sub>O



# Myth #1: SIH is defined by low pressure

Case example:

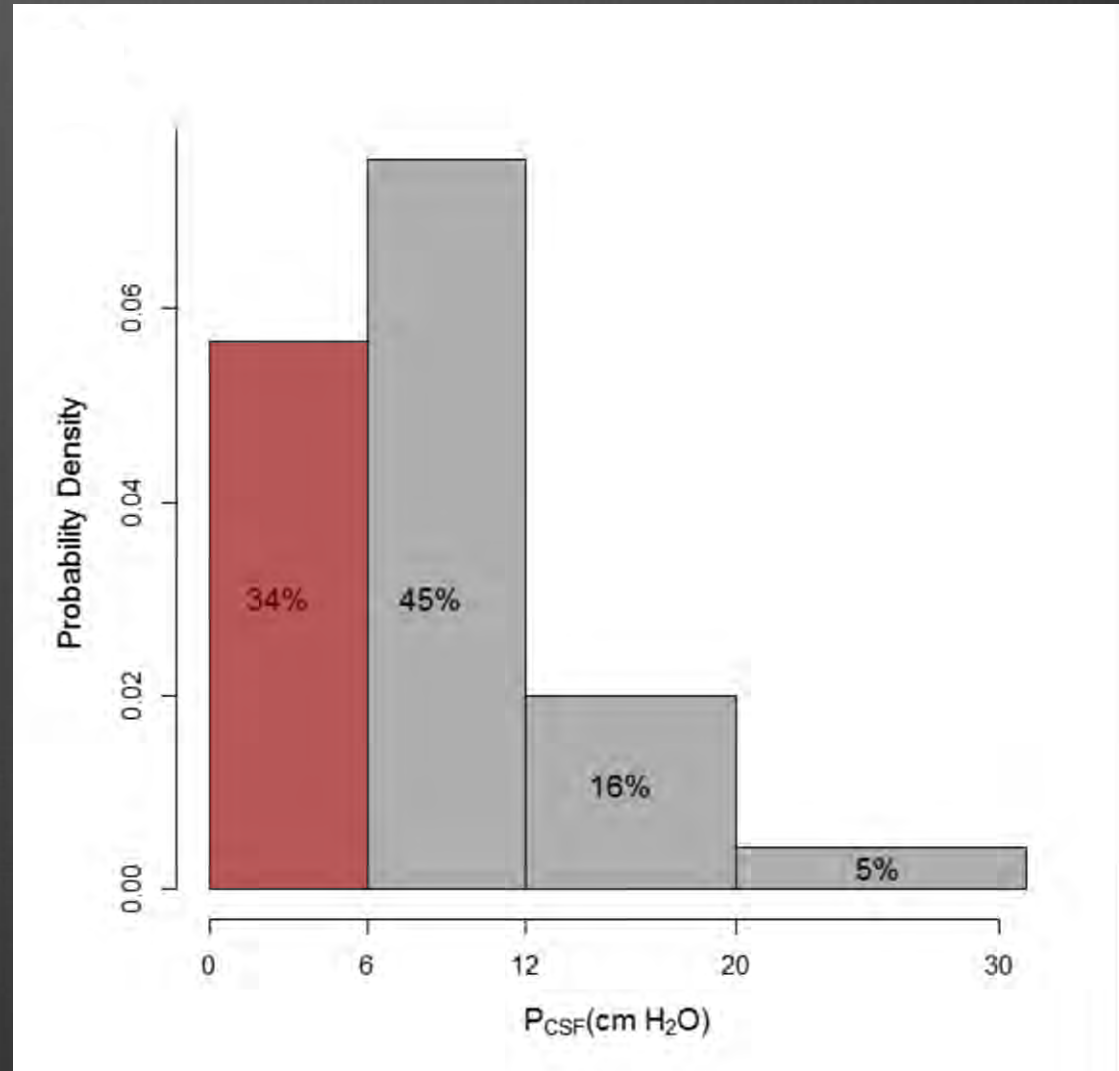
- 57 y.o. female with headache
- Opening pressure: 25.4 cm H<sub>2</sub>O



# Myth #1: SIH is defined by low pressure

Traditionally defined by pressure <6 cm H<sub>2</sub>O

- *Most patients actually in normal range*
- *Higher pressure the longer you leak*
- *Higher pressure the larger the patient is*



## Myth #2: SIH always causes orthostatic HA/orthostatic HA is always SIH

Most cases (~75%) of SIH have orthostatic HA

But...

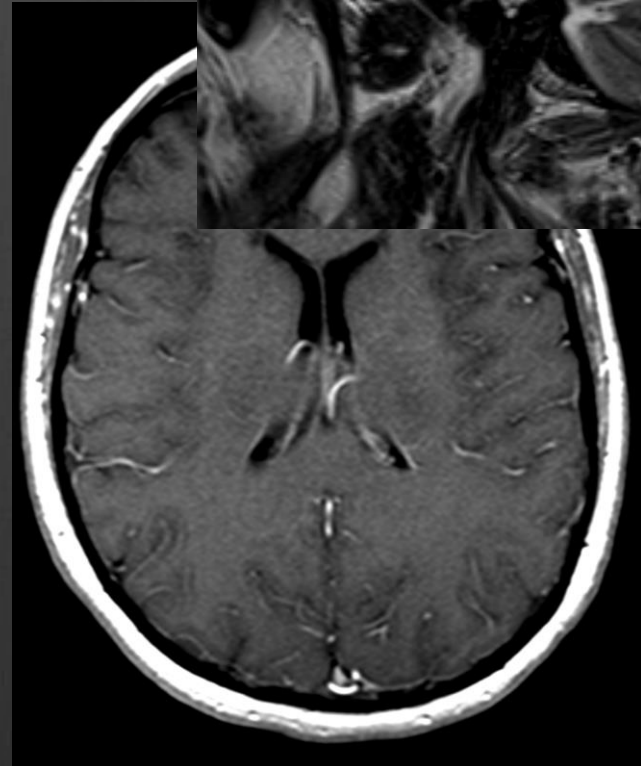
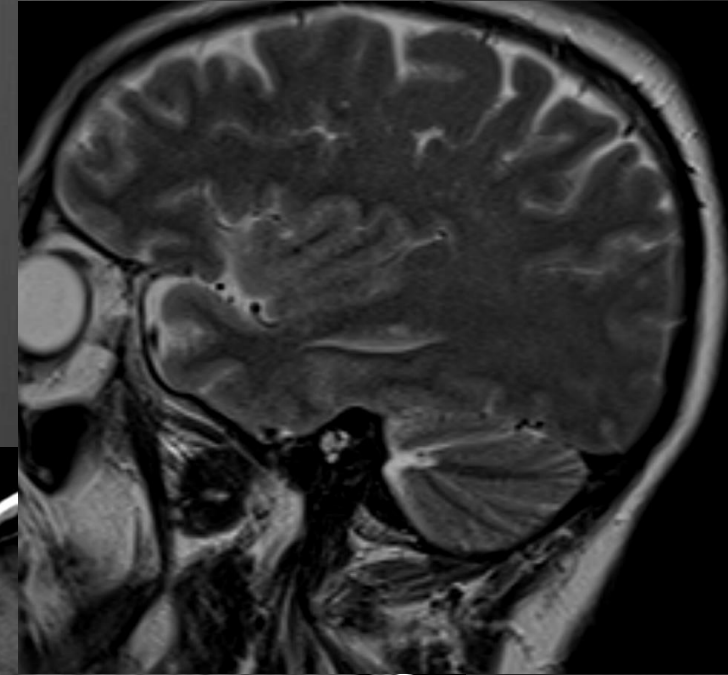
- 2<sup>nd</sup> half-of-the-day HA
- Non-positional HA
- Acephalgic

Mimics:

- POTS
- Cervicogenic HA
- New Daily Persistent Headache (NDPH)
- Some hard to classify



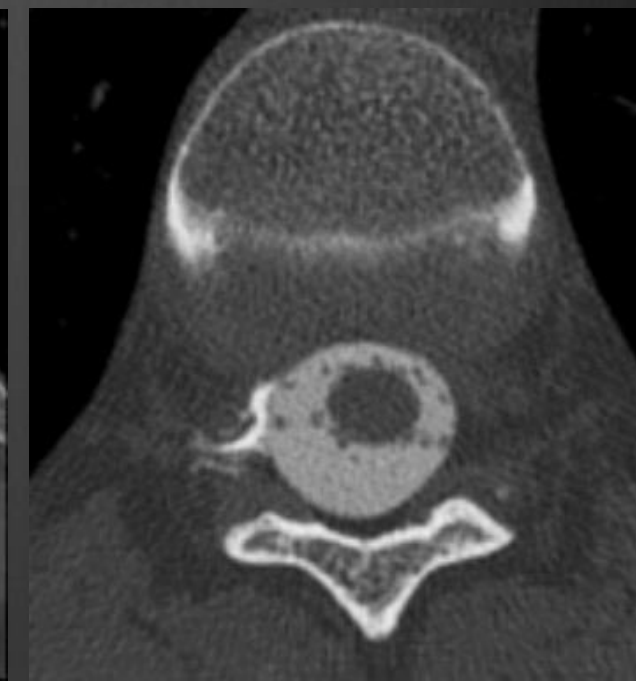
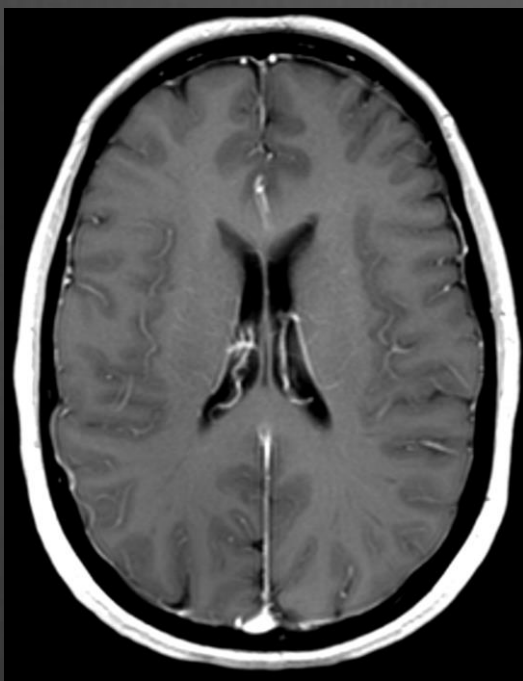
Myth #2: SIH always causes orthostatic HA/orthostatic HA is always SIH



56 yo woman with ear pain  
and tinnitus, no headache



Myth #3: A negative brain MRI excludes the diagnosis



55 yo woman with positional headache

# Myth #3: A negative brain MRI excludes the diagnosis

Prevalence

Dural Enhancement

Brain Sagging

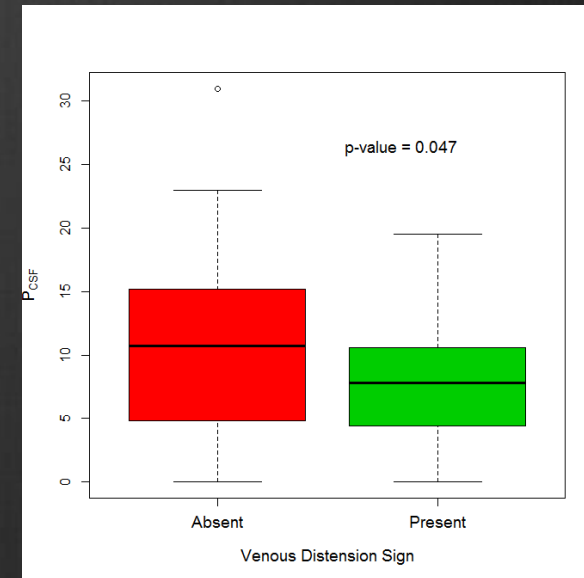
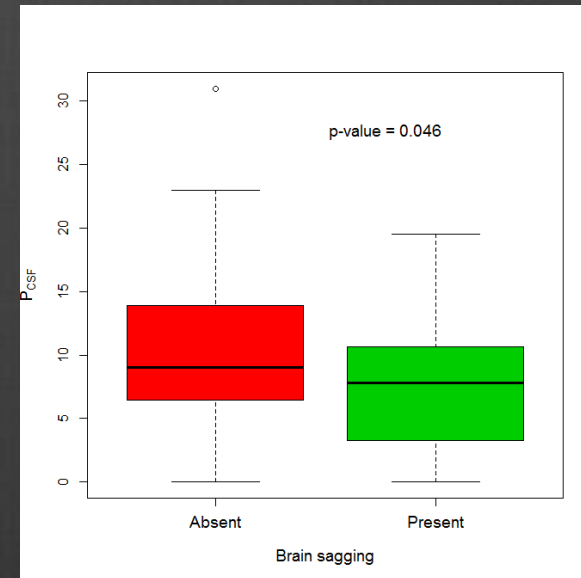
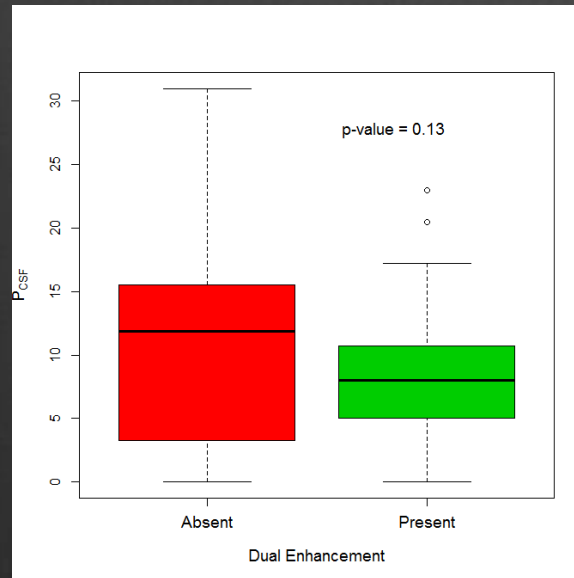
Venous Distension

83%

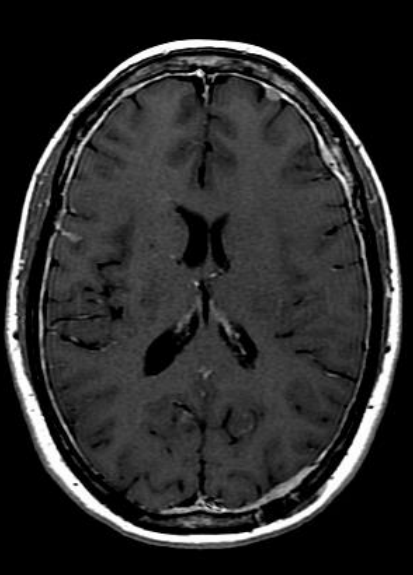
61%

75%

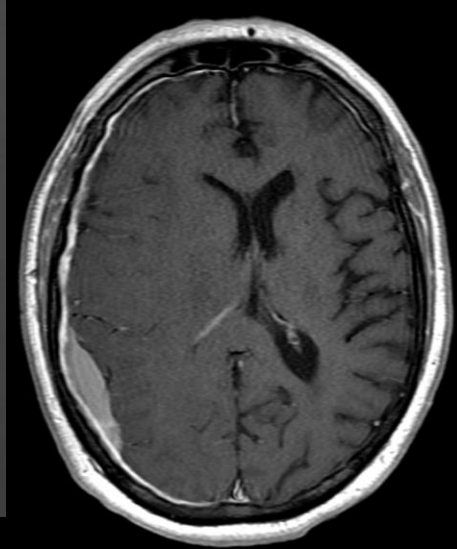
Relationship to pressure



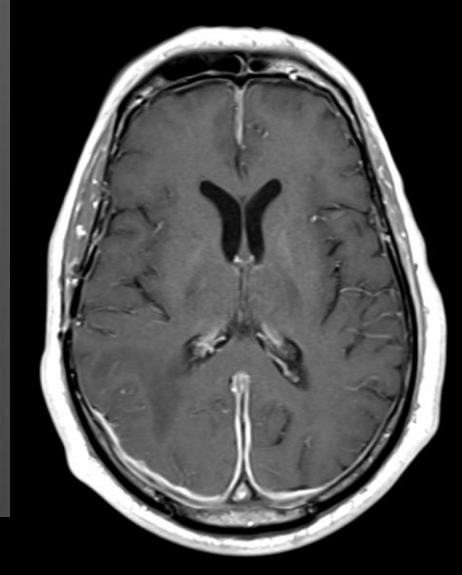
# Myth #4: When dural enhancement is seen on MRI, r/o infection first



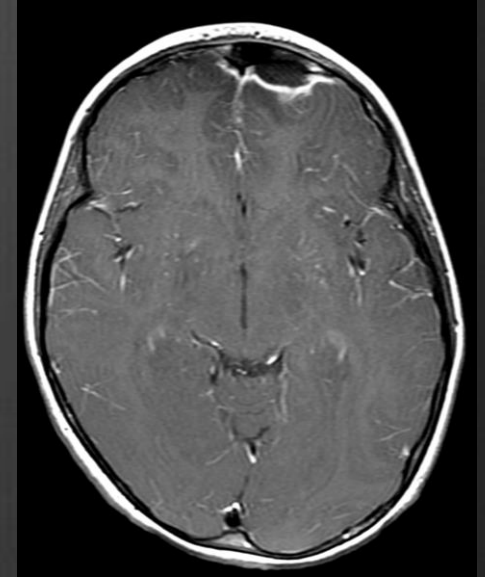
Mets



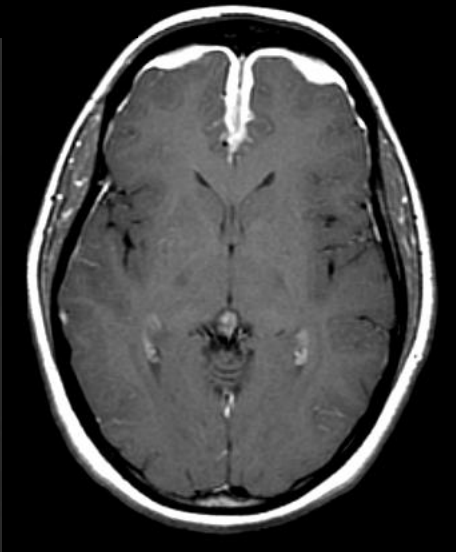
Subdural



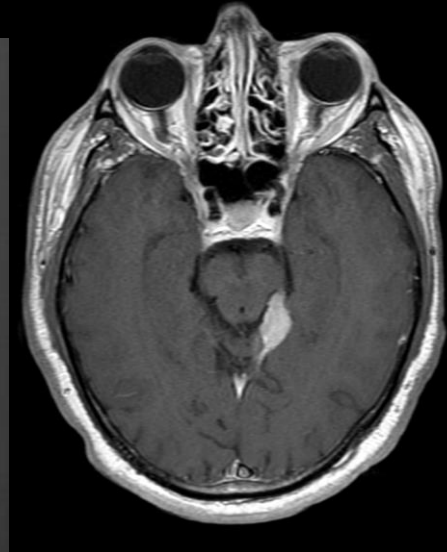
Idiopathic Hypertrophic  
Pachymeningitis



Empyema -  
Sinusitis



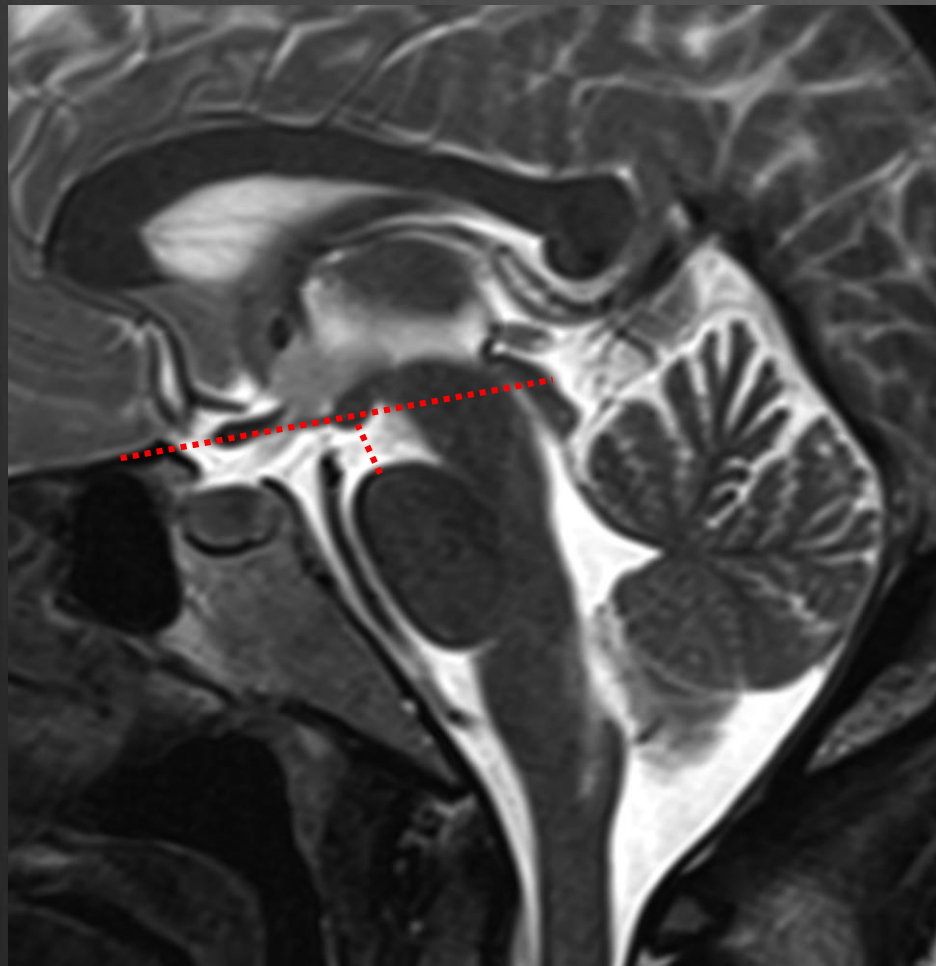
Wegener's



Sarcoid

- *Infectious meningitis is leptomeningitis, not pachymeningitis*
- *Nothing else besides SIH typically causes diffuse, smooth dural enhancement*

# Myth #5: Chiari I is a feature of SIH



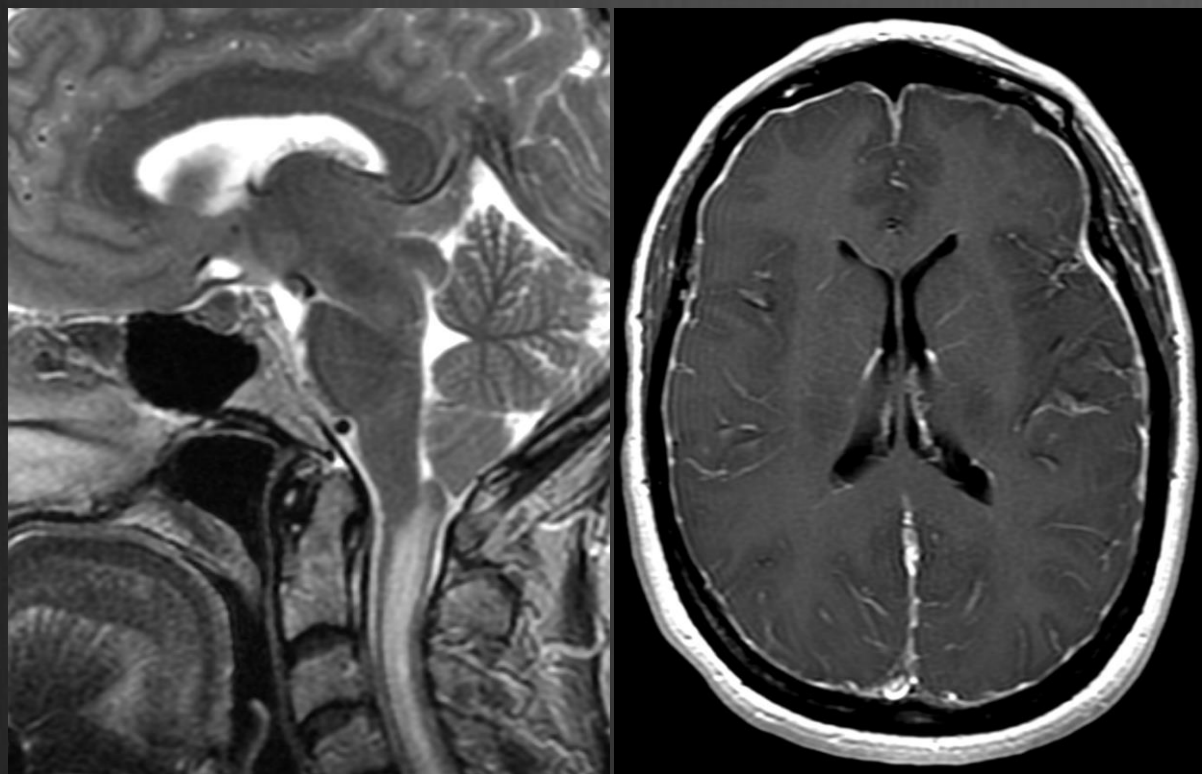
Normal



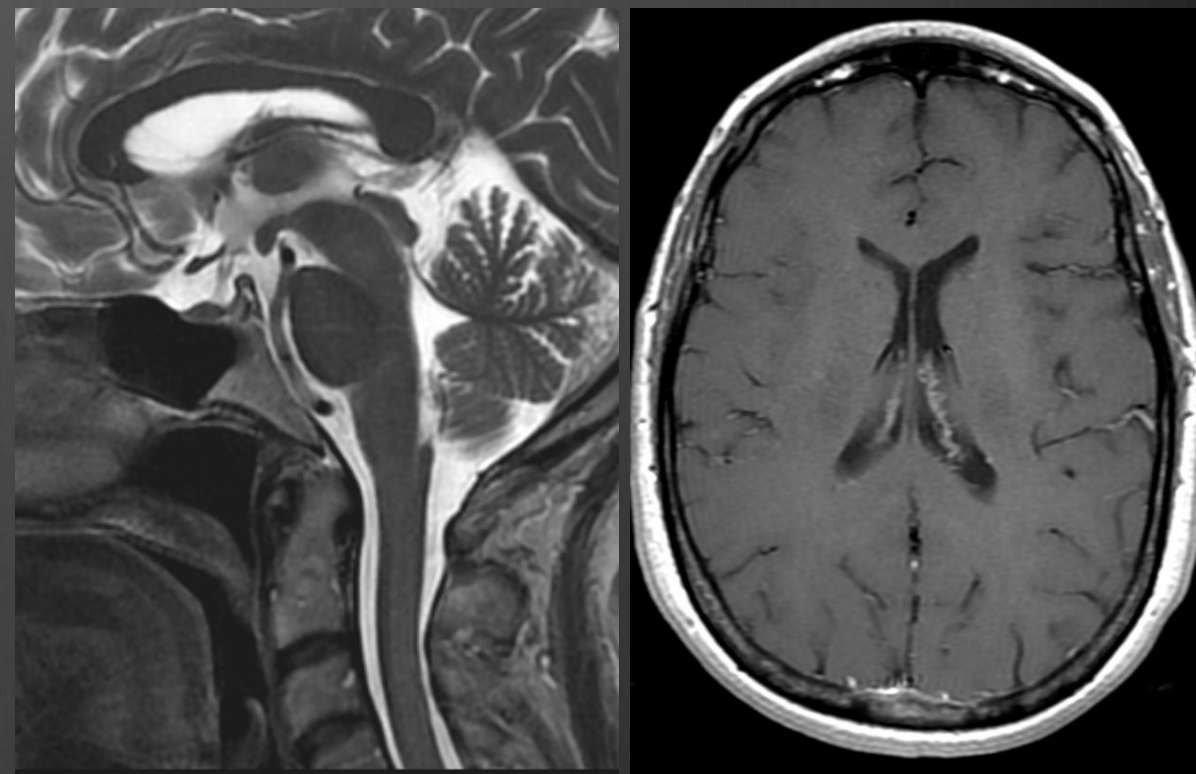
Brain sag



# Myth #5: Chiari I is a feature of SIH

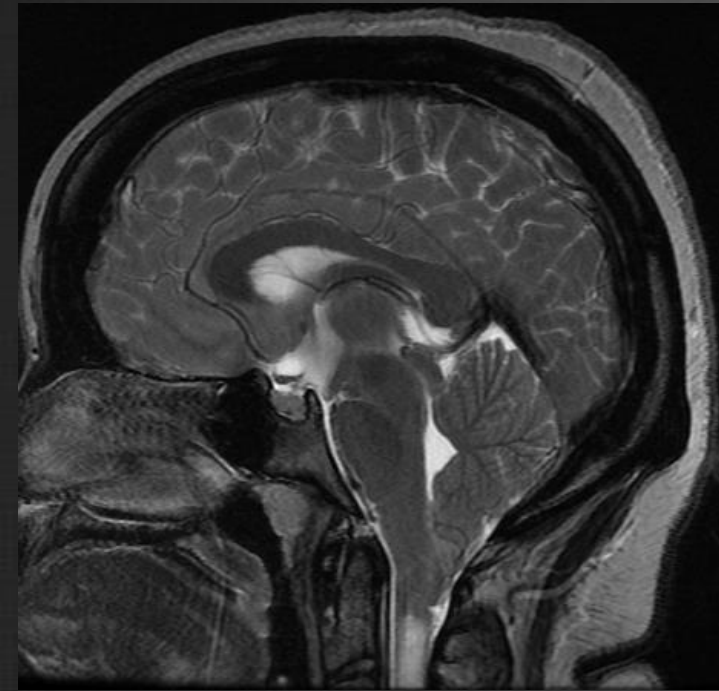


Pre-treatment



Post-treatment

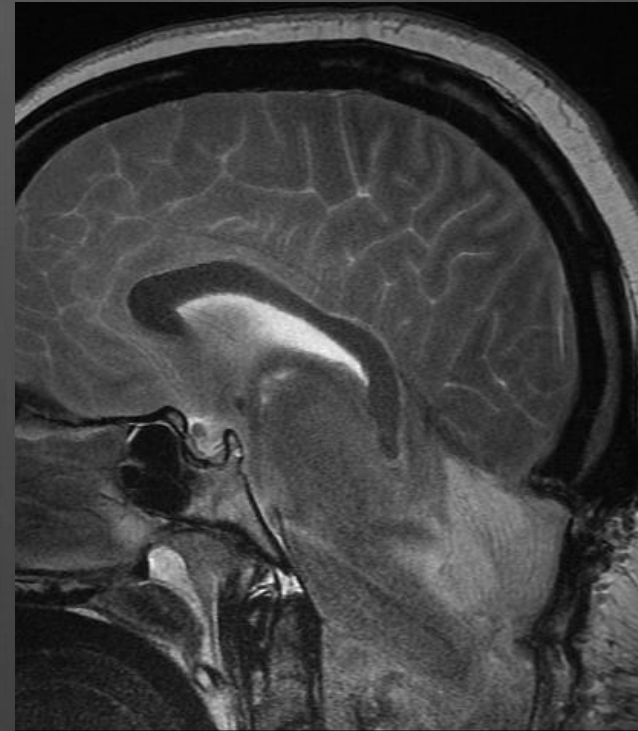
# Myth #5: Chiari I is a feature of SIH



Called  
"Chiari"



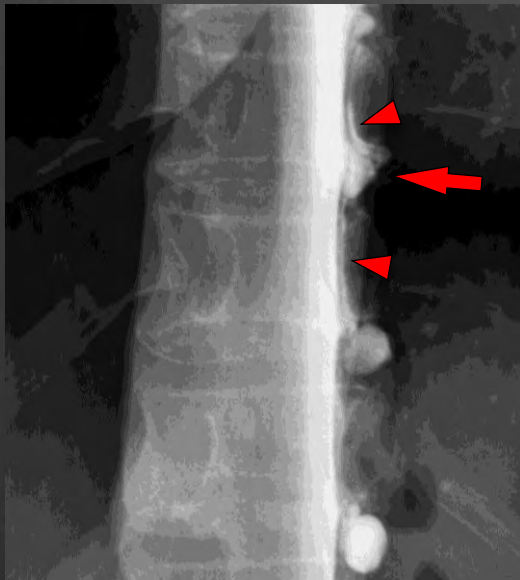
Suboccipital  
decompression



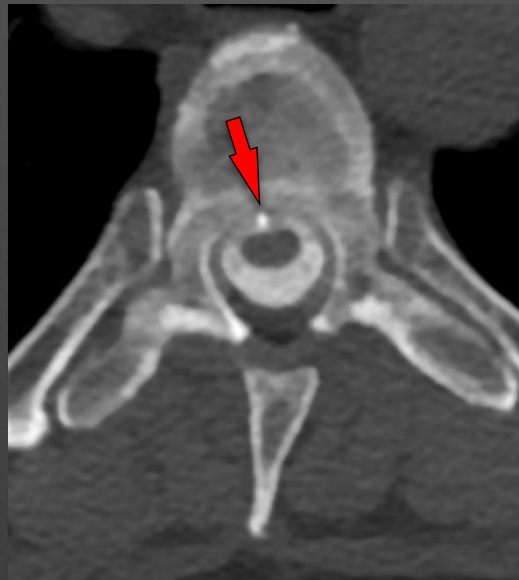
Post-op

# Myth #6: All leaks caused by diverticula/Tarlov Cysts

## 3 Major Causes



Leaking  
diverticulum



Calcified thoracic  
disk



CSF-Venous  
fistula

**\*\* Leaking sacral Tarlov cysts are very rare**

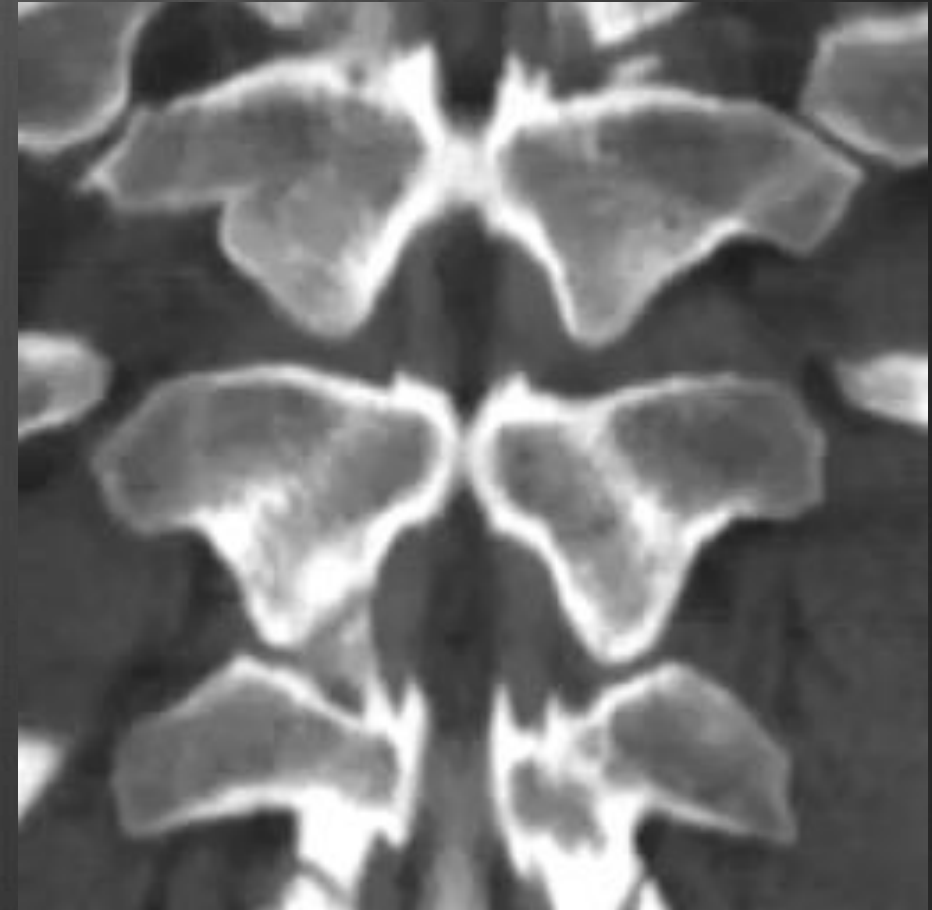
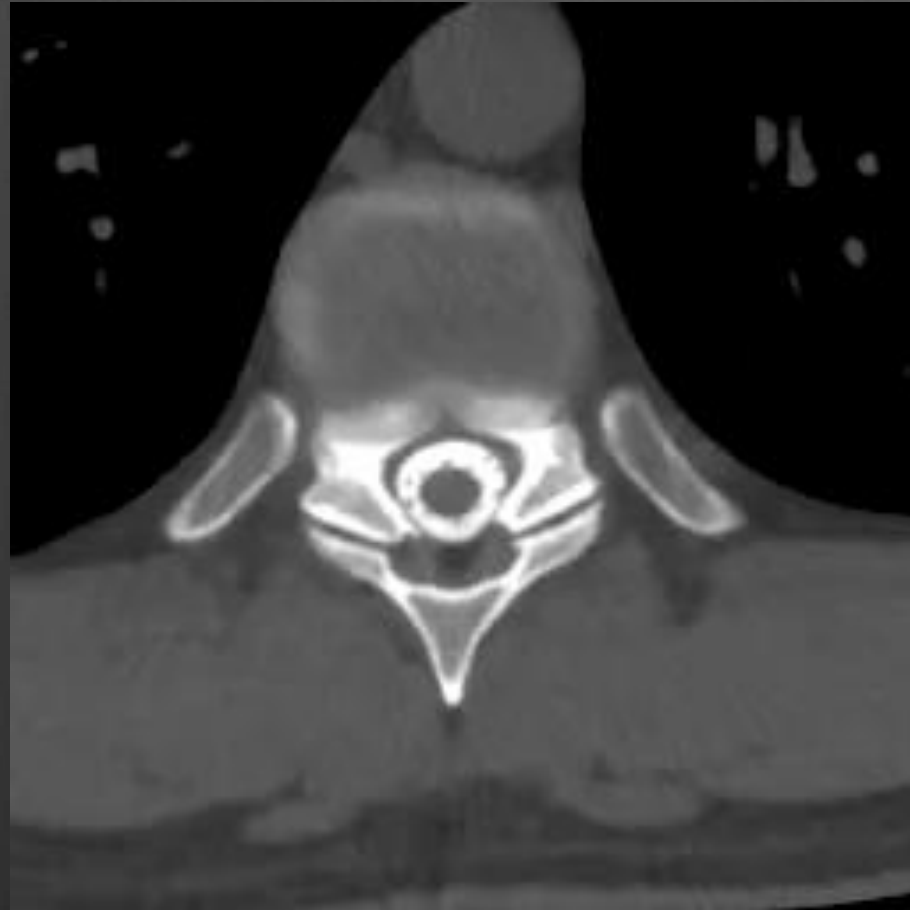


## Myth #7: Spinal imaging rarely reveals the leak

About 50% of cases of bona fide SIH have a leak on CTM

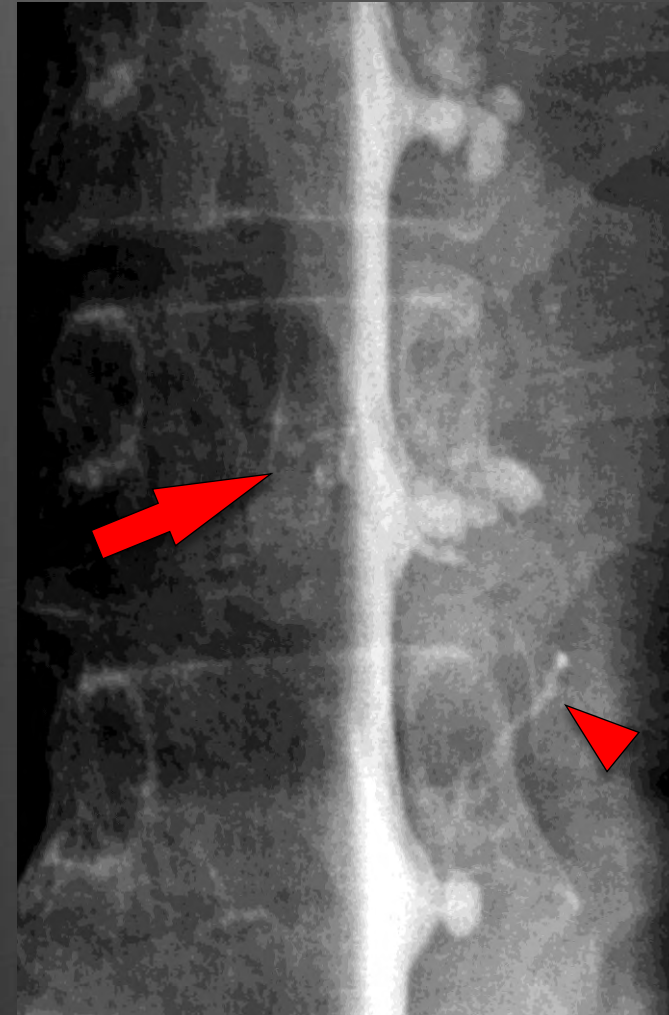
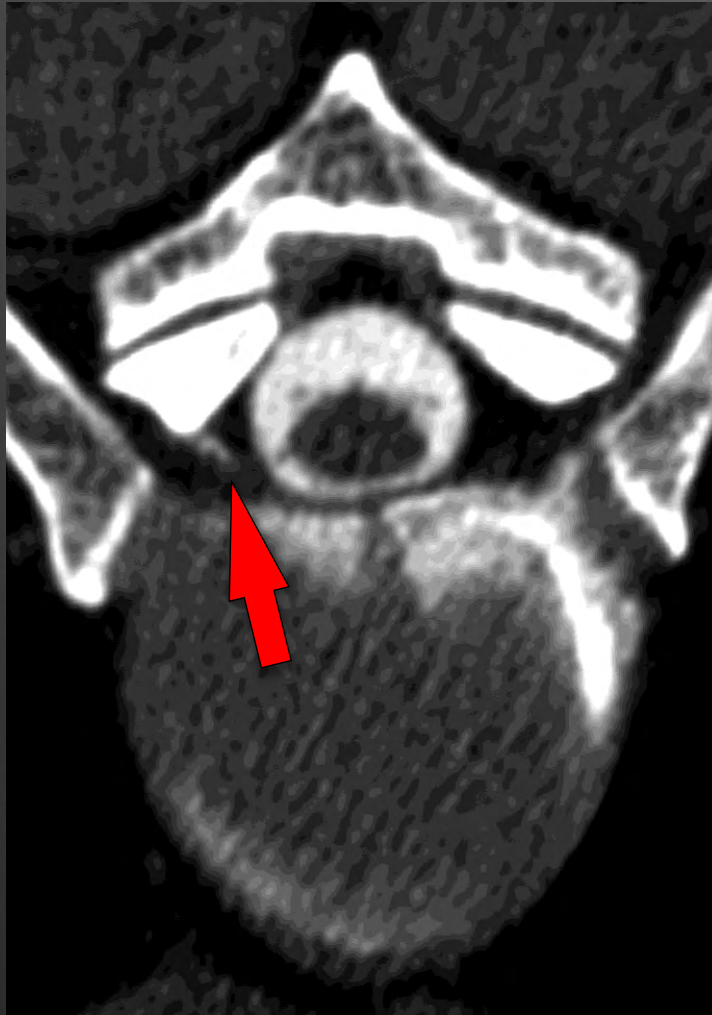
But...

They can be subtle!



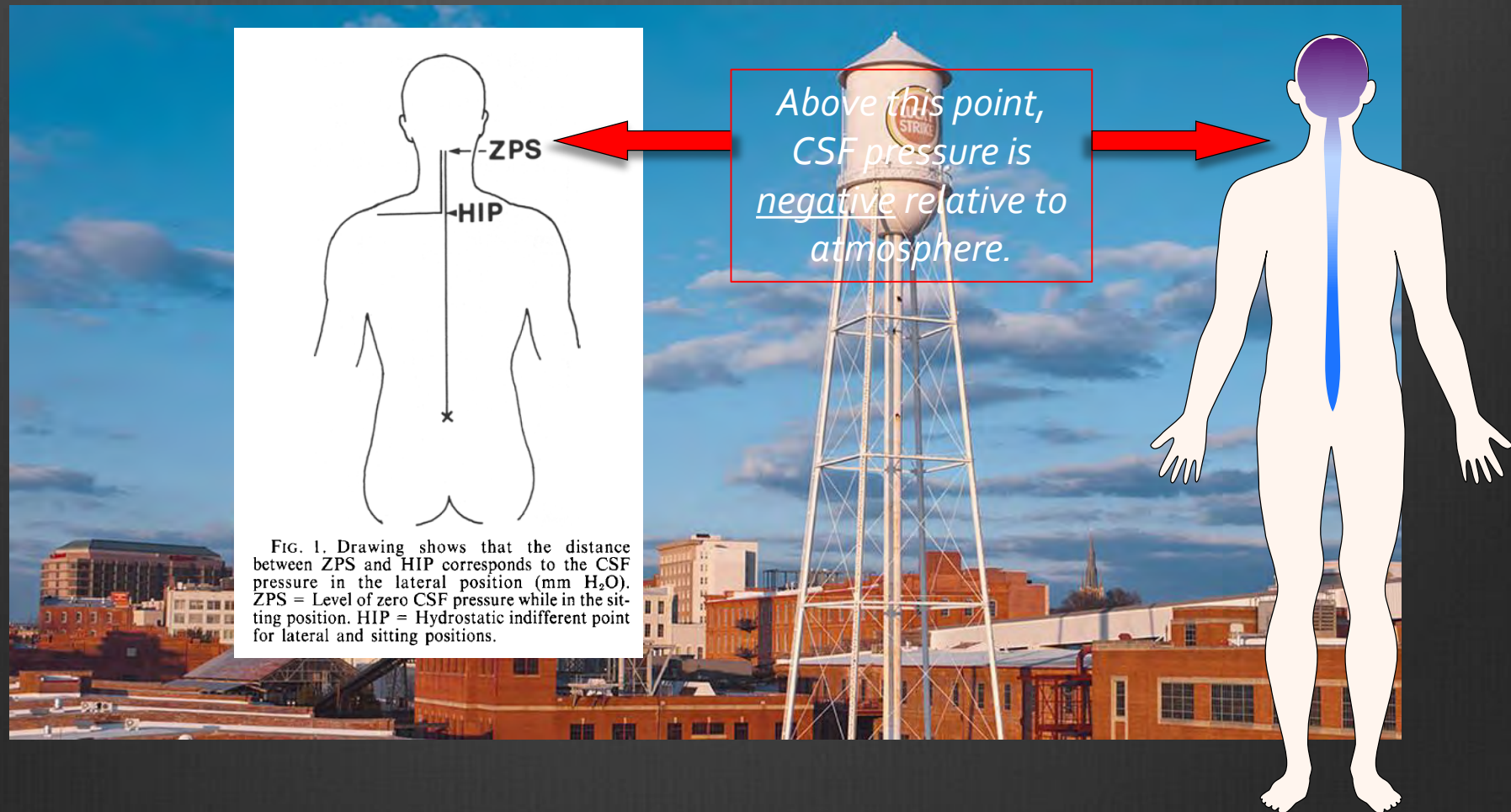


**Myth #7: Spinal imaging rarely reveals the leak**



**Good technique (i.e. thin images, breath hold, reformats) is key!**

# Myth #8: Skull base CSF leaks cause SIH



# Myth #8: Skull base CSF leaks cause SIH

J Neurosurg 116:749–754, 2012

## Lack of causal association between spontaneous intracranial hypotension and cranial cerebrospinal fluid leaks

Clinical article

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FRANKLIN G. MOSER, M.D., M.M.M.,<sup>3</sup> AND TODD D. ROZEN, M.D.<sup>4</sup>

Departments of <sup>1</sup>Neurosurgery and <sup>3</sup>Radiology, Cedars-Sinai Medical Center; <sup>2</sup>House Clinic, Los Angeles, California; and <sup>4</sup>Department of Neurology, Geisinger Specialty Clinic, Wilkes-Barre, Pennsylvania

*Object.* Spontaneous intracranial hypotension is an important cause of headaches and an underlying spinal CSF leak can be demonstrated in most patients. Whether CSF leaks at the level of the skull base can cause spontaneous intracranial hypotension remains a matter of controversy. The authors' aim was to examine the frequency of skull base CSF leaks as the cause of spontaneous intracranial hypotension.

*Methods.* Demographic, clinical, and radiological data were collected from a consecutive group of patients evaluated for spontaneous intracranial hypotension during a 9-year period.

*Results.* Among 273 patients who met the diagnostic criteria for spontaneous intracranial hypotension and 42 who did not, not a single instance of CSF leak at the skull base was encountered. Clear nasal drainage was reported by 41 patients, but a diagnosis of CSF rhinorrhea could not be established. Four patients underwent exploratory surgery for presumed CSF rhinorrhea. In addition, the authors treated 3 patients who had a postoperative CSF leak at the skull base following the resection of a cerebellopontine angle tumor and developed orthostatic headaches; spinal imaging, however, demonstrated the presence of a spinal source of CSF leakage in all 3 patients.

*Conclusions.* There is no evidence for an association between spontaneous intracranial hypotension and CSF leaks at the level of the skull base. Moreover, the authors' study suggests that a spinal source for CSF leakage should even be suspected in patients with orthostatic headaches who have a documented skull base CSF leak.

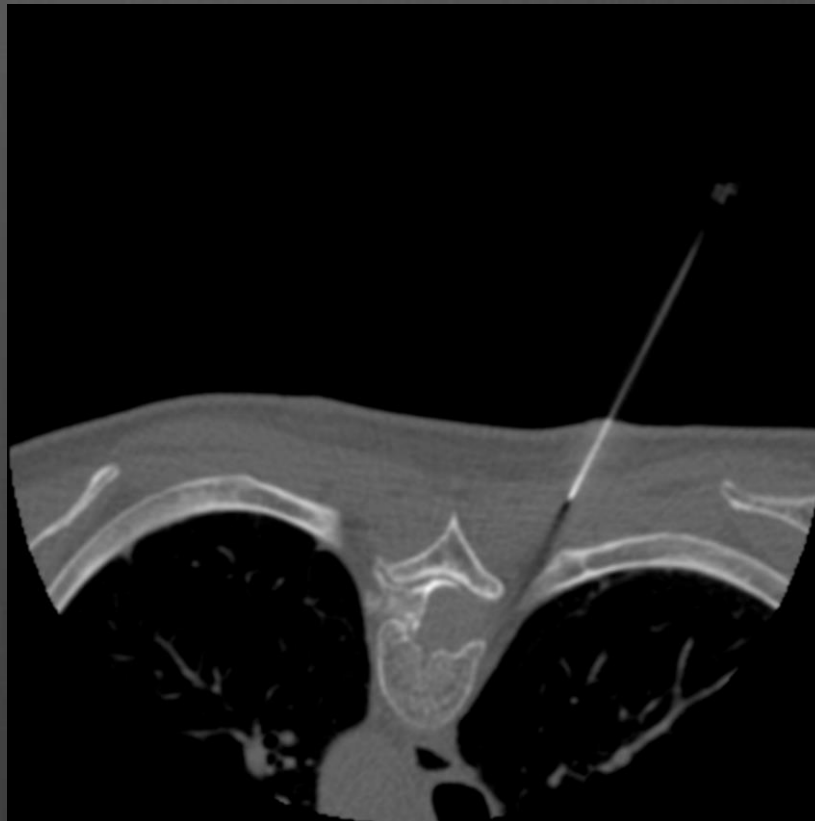
(<http://thejns.org/doi/abs/10.3171/2011.12.JNS111474>)

**KEY WORDS** • cerebrospinal fluid leak • cerebrospinal fluid rhinorrhea • headache • intracranial hypotension

*Conclusions.* There is no evidence for an association between spontaneous intracranial hypotension and CSF leaks at the level of the skull base. Moreover, the authors' study suggests that a spinal source for CSF leakage should even be suspected in patients with orthostatic headaches who have a documented skull base CSF leak.



## Myth #9: Blood patch immediately cures SIH

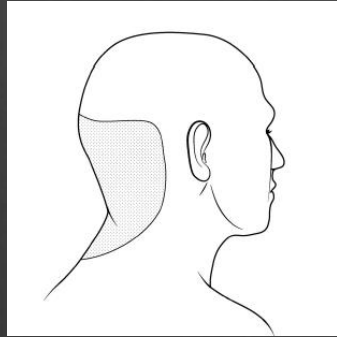


Unlike post-LP headache  
Can take up to a week



# Myth #10: After the blood patch, the job is done

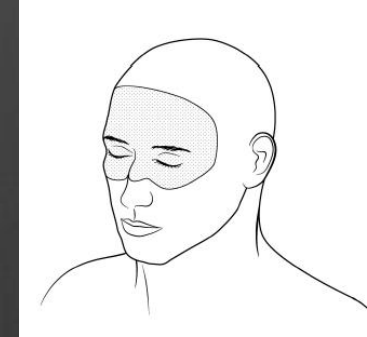
## SIH



- Low volume, low pressure
- Worse when upright
- Often occipital

## RIH

### *Rebound Intracranial Hypertension*



- High(er) pressure
- Worse when recumbent (night)
- Often frontal
- Nausea common
- Onset after blood patch (worst in 1<sup>st</sup> 24 hrs)

# Myth #10: After the blood patch, the job is done

## RIH: Treatment

**Mild**

Elevate head  
Analgesia

**Moderate**

+ Acetazolamide, methazolamide  
oral  
+ Topirimate, other diuretics oral

**Severe**


+/- immediate acetazolamide IV  
LP to remove fluid

## 10 Myths and Misconceptions

1. SIH defined by low pressure
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## Review Article

### Spontaneous Intracranial Hypotension: 10 Myths and Misperceptions

Peter G. Kranz, MD ; Linda Gray, MD; Timothy J. Amrhein, MD

**Objective.**—To discuss common myths and misperceptions about spontaneous intracranial hypotension (SIH), focusing on common issues related to diagnosis and treatment, and to review the evidence that contradicts and clarifies these myths.

**Background.**—Recognition of SIH has increased in recent years. With increasing recognition, however, has come an increased demand for management by neurologists and headache specialists, some of whom have little prior experience with the condition. This dearth of practical experience, and lack of awareness of recent investigations into SIH, produces heterogeneity in diagnostic and treatment pathways, driven in part by outdated, confusing, or unsubstantiated conceptions of the condition. We sought to address this heterogeneity by identifying 10 myths and misperceptions that we frequently encounter when receiving referrals for suspected or confirmed SIH, and to review the literature addressing these topics.

**Methods.**—Ten topics relevant to diagnosis and treatment SIH were generated by the authors. A search for studies addressing SIH was conducted using PubMed and EMBASE, limited to English language only, peer reviewed publications from inception to 2018. Individual case reports were excluded. The resulting studies were reviewed for relevance to the topics in question.

**Results.**—The search generated 557 studies addressing SIH; 75 case reports were excluded. Fifty-four studies were considered to be of high relevance to the topics addressed, and were included in the data synthesis. The topics are presented in the form of a narrative review.

**Conclusions.**—The understanding of SIH has evolved over the recent decades, leading to improvements in knowledge about the pathophysiology of the condition, diagnostic strategies, and expanded treatments. Awareness of these changes, and dispelling outdated misconceptions about SIH, is critical to providing appropriate care for patients and guiding future investigations going forward.

**Key words:** spontaneous intracranial hypotension, cerebrospinal fluid leak, cerebrospinal fluid pressure, CSF hypovolemia, orthostatic headache

**Abbreviations:** CSF cerebrospinal fluid, MRI magnetic resonance imaging, NDPH new daily persistent headache, POTS postural orthostatic tachycardia syndrome, RHH rebound intracranial hypertension, SIH spontaneous intracranial hypotension