

Spinal CSF Leak Foundation

# Learn About Intracranial Hypotension

**SYMPTOMS**

**CAUSES**

**DIAGNOSIS**

**TREATMENT**

[spinalcsfleak.org](http://spinalcsfleak.org)



# Symptoms of Intracranial Hypotension

Cerebrospinal fluid (CSF) bathes and supports the brain and spinal cord. When the connective tissue known as dura mater that holds CSF in around the spinal cord has a hole or tear, the result is a loss of CSF volume, known as intracranial hypotension. This results in a loss of buoyancy of the brain that is worse when upright. Distension of intracranial veins and traction on pain sensitive structures in the head are thought to be causes of the head pain that is usually worse with upright posture. There are numerous other neurologic signs and symptoms. The head pain is often located at the back of the head but can be frontal, bitemporal or generalized. Head pain severity varies enormously from mild to severe and may not correlate well with findings on imaging. The positional aspect of head pain tends to lessen with time and may not be evident even from the onset. Many patients are quite disabled by their inability to be functional while upright. Recognition of the head pain pattern and other symptoms is important in leading physicians to suspect the diagnosis of intracranial hypotension.

## COMMON

- positional headache (or other patterns)
- neck pain or stiffness
- nausea and vomiting
- change in hearing (muffled, tinnitus)
- impaired balance
- dizziness or vertigo
- photophobia (sensitivity to light)
- phonophobia (sensitivity to sound)
- pain between shoulder blades
- changes in cognition (brain fog)
- arm pain or numbness

## LESS COMMON

- visual changes
- facial numbness or pain
- changes in taste
- fatigue
- pain or numbness below arm level

## RARE

- quadriplegia
- dementia tremor, Parkinsonism
- ataxia (unsteady gait)
- cerebral venous thrombosis
- stupor/coma
- stroke
- death

# Causes of Intracranial Hypotension

## IATROGENIC

(caused by a medical procedure)

- lumbar puncture
- epidural injections or anesthesia
- CSF shunt overdrainage
- spinal surgery
- other surgery

## TRAUMATIC

(caused by an injury)

## SPONTANEOUS

(seemingly out of the blue)

- preexisting spinal pathology like a bone spur
- preexisting weakness of dura mater due to heritable disorders of connective tissue (Marfan, Ehlers-Danlos syndromes, others)
- CSF-venous fistula (abnormal connection from CSF space to epidural veins)



# Diagnosis of Intracranial Hypotension

## PATIENT HISTORY

- headache / neuro symptoms
- spinal injections or surgery
  - Marfan, Ehlers-Danlos
  - trauma

## BRAIN MRI

(with contrast)  
SEEPS findings  
in 80%

## PHYSICAL EXAM

(may be normal)

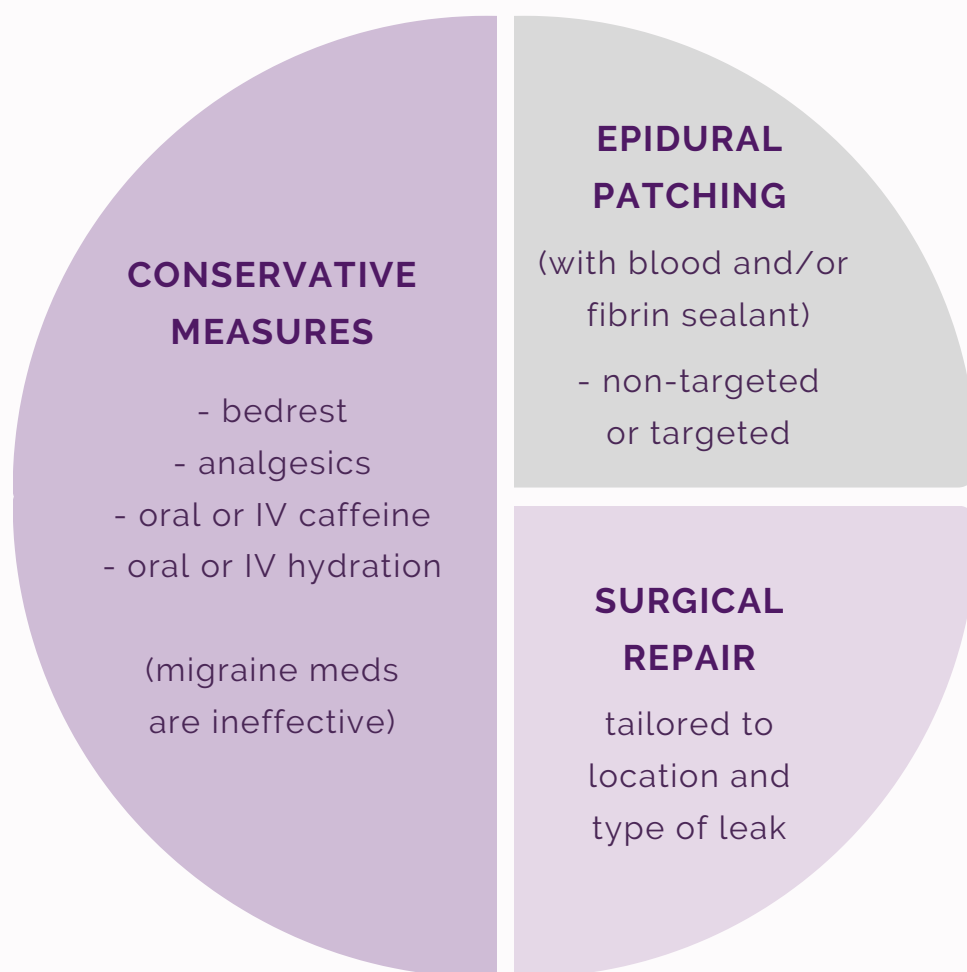
- neurologic findings
- evidence of heritable disorders of connective tissue

## SPINAL IMAGING

- spinal MRI with myelographic sequencing (non-invasive)\*
- CT myelogram (dynamic, early or delayed)
- digital subtraction myelogram
- intrathecal gadolinium-enhanced spinal MRI

\*spinal imaging is negative in about half of patients

# Treatment of Intracranial Hypotension



## KEY POINTS

- An unknown % of patients will have their symptoms resolve spontaneously without treatment.
- Rarely, serious complications such as coma or a large subdural hematoma will dictate emergent intervention.
- Epidural patching is effective for many patients but may lack durability.
- Correct interpretation of spinal imaging findings is critical to targeted treatment approaches; false localizing signs on imaging can lead to misdirected treatment.
- Epidural patching procedures and surgical procedures may have better outcomes with clinicians that treat a larger volume of patients.
- Surgical repairs are often less technically straightforward than they may appear, due to the variety of anatomic leak types and locations as well as attenuated dura mater.
- Outcomes are generally favorable, but many patients have persistent symptoms and associated disability.