

# Idiopathic Intracranial Hypertension (IIH)



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The primary source for this slide-set is the 2021-22 revision of the BCSC *Neuro-Oph* book. Other sources include an AAO *Focal Points* issue on IIH, entries on the ONE Network's *Oculofacial Plastic Surgery* and *Pediatric Ophthalmology Education Centers* IIH pages, and the *EyeWiki* IIH page. (Note that all are Academy sources.)

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## *Idiopathic Intracranial Hypertension (IIH)*



- You find bilateral disc edema in an obese young-adult female patient who c/o HA and transient visual obscurations. Your working diagnosis is IIH.

# Q

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*How strong is the association between IIH and obesity?*

# Q/A

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*How strong is the association between IIH and obesity?*

Very—  % of IIH pts are obese

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Very—90% of IIH pts are obese

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*How common is IIH in food-scarce regions marked by widespread and severe caloric malnutrition?*

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*How common is IIH in food-scarce regions marked by widespread and severe caloric malnutrition?*

IIH is almost unheard of in such areas



# Q

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*Females are more likely than males to develop IIH. Are they also more likely to suffer severe vision loss (SVL)?*

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No, male IIH patients are more likely to experience SVL



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*What are the other risk factors for SVL in IIH?*

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--?

--?

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--African-American ancestry

--Morbid obesity

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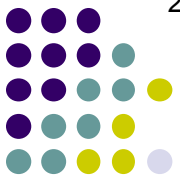
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- Male gender
- African-American ancestry
- Morbid obesity
- severity papilledema
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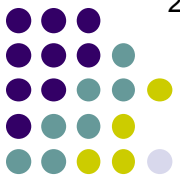
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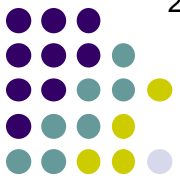
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systemic condition



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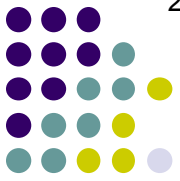
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- Morbid obesity
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- Anemia

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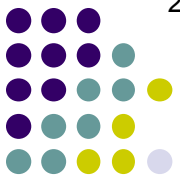
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- Male gender
- African-American ancestry
- Morbid obesity
- Severe papilledema

**Anemia**

In addition to being a risk factor for SVL in IIH, the *Neuro* book lists *anemia* as a possible **cause** of the condition



# Q

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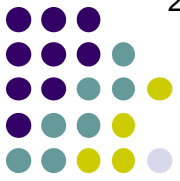
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*More precisely than 'young adult,' during what developmental stage are women at greatest risk of developing IIH?*



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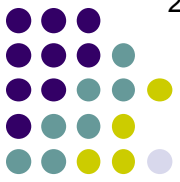
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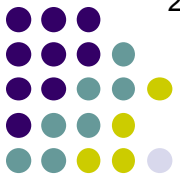
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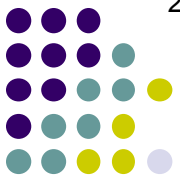
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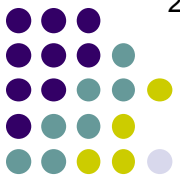
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- Headache
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- Diplopia



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*Upright vs supine--in which position is the HA in IIH worse?*



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*Is this fact diagnostic of IIH?*





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*Upright vs supine--in which position is the HA in IIH worse?*

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No, but it is strongly suggestive that the HA is due to increased ICP (as opposed to other HA etiologies, in which HA intensity is *lessened* by supine positioning)



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This is  phenomenon, and is suggestive of , not IIH



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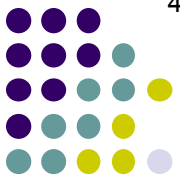
–**Transient visual obscurations**

*What is the classic provocative event for TVO?*

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This is **Uhthoff's** phenomenon, and is suggestive of **multiple sclerosis**, not IIH



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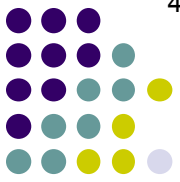
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*Do Uhthoff-associated vision changes last seconds, like TVOs?*





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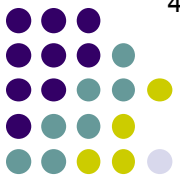
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No, more on the order of minutes



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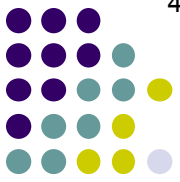
*What are two classic overheating events known to provoke Uhthoff's?*

--?

--?

*Do Uhthoff-associated vision changes last for minutes or hours?*

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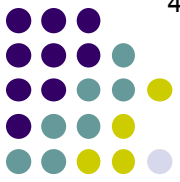
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--A hot shower

--Exercising

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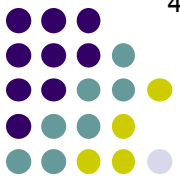
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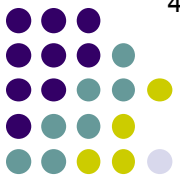
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*How long do the TVOs last?*

Seconds—no more than 30 or so. Afterwards, vision returns to baseline.



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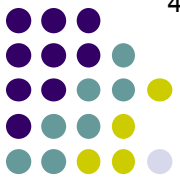
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Only if it is severe or, especially, longstanding



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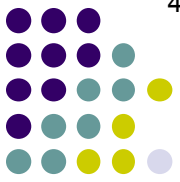
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*It should be noted that one specific pattern of VF loss is extremely common in IIH. What is it?*





# A

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in an obese young-adult female patient who c/o HA and **transient visual obscurations**. Your working diagnosis is IIH.

*Two other symptoms are especially common in IIH—what are they?*

- Headache
- Transient visual obscurations

*What is the classic provocative event for TVO?*

A change in posture, especially standing up after bending over

*How long do the TVOs last?*

Seconds—no more than 30 or so. Afterwards, vision returns to baseline.

*Is increased ICP typically associated with visual complaints other than TVO (eg, decreased acuity, **visual field defects**, altered color vision)?*

Only if it is severe or, especially, if it is progressive

*It should be noted that one specific pattern of VF loss is extremely common in IIH. What is it?*

An enlarged blind spot 2ndry to the disc edema



# Q

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- Pulsatile tinnitus**
- Diplopia

*What causes the tinnitus?*



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*What causes the tinnitus?*

Blood being forced through a narrowed portion of a venous sinus



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*Can the tinnitus be auscultated, ie, does it produce a pulse-synchronous bruit?*



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In some cases, yes

*A simple maneuver in clinic can stop it (temporarily).*

*What maneuver?*



# Q/A

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*What maneuver?*

Compression of the ipsilateral

vascular structure



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In some cases, yes

### *A simple maneuver in clinic can stop it (temporarily).*

#### *What maneuver?*

Compression of the ipsilateral jugular vein (either by pressing on it, or when the pt turns her head)



Q

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in an obese young-adult female patient who c/o HA and transient visual obscurations. Your working diagnosis is IIH.

There are four symptoms of increased intracranial pressure. What are they?

- Headache
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Is the diplopia horizontal, or vertical?

Increased intracranial pressure.



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CN6 palsy



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**CN6 palsy**

Why do IIH pts get CN6 palsies?



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**CN6 palsy**

*Why do IIH pts get CN6 palsies?*

Blame the increased ICP. Recall that CN6 makes a 90° turn over the apex of the temporal bone as it enters the cavernous sinus. When ICP is elevated, the nerve gets s-t-r-e-t-c-h-e-d at this location, compromising its function and causing a palsy on that side.



# Q

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Another cranial nerve can be palsied—which one?



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**CN6 palsy**

*CN7 palsy*

*Another cranial nerve can be palsied—which one?*

CN7



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*Is CN7 palsy as commonly encountered as CN6?*





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*Is CN7 palsy as commonly encountered as CN6?*

No, it is quite uncommon

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There are four symptoms of IIH. What are they? Increased intracranial pressure.

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Horizontal

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Esotropia

Is it comitant, or incomitant?

Incomitant

What is the underlying mechanism?

**CN6 palsy**

**CN7 palsy**

Per the *Neuro* book, these are the only neurologic deficits associated with IIH<sup>1</sup>

Another cranial nerve can be palsied—which one?

CN7

Is CN7 palsy as commonly encountered as CN6?

No, it is quite uncommon

<sup>1</sup>However *EyeWiki* says **kids** with IIH can manifest CN3 and/or CN4 palsies as well<sup>2</sup>

<sup>2</sup>But the *Peds* book makes no mention of CN3/CN4 palsies, so...



# Q

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*Among all the signs of IIH, what is the status of disc edema?*



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It is the cardinal sign of the condition



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*IIH has only one major morbidity. What is it?*



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*What is the cause of vision loss in IIH?*



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Disc edema

*How does disc edema lead to vision loss?*



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Vision loss

*What is the cause of vision loss in IIH?*

Disc edema

*How does disc edema lead to vision loss?*

Edema acts as a space-occupying lesion at the optic nerve head, and as such, it compresses ganglion-cell axons, ie, the nerve fibers that comprise the optic nerve. This compression produces axonal death, with concomitant loss of visual function.



Q

## Idiopathic Intracranial Hypertension (IIH)

- You find <sup>no</sup> ~~bilateral~~ **disc edema** in an obese young-adult female patient who c/o HA and transient visual obscurations. Your working diagnosis is IIH?

*Is it possible to have IIH without papilledema?*

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*What is IIH without papilledema called?*

It is called 'IIH without papilledema'

*How does it present?*

In the same manner as IIH *with* papilledema (ie, an obese young-adult female who c/o HA, TVO, tinnitus, diplopia, etc)

*How does it*

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*What implications does this entity have for clinical practice?*

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*How does it present?*

In the same manner as IIH *with* papilledema (ie, an obese young-adult female who c/o HA, TVO, tinnitus, diplopia, etc)

*What implications does this entity have for clinical practice?*

It implies that the absence of disc edema does not rule out IIH, and that an IIH workup should be considered in an otherwise typical pt

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## *Idiopathic Intracranial Hypertension (IIH)*

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*What test/study cinches the diagnosis of IIH?*



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Brain imaging

*Why must brain imaging be obtained?*

At a minimum, to rule out the presence of a space-occupying lesion that could result in tonsillar herniation when LP is performed





# Q

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*What imaging study (studies) should be ordered?*

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**Brain imaging**

*What imaging study (studies) should be ordered?*

The current *Neuro* book asserts that 'all pts with suspected IIH should undergo MRI and MRV'

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# Q

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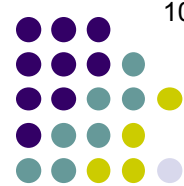
The current *Neuro* book asserts that 'all pts with suspected IIH should undergo MRI and MRV'

ion that

*Both studies (MRI and MRV) have specific 'rule out' goals. What are they?*

--MRI: Rule out... *[three things]*

--MRV: Rule out...



# A

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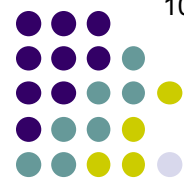
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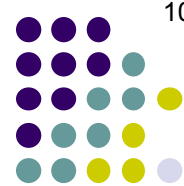
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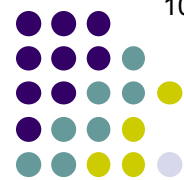
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--?

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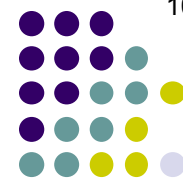
*Both studies (MRI and MRV) have specific findings that support the diagnosis of IIH.*

–MRI: Rule out... Mass, hydrocephalus or meningeal lesion

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# Q/A

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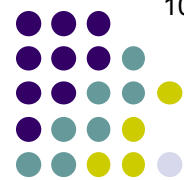
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Both studies (MRI and MRV) have specific roles to play in the diagnosis of IIH

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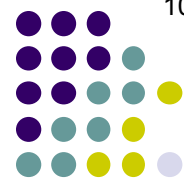
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--[redacted] sella

--?

--?

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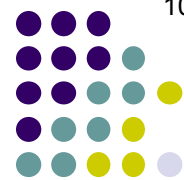
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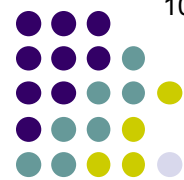
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*Both studies (MRI and MRV) have specific things to look for to rule out other causes*

--MRI: Rule out... Mass, hydrocephalus or meningeal lesion

--MRV: Rule out... Venous sinus occlusion



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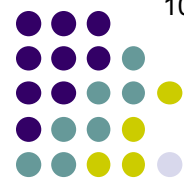
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Both studies (MRI and MRV) have specific findings suggesting IIH.

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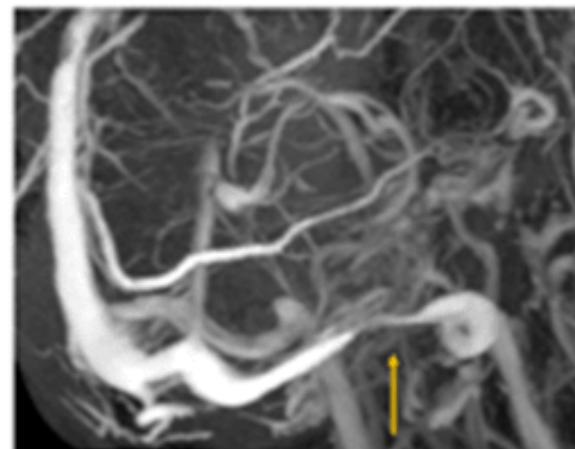
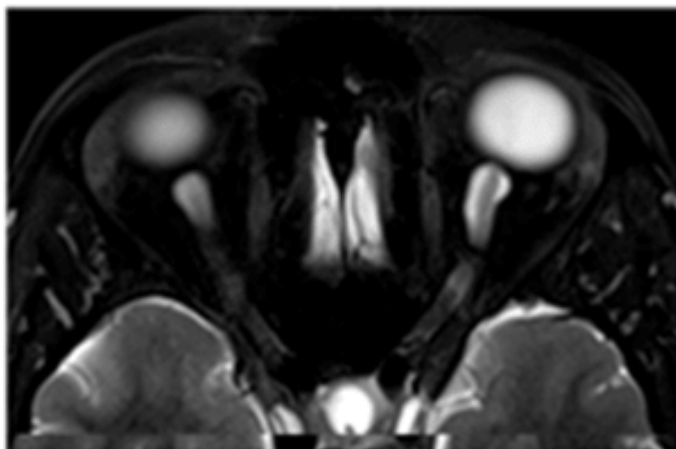
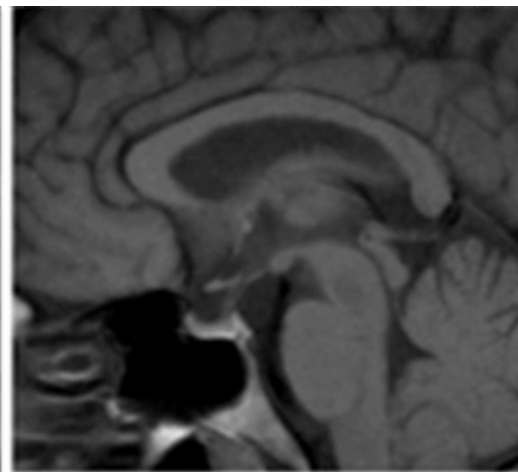
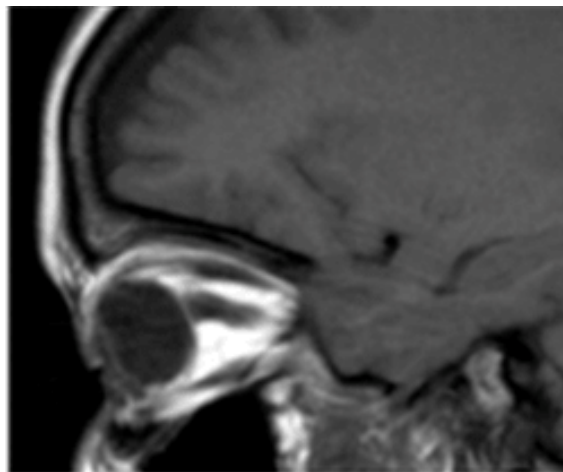
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# Idiopathic Intracranial Hypertension (IIH)



## **MRI findings often found in patients with IIH:**

*Top left:* Flattening of the posterior aspect of the globe

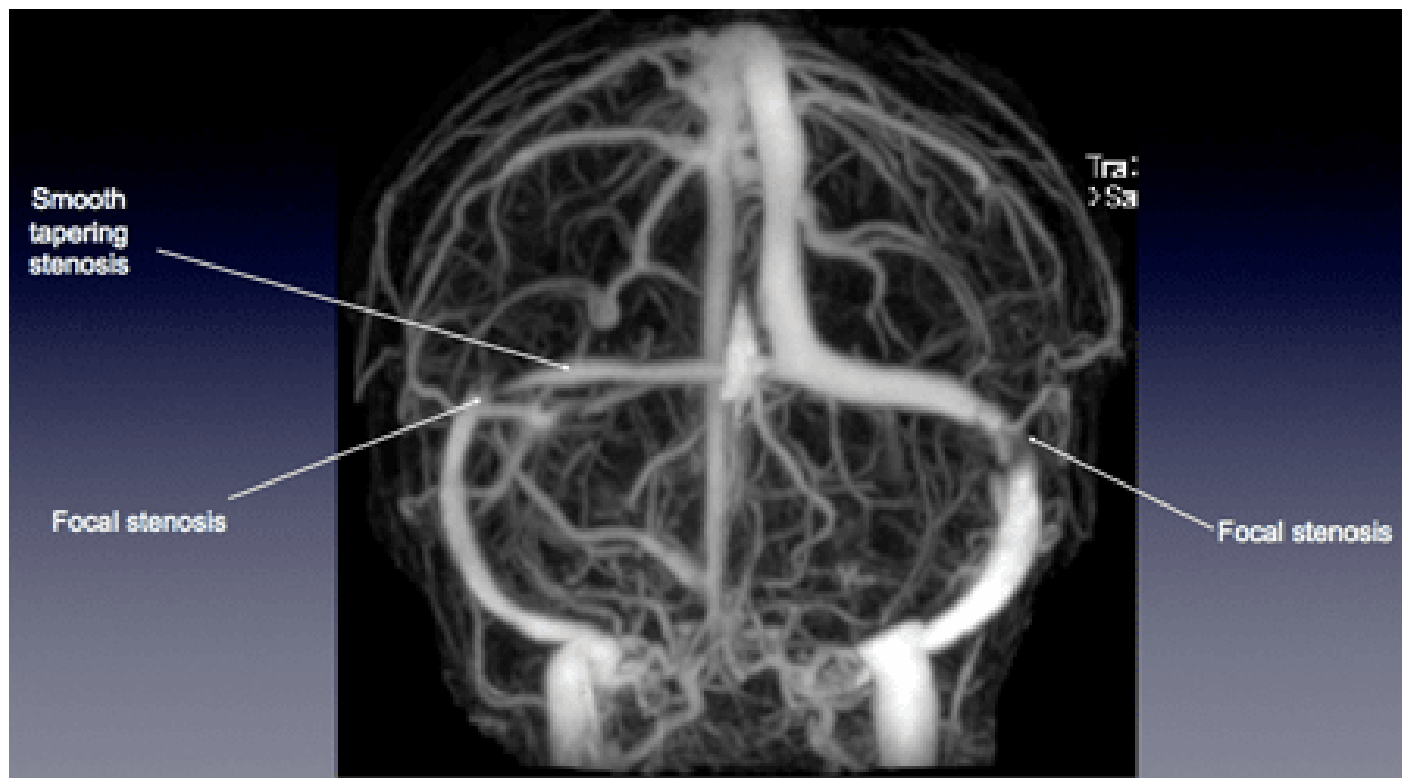
*Top right:* Partially empty sella

*Bottom left:* Enlargement of the optic nerve sheath.

*Bottom right:* Narrowing of the distal transverse sinus at its junction with the sigmoid sinus (yellow arrow)



## *Idiopathic Intracranial Hypertension (IIH)*



MRV in IIH. Focal stenosis at the junction of the distal portion of the transverse sinus sigmoid sinuses. (The smooth, tapering stenosis noted along the right transverse sinus is a common finding as well.)



# Q

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*Getting back to the LP...What position should the pt be in for it?*



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The lateral decubitus



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*What are the units of measurement for ICP?*

# Q/A

## Idiopathic Intracranial Hypertension (IIH)



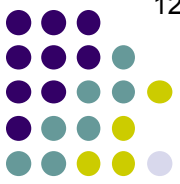
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Millimeters or centimeters of substance



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The value 250 is used in the *Neuro* book, and thus should be one's answer on the OKAP, WQE, and Boards



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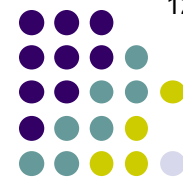
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# Q

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in <sup>a child</sup> an obese young-adult female patient who c/o H<sup>A</sup> and transient visual obscurations. Your working diagnosis is IIH.

*Can children develop IIH?*



# A

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# Q

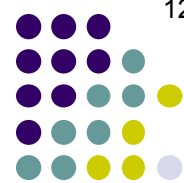
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*Yes*

*With what common chromosomal condition is IIH associated?*



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*How early can it present?*





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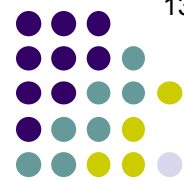
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*With what common chromosomal condition is IIH associated?*

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*How early can it present?*

It has been reported in infancy, but is extremely rare before age 3 years



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	Pre-pubescent children	Post-pubescent children
Gender predilection	M  F	M  F



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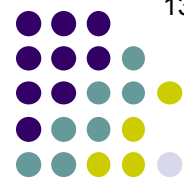
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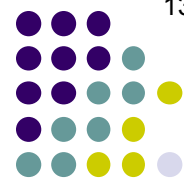
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Habitus	?	?



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Note how post-pubescent pediatric IIH is demographically equivalent to the adult version...

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With w  
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Because pre-pubescent pediatric IIH is so dissimilar to the adult version, the *Neuro* book contends that IIH “appears to be a different disorder in prepubertal children”

lated?

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# Q

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*What is the normal opening pressure in children?*



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It averages about 195 mm; it ranges from 100-280

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Can children develop IIH?

Yes

What is the normal opening pressure in children?

It averages about 195 mm; it ranges from 100-280

Note that the upper limit of normal for children is a **little higher** than it is for adults (more on this shortly)



# Q

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It averages about 195 mm; it ranges from 100-280

*So, if a child has an opening pressure of, say, 250, does s/he have IIH?*



# A

## *Idiopathic Intracranial Hypertension (IIH)*

- You find bilateral disc edema in <sup>a child</sup> an obese young-adult female patient who c/o H<sup>A</sup> and transient visual obscurations. Your working diagnosis is IIH.

*Can children develop IIH?*

Yes

*What is the normal opening pressure in children?*

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Maybe; your clinical suspicion will have to be your guide



# Q

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# Q/A

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It **elevates** it as much as # mm



# A

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*Children often need to be sedated for LP. What effect (if any) does sedation have on opening pressure in kids?*

It **elevates** it as much as 30 mm





Q

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in <sup>a child</sup> an obese young-adult female patient who c/o HA<sup>^</sup> and transient visual obscuration

What two things about the clinical scenario would make you much more comfortable diagnosing IIH in a child with an OP of 250?

--?

--?

Can children develop IIH?

Yes

What is the normal opening pressure in children?

It averages about 195 mm; it ranges from 100-280

So, if a child has an opening pressure of, say 250, does s/he have IIH?

**Maybe**; your clinical suspicion will have to be your guide

Children often need to be sedated for LP. What effect (if any) does sedation have on opening pressure in kids?

It **elevates** it as much as 30 mm



# Q/A

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What two things about the clinical scenario would make you much more comfortable diagnosing IIH in a child with an OP of 250?

--If the child was not            for the procedure  
--?

Can children develop IIH?

Yes

What is the normal opening pressure in children?

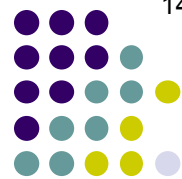
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# Q/A

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# A

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What two things about the clinical scenario would make you much more comfortable diagnosing IIH in a child with an OP of 250?  
 --If the child was not **sedated** for the procedure  
 --?

Can children develop IIH?  
 Yes

What is the normal opening pressure in children?  
 It averages about 195 mm; it ranges from 100-280

So, if a child has an opening pressure of, say 250, does s/he have IIH?  
**Maybe**; your clinical suspicion will have to be your guide

Children often need to be sedated for LP. What effect (if any) does sedation have on opening pressure in kids?  
**It elevates it as much as 30 mm**



# Q/A

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in <sup>a child</sup> an obese young-adult female patient who c/o HA<sup>^</sup> and transient visual obscuration

What two things about the clinical scenario would make you much more comfortable diagnosing IIH in a child with an OP of 250?

--If the child was not **sedated** for the procedure

--If the child was not  

Can children develop IIH?

Yes

What is the normal opening pressure in children?

It averages about 195 mm; it ranges from 100-280

So, if a child has an opening pressure of, say 250, does s/he have IIH?

**Maybe**; your clinical suspicion will have to be your guide

Children often need to be sedated for LP. What effect (if any) does sedation have on opening pressure in kids?

It **elevates** it as much as 30 mm



# A

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in <sup>a child</sup> an obese young-adult female patient who c/o HA<sup>^</sup> and transient visual obscuration

What two things about the clinical scenario would make you much more comfortable diagnosing IIH in a child with an OP of 250?

- If the child was not **sedated** for the procedure
- If the child was not **obese**

Can children develop IIH?  
Yes

What is the normal opening pressure in children?  
It averages about 195 mm; it ranges from 100-280

So, if a child has an opening pressure of, say 250, does s/he have IIH?  
**Maybe**; your clinical suspicion will have to be your guide

Children often need to be sedated for LP. What effect (if any) does sedation have on opening pressure in kids?  
It **elevates** it as much as 30 mm



# Q

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in <sup>a child</sup> an obese young-adult female patient who c/o HA<sup>^</sup> and transient visual obscurations. Your working diagnosis is IIH.

Can children develop IIH?

Yes

What is the normal opening pressure in children?

What is the mechanism thought to account for the increase in ICP associated with sedation?

Children often need to be sedated for LP. What effect (if any) does sedation have on opening pressure in kids?

It **elevates** it as much as 30 mm



# A

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in <sup>a child</sup> an obese young-adult female patient who c/o HA<sup>^</sup> and transient visual obscurations. Your working diagnosis is IIH.

Can children develop IIH?

Yes

What is the normal opening pressure in children?

What is the mechanism thought to account for the increase in ICP associated with sedation?

Hypoventilation

Children often need to be sedated for LP. What effect (if any) does sedation have on opening pressure in kids?

It **elevates** it as much as 30 mm





Q

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in <sup>a child</sup> an obese young-adult female patient who c/o HA<sup>^</sup> and transient visual obscurations. Your working diagnosis is IIH.

Can children develop IIH?

Yes

What is the normal opening pressure in children?

What is the mechanism thought to account for the increase in ICP associated with sedation?

Hypoventilation

How does hypoventilation increase ICP?

Children often need to be sedated for MRI. What effect (if any) does sedation have on opening pressure in kids?

It **elevates** it as much as 30 mm



# Q/A

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in <sup>a child</sup> an obese young-adult female patient who c/o HA<sup>^</sup> and transient visual obscurations. Your working diagnosis is IIH.

Can children develop IIH?

Yes

What is the normal opening pressure in children?

What is the mechanism thought to account for the increase in ICP associated with sedation?

Hypoventilation

How does hypoventilation increase ICP?

Hypoventilation leads to decreased  and increased  levels, both of which induce  of the cerebral vasculature, which in turn increases ICP

Children often need to be sedated for MRI. What effect (if any) does sedation have on opening pressure in kids?

It **elevates** it as much as 30 mm



# A

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Can children develop IIH?

Yes

What is the normal opening pressure in children?

What is the mechanism thought to account for the increase in ICP associated with sedation?

Hypoventilation

How does hypoventilation increase ICP?

Hypoventilation leads to decreased  $O_2$  and increased  $CO_2$  levels, both of which induce dilation of the cerebral vasculature, which in turn increases ICP

Children often need to be sedated for MRI. What effect (if any) does sedation have on opening pressure in kids?

It **elevates** it as much as 30 mm



Q

## Idiopathic Intracranial Hypertension (IIH)

- You find bilateral disc edema in <sup>a child</sup> an obese young-adult female patient who c/o HA<sup>^</sup> and transient visual

Can you think of a condition--very common in obese adults--that is associated with hypoventilation, decreased  $O_2$ , and increased  $CO_2$ ?

How does hypoventilation increase ICP?

**Hypoventilation leads to decreased  $O_2$  and increased  $CO_2$**  levels, both of which induce dilation of the cerebral vasculature, which in turn increases ICP

Children often need to be sedated for LP. What effect (if any) does sedation have on opening pressure in kids?

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**Obstructive sleep apnea (OSA)**

How does hypoventilation increase ICP?

**Hypoventilation leads to decreased  $O_2$  and increased  $CO_2$**  levels, both of which induce dilation of the cerebral vasculature, which in turn increases ICP

Children often need to be sedated for ENT procedures (if any), does sedation have an opening pressure in kids?

**It elevates it as much as 30 mm**



Q

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Can you think of a condition--very common in obese adults--that is associated with hypoventilation, decreased  $O_2$ , and increased  $CO_2$ ?

**Obstructive sleep apnea (OSA)**

Is there a relationship between IIH and OSA?

How does hypoventilation increase ICP?

**Hypoventilation leads to decreased  $O_2$  and increased  $CO_2$**  levels, both of which induce dilation of the cerebral vasculature, which in turn increases ICP

Children on chronic steroids for any reason (e.g., asthma) have an opening pressure in kids?

It **elevates** it as much as 30 mm



# A

## Idiopathic Intracranial Hypertension (IIH)

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Can you think of a condition--very common in obese adults--that is associated with hypoventilation, decreased  $O_2$ , and increased  $CO_2$ ?

**Obstructive sleep apnea (OSA)**

Is there a relationship between IIH and OSA?

Indeed there is. The *Neuro* book states OSA is a “potential cause” of IIH.

How does hypoventilation increase ICP?

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*What implications does this have for the management of IIH?*

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Indeed there is. The *Neuro* book states OSA is a “potential cause” of IIH. Further, if OSA is co-morbid with IIH, OSA will exacerbate it.

*What implications does this have for the management of IIH?*

The diagnosis of OSA should be considered in all IIH/potential IIH pts, and further testing should be pursued as warranted

*How does hypoventilation increase ICP?*

**Hypoventilation leads to decreased O<sub>2</sub> and increased CO<sub>2</sub>** levels, both of which induce dilation of the cerebral vasculature, which in turn increases ICP

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## *Idiopathic Intracranial Hypertension (IIH)*

- You find **bilateral disc edema** in an obese young-adult female patient who c/o **HA** and transient visual obscurations. Your working diagnosis is IIH.

*What is the differential for papilledema + HA?*

--IIH

--?

--?

--?

--?

--?



# A

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- You find **bilateral disc edema** in an obese young-adult female patient who c/o **HA** and transient visual obscurations. Your working diagnosis is IIH.

*What is the differential for papilledema + HA?*

- IIH
- Meningeal inflammatory process
- Intracranial space-occupying lesion (mass; bleed)
- Malignant hypertension
- Hydrocephalus
- Obstruction of cerebral venous outflow



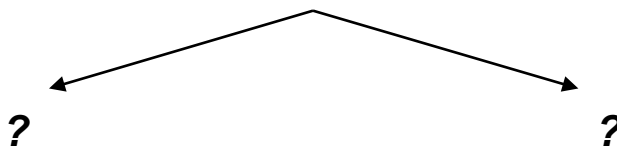
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*Causes of venous outflow obstruction can be broken into two general categories—what are they?*



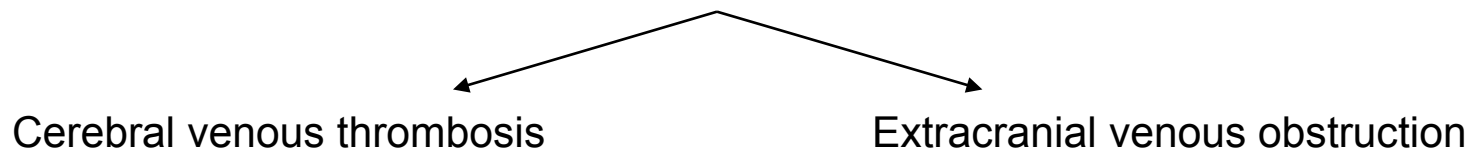
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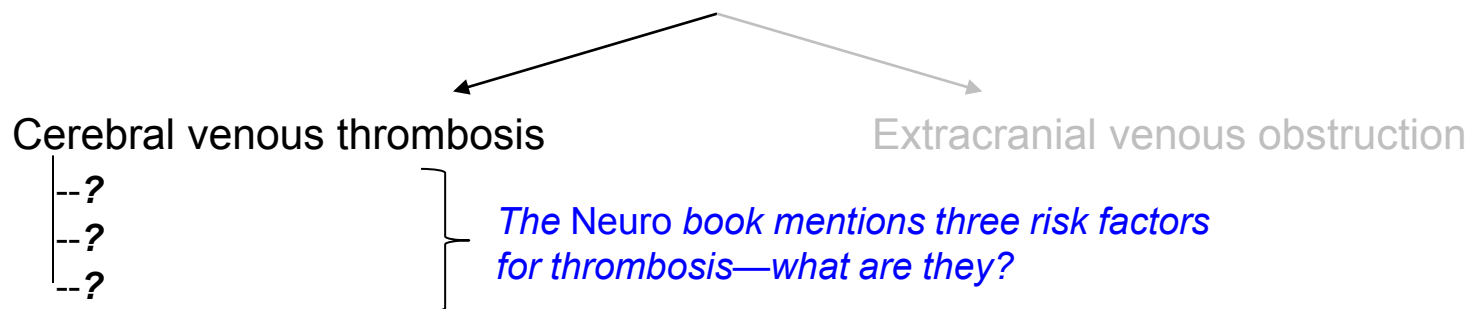
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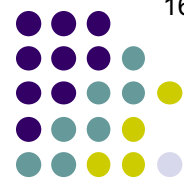
Cerebral venous thrombosis

- OCP use
- Dehydration
- Thrombotic disorders

*The Neuro book mentions three risk factors for thrombosis—what are they?*

Extracranial venous obstruction





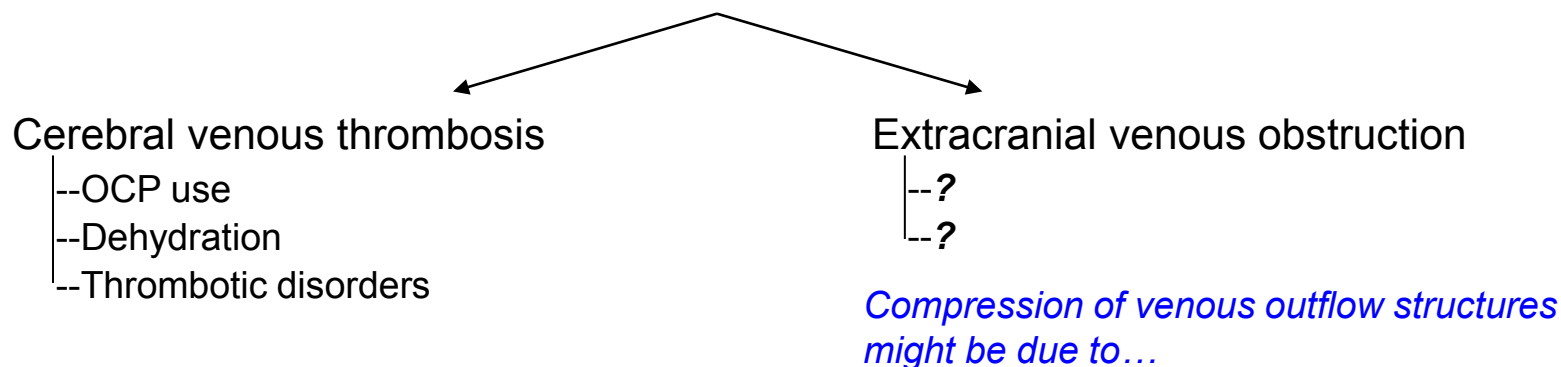
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- Hydrocephalus
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Cerebral venous thrombosis

- OCP use
- Dehydration
- Thrombotic disorders

Extracranial venous obstruction

- Mass
- Scarring (eg, s/p neck surgery)

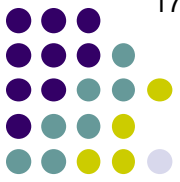
*Compression of venous outflow structures might be due to...*

# *Idiopathic Intracranial Hypertension (IIH)*



- *Pharmacologic causes of (secondary) IH*

*There are a number of pharmacologic and nutritional agents for which evidence of a causal relationship with intracranial HTN exists. In this next section, we will identify and discuss these agents.*



# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- *Pharmacologic causes of (secondary) IH:*
  - This (and related) abx are known to cause IIH:

# A

## *Idiopathic Intracranial Hypertension (IIH)*



- *Pharmacologic causes of (secondary) IH:*
  - This (and related) abx are known to cause IIH: *Minocycline*

## Q

*Idiopathic Intracranial Hypertension (IIH)*

- *Pharmacologic causes of (secondary) IH:*
  - This (and related) abx are known to cause IIH: *Minocycline*
  - This antibiotic is also used as an acne medicine:

# A

## *Idiopathic Intracranial Hypertension (IIH)*



- *Pharmacologic causes of (secondary) IH:*
  - This (and related) abx are known to cause IIH: *Minocycline*
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## Q

*Idiopathic Intracranial Hypertension (IIH)*

- *Pharmacologic causes of (secondary) IH:*
  - This (and related) abx are known to cause IIH: *Minocycline*
  - This antibiotic is also used as an acne medicine: *Minocycline*
  - This antibiotic is used as a DMARD:



# A

## *Idiopathic Intracranial Hypertension (IIH)*



- *Pharmacologic causes of (secondary) IH:*
  - This (and related) abx are known to cause IIH: *Minocycline*
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  - This antibiotic is also used as an acne medicine: *Minocycline*
  - This antibiotic is used as a **DMARD**: *Minocycline*

*What does **DMARD** stand for?*



# A

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  - This antibiotic is used as a **DMARD**: *Minocycline*

*What does **DMARD** stand for?*

**Disease-Modifying Anti-Rheumatic Drug**



# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- *Pharmacologic causes of (secondary) IH:*
  - This (and related) abx are known to cause IIH: *Minocycline*
  - This antibiotic is also used as an acne medicine: *Minocycline*
  - This antibiotic is used as a DMARD: *Minocycline*
  - Use **or** withdrawal of this medicine can lead to IIH:

# A

## *Idiopathic Intracranial Hypertension (IIH)*



- *Pharmacologic causes of (secondary) IH:*
  - This (and related) abx are known to cause IIH: *Minocycline*
  - This antibiotic is also used as an acne medicine: *Minocycline*
  - This antibiotic is used as a DMARD: *Minocycline*
  - Use **or** withdrawal of this medicine can lead to IIH: *Steroids*



# Q

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# A

## *Idiopathic Intracranial Hypertension (IIH)*



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  - The classic association is 'polar bear liver:' *Excess vitamin A*



# Q

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*Unless you work in an Inuit village, you're unlikely to see a pt who overindulged in polar bear liver. If a pt has hypervitaminosis A-induced IIH, what liver-based dietary supplement is likely the culprit?*





# A

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*Unless you work in an Inuit village, you're unlikely to see a pt who overindulged in polar bear liver. If a pt has hypervitaminosis A-induced IIH, what liver-based dietary supplement is likely the culprit?*

**Cod-liver oil**



# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- *Pharmacologic causes of (secondary) IH:*
  - This (and related) abx are known to cause IIH: *Minocycline*
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  - The classic association is 'polar bear liver:' *Excess vitamin A*
  - The test scenario will be a teenager with acne:

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*Note the recurring theme here—hypervitaminosis A*



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*Can one develop hypervitaminosis A from ingesting excess vitamin-A precursor (ie, beta carotene)?*



# A

## Idiopathic Intracranial Hypertension (IIH)

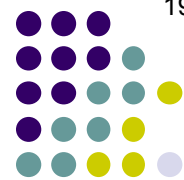
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**Note the recurring theme here—hypervitaminosis A**

*Can one develop hypervitaminosis A from ingesting excess vitamin-A precursor (ie, beta carotene)?*

**No.** Only the ingestion of *pre-formed* vitamin A in excess can cause it.





# Q

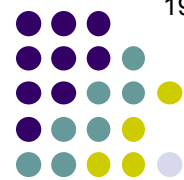
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*Note the recurring theme here—hypervitaminosis A*

Can one develop hypervitaminosis A from beta carotene ingestion?  
 No. Only the ingestion of high levels of beta-carotene can lead to hypervitaminosis A.

What will result from high levels of beta-carotene ingestion? or



# A

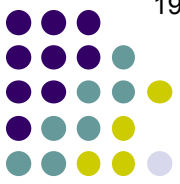
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*Note the recurring theme here—hypervitaminosis A*

Can one develop hypervitaminosis A (ie **beta carotene**)?  
No. Only the ingestion

What will result from high levels of beta-carotene ingestion? or  
**Carotenosis, a benign condition the hallmark of which is the development of an orange tint to the skin**



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*What retinal-related ocular condition is isotretinoin notorious for causing?*



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*What retinal-related ocular condition is isotretinoin notorious for causing?*  
**Nyctalopia**



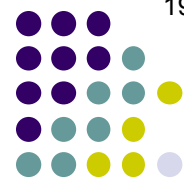
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*In layman's terms, what is nyctalopia?*



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*In layman's terms, what is nyctalopia?*  
Night blindness



# Q

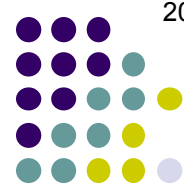
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*What other, much less serious ocular condition is associated with isotretinoin use?*



# A

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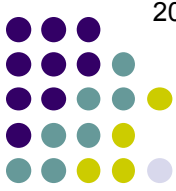
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*What retinal-related ocular condition is isotretinoin notorious for causing?*  
Nyctalopia

*In layman's terms, what is nyctalopia?*  
Night blindness

*What other, much less serious ocular condition is associated with isotretinoin use?*  
Meibomian gland disease, including chalazion development

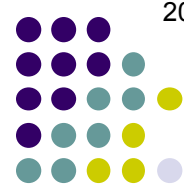




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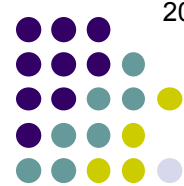


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*What is the brand-name for nitrofurantoin?*



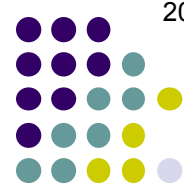
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*What is the brand-name for nitrofurantoin?*

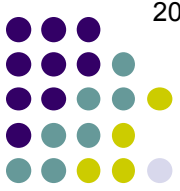
**Macrobid**



# Q

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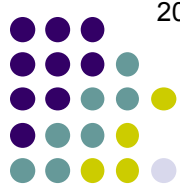
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  - This antibiotic is no longer available in the US:



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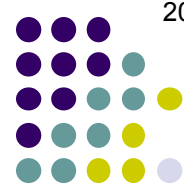
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  - What medicine is implicated, for which I have failed to come up with an interesting question?

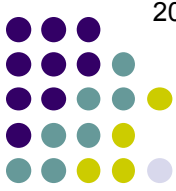


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  - What medicine is implicated, for which I have failed to come up with an interesting question? *Levothyroxine*



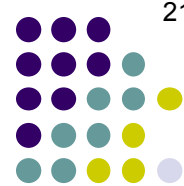


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  - This antibiotic is no longer available in the US: *Nalidixic acid*
  - What medicine is implicated, for which I have failed to come up with an interesting question? ***Levothyroxine***

*One population in particular is at risk for levothyroxine-induced IH--who is it?*

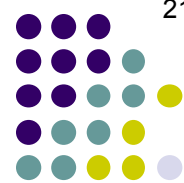


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  - What medicine is implicated, for which I have failed to come up with an interesting question? ***Levothyroxine***

*One population in particular is at risk for levothyroxine-induced IH--who is it?*  
**Children**



# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- **Pharmacologic causes of (secondary) IH:**

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*Minocycline?*

*Steroids?*

*vitamin A?*

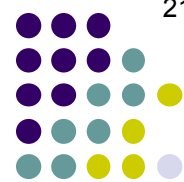
*Isotretinoin?*

*The Neuro book states the evidence of a connection with IH is strongest for three of these—which three?*

*Nitrofurantoin?*

*Nalidixic acid?*

*Levothyroxine?*



# A

## *Idiopathic Intracranial Hypertension (IIH)*

- **Pharmacologic causes of (secondary) IH:**

- 

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*The Neuro book states the evidence of a connection with IH is strongest for three of these—which three?*

- 

The cycline abx, vitamin A, and retinoic acid

- 

- 

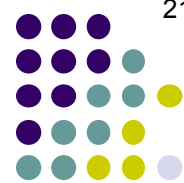
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- 

***Minocycline***

***vitamin A***

***Isotretinoin***



# Q

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- **Pharmacologic causes of (secondary) IH:**



**Minocycline**

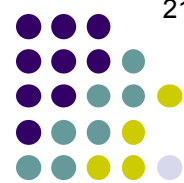
*The Neuro book states the evidence of a connection with IH is strongest for three of these—which three?*

The cycline abx, vitamin A, and retinoic acid

**vitamin A**

**Isotretinoin**

*Again per the Neuro book: Is the connection between these substances and IH firmly established?*



# A

## Idiopathic Intracranial Hypertension (IIH)

### ● **Pharmacologic causes of (secondary) IH:**



**Minocycline**

*The Neuro book states the evidence of a connection with IH is strongest for three of these—which three?*

The cycline abx, vitamin A, and retinoic acid

**vitamin A**

**Isotretinoin**

*Again per the Neuro book: Is the connection between these substances and IH firmly established?*

No—in fact, it states ‘a clear correlation is lacking’

Q

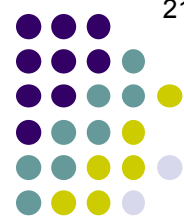
## *Idiopathic Intracranial Hypertension (IIH)*



- Regular f/u is important to ensure what two tx goals are met?

# A

## *Idiopathic Intracranial Hypertension (IIH)*



- Regular f/u is important to ensure what two tx goals are met? **Edema resolution and vision maintenance**





# Q

## *Idiopathic Intracranial Hypertension (IIH)*

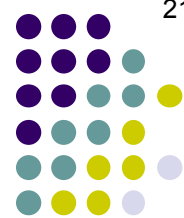
- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance

*What should be checked to assess visual function and the continued viability of the optic nerves?*

--?

--?

--?



# A

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance

*What should be checked to assess visual function and the continued viability of the optic nerves?*

- Acuity
- Color vision
- Visual fields



# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance

*What should be checked to assess for resolution of ONH edema?*

--?

--?



# A

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance

*What should be checked to assess for resolution of ONH edema?*

- Fundus photos
- OCT RNFL



# A

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance

*What should be checked to assess for resolution of ONH edema?*

--Fundus photos

--OCT RNFL. But take note...serial RNFL measurements cannot be relied upon in isolation.



# Q

## Idiopathic Intracranial Hypertension (IIH)

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance

*What should be checked to assess for resolution of ONH edema?*

--Fundus photos

--OCT RNFL. **But take note...serial RNFL measurements cannot be relied upon in isolation.**

*Huh? Serial RNFLs seem like a straightforward way to document resolution of ONH edema. What's the issue with using them?*

# Q/A

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By simultaneously monitoring (via OCT) the thickness of the retinal

three words



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*How does knowing GCC thickness help one interpret changes in RNFL thickness?*



# A

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*How does knowing GCC thickness help one interpret changes in RNFL thickness?*

**Because while ONH edema resolution would cause the RNFL to decrease, no concomitant change in retinal GCC thickness should be seen**



# A

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By simultaneously monitoring (via OCT) the thickness of the retinal ganglion cell complex (GCC)

*How does knowing GCC thickness help one interpret changes in RNFL thickness?*

**Because while ONH edema resolution would cause the RNFL to decrease, no concomitant change in retinal GCC thickness should be seen.** In contrast, atrophy of the ONH would cause both the RNFL and the GCC to thin over time.

Q

## *Idiopathic Intracranial Hypertension (IIH)*



- Regular f/u is important to ensure what two tx goals are met? **Edema resolution and vision maintenance**
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment?



# A

## *Idiopathic Intracranial Hypertension (IIH)*



- Regular f/u is important to ensure what two tx goals are met? **Edema resolution and vision maintenance**
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# Q

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*How much weight must be lost to ameliorate IIH?*



# A

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*How much weight must be lost to ameliorate IIH?*  
Loss of as little as 5% may be enough!



# Q

## *Idiopathic Intracranial Hypertension (IIH)*

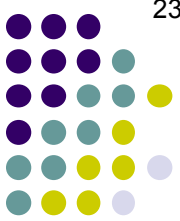
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# Q

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*What is the dose of acetazolamide?*



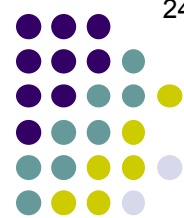
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1-4 g/day



# Q

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*What is the dose of acetazolamide?*

1-4 g/day

*What are the classic side effects of acetazolamide?*

--?

--?

--?



# Q/A

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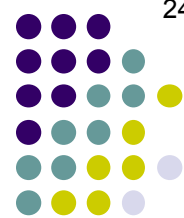
1-4 g/day

*What are the classic side effects of acetazolamide?*

--Tingling of [redacted], [redacted] and [redacted] area

--?

--?



# A

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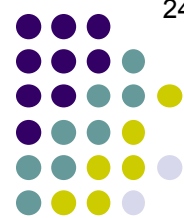
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*What are the classic side effects of acetazolamide?*

--Tingling of fingers , toes and perioral area

--Altered taste of food (described as   )

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# A

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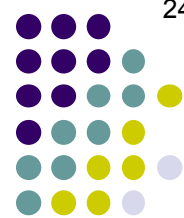
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*What are the classic side effects of acetazolamide?*

--Tingling of fingers , toes and perioral area

--Altered taste of food (described as 'metallic' )

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# A

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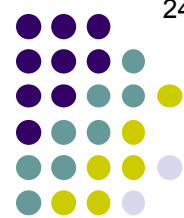
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- Tingling of fingers , toes and perioral area
- Altered taste of food (described as 'metallic' )
- Lassitude



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*Why is the altered-taste side effect not necessarily a bad thing?*

*acetazolamide?*

- Tingling of fingers, toes and perioral area
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*Why is the altered-taste side effect not necessarily a bad thing?*

Because it might lead to reduced caloric intake, leading in turn to weight loss

acetazolamide?

- Tingling of fingers, toes and perioral area
- Altered taste of food** (described as 'metallic' )
- Lassitude



# Q

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- Regular f/u is important to ensure what two tx goals are met? **Edema resolution and vision maintenance**
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- And if they continue to worsen?



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# Q/A

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*With regard to treating IIH, topiramate has three things (properties) going for it.  
What are they?*

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--Like acetazolamide, it has mechanism of action (three words) effects

--?

--?

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*With regard to treating IIH, topiramate has three things (properties) going for it. What are they?*

--Like acetazolamide, it has carbonic anhydrase inhibition effects

--With respect to HA control it has a two words effect

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*With regard to treating IIH, topiramate has three things (properties) going for it.  
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--Like acetazolamide, it has carbonic anhydrase inhibition effects

--With respect to HA control it has a direct analgesic effect

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two words

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two different words

# Q/A *Idiopathic Intracranial Hypertension (IIH)*



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*With regard to treating IIH, topiramate has three things (properties) going for it. What are they?*

- Like acetazolamide, it has carbonic anhydrase inhibition effects
- With respect to HA control it has a direct analgesic effect
- It acts as an appetite suppressant, and thus will promote weight loss





# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
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*If acetazolamide and topiramate are contraindicated, not tolerated, or only partially effective, what drug can be used or added?*



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*If acetazolamide and topiramate are contraindicated, not tolerated, or only partially effective, what drug can be used or added?*  
Furosemide

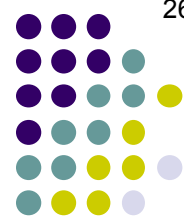


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*What about steroids—should they be tried?*



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- If a patient has moderate dz, or fails the above, what is added? PO **acetazolamide**
- And if they continue to worsen? **Topiramate**

*What about steroids—should they be tried?*

Per the *Neuro* book, only in severe cases, and in a limited manner (short course; high-dose; delivered IV)



# Q

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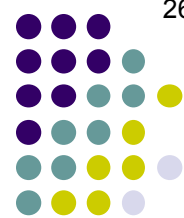
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- And if they continue to worsen? **Topiramate**
- If they continue to lose VF?



# A

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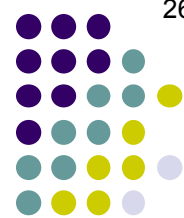
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- And if they continue to worsen? **Topiramate**
- If they continue to lose VF? **Consider ON sheath fenestration (ONSF)**



# Q

## Idiopathic Intracranial Hypertension (IIH)

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has persistent symptoms despite treatment, what is the next step?
  - Is ONSF an appropriate intervention if the primary goal is HA amelioration?
- If a patient has persistent symptoms despite treatment, what is the next step?
  - Weight
  - ove,
- And if they continue to worsen, what is the next step?
- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**



# A

## Idiopathic Intracranial Hypertension (IIH)

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has persistent symptoms despite treatment, consider **ON sheath fenestration (ONSF)**

*Is ONSF an appropriate intervention if the primary goal is HA amelioration?*  
 Per the *Neuro* book, ONSF “does not reliably treat HA”





# Q

## Idiopathic Intracranial Hypertension (IIH)

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has persistent weight loss, what is the next step?
  - Is ONSF an appropriate intervention if the primary goal is HA amelioration? Per the *Neuro* book, ONSF “does not reliably treat HA”
  - Is ONSF effective at reducing ICP?
- If a patient has persistent weight loss, what is the next step?
  - And if they continue to lose weight, what is the next step?
- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**



# A

## Idiopathic Intracranial Hypertension (IIH)

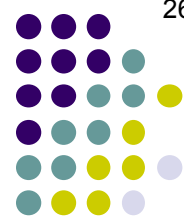
- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has persistent weight loss, consider if ONSF is appropriate  
 Is ONSF an appropriate intervention if the primary goal is HA amelioration?  
 Per the *Neuro* book, ONSF “does not reliably treat HA”  
 Is ONSF effective at reducing ICP?  
 No (this is probably why it doesn’t treat HA well)
- If a patient has persistent weight loss, consider if ONSF is appropriate
- And if they continue to lose weight, consider ONSF
- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**



# Q

## Idiopathic Intracranial Hypertension (IIH)

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has persistent HA, what is the next step?
  - Is ONSF an appropriate intervention if the primary goal is HA amelioration?*  
Per the *Neuro* book, ONSF “does not reliably treat HA”
  - Is ONSF effective at reducing ICP?*  
No (this is probably why it doesn’t treat HA well)
  - Oh well, you can’t have it all I guess. At least it’s an effective long-term tx for preventing vision loss, right?*
- If a patient has persistent vision loss, what is the next step?
- And if they continue to lose vision, what is the next step?
- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**



# A

## Idiopathic Intracranial Hypertension (IIH)

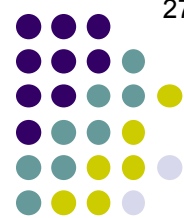
- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has significant weight loss, is ONSF an appropriate intervention if the primary goal is HA amelioration?  
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Oh well, you can’t have it all I guess. At least it’s an effective long-term tx for preventing vision loss, right?
- If a patient has significant weight loss, is ONSF effective at preventing vision loss?  
The *Neuro* book states its long-term success rate in this regard is “unclear”
- And if they continue to lose weight, is ONSF appropriate?
- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**



# Q

## Idiopathic Intracranial Hypertension (IIH)

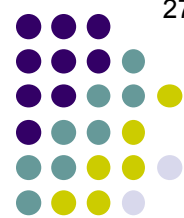
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  - Is it at least **safe**??!!*
- And if they continue to lose weight, what is the impact on ICP?
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# Q/A

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  - Is it at least **safe**??!!*  
Not to the extent one would like—it carries a complication rate of %
- And if they continue to lose vision, what is the next step?
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  - Is it at least **safe**??!!*  
Not to the extent one would like—it carries a complication rate of 10-15%
- And if they continue to lose weight, what is the impact on ICP?
- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**

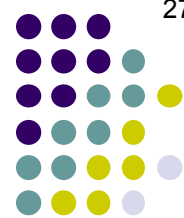


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  - Is it at least **safe**??!!*  
Not to the extent one would like—it carries a complication rate of 10-15% (including a 10% chance of vision loss, ironically)
- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**





# A

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The *Neuro* book states its long-term success rate in this regard is “unclear”
  - Is it at least **safe**??!!*  
Not to the extent one would like—it carries a complication rate of 10-15% (including a 1-2% chance of vision loss, ironically)
- And if they continue to lose VF? Consider **ON sheath fenestration (ONSF)**



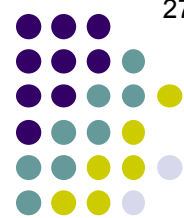
# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has mild dz (little edema; minimal VF

*What is the mechanism by which ONSF arrests loss of visual function?*

- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**



# A

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has mild dz (little edema; minimal VF

*What is the mechanism by which ONSF arrests loss of visual function?*

This is controversial. The obvious answer is that the fenestration allows CSF to percolate out of the subarachnoid space, thereby reducing pressure--the brain-equivalent of a trab. (It's not for nothing that IIH has been called 'glaucoma of the brain.')

- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**



# A

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- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**



# A

## *Idiopathic Intracranial Hypertension (IIH)*

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However, this explanation is problematic, as studies indicate fenestrations often scar down, thus rendering long-term CSF egress impossible.

That said, the phenomenon of scarring provides a neat explanation for the ability of ONSF to arrest loss of visual function—namely, that circumferential scarring at the surgery site prevents CSF from reaching the ONH, thereby relocating the increased ICP 'pressure head' from the vulnerable circulatory watershed zone at the ONH to the robustly-perfused retrobulbar region of the nerve.

- If they continue to lose VF? Consider **ON sheath fenestration (ONSF)**



# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? **Edema resolution and vision maintenance**
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment? **Weight loss +/- symptomatic HA relief**
- If a patient has moderate dz, or fails the above, what is added? **PO acetazolamide**
- And if they continue to worsen? **Topiramate**
- If they continue to lose VF? **Consider ON sheath fenestration (ONSF)**
- If they continue to have intractable HA?

# Q/A *Idiopathic Intracranial Hypertension (IIH)*



- Regular f/u is important to ensure what two tx goals are met? **Edema resolution and vision maintenance**
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment? **Weight loss +/- symptomatic HA relief**
- If a patient has moderate dz, or fails the above, what is added? **PO acetazolamide**
- And if they continue to worsen? **Topiramate**
- If they continue to lose VF? **Consider ON sheath fenestration (ONSF)**
- If they continue to have intractable HA? **Consider a [redacted] or [redacted] procedure**



# A

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? **Edema resolution and vision maintenance**
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment? **Weight loss +/- symptomatic HA relief**
- If a patient has moderate dz, or fails the above, what is added? **PO acetazolamide**
- And if they continue to worsen? **Topiramate**
- If they continue to lose VF? **Consider ON sheath fenestration (ONSF)**
- If they continue to have intractable HA? **Consider a shunt or stenting procedure**





# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment? Weight loss +/- symptomatic HA relief
- If a patient has moderate dz, or fails the above, what is added? PO acetazolamide
- And if they continue to worsen? Topiramate
- *Are shunts effective in treating IIH?*
- Consider ON sheath
- *Are they effective to relieve intolerable HA? Consider a*  
**shunt** or stenting **procedure**



# A

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment? Weight loss +/- symptomatic HA relief
- If a patient has moderate dz, or fails the above, what is added? PO acetazolamide
- And if they continue to worsen? Topiramate
- *Are shunts effective in treating IIH?*  
Generally yes
- Consider ON sheath
- If they continue to have intolerable HA? Consider a **shunt** or stenting **procedure**



# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment? Weight loss +/- symptomatic HA relief
- If a patient has moderate dz, or fails the above, what is added? PO acetazolamide
- And if they continue to worsen? Topiramate
- *Are shunts effective in treating IIH?*  
Generally yes
- *What is their main drawback?*
- *How do you determine if there is a shuntable HA? Consider a*  
**shunt** or stenting **procedure**



# A

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment? Weight loss +/- symptomatic HA relief
- If a patient has moderate dz, or fails the above, what is added? PO acetazolamide
- And if they continue to worsen? Topiramate
- *Are shunts effective in treating IIH?*  
Generally yes
- *What is their main drawback?*  
A significant portion will fail, and thus require revision (and many will require **multiple** revisions)
- **shunt** or stenting **procedure**

Consider ON sheath

able HA? Consider a



# Q

## *Idiopathic Intracranial Hypertension (IIH)*

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- If a patient has moderate dz, or fails the above, what is added? PO acetazolamide
- And if they continue to worsen? Topiramate
- If they continue to lose VF? Consider ON sheath fenestration (ONSF)
- If they continue to have intractable HA? Consider a shunt or stenting procedure *or repeated LPs?*

*What about repeated LPs—is that an appropriate treatment?*



# A

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
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- If a patient has moderate dz, or fails the above, what is added? PO acetazolamide
- And if they continue to worsen? Topiramate
- If they continue to lose VF? Consider ON sheath fenestration (ONSF)
- If they continue to have intractable HA? Consider a shunt or stenting procedure *or repeated LPs? No*

*What about repeated LPs—is that an appropriate treatment?  
The Neuro book flatly states it is not*



# Q

## *Idiopathic Intracranial Hypertension (IIH)*

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment? Weight loss + symptomatic HA relief
  - *After an LP, how long does it take for ICP to return to its pre-procedure level?*
- If a patient has moderate/severe edema, what are the mainstays of treatment?
- And what if they continue to have moderate/severe edema?
- If they continue to lose VF? Consider ON/OFF fenestration (ON/OFF)
  - *What about repeated LPs—is that an appropriate treatment?*  
The Neuro book flatly states it is not
- If they continue to have intractable HA? Consider a shunt or stenting procedure *or repeated LPs? No*



# A

## Idiopathic Intracranial Hypertension (IIH)

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment? Weight loss + symptomatic HA relief
  - After an LP, how long does it take for ICP to return to its pre-procedure level? About 90 minutes
- If a patient continues to have symptoms, what are the next steps?
- And if they continue to have symptoms, what are the next steps?
- If they continue to have symptoms, what are the next steps? Consider ON shunt fenestration (ON shunt fenestration)
  - What about repeated LPs—is that an appropriate treatment? The Neuro book flatly states it is not
- If they continue to have intractable HA? Consider a shunt or stenting procedure or repeated LPs? No





# Q

## Idiopathic Intracranial Hypertension (IIH)

- Regular f/u is important to ensure what two tx goals are met? Edema resolution and vision maintenance
- If a patient has mild dz (little edema; minimal VF loss) what are the mainstays of treatment? Weight loss + symptomatic HA relief
  - After an LP, how long does it take for ICP to return to its pre-procedure level?*  
About 90 minutes
  - But some pts experience HA relief for day to weeks after an LP. How is this possible if ICP returns to baseline in an hour and a half?*
- And
- If they continue to lose VF? Consider ON shunt fenestration (ON SF)
- What about repeated LPs—is that an appropriate treatment?*  
The Neuro book flatly states it is not
- If they continue to have intractable HA? Consider a shunt or stenting procedure *or repeated LPs? No*



# A

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  - *After an LP, how long does it take for ICP to return to its pre-procedure level?*  
About 90 minutes
  - *But some pts experience HA relief for day to weeks after an LP. How is this possible if ICP returns to baseline in an hour and a half?*  
Probably because the drop in ICP induced by the procedure allows the flattened venous sinuses to re-cannulate, which in turn re-establishes normal CSF circulatory dynamics.
- If they continue to lose VF? Consider ON or cath fenestration (ONCSF)
- *What about repeated LPs—is that an appropriate treatment?*  
The Neuro book flatly states it is not
- If they continue to have intractable HA? Consider a shunt or stenting procedure or repeated LPs? No



# A

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About 90 minutes
  - But some pts experience HA relief for day to weeks after an LP. How is this possible if ICP returns to baseline in an hour and a half?  
Probably because the drop in ICP induced by the procedure allows the flattened venous sinuses to re-cannulate, which in turn re-establishes normal CSF circulatory dynamics. The inevitable re-collapse of the sinuses (with its accompanying re-derangement of CSF circulation) leads to recurrence of the HA.
- If they continue to lose VF? Consider ON/OFF fenestration (ONCSF)
- What about repeated LPs—is that an appropriate treatment?  
The Neuro book flatly states it is not
- If they continue to have intractable HA? Consider a shunt or stenting procedure or repeated LPs? No