

Visualizing Idiopathic intracranial hypertension: a case report

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Introduction:

The neurological disorder, Idiopathic intracranial hypertension (IIH) mainly affects younger overweight women, with an incidence of about 20 per 100,000, which is 20 times higher than the general population. The most common symptom of IIH is headache, which occurs in almost all cases and may be associated with nausea and vomiting. The increased intracranial pressure leads to papill edema, which is a swelling of the optic disc, the spot where the optic nerve enters the eye. This occurs in practically all cases of IIH, but not everyone experiences symptoms from this. The symptoms, typically reported are transient visual obscurations and episodes of difficulty seeing, this occurs in both eyes but not necessarily at the same time. Long-term untreated papilledema can lead to visual loss¹.

Protocol for IIH patients: Avanto 1.5T	
T1_mprage_sag_3D_iso	5.25min
T2_spc_Darkfluid_sag_3D_iso - FLAIR	7.02min
Ep2d_diff_3scan	1.02min
T2_tse_tra	3.17min
T2spc_fs_sag_iso (left eye)	3.04min
T2spc_fs_sag_iso (right eye)	3.04min
---Optional sequences---	
PC_venc_9_ax_venography	7.35min
Cor TWIST angiography_10dyn +Gd	1.43min
T1_mprage_sag_3D_iso +Gd	5.25min

Diagnosis:

To confirm the diagnosis, several investigations are required: A lumbar puncture is performed to measure the opening pressure, and to exclude alternative diagnoses. An ophthalmoscopy eye examination is critical for the diagnosis, as papill edema usually is the only objective finding for patients with IIH. However this can be quite subtle, and cases of IIH without papill edema have been reported. An MRI exam is used to exclude any mass lesions, and sometimes supplemented with an MR venography to exclude venous sinus stenosis¹.

Case presentation:

A young female, age 21, was referred to MRI, with recurring signs of IHH. The ophthalmoscopy showed very minute papill edema. Her symptoms being: headache and visual obscurations, in the form of blind spots. The patient suffered from the same symptoms one year earlier and was back then successfully treated medicinally with Diamox (Acetazolamide), that reduce the build-up of fluids in the body.

The MRI was performed on a Siemens Avanto 1.5T system including T2 fatsat images of the optical nerve, but without an MRI Venography. The scan showed no signs of hydrocephalus or other pathology. The T2 fatsat images did however show significant amounts of water along the optic nerve.

The patient was again treated with Diamox, and returned 3 weeks later for a follow up MRI. At this check up, the patients symptoms were still unchanged and the MRI T2 fatsat images showed only minute reduction in CSF along the optic nerves, measured on both sagittal images and coronal reconstructions (first visit 5.5mm, second visit 5.4mm). This time the examination was supplemented with an MR venography (cor Twist + Gd), which showed stenosis in both transverse sinuses, thus explaining the increased intracranial pressure.

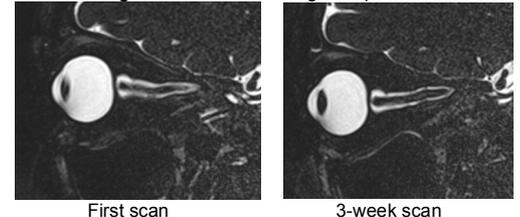
Discussion:

We suggest supplementing the MRI examination with T2 Fatsat of the optic nerve. This may help identify IIH and give quantitative measurements of CSF along the optic nerve, which can supplement the ophthalmoscopy that in this case only showed minute papill edema.

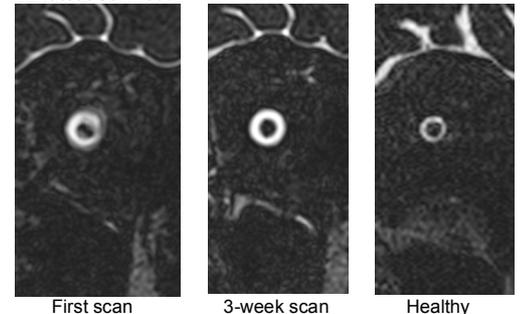
On our Siemens 1.5T Avanto MRI system, we used a sag-T2-space sequence with fatsat to visualize CSF in the subarachnoid space around the optic nerves, associated with IIH. This 3D sequence, with isotropic voxels (0.6x0.6x0.6mm), enable reconstructions in all planes, and makes visualization and quantitative measurements easier. The addition of fatsat removes the hyper intense signal from fat in the area, which often is seen on fast T2 imaging techniques.

Further follow up MRI examinations on IIH patients, will revile if symptoms, ophthalmoscopy and volume of water along the optic nerve correlate over time.

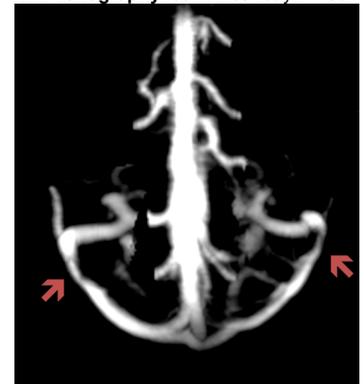
T2 fatsat sag: Increased CSF along the optic nerve



T2 fatsat cor: recon



MRI venography: cor Twist 10dyn + Gd



Stenosis at both Transverse sinuses

¹ Binder DK, Horton JC, Lawton MT, McDermott MW (March 2004). "Idiopathic intracranial hypertension". *Neurosurgery*. **54** (3): 538–51