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Case Report

The Spectrum of Magnetic Resonance Imaging Findings in Idiopathic Intracranial Hypertension – Case Report

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Abstract:
Idiopathic intracranial hypertension (IIH), formerly known as benign intracranial hypertension and pseudotumor cerebri, is a neurological condition with an unidentified cause. Many patients are adult females who present with a variety of clinical signs and symptoms, such as headache, nausea, and vomiting as well as papilledema and sixth nerve palsy. The majority of the time, a neurological examination reveals no abnormalities; nevertheless, a CSF analysis reveals increased CSF opening pressure upon lumbar puncture. Imaging plays a critical role in these situations, assisting physicians with diagnosis, excluding complications, and patient follow-up. Here, we discuss the case of a 34-year-old female patient who had symptoms and signs of IIH, and whose magnetic resonance imaging (MRI) not only helped to diagnose IIH but also revealed the involvement of optic nerve and venous sinuses.

Keywords: Intracranial hypertension, Magnetic resonance imaging, Venography.

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Case Report

A 34-year-old female, apparently alright two months back, presented with a complaint of neck pain radiating to the whole head with the blurring of vision. This was not associated with vomiting, nausea, photophobia, or aggravation with stress. At admission, the patient had a normal pulse rate, blood pressure, and temperature. Her neurological examination was normal and did not reveal any neck stiffness or signs of meningitis. Ophthalmology reference was taken which revealed normal visual acuity with a normal visual field however, fundoscopic examination showed evidence of papilledema.

The patient underwent an MRI of the brain with a 3-Tesla scanner which showed prominent CSF spaces in the form of partially empty sella, prominent bilateral optic nerve CSF sheath, and Meckel's cave (Figures 1,2, and 3). T-2 weighted images revealed flattening of the bilateral posterior sclera and intraocular protrusion of the right optic nerve (Figure 1).

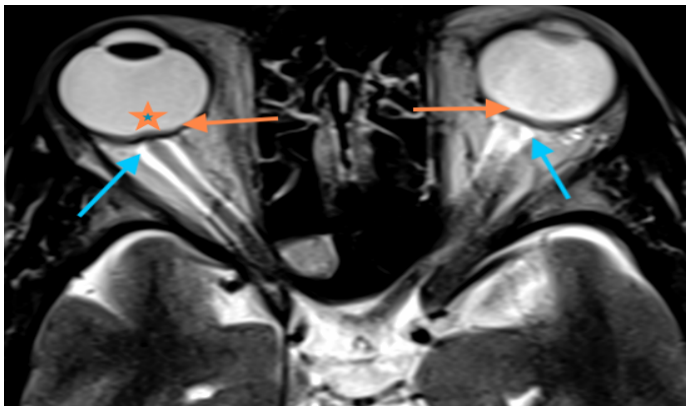

Figure 1: Axial T-2 weighted MR image at the level of the orbits showing prominent bilateral optic nerve sheath (blue arrows), flattening of sclera at the posterior aspect of globe (orange arrows), and intraocular protrusion of the right optic nerve (star).

Figure 2: Axial T-2 weighted MR image at the level of pons - showing prominent bilateral Meckel's cave (red arrows).

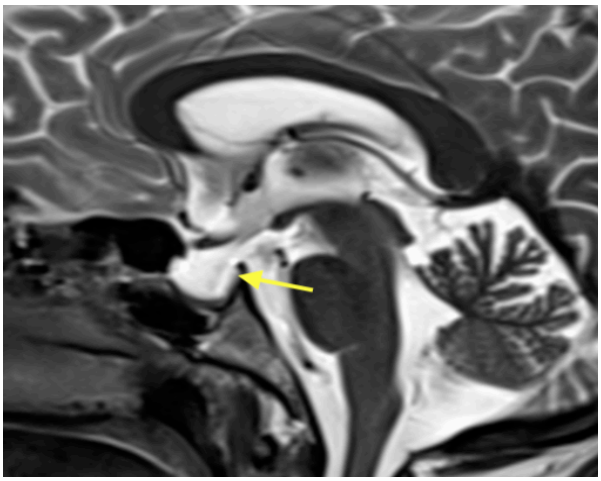

Figure 3: Mid-sagittal T-2 weighted MR image of brain showing partially empty sella (yellow arrow).

Three-dimensional time-of-flight MR venography (Figure 4) revealed a hypoplastic left transverse and sigmoid sinuses with narrowing at the junction of the right side transverse and sigmoid sinus. There was no evidence of venous sinus thrombosis.

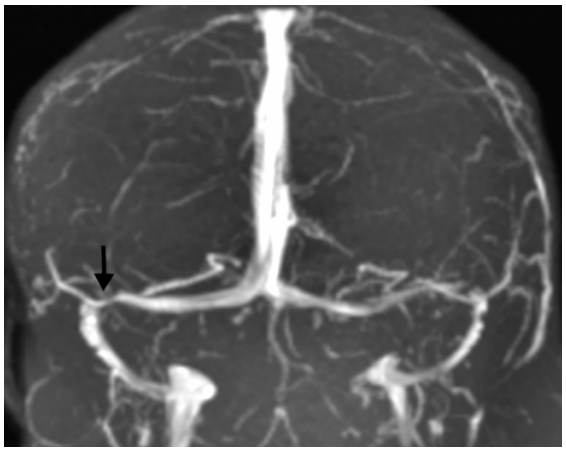

Figure 4: Time-of-flight MR venography image showing right transverse venous sinus stenosis at its junction with sigmoid sinus (black arrow). The left transverse venous sinus appears hypoplastic.

A lumbar puncture was performed with the patient in decubitus position which showed an opening pressure of 40 cm of H2O, and around 20 ml of CSF was drained. The CSF cell count revealed normal composition i.e., one leukocyte; protein, 24 mg/dL; glucose, 83 mg/dL and Adenosine

deaminase, 0.60. The patient was managed with intravenous anti-edema drugs which resulted in gradual relief of symptoms. The patient was discharged in stable condition with advice for further follow-up.

Discussion

Idiopathic intracranial hypertension (IIH) is a diagnosis of exclusion, and imaging is performed to rule out disorders associated with increased intracranial pressure like obstructive hydrocephalus, tumor, chronic meningitis, arteriovenous fistula, internal jugular vein stenosis, and dural sinus thrombosis [1] IIH generally affects obese young women of childbearing age. As a causative factor, recent evidence points to androgen excess, specifically testosterone, concentrations of which were found to be higher in both blood and CSF as compared to obese females with and without polycystic ovary syndrome. [2]

The clinical features of IIH can be discussed under two headings - headache and vision-related. Headache is the predominant clinical symptom that has been described as increasingly severe and frequent. Many times it remains underdiagnosed due to overlapping signs and symptoms with migraine. Visual complaints are attributed to papilledema which can be bilateral, unilateral, or asymmetrical. The vision disturbances comprise transient darkening of vision typically lasting for a few seconds and horizontal diplopia. Due to the potential irreversibility of visual symptoms, a quick and accurate assessment is essential in the diagnostic workup of IIH. [3] Other symptoms of IIH include pulsatile tinnitus, radicular or neck pain, dizziness, and rarely cognitive disturbance. Interestingly none of these symptoms is path gnomic for IIH.

MRI plays an important role in the diagnostic workup of IIH as well as ruling out secondary causes of raised CSF pressure. Many neuroimaging signs have been observed and can be studied under orbital findings and rest others. Orbital findings include the tortuosity of the optic nerve which can be studied in both horizontal and vertical directions however, horizontal tortuosity although difficult to observe is more specific for IIH. These changes are likely due to direct transmission of the increased CSF pressure causing distension of the peri-optic subarachnoid space with intraocular bulging of the optic nerve head. The other orbital findings include flattening of the posterior sclera, distension of the peri-optic subarachnoid space, enhancement of the prelaminar optic nerve, and intraocular protrusion of the prelaminar portion of the optic nerve. [4]

MRI brain findings apart from the above-mentioned orbital findings include: the one most commonly seen is an empty sella on T-2 weighted midsagittal sections of MRI brain however, this sign is quite commonly seen in patients undergoing MRI for other conditions hence, a clinical correlation is a must. Other neuroimaging signs include partially empty sella or reduced pituitary height, enlarged Meckel's cave, and transverse venous sinus stenosis. A time-of-flight MR venography is performed to rule out venous sinus thrombosis as the cause of IIH. By using a novel MR venography method, auto-triggered elliptic centric-ordered imaging, Farb et al [5] identified venous stenoses in 90% of patients with IIH with a reported sensitivity and specificity of 93%. Further advancements in MR venography may demonstrate stenosis of the venous sinuses to be an excellent indicator of the presence of elevated ICP. [6]

A consensus-based study conducted in the United Kingdom (UK) under the expert supervision of neurologists, neuroradiologists, ophthalmologists, and primary physicians diagnosing and treating patients with IIH, postulated three main principles for management which include: treating the underlying disease by weight reduction, surgical and non-surgical techniques to protect vision and to reduce the morbidity associated with headache.(7) The various surgical management strategies include optic nerve sheath fenestration to more invasive CSF diversion procedures like placement of ventricular peritoneal (VP) shunt and lumbar puncture drain. Medical management strategies include the use of Acetazolamide (carbonic anhydrase enzyme inhibitor drug) and non-steroidal anti-inflammatory drugs like Paracetamol or Indomethacin which have a modest effect on reducing headache as well as intracranial pressure (ICP). [7]

Conclusion

Idiopathic intracranial hypertension is a disease with significant morbidity affecting a particular population group. Neuroimaging plays an essential role in diagnosing the condition with the use of previously described signs as well as excluding venous sinus thrombosis, tumor, and CSF obstructing lesions as a cause of raised ICT. Familiarity of neuroradiologists, neurologists, and clinicians with the imaging signs has enabled MRI to become a great tool and adjunct to clinical examination in the management of IIH.

References

1. Suzuki H, Takanashi J, Kobayashi K, Nagasawa K, Tashima K, Kohno Y. MR imaging of idiopathic intracranial hypertension. AJNR Am J Neuroradiol 2001; 22:196–9.
2. O'Reilly MW, Westgate CSJ, Hornby C, Botfield H, Taylor AE, Markey K, et al. A unique androgen excess signature in idiopathic intracranial hypertension is linked to cerebrospinal fluid dynamics. JCI Insight 2019;4.

3. Moreno-Ajona D, McHugh JA, Hoffmann J. An Update on Imaging in Idiopathic Intracranial Hypertension. Front Neurol. 2020; 11:453.
4. Brodsky MC, Vaphiades M. Magnetic resonance imaging in pseudotumor cerebri. Ophthalmology 1998; 105:1686–93.
5. Farb RI, Vanek I, Scott JN, Mikulis DJ, Willinsky RA, Tomlinson G, et al. Idiopathic intracranial hypertension: the prevalence and morphology of sinovenous stenosis. Neurology 2003; 60:1418–24.
6. Degnan AJ, Levy LM. Pseudotumor cerebri: brief review of clinical syndrome and imaging findings. American Journal of Neuroradiology 2011; 32:1986–93.
7. Mollan SP, Davies B, Silver NC, Shaw S, Mallucci CL, Wakerley BR, et al. Idiopathic intracranial hypertension: consensus guidelines on management. Journal of Neurology, Neurosurgery and Psychiatry 2018;89:1088–1100.