Imaging findings of IIH: The value of MRI in predicting the presence of disease; A Retrospective Analysis

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RESEARCH QUESTION

In a retrospective analysis of patients that have a confirmed diagnosis of idiopathic intracranial hypertension (IIH), what is the predictive value of magnetic resonance imaging (MRI) in the diagnosis of IIH?

BACKGROUND

Idiopathic intracranial hypertension (IIH) is a condition characterized by an increase in cerebrospinal fluid (CSF) with a lack of identifiable structural cause or etiology. Its major morbidity is blindness which occurs in 10% of patients and is expected to rise in incidence due to rising rates of obesity, which is a major risk factor.

METHODS

This study was a retrospective data analysis of MRI reports completed during 2020 at John Peter Smith hospital (Fort Worth, TX). Reports containing "Idiopathic intracranial hypertension" were reviewed and patients with a lumbar puncture confirming the diagnosis were included. All cases were de-identified and randomized. These MRI studies were reviewed by three neuroradiologists who were blinded to the diagnoses. The presence or absence of each of four characteristic imaging findings were noted. Inter-rater reliability (IRR) and Odds Ratios (OR) were analyzed for each finding using a generalized linear mixed model.

What is the predictive value of magnetic resonance imaging (MRI) in the diagnosis of IIH? Venous imaging may be needed to identify bilateral transverse sinus stenosis

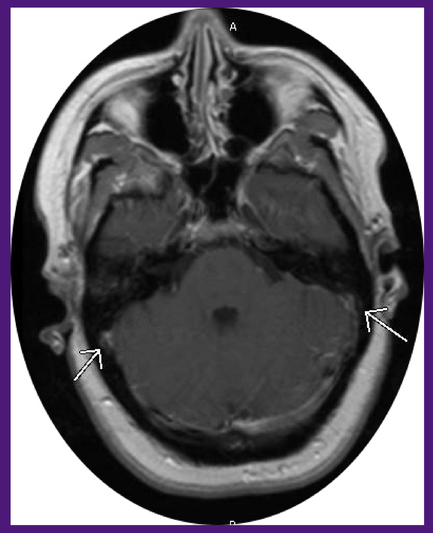

Figure 1: Bilateral transverse dural venous sinus stenosis in a patient with IIH.

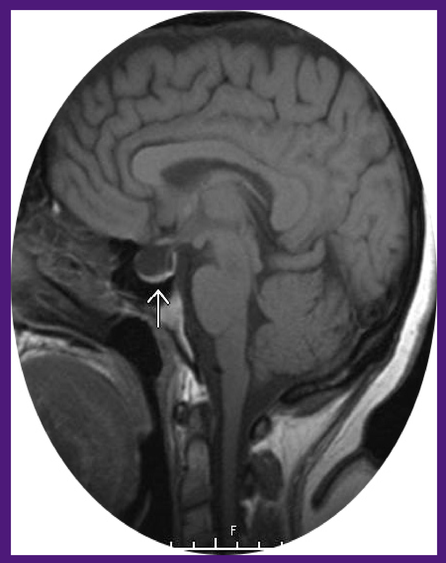

Figure 2: An expanded, empty pituitary sella in a patient with IIH.

RESULTS

Table 1. Inter-Rater Reliability of Radiologist Diagnosis

	All Subjects N = 105	IIH Subjects N = 64	Normal Subjects N = 41
Empty Sella	0.959	>0.999	0.599
Bilateral Transverse Sinus Stenosis	0.569	0.521	0.238
Enlarged Optic Nerve Sheaths	0.827	0.914	-0.0789
Posterior Globe Flattening	0.705	0.621	-0.025

Table 2. Results of Generalized Linear Mixed Model Assessing Imaging Findings by Idiopathic Intracranial Hypertension Status

	Odds Ratio	95% Confidence Interval	P-Value
a.) Probability of Being Diagnosed With An Empty Pituitary Sella			
Patient Status			
Idiopathic Intracranial Hypertension	19.699	(9.055, 42.854)	<.0001
Normal	*Reference*	*Reference*	*Reference*
b.) Probability of Being Diagnosed With Bilateral Transverse Sinus Stenosis			
Patient Status			
Idiopathic Intracranial Hypertension	10.839	(5.324, 22.064)	<.0001
Normal	*Reference*	*Reference*	*Reference*
c.) Probability of Being Diagnosed With Enlarged Optic Nerve Sheaths			
Patient Status			
Idiopathic Intracranial Hypertension	18.513	(8.811, 38.896)	<.0001
Normal	*Reference*	*Reference*	*Reference*
d.) Probability of Being Diagnosed With Posterior Globe Flattening			
Patient Status			
Idiopathic Intracranial Hypertension	49.302	(15.017, 161.865)	<.0001
Normal	*Reference*	*Reference*	*Reference*

FUTURE DIRECTIONS

Our results reinforced existing evidence that there are characteristic imaging findings on MRI that suggest a diagnosis of IIH. A limitation to this study was the lack of vascular imaging such as MR Venography, which is likely responsible for the low IRR in identifying bilateral transverse sinus stenosis. A future retrospective study could include vascular imaging.