



Original Article

Sinovenous Abnormalities in Patients of Idiopathic Intracranial Hypertension

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Abstract

Idiopathic Intracranial Hypertension is a disease of unknown aetiology common in obese females and presents with headache, papilledema, raised CSF opening pressure, no abnormalities in CSF examination and no abnormality on CT scan or MRI of the Brain. Sinovenous abnormalities are commonly detected in patients of IIH by different neuroimaging techniques. But the exact role of these sinovenous abnormalities in the causation of the disease or whether they are an effect of the disease is not yet known. Nor has a 'gold standard' investigation been established yet for detection of the sinovenous abnormalities. This study was done to detect the presence of sinovenous abnormalities in IIH patients by performing a Magnetic Resonance Venography of the brain.

All 33 patients of IIH who presented to Rajshahi Medical College Hospital during the study period from June 2009 to May 2010 were included in the study. There were 30 females and 3 males having a F:M ratio of 10:1. 91% of the patients were between 20 and 35 years of age and most of them were married housewives. 63.64% patients had history of use of oral contraceptives. Unusually 51.52% of the patients had a BMI less than 25 indicating that they were not even overweight (BMI 25 to 30). Only 6% of the patients had BMI > 30 indicating that they were obese. Headache and papilloedema were present in all patients but visual difficulties were present only in 54.54% of the patients. Abnormalities in MRV of the brain were detected in 27.27% (9/33) of the patients and transverse sinus hypoplasia was the commonest finding (88.89% - 8/9 patients). There was no statistically significant difference in the findings of MRV abnormalities between the males and females or among the patients having BMI less or more than 25

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Introduction

Idiopathic intracranial hypertension has had a number of different names in the century since it was first described by Quincke under the name of 'meningitis serosa'.¹ The most commonly used synonyms are 'pseudotumour cerebri'² and 'benign intracranial hypertension'.³ However, there are problems with both these names because

the condition is not always benign.⁴ IIH has a significant morbidity with 10% to 85% of patients showing some degree of visual loss when carefully sought.⁵ "The syndrome is neither a benign process nor a false tumour," wrote Bucheit et al in 1969⁶ and they introduced the term "idiopathic intracranial hypertension". But there is still considerable confusion in the literature because

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the clinical picture of 'IIH' has in some cases been associated with a number of potential underlying factors (e.g. sagittal sinus thrombosis and vitamin A toxicity), in which case the term 'idiopathic' obviously becomes inappropriate.⁷ However, IIH seems to be the generally preferred name at the moment.⁸ IIH is defined as raised intracranial pressure without ventricular enlargement or intracranial mass on imaging, with normal cerebrospinal fluid constituents.⁸ It often presents with headaches, and is usually associated with bilateral papilloedema.

The overall incidence is 1–3/100,000 population/year.⁹ It is somewhere between four and 10 times as common in women as in men, particularly women between the ages of 15 and 44 when it is strongly associated with obesity (the incidence rises to 21/100,000 population/year in the obese group).⁷

The pathophysiologic mechanism of the elevated intracranial pressure in idiopathic intracranial hypertension (IIH) remains unknown.¹⁰ Contributing to the confusion associated with IIH is the recent evidence suggesting that there is a functional obstruction to outflow in the venous sinuses. It was documented by several groups that the cerebral venous pressure was consistently elevated in pseudotumor cerebri; half of their patients revealed venous outflow obstruction demonstrated by MR venography of the brain, often with a pressure gradient across the site.¹¹ Many authors proposed that venous hypertension increases the resistance to CSF absorption and is the proximate mechanism underlying IIH.¹² Venous sinus narrowing in patients with IIH can be found regularly (in 27 of 29 patients and in 4 of 59 control subjects) on MRV imaging of the brain and may cause venous outflow obstruction.¹³

Materials and Methods

33 patients of IIH who were admitted in different wards of Rajshahi Medical College Hospital were included in the study. Patients were diagnosed as suffering from Idiopathic Intracranial Hypertension on the basis of presence of the chief characteristics of the disease which are Headache, papilloedema, normal level of consciousness,

normal CSF constituents, and no structural cause present on neuroimaging of the brain (CT Scan or MRI) which may explain the presence of raised intracranial pressure. All the patients underwent a MRI of the Brain and also MRV of Brain to study the venous sinuses.

Results

This was a descriptive cross sectional study in which all patients, meeting the criteria for diagnosis of Idiopathic Intracranial Hypertension, who came to the different departments of Rajshahi Medical College Hospital during the period June 2009 to May 2010 were included.

33 patients fulfilled the criteria for diagnosis of IIH and were included in the study. 30 (88%) of the patients were female and only 3(12%) patients were male.

Majority (63.64%) of the patients were between 20 and 30 years, and 09.09% were below 20 years of age. Most of the patients 27(81.82%) were married. History of intake oral contraceptives in 21 (63.64%) of the patients prior to the development of the disease.

Table 1. BMI of the patients (n=33)

Body Mass Index (BMI)	Total patients	Percentage
< 25	17	51.52
25 to 30	14	42.42
> 30	02	06.06

Table 1 shows the body mass index (BMI) of the patients. This table shows that 14(42.42%) of the patients had a BMI within 25 to 30 and only 02 (06.06%) patients were obese (BMI > 30). Majority of the patients 17(51.52%) had a BMI less than 25 indicating that they were not even obese.

Table 2. The symptoms and signs in the 33 study patients.

	Total Patients	Percentage
Headache	33	100
Visual disturbances	18	54.54
Tinnitus	5	15.15
Papilledema	33	100.00
Unilateral Sixth nerve palsy	07	21.21
Bilateral Sixth nerve palsy	03	9.09

Table 2 shows that all the patients had headache and papilledema. This is not unusual as these two were the inclusion criteria for patients of this study. 15% of the patients suffered from tinnitus and 30% patients had sixth nerve palsy.

9(27.27%) patients out of the 33 patients had some abnormality in their MRV study.

Table 3. Demographic characteristics of the 9 patients with abnormal MRV findings

Sex	Male – 1	Female – 8	
Age	< 20 yrs – nil	20 to 30 – 5	> 30 yrs – 4
Marital Status	Married – 9	Unmarried – nil	
Occupation	Housewives – 7	Student – 1	Others – 1 (farmer)
History of Drug Intake	No h/o of Oral contraceptive use - 04	Past h/o Oral contraceptive use - 05	
BMI	< 25 – 06	25 to 30 – 3	> 30 – nil

Table 4. Pattern of Abnormalities reported in the MRV of Brain of the 9 Patients

Pattern of Abnormality	No. of patients	Percentage
Left transverse sinus hypoplasia	03	33.33
Right transverse sinus hypoplasia	03	33.33
Hypoplasia of the rostral superior sagittal sinus and left transverse sinus	02	22.22
Thrombosis of the superior sagittal sinus	01	11.11

Table 4 shows what abnormalities were detected in the MRV of Brain of the 9 patients with abnormal MRV. In 3 patients the right transverse sinus was not detected in any of the views and was diagnosed as hypoplastic right transverse sinus and for similar findings on the left side in 3 patients it was diagnosed as hypoplastic left transverse sinus.

2 patients had hypoplasia of the rostral superior sagittal sinus and left transverse sinus and 1 patient had non signal from anterior aspect of superior sagittal sinus which was suggestive of thrombosis of the superior sagittal sinus.

Discussion

In this study carried out in Rajshahi Medical College Hospital, all patients of Idiopathic Intracranial Hypertension presenting to the hospital during the study period were enrolled in the study. This study is therefore not a truly

community based study and does not exactly reflect the demographic pattern of all IIH patients.

33 patients fulfilled the inclusion criteria as described for this study during the study period of July 2009 to June 2010. All these patients had been admitted in Rajshahi Medical College Hospital with the diagnosis of IIH. 88% of the patients were female and 22% were male having a F:M ratio of 4:1.

81.82% of the patients were married and 57.58% were housewives. All the 3 male patients were businessmen. The unmarried young girls were students. These demographic findings are a fair reflection of the prevailing condition in the society.

The BMI of the patients were calculated to study the presence of obesity in the patients of this study. 2 patients (6.06%) had a BMI more than 30 and the rest 93.94% had a BMI less than 30. 51.52% of the patients had a BMI less than 25 indicating that they were not even obese. All the three patients below 20 years had a BMI less than 25. So in this study obesity does not seem to be an association of IIH. Obesity has long been associated with IIH and a number of studies have confirmed this association.¹⁴ Obesity is a known risk factor and increases the annual incidence to 19 per 100,000.¹⁵ So the finding of this study is against what has been reported elsewhere. This maybe due to the fact that obesity is generally less prevalent in our country than in the developed countries.

21 patients (63.64%) of the patients had a history of drug intake and all these 21 patients were taking oral contraceptives. Intake of oral contraceptives have been implicated in the development of IIH though the exact mechanism is not known.¹⁶ Oestrogens may play a part as the disease is more prevalent in women also.

This study was specially done to find out the presence of sino venous abnormality in patients who present with idiopathic intracranial hypertension. In trying to detect the cause of IIH different groups have proposed that increased intracranial venous pressure is the major mechanism of raised intracranial pressure in IIH.¹⁷ This increase in intracranial venous pressure may

be due to different aetiologies of which cerebral venous outflow obstruction due to venous sinus thrombosis and congenital or acquired venous sinus stenosis are considered to be principal culprits. But the major problem in defining a venous sinus abnormality as the cause of IIH is the presence of large number of cerebral venous sinus abnormality in the normal population.

In subjects with features of IIH and normal findings by conventional CT scans, venous sinus obstructions are revealed by MRV or conventional angiography in 26–36% of cases.¹⁸ In this study also 27.27% of patients had abnormalities detected in their MRVs. Thus findings of this study is not very different from that observed in studies done elsewhere.

Unfortunately, sensitivity as well as specificity of MRV in detecting transverse sinus outflow obstructions may still be insufficiently high.¹⁹ The extent of false-negative and false-positive findings in IIH patients is unknown but until further evidence is available, standard MRI and MRV of brain should be carried out in all patients before the diagnosis of IIH can be given.

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