

Evaluation of MRI Findings in Patients with Chronic Primary Headache

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Abstract

Background: Headache is a common clinical feature in patients in the emergency room and in general neurology clinics. Hence; under the light of above mentioned data, we planned the present study to assess the role of MRI scan in persons with chronic) primary headache. **Subjects and Methods:** The present study included 26 patients with chronic primary headache. Relevant history, clinical examination and routine investigations were done. Patients underwent MRI investigations. The entire patient diagnosed with non-acute headache was included in the study irrespective of their age and gender informed written consent was taken from all the patients. Imaging was performed using a head coil with patient in a supine position. All the MR imaging examination were performed on a Seimen's Avento 1.5 Tesla Magnet MR system, slice thickness was 4-5mm with an inter slice gap of 0.5mm. MR imaging findings were compiled as per proforma and subjected to analysis using SPSS software. **Results:** Significant MRI findings were found to be present in 23.08 percent of the patients. Out of 15 migraine patients, significant abnormal MRI findings were present in 26.67 percent of the patients. Out of 6 patents with tension type headache, significant abnormal MRI findings were found to be present in 1 patient only (16.6 percent). Among the 5 patients with cluster headache, significant abnormal MRI findings were found to be present in 1 patient (20 percent). **Conclusion:** The chance of finding a significant underlying abnormality in patients with a stable headache pattern and a normal neurological examination is uncommon but if red flags are present neuro-imaging must be strictly considered.

Keywords: Chronic, Headache Magnetic resonance imaging.

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Introduction

Brain magnetic resonance (MR) imaging studies provide multiple different imaging sequences in at least 2, and often 3, imaging planes. The different tissue signal characteristics and anatomic viewpoints are often complementary, and interpreting an MR imaging study of the brain can be a daunting task. The variety of pulse sequences and imaging planes makes understanding normal anatomy a necessity.^[1- 3] Headache is a common clinical feature in patients in the emergency room and in general neurology clinics. For physicians not experienced in headache disorders it might be difficult sometimes to decide in which patients neuroimaging is necessary to diagnose an underlying brain pathology and in which patients cerebral imaging is unnecessary. Headache is the most often reported neurological symptom. Many patients are frightened that they are suffering from a severe disease and therefore request further diagnostics. Non-acute (chronic) headache is one of the common presenting complaints in patients attending the out patient's department or emergency care of any hospital or general practitioner however, only about 10% of patients with recurrent headache have secondary cause. Non-acute (chronic) headache is defined as all headache syndromes lasting for at

least four weeks.^[4, 5]

It is also one of the commonest symptoms, and primary headache disorders are among the most ubiquitous disorders, affecting people in all countries. India appears to be no exception. From an Indian perspective, few studies describe the epidemiology of headache disorders. Previously, these disorders have been investigated only within larger neuroepidemiological surveys that have neither focused on headache nor used internationally accepted criteria for headache diagnoses.^[6, 7] Hence; under the light of above mentioned data, we planned the present study to assess the role of MRI scan in persons with chronic) primary headache.

Subjects and Methods

The present study was conducted in the department of Radiodiagnosis, Rajindra Hospital, Patiala, and it included assessment of role of MRI scan in persons with non-acute (chronic) headache. The present study included 26 patients.

Inclusion Criteria

- Patients with chief complaint of non-acute headache.
- Systematic reviews randomized controlled trials, observational studies.
- Patient willing to give informed written consent to take

part in the study.

Exclusion Criteria

- Patients of acute head injury and history of neurosurgery.
- Uncooperative patients.
- Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. Relevant history, clinical examination and routine investigations were done. Patients underwent MRI investigations.

Study instruments

1. MRI machine- siemensmagnetomaera 1.5T MRI machine.
2. Contrast wherever needed.

The entire patient diagnosed with non-acute headache was included in the study irrespective of their age and gender informed written consent was taken from all the patients. Imaging was performed using a head coil with patient in a supine position. All the MR imaging examination were performed on a Seimen'sAvento 1.5 Tesla Magnet MR system, slice thickness was 4-5mm with an inter slice gap of 0.5mm. The following sequences was obtain axial and sagittal T1, axial and coronal T2 weighted MRI, axial fluid attenuated inversion recovery (flair) MRI, diffusing weighted imaging (DWI), susceptibility weighted imaging/gradient record echo (SWI/GRE) and post contrast T1 weighted images.MR imaging findings were compiled as per proforma and subjected to analysis using SPSS software. Mann-Whitney U test and chi-square test were used for assessment of level of significance. P- value of less than 0.05 was taken as significant.

Results

In the present study, 42.31 percent of the patients belonged to the age group of 41 to 50 years. 26.92 percent and 19.23 percent of the patients belonged to the age group of 31 to 40 years and more than 50 years respectively. 15 patients were of migraine, 6 patients were of tension type headache and remaining 5 patients were of clustered headache. Significant MRI findings were found to be present in 23.08 percent of the patients. Out of 15 migraine patients, significant abnormal MRI findings were present in 26.67 percent of the patients. One patient showed T2 and T2 FLAIR Hyperintensities in subcortical white matter in frontal region. MRI findings in two patients exhibited T2 and T2 Hyperintensities in Bilateral centrum semi-ovale and periventricular white matter. In third patient with migraine, MRI finding revealed an area of diffusion restriction in left basal ganglia region which was hypointense on T1, T2 FLAIR and Hyperintense on T2 consistent with chronic infarct. Out of 6 patients with tension type headache, significant abnormal MRI findings were found to be present in 1 patient only (16.6 percent). Among the 5 patients with cluster headache, significant abnormal MRI findings were found to be present in 1 patient (20 percent). Patient with cluster headache with significant abnormal MRI findings

showed T2 and T2 flair hyperintensities in periventricular, subcortical and deep white matter of bilateral cerebral hemispheres.

Table 1: Age-wise distribution of patients

Age group	Number of patients	Percentage of patients
Less than 20	1	3.85
20 to 30	4	15.38
31 to 40	7	26.92
41 to 50	11	42.31
More than 50	5	19.23
Total	26	100

Table 2: Distribution of patients according to type of chronic headache

Chronic headache	Number of patients	Percentage of patients
Primary	Migraine	15
	Tension type	6
	Clustered headache	5
Total	26	100

Table 3: MRI findings in patients with chronic primary headache divided on the basis of etiology

Parameter	Presence of significant MRI findings		Absence of significant MRI findings	
	Number of patients	Percentage of patients	Number of patients	Percentage of patients
Primary chronic headache	6	23.08	20	76.92

Table 4: Migraine patients divided on the basis of MRI findings

Parameter	Presence of significant MRI findings		Absence of significant MRI findings		Total	
	Number of patients	Percentage of patients	Number of patients	Percentage of patients	Number of patients	Percentage of patients
Migraine	4	26.67	11	73.33	15	100

Table 5: Tension type headache patients divided on the basis of MRI findings

Parameter	Presence of significant MRI findings		Absence of significant MRI findings		Total	
	Number of patients	Percentage of patients	Number of patients	Percentage of patients	Number of patients	Percentage of patients
Tension type	1	16.67	5	83.33	6	100

Table 6: Cluster headache patients divided on the basis of MRI findings

Parameter	Presence of significant MRI findings		Absence of significant MRI findings		Total	
	Number of patients	Percentage of patients	Number of patients	Percentage of patients	Number of patients	Percentage of patients
Cluster	1	20	4	80	5	100

Discussion

Among the 26 patients with primary headache, significant MRI findings were observed in 23.08 percent of the patients. Among the 34 patients with secondary headache, significant MRI findings were observed in 32.35 percent of the patients. Our results were in concordance with the results obtained by Rai GS et al, who reported abnormal neuroimaging findings in 25.2 percent of the patients with chronic headache.^[8] A study was conducted at Gunma University Hospital of Japan, to evaluate the efficacy of MRI in the diagnosis of an abnormality in patients who presented with chronic or recurrent headache without any neurological deficit. Out of a total of 306 patients, 169 pts (55.2%) had no abnormality in the scan, 135 pts (44.1%) had a minor associated abnormality while only two pts (0.7%) have intracranial pathology which may be culprit of headache.^[9]

Out of 15 migraine patients, significant abnormal MRI findings were present in 23.08 percent of the patients. Our results were in concordance with the results obtained by previous authors who also reported similar findings in their respective studies. Out of three patients, one patient showed T2 and T2 FLAIR Hyperintensities in subcortical white matter in frontal region. MRI findings in two patients exhibited T2 and T2 Hyperintensities in Bilateral centrum semi-ovale and periventricular white matter. In third patient with migraine, MRI finding revealed an area of diffusion restriction in left basal ganglia region which was hypointense on T1, T2 FLAIR and Hyperintense on T2 consistent with chronic infarct. Our results were in concordance with the results obtained by Osborn RE et al, who reported that significant MRI findings among patients with migraine headache were found to be present in 14.63 percent of the patients.^[10]

Out of 6 patients with tension type headache, significant abnormal MRI findings were found to be present in 1 patient only (16.6 percent). The patients with significant MRI finding showed few small discrete T2 and T2 flair Hyperintensities in subcortical white matter in right frontal region. Our results were in concordance with the results obtained by previous authors who also reported similar findings. De Benedittis G et al reported the prevalence of significant MRI findings in 34.3 percent of the patients with tension type headache. Also, in a systemic review published in past literature by Scottish Intercollegiate Guidelines Network, 5 patients out of 665 patients with tension type headache had significant abnormal MRI findings.^[11,12]

Among the 5 patients with cluster headache, significant abnormal MRI findings were found to be present in 1 patient (20 percent). Patient with cluster headache with significant abnormal MRI findings showed T2 and T2 flair hyperintensities in periventricular, subcortical and deep white matter of

bilateral cerebral hemispheres. In a previous systemic review conducted by the Scottish Intercollegiate Guidelines Network (SIGN), significant intracranial abnormalities were detected in 5% for persons with a cluster headache.^[13] In a previous study conducted by Sjaastad O et al, authors assessed fourteen patients with cluster headache (13 with the episodic and 1 with the chronic form; 11 males and 3 females). In none of the cases was any definite pathology found, either in the cavernous sinus, or in its surroundings. In four patients slight changes in other parts of the brain (atrophy and deep white matter changes in two subjects, respectively) were detected which are considered within the normal range for subjects of this age group.^[14] Ferbert A investigated MRI pattern of a total of 45 patients suffering from classic migraine; 25 patients had been treated in our department for classic migraine over the past 2 years (group A), and 20 other patients investigated between 1976 and 1984 were reexamined for this study (group B). Thirty-two age- and roughly sex-matched healthy volunteers underwent magnetic resonance imaging and served as controls (group C). There was a trend for patients with classic migraine to have more subcortical patchy lesions on T2-weighted magnetic resonance imaging. In a comparison of our control subjects and patients with a history of >20 attacks of classic migraine taken from groups A and B, this difference in number of lesions was significant ($p=0.02$). The results suggest that patchy lesions in patients with classic migraine should be interpreted with particular caution before diagnosing a demyelinating disease since the lesions could be ischemic in origin.^[15]

Conclusion

Non-acute (chronic) headache patient occasionally have abnormal MRI findings to explain their headaches. The chance of finding a significant underlying abnormality in patients with a stable headache pattern and a normal neurological examination is uncommon but if red flags are present neuro-imaging must be strictly considered.

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