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### Original Research

#### Assessment of Magnetic resonance imaging findings in cluster headache patients

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##### ABSTRACT

**Background:** Patients with cluster type headache have been reported to exhibit significant increment of the mean, axial and perpendicular diffusivity in widespread white matter regions in the frontal, parietal, temporal and occipital lobes. Hence; the present study was undertaken for assessing Magnetic resonance imaging findings in cluster headache patients. **Materials & methods:** A total of 10 cluster headache patients were enrolled in the present study. Complete demographic and clinical details of all the patients were obtained. MRI scanning of all the patients was done and analysis was done by experienced and registered radiologists. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

**Results:** Abnormal MRI findings were found to be present in 1 patient. 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. **Conclusion:** Magnetic resonance imaging plays a significant role in detecting neural abnormalities in cluster headache patients.

**Key words:** Cluster headache, Magnetic resonance imaging

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##### INTRODUCTION

Knowledge of the prevalence of headache disorders, on which reiterations of the Global Burden of Disease Study depend, remains substantially incomplete. Historically, it has been gathered predominantly from the high-income countries of Western Europe and North America, leaving vast geographical areas almost data-free. Notable among these have been South East Asia, and in particular India. Neuroepidemiological studies in India have included headache only as one of multiple conditions of enquiry under the broad spectrum of neurological disorders. There have been hospital-based studies of migraine, but these do not provide information on prevalence or reveal the characteristics and impact of disorders in the population. Yet India is home to over 16 % of the world's inhabitants.<sup>1-3</sup>

Patients with cluster type headache have been reported to exhibit significant increment of the mean, axial and perpendicular diffusivity in widespread

white matter regions in the frontal, parietal, temporal and occipital lobes. Reduced fractional anisotropy has also been reported in the corpus callosum and some frontal and parietal white matter tracts mainly in the contralateral side of the pain. MRI studies have reported grey as well as white matter alterations in Cluster headache similar to those found in migraine.<sup>4-6</sup> Hence; the present study was undertaken for assessing Magnetic resonance imaging findings in cluster headache patients.

##### MATERIALS & METHODS

The present study was planned in the department of radio-diagnosis of the medical institute and it included for assessing Magnetic resonance imaging findings in cluster headache 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. A total of 10 cluster headache patients were enrolled

in the present study. Complete demographic and clinical details of all the patients were obtained. Exclusion criteria for the present study included:

- Patients with history of any other systemic illness,
- Patients with presence of any form of malignancy,
- Patients with any known drug allergy

MRI scanning of all the patients was done and analysis was done by experienced and registered radiologists. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software.

**RESULTS**

In the present study, a total of 10 cluster headache patients were enrolled. Mean age of the patients was 43.5 years. 40 percent of the patients belonged to the age group of less than 30 years. Another 40 percent belonged to the age group of 30 to 50 years while remaining 20 percent of the patients belonged to the age group of more than 50 years. 60 percent of the patients were males.

Abnormal MRI findings were found to be present in 1 patient. 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.

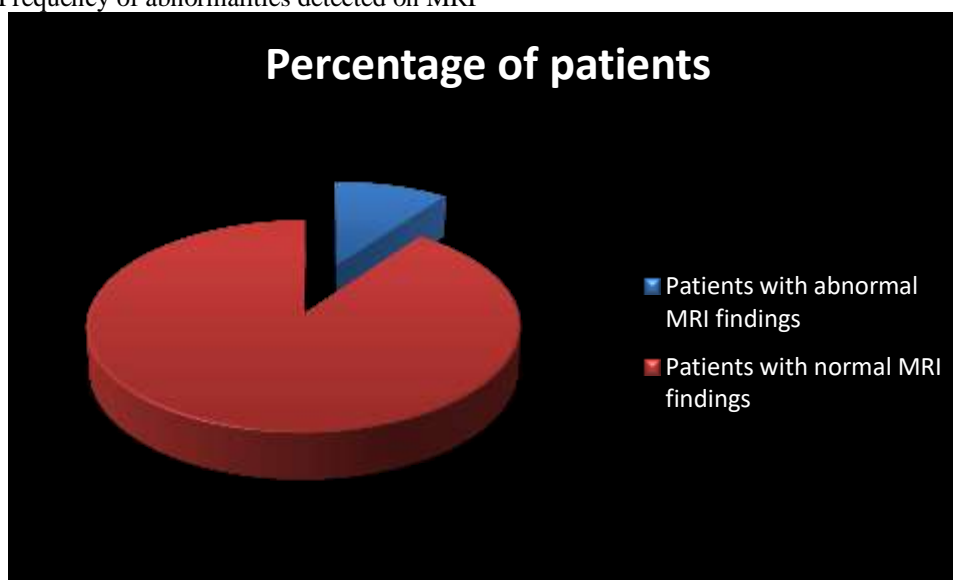
**DISCUSSION**

MRI is the procedure of choice for evaluating patients with subacute or chronic headaches, a suspected brain tumor, or other space-occupying mass and hydrocephalus. Although claustrophobia was a problem for many patients with the early MRI machines, recent developments have made the units much more patient-friendly. Patients undergoing MRI examination may receive an injection of a contrast agent to help the neuroradiologist more thoroughly evaluate the brain and its associated blood vessels. Cluster headache is a less common type of primary headache. Cluster headache is sometimes referred to as a neurovascular headache, evidence now suggests that its cause may lie in the hypothalamus, a region deep in the brain that regulates, among other functions, the biologic rhythms of the body.<sup>7-9</sup> Hence; the present study was undertaken for assessing Magnetic resonance imaging findings in cluster headache patients.

**Table 1:** Demographic data

Parameter		Number of patients	Percentage of patients
Age group (years)	Less than 30	4	40
	30 to 50	4	40
	More than 50	2	20
Gender	Males	6	60
	Females	4	40

**Graph 1:** Frequency of abnormalities detected on MRI



**Table 2:** MRI findings

Parameter	T1	T2	T2 FLAIR	DWI	SWI
Patient	-	Hyperintensities in bilateral Peri-ventricular, subcortical and deep white matter	Hyperintensities in bilateral Peri-ventricular, subcortical and deep white matter	-	-

In the present study, a total of 10 cluster headache patients were enrolled. Mean age of the patients was 43.5 years. 40 percent of the patients belonged to the age group of less than 30 years. Another 40 percent belonged to the age group of 30 to 50 years while remaining 20 percent of the patients belonged to the age group of more than 50 years. 60 percent of the patients were males. Rai GS et al evaluated the findings of computed tomography (CT) and Magnetic Resonance Imaging (MRI) among patients presented with the chief complaint of headache and to compare the findings between two groups of patients. This retrospective observational study was carried out in 500 selected patients. Siemens Somatom sensation 40 slice MDCT and Siemens magnetom 1.5T MRI scanner were used for imaging. Five hundred patients of 10 to 70 year age were selected for the study based on our criteria of selection. All 500 patients were divided into two groups A and B based on presence or absence of red flag signs and CWC signs. Group A consists of 48 patients having one or more red flag or CWC signs and group B consists of 452 patients those don't have any above signs. 29 cases (60.4%) out of total 48 cases of group A is suffering from chronic headache as compared to 97 cases (21.5%) out of total 452 patients of group B is having positive findings ( $p$ -value<0.05). Out of 500 patients, only 29 cases (5.8%) revealed some form of brain parenchymal pathology whereas other associated findings were seen in 97 cases e.g. sinusitis in 58 (11.6%), bone related pathology in 26 (5.2%) and chronic suppurative otitis media (CSOM) in 13 (2.6%) patients. CT/MRI in patients without red flag or CWC sign yields very low percentage of clinically significant positive findings in neuroimaging. In the absence of these, the only reason for CT or MRI scan seems to reassure the patients and their loved ones.<sup>10</sup> In the present study, abnormal MRI findings were found to be present in 1 patient. 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. Gupta V et al ascertained the frequency of normal head computed tomography (CT) scans and positive CT scan findings in patients having chronic headache as chief complaint. Head CT scans done over a period of two years were retrospectively evaluated. On the basis of CT reports, the patients were divided into two groups: Group A, having headache as the only complaint, and Group B, having headache and additional neurological signs or symptoms. A total of 2498 patient reports were evaluated. There were 1772 patients in Group A and 726 patients in Group B. In Group A, 82% (n=1453) patients had normal head CT, whereas in Group B 74.5% (n=541) patients had a normal CT scan. There were 13.22% head CT scans showing significant findings in Group B, as compared to 6.2% in Group A. Both these differences were found to be statistically significant. CT findings such as

infections, neoplasm, hydrocephalus, and extra-axial collections were higher in Group B when compared to Group A. CT examination in patients with isolated chronic headache is normal in high percentage of patients.<sup>11</sup>

## CONCLUSION

Magnetic resonance imaging plays a significant role in detecting neural abnormalities in cluster headache patients.

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