

Assessment of MRI Findings in Seizure Patients

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ABSTRACT

Background: A "seizure" is a paroxysmal alteration of neurologic function caused by the excessive, hypersynchronous discharge of neurons in the brain. Clinical evaluation is guided by the history and physical examination of the patient. Hence; the present study was undertaken for assessing the Magnetic resonance imaging (MRI) findings in seizure patients.

Materials & Methods: A total of 20 patients with history of seizure were enrolled in the present study. Complete demographic details and clinical details of all the patients were obtained. MRI was done in all the patients and findings were analyzed by experienced radiologists. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software.

Results: Infarct with gliosis was found to be present in 15 percent of the patients. Tuberculoma and cerebral atrophy was found to be present in 1 patient each. While correlating the MRI findings in seizure patients divided on the basis of age and gender, non-significant results were obtained.

Conclusion: Seizure patients and their assessment is a common problem in clinical practice. Hence; magnetic resonance imaging plays a significant role in the evaluation of these patients.

Key words: Magnetic Resonance Imaging, Seizure.


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Article History:

Received: 27-09-2019, Revised: 25-10-2019, Accepted: 21-11-2019

Access this article online

Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2019.5.6.030	

INTRODUCTION

A "seizure" is a paroxysmal alteration of neurologic function caused by the excessive, hypersynchronous discharge of neurons in the brain. "Epileptic seizure" is used to distinguish a seizure caused by abnormal neuronal firing from a nonepileptic event, such as a psychogenic seizure. "Epilepsy" is the condition of recurrent, unprovoked seizures. Epilepsy has numerous causes, each reflecting underlying brain dysfunction. A seizure provoked by a reversible insult (e.g., fever, hypoglycemia) does not fall under the definition of epilepsy because it is a short-lived secondary condition, not a chronic state.¹⁻³ Clinical evaluations are guided by the history and physical examination of the patient. Typically laboratory work including electrolytes is obtained. Imaging is often obtained and is of higher yield based on historical factors or focal findings on the neurologic examination. Persistent alteration of consciousness will dictate additional testing such as neuroimaging and other serologic tests. If nonconvulsive status epilepticus is a consideration, arrangements for neurologic consultation and EEG should be made.⁴⁻⁶ Hence; the present study was undertaken for assessing the Magnetic resonance imaging (MRI) findings in seizure patients.

MATERIALS & METHODS

The present study was conducted in the Department of Radiodiagnosis, Career Institute of Medical Sciences and Hospital, Ghaila, Lucknow, Uttar Pradesh (India) and it included assessment of MRI findings in seizure patients. Ethical clearance 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 20 patients with history of seizure were enrolled in the present study.

Inclusion Criteria

- Seizure patients selected on the basis of clinical data,
- Patients who presented with seizures,
- Patients who gave informed consent

Complete demographic details and clinical details of all the patients were obtained. MRI was done in all the patients and findings were analyzed by experienced radiologists. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Chi-square test was used for assessment of level of significance.

Table 1: Demographic distribution

Parameter		Number of Patients	Percentage of Patients
Age group (years)	Less than 30	3	15
	30 to 50	8	40
	More than 50	9	45
Gender	Males	12	60
	Females	8	40
Residence	Rural	5	25
	Urban	15	75

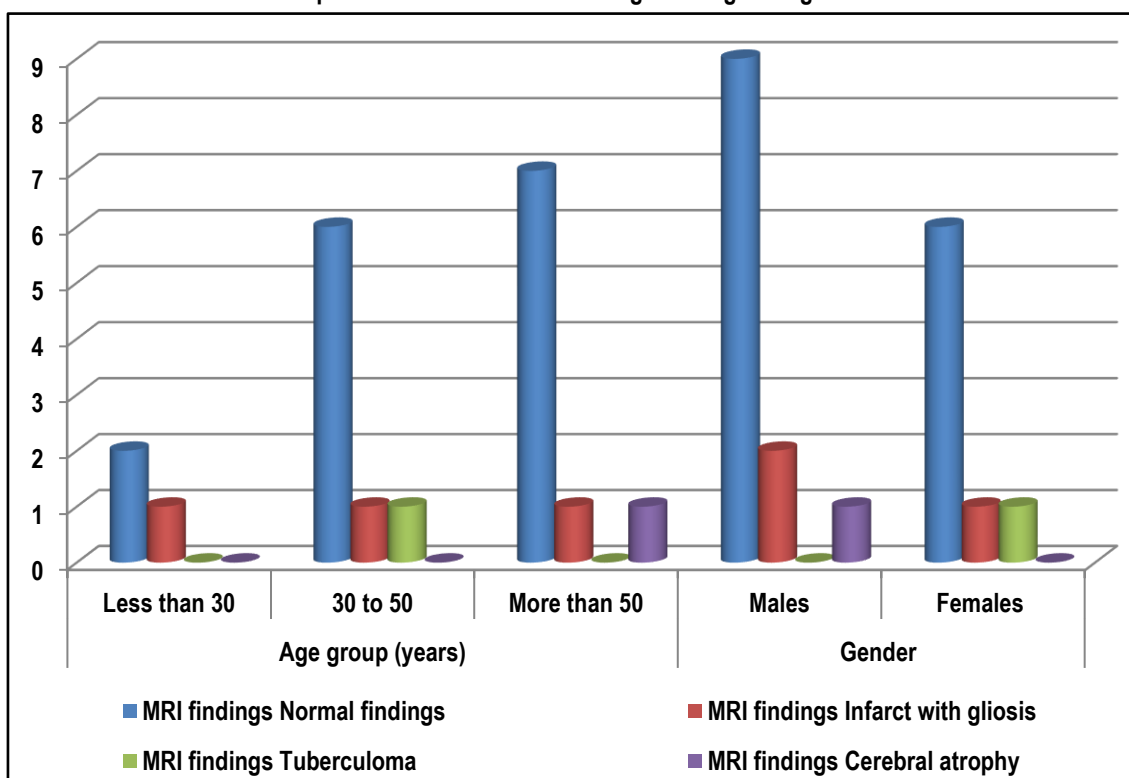
Table 2: MRI findings

MR Diagnosis	Number of Patients	Percentage of Patients
Normal findings	15	75
Infarct with gliosis	3	15
Tuberculoma	1	5
Cerebral atrophy	1	5
Total	20	100

Table 3: Correlation of MRI findings with age and gender

Parameter	MRI findings				p- value
	Normal findings	Infarct with gliosis	Tuberculoma	Cerebral atrophy	
Age group (years)	Less than 30	2	1	0	0.12
	30 to 50	6	1	1	
	More than 50	7	1	0	
Gender	Males	9	2	0	0.88
	Females	6	1	1	

Graph 1: Correlation of MRI findings with age and gender



RESULTS

In the present study, a total of 20 patients with history of seizure were enrolled. Mean age of the patients of the present study was found to be 53.5 years. 45 percent of the patients belonged to the age group of more than 50 years. 40 percent of the patients belonged to the age group of 30 to 50 years. 60 percent of the patients were males while the remaining were females. 75 percent of the patients were of urban residence while the remaining were of rural residence.

In the present study, infarct with gliosis was found to be present in 15 percent of the patients. Tuberculoma and cerebral atrophy was found to be present in 1 patient each. While correlating the MRI findings in seizure patients divided on the basis of age and gender, non-significant results were obtained.

DISCUSSION

Paroxysmal spells might represent events stemming from the central nervous system, cardiac activity, psychiatric causes, and others. Convulsive concussion, convulsive syncope, rigors, movement disorders, sleep-related events, and non-non-epileptic spells or pseudoseizures are all in the differential diagnosis of an event. Epileptic seizures constitute one type of paroxysmal event.⁷ Seizures may be either provoked or unprovoked. Provoked seizures may result from electrolyte disorders, toxins, head injury, infectious processes, vascular anomalies, tumors or other mass lesions, and many other causes. Unprovoked seizures by definition occur in the absence of provocative causes or more than seven days after an acute injury or insult such as stroke or brain hemorrhage.⁸ Epilepsy by definition is a condition of recurrent unprovoked seizures. Determining whether a first seizure or recurrent seizures are provoked or unprovoked is fundamentally important for diagnosis and treatment. Neuroimaging is central to the evaluation of patients with first-onset seizure, especially in the identification of structural brain lesions that can serve as epileptogenic foci, and that might be surgically resectable if the patient becomes refractory to medical treatment.⁹ Hence; the present study was undertaken for assessing the MRI findings in seizure patients.

In the present study, a total of 20 patients with history of seizure were enrolled. Mean age of the patients of the present study was found to be 53.5 years. 45 percent of the patients belonged to the age group of more than 50 years. 40 percent of the patients belonged to the age group of 30 to 50 years. 60 percent of the patients were males while the remaining were females. 75 percent of the patients were of urban residence while the remaining was of rural residence. A proper MRI investigation of patients with focal epilepsy requires the use of specific protocols, selected based on identification of the region of onset by clinical and EEG findings. For practical purposes, focal epilepsy can be divided into mesial temporal-lobe epilepsy (MTLE) and neocortical epilepsy. This distinction is due to the relative specificity and consistency of clinical, MRI, and pathologic findings (most frequently hippocampal sclerosis: HS) observed in MTLE compared to neocortical epilepsies. The clinical manifestations and EEG changes in neocortical epilepsy are varied, and the pathologic substrate involved in its genesis comprises a broader range of etiologies.^{9, 10} Ho K et al correlated the results of neuroimaging (CT brain, MRI brain, or both) in 1,013 adults with first-ever unprovoked seizure with clinical features and seizure outcome.

Epileptogenic lesions were identified in 29%. Of patients with a normal CT who also had MRI, 12% had an epileptogenic lesion on MRI, the strongest independent predictor of which was a focal abnormality on EEG. Patients with an epileptogenic lesion had a higher risk of seizure recurrence, including when this was only evident on MRI.¹⁰

In the present study, infarct with gliosis was found to be present in 15 percent of the patients. Tuberculoma and cerebral atrophy was found to be present in 1 patient each. While correlating the MRI findings in seizure patients divided on the basis of age and gender, non-significant results were obtained. Ponnatapura J et al evaluated the diagnostic efficacy of standard MRI in the diagnostic yield with the addition of dedicated seizure protocol, and compared the diagnostic yields of MRI and electroencephalogram (EEG) individually and in combination. This was a prospective study of 129 consecutive patients who presented with new-onset seizures over an 18-month period. The MRI scans performed on 1.5T were reviewed for their diagnostic yield and their association with abnormal electrical activity on EEG. Chi-square test of significance ($P < 0.05$) was used to test for the difference in proportion. MRI detected potentially epileptogenic lesions in 59 patients (47%). The frequency of epileptogenic lesions was highest in patients who had focal-onset seizures (81%). The most common lesion type was infection and inflammation (28%), with neurocysticercosis being the most common, followed by mesial temporal sclerosis, ischemia, and tumor. About 37% of epileptogenic lesions were missed by standard protocol, which were detected on a dedicated seizure protocol MRI. The diagnostic yield of EEG was 31%. Abnormal MRI and EEG were concordant in 18% of patients, with EEG being normal in 37% of patients with epileptogenic lesions. MRI detects epileptogenic lesions in almost one half who presented with new-onset seizures and of these, more than third of them were detected using a "dedicated seizure protocol." While almost 50% with seizures will have a cause identified on MRI, the sensitivity can be substantially improved by utilizing a dedicated seizure protocol.¹¹

CONCLUSION

The Present study concluded that seizure patients and their assessment is a common problem in clinical practice. Hence; magnetic resonance imaging plays a significant role in the evaluation of these patients.

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Source of Support: Nil. **Conflict of Interest:** None Declared.

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Cite this article as: Eram Fatima. Assessment of MRI Findings in Seizure Patients. *Int J Med Res Prof*. 2019 Nov; 5(6):129-32. DOI:10.21276/ijmrp.2019.5.6.030