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Frequency of Abnormal Brain Imaging Findings in Patients with Idiopathic Generalized Epilepsy Presenting to Neurology Unit of a Tertiary Care Hospital Leh Peshawar

Frequency of Abnormal Brain Imaging Findings in Patients with Idiopathic Generalized Epilepsy Presenting to Neurology Unit of a Tertiary Care Hospital Leh Peshawar

¹Tanveer Fatima, ²Saad Ali, ³Hira Hamid, ⁴Ushna Ahmad, ⁵Shakirullah

¹ Trainee medical officer, Neurology MTI lady reading hospital Peshawar Pakistan

² Assistant Professor, Neurology MTI lady reading hospital Peshawar Pakistan

³ Trainee medical officer, Neurology MTI lady reading hospital Peshawar Pakistan

⁴ Trainee medical officer, Neurology MTI lady reading hospital Peshawar Pakistan

⁵ Assistant Professor, Khyber Medical University, Peshawar

Corresponding Author: Dr. Saad Ali Email saadali1234594@yahoo.com

Abstract

Background: Epilepsy, as defined by the International League against Epilepsy, is a syndrome characterized by at least two unprovoked seizures that affect over 70 million individuals worldwide. Although epilepsy is predominantly a clinical and EEG-based diagnosis, neuroimaging, particularly MRI, has become an important aspect of the work-up for an epilepsy diagnosis.

Objective: The goal of this study was to determine the frequency of abnormal MRI brain imaging in epileptic patients who came to the Lady Reading Hospital's neurology unit.

Study Design: Lady Reading Hospital Peshawar's Neurology Department conducted a cross-sectional study

Duration of Study: This study was conducted from January 1, 2021, through June 30, 2021.

Methodology: The study included 281 patients, both male and female, who were diagnosed with epilepsy. The International League Against Epilepsy's recommendations are as follows. An MRI was performed in a 2.0 T scanner before the epilepsy protocol was recognized. Images were examined, and some abnormalities were discovered. An MRI of the two patients' brains was performed and reported by a radiologist to look for any abnormal brain lesions. Age, seizure onset age, sub-syndrome, EEG findings, and seizure control were all evaluated in these groups.

Results: MRI findings were abnormal in 81 percent of patients. The participants in this study ranged in age from 16 to 80 years old, with a mean age of 35.793.1051 years, a mean epilepsy duration of 15.156.86 years, and a mean age at diagnosis of 20.637.35 years. In 16.4 percent of patients, abnormal neuroimaging was discovered. Space-occupying lesions accounted for 21.7% of abnormal neuroimaging, tumors 47.9%, cysts 21.7%, and hemorrhages 8.7%. Tables 01 to 07 will explain.

Conclusion: According to the findings of our study, up to a fourth of epileptic patients

Findings in Epilepsy MRI Neuroimaging and Idiopathic Generalized Epilepsy with



Figure:01 MRI Neuroimaging of Epilepsy

Figure:02 MRI patients with idiopathic generalized epilepsy, abnormal with idiopathic generalized epilepsy

Abnormal MRI

Introduction

The International League Against Epilepsy (ILAE) defines epilepsy as a syndrome of at least two unprovoked seizures that affects more than 70 million people worldwide¹. Although epilepsy is primarily a clinical and EEG-based diagnosis, neuroimaging, particularly MRI, has become an important part of the work-up for an epilepsy diagnosis². Structural abnormalities are becoming more widely recognized in various epileptic disorders³. This includes not only temporal lobe epilepsy and childhood epilepsy syndromes, and idiopathic generalized epilepsy. Different MR findings in different types of epilepsies have aided in understanding structural abnormalities and, to a lesser extent, functional interpretations⁴. Another important factor to consider when a patient with epilepsy visits a tertiary care center. According to published studies in the United Kingdom, patients labeled with epilepsy who presented to tertiary care for further evaluation had a misdiagnosis rate ranging from 23% to 42%⁵. 10 Similarly, a study conducted by the Danish epilepsy center, which accepts referrals from all over Denmark, revealed a high rate of misdiagnosis in patients referred to them⁶. According to a 2006 study published in the journal "Neurology," 24 percent of patients with idiopathic generalized epilepsy had abnormal MRI findings⁷. This study aims to determine the prevalence of abnormal brain imaging in the local population of epileptic patients who present to the neurology unit at Lady Reading Hospital in Peshawar⁸. This will assist us in determining the percentage of patients in our local area. The Population is wrongly labeled as having idiopathic generalized epilepsy⁹. This is significant because patients suffering from epilepsy as a result of abnormal brain findings can benefit from specific treatment of the primary brain lesion¹⁰.

Table- 01: Mean±SD Of Patients According To Age, Duration Of Epilepsy, And Age At Diagnosis

No	Demographics	Mean±SD
1	Age(years)	35.793±10.51
2	Duration of epilepsy (years)	15.156±6.86
3	Age at diagnosis (years)	20.637±5.35

Table- 02: Frequency Percentage Wise Of Patients According To Gender

Gender	Frequency	Percentage %
Male	169	60.1%
Female	112	39.9%
Total	281	100%

Table- 03 Frequency and Percentage of patients according to the type of seizure

Type of Seizure	Frequency	%age
Generalized Tonic-Clonic	117	41.6%
Simple Partial	109	38.8%
Complex Partial	25	8.9%
Partial with Secondary Generalization	30	10.7%
Total	281	100%

Table 04: Frequency And %Age Of Patients According To Abnormal Neuroimaging

Abnormal Neuroimaging	Frequency	%age
Yes	46	16.4%
No	235	83.6%
Total	281	100%

Table 05: Frequency And %Age Of Patients According To Findings Of Abnormal Neuroimaging N-46

Findings of Abnormal Neuroimaging	Frequency	%age
Space occupying lesion	10	21.7%
Tumor	22	47.9%
Cyst	10	21.7%
Hemorrhage	4	8.7
Total	46	100%

Table No 06 Stratification Of Abnormal Neuroimaging Concerning The Duration Of Epilepsy.

Duration of epilepsy (years)	Abnormal Neuroimaging		P. value
	YES	NO	
<15	3(1.7%)	177(98.3%)	0.399
>15	43(42.6%)	58(57.4%)	
Total	46(16.4%)	235(83.6%)	
Hemorrhage	4	8.7	
Total	46	100%	

Table no 07 Stratification of Abnormal Neuroimaging concerning the type of seizure.

Type of seizure	Abnormal Neuroimaging		P. value
	YES	NO	
Generalized Tonic-Clonic	16(13.7%)	101(86.3%)	0.399
Simple Partial	23(21.1%)	86(78.9%)	
Complex Partial	3(12%)	22(88%)	
Partial with Secondary Generalization	4(13%)	26(86.7%)	
Total	46(16.4%)	235(83.6%)	

Discussion:

MRI is fundamentally important and has become increasingly relevant in the evaluation and management of epilepsy it aids in the elucidation of etiology, the description of syndromes, prognosis, and the identification of opportunities for definitive interventions¹¹. The detection of focal brain lesions on MRI has allowed for the expansion of surgical interventions, resulting in better outcomes for epilepsy conditions previously associated with refractory seizures and poor outcomes¹². It is useful in infectious pathologies for determining etiological agents and supporting targeted and adequate microbial care. MRI is essentially an indispensable tool in a well-functioning epilepsy center. However, MRI practices vary around the world, particularly in SSA¹³. Identifying candidates for priority access is useful in informing judicious use where resources are limited due to disparate resources, technical capacity, and infrastructure. Our study found that 16.4 percent of the patients with epilepsy who underwent imaging in our study had abnormal MRI findings¹⁴.

A retrospective observational study of epilepsy presentation at a tertiary hospital in South Africa with access to CT and MRI revealed abnormalities in 34% of the epileptic patients, with features of perinatal hypoxic insult, disorders of neuronal migration, and neurocutaneous disorders

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being the most common. In Tanzania, a smaller case-control study found abnormalities in 29 percent of patients who had CT scans—describing brain atrophy and features of perinatal insults as the most common positive findings. Both studies show similar proportions of positive imaging yield¹⁵. They also reveal an etiological profile that identifies perinatal insults as one of the most common findings: recognizing a preventable cause of epilepsy that calls for deliberate ameliorating interventions in maternal and newborn health. A Bhutan study that included adults and excluded children under the age of 5 years reported abnormal MRI findings in 81% of the patients, the most common findings being mesial temporal sclerosis and neurocysticercosis¹⁶. Accordingly, different settings will have different observations in yield and profile description on imaging, underscoring the importance of a well-conducted imaging description for our setting. Admittedly, some of our imaging findings are nonspecific concerning etiological relationships, and observations of arachnoid and choroidal cysts were likely incidental¹⁷. Significant observations of focal lesions in our study indicate the opportunity for surgical interventions in care in our setting, calling for the need for deliberate development of capacity for epilepsy surgery¹⁸. Findings related to infectious etiology were not as commonly seen in our study as has been reported in other studies, 80 an observation demonstrating the setting's heterogeneity. Imaging is insufficient for determining infectious etiology, and it is possible that the observed imaging findings related to infectious etiology represent an underestimation of infectious etiology in our study patients¹⁹. These findings, however, could also be attributed to the declining impact of infectious etiologies on epilepsy morbidity in our setting, which is due to the success of public health interventions such as large-scale water and sanitation programs, HIV/AIDS prevention and care programs, and universal Haemophilus influenzae and Streptococcus pneumoniae vaccination programmes. Other studies that found a higher prevalence of infectious etiology may have been biased because some infectious etiologies are endemic²⁰. Comorbidity was independently associated with greater odds of positive imaging findings. We observed significant comorbidity in 23% of our children, a much lower finding than a previous observation of 54% neurobehavioral comorbidities in children with lifetime epilepsy in rural Coastal Kenya. The occurrence of comorbidity in epilepsy is an evolving clinical scenario, and our observations at a particular period and age are not representative of lifetime prevalence²¹.

Further, it would be expected that children seen at a tertiary facility would have complicated epilepsies with associated greater comorbidity²². However, like in most settings, 81, because of a suboptimal health system and a broken referral scheme, our hospital functions as a primary, secondary, and tertiary facility in one, and the profile of her catchment is not necessarily constituted only of patients requiring tertiary health services. It would certainly be useful to undertake a prospective study using consistent clinical criteria to determine the prevalence of comorbidity and etiology of childhood epilepsy in urban and rural facilities that likely have different disease profiles²³. Inter-ictal epileptiform EEG activity was also independently associated with abnormal imaging findings. EEG services to supplement epilepsy care are becoming more

widely available in our setting, albeit with challenges in maintaining quality in conduct and reporting. EEG services are scalable because of their lower costs²⁴. When resources are limited, it is possible to consider using EEG study findings and clinical findings of comorbidity to determine priority in access to MRI services. Our study included many epileptic patients who underwent MRI as part of a consistent imaging protocol²⁵. It describes imaging findings of patients with epilepsy from cosmopolitan backgrounds in this setting, representing greater generalizability than other studies in the same setting have provided²⁶.

Results: The participants in this study ranged in age from 16 to 80 years old, with a mean age of 35.793.1051 years, a mean epilepsy duration of 15.156.86 years, and a mean age at diagnosis of 20.637.35 years. In 16.4 percent of patients, abnormal neuroimaging was discovered. Space-occupying lesions accounted for 21.7% of abnormal neuroimaging, tumors 47.9%, cysts 21.7 percent, and hemorrhages 8.7%.

Conclusion:

According to the findings of our study, up to a fourth of epileptic patients who had an MRI had abnormal findings. Overall, we describe epilepsy imaging findings, elucidating the etiology of epilepsy in our setting, defining the opportunity for surgical interventions, and promoting public health interventions that facilitate access to optimal skilled delivery services.

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