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Radiology Section

MRI in Epilepsy : A Hope in the Midst of a Storm

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ABSTRACT

Introduction: Epilepsy is a major public health problem in developing countries like India where it is not spared from threatening myths. Few Indian studies have described the wide spectrum of MRI findings in patients of varied age groups and those with variety of etiologies.

Aim: We aim to present the spectrum of MR brain imaging in patients referred with diagnosis of epilepsy observed clinically and/or confirmed by EEG.

Materials and Methods: This prospective study was conducted in the Department of Radiology, Shree Krishna Hospital, for the duration of two years between 1st June 2013 to 31st May 2015. Total 150 patients underwent EEG to locate the epileptogenic focus before they were subjected to MRI. Patients were subjected to MRI scan of the brain on superconductive 1.5 Tesla Magnetom Symphony Maestro class MRI scan. (Siemens AG Co., Relangen). Statistical analysis was done by using percentages and proportions.

Results: Among the patients, the most common type of seizures was generalised tonic clonic type i.e., 73 (48%). Age of patients varied from 4 months to 82 years and majority were between 11-20 years i.e., 27 (18%). There was a male predominanace 94 (62.67%) and 56 (37.33%) females. MRI revealed abnormal findings in 93 (62%) of 150 patients. Acute infarct in 11 (7.3%), chronic infarct in 4 (2.7%), cystic encephalomalacia in 15 (10%), chronic small vessel disease in 25 (16.7 %), tumours in 13 (8.7%), hydrocephalous in 4 (2.7 %), developmental malformations in 1 (0.7%), Infective in 15 (10%), demyelinating lesions in 9 (6%), vascular malformations in 3 (2%), haemorrhage in 7 (4.7 %), thrombosis in 5 (3.3 %), mesial temporal sclerosis in 5 (3.3 %), atrophy in 20 (13.3%), edema in 11 (7.3 %) and hypoxic injury in 5 (3.3 %).

Conclusion: The study highlights the contribution of MRI in identifying surgically or medically treatable causes and thus aid in timely management.

Keywords: Brain, Imaging, Seizure

INTRODUCTION

Epilepsy is a major public health problem in developing countries like India. Out of the 50 million people with epilepsy worldwide, most of them reside in developing countries. There are approximately 10 million people suffering with epilepsy in India and the prevalence is seen to be dominating the rural (1.9%) compared to urban population (0.6%) [1]. The reported incidence rates of epilepsy are around 60 per 1, 00,000 per year [2] in developing countries as compared to those reported as 24-53 per 1,00,000 in developed countries [3]. China and India, the two big populations together harbour 20% of epileptics worldwide. The incidence rates from studies in India is higher than that from China i.e. 35.0 per lac per year [4]. Moreover, the disease is not spared from the various threatening myths in rural areas like ours.

From about 50 million people globally with epilepsy, approximately 35 million hardly have any access to appropriate treatment. To be blamed is the poor availability of services or because epilepsy is yet to be considered as a medical problem and not a psychosocial ailment that is left in the hand of quacks.

Hughlings Jackson in the 19th century was the first person to recognise epilepsy as a medical disease. He proposed in 1873, that seizures resulted from sudden brief electro-chemical discharges in the brain.

The imaging of epilepsy has vastly changed since the end of the 20th century. Prior imaging with Computed Tomography (CT) scanning infrequently revealed the pathologic substrate for epilepsy [2] . MR imaging has revolutionized the evaluation of epilepsy and it is superior to CT for detection of structural abnormalities. The initial low-field strength MRI though increased the diagnostic numbers, it has its own limitations and could identify only the neoplasms, encephalomalacia and vascular malformations [5].

The ILAE has suggested that seizures should be classified etiologically [6] . MRI has emerged as a powerful tool towards directing treatment, both medically and surgically when a lesion is precisely identified. MRI can assist in classification, determine prognosis, predict long term intractability to anti-epileptic medications [7] and can also identify potential surgical candidates. This has helped in the evaluation and management of epilepsy.

Though, there have been studies pertaining to etiologies, diagnosis and management of epilepsy, few Indian studies have described the wide spectrum of MRI findings that occur in patients belonging to varied age groups and presenting with epilepsies due to a variety of underlying identifiable etiologies.

The role of MRI in epilepsy has been evaluated through research in different contexts like relation of seizure recurrence in patients on anti-epileptic drugs if there was an associated lesion detected on MRI [8], focal abnormalities in patients with drug resistant hypermotor seizures [9], volumetric assessment in temporal lobe epilepsy [7] .

Hence, the present study aims at describing the spectrum of brain findings in patients with epilepsy coming to the Radiology Department of Shree Krishna Hospital, which is a secondary neurological care hospital for patients with epilepsy.

The findings of this study may throw some light on the role of MRI in epilepsy management in the setting of a developing country like ours and guide further research in the direction of cost effectiveness and optimization of use of MRI in epilepsy diagnosis and management.

MATERIALS AND METHODS

This prospective study was conducted in the Radiology Department of Shree Krishna Hospital, Gujarat, India between the period of 1st June 2013 to 31st May 2015. The study was approved by Institutional Ethics Committee. An Informed consent to participate was obtained from the subjects. Total 150 patients underwent EEG to locate the epileptogenic focus before they were subjected to MRI. All patients were classified according to the most widely used classification of epileptic seizure ILAE principally [6] based on clinical seizure type and interictal EEG findings and are tabulated in [Table/Fig-1].

The study included patients of both sex, irrespective of their religion, age or socio-economic status. Patients with known contraindication to MRI, such as pacemakers, metallic implants, or aneurysmal clips were exluded from the study. Clinical details of each patient was recorded along with an informed consent.

Patients were subjected to MRI scan of the brain on superconductive 1.5 Tesla Magnetom Symphony Maestro class MRI scan (Siemens AG Co. Relangen). The head coil was used for the scan. MRI protocol at 1.5T included the entire brain from nasion to inion, non-contrast MRI of brain was done with 5 mm thick TSE (turbo Spin Echo) T1 weighted, TSE T2 weighted, TSE T2 weighted FLAIR (Fluid Attenuation Inversion Recovery), EPI (Echo Planner Imaging) diffusion weighted and ADC (Apparent Diffusion Coefficient) axial images, 5 mm thick TSE FLAIR coronal images and 5 mm thick TSE T1W sagittal images, 5 mm thick Gradient Recalled Echo (GRE) (T2*) axial and coronal images. Additionally, 3 mm thick IR with MTC (Magentization transfer contrast) T1W and FSE (Fast Spin Echo) T2W oblique coronal images were also obtained through the hippocampal regions.

After intravenous administration of gadolinium contrast medium (Dosage: 0.1 mg/kg wt), 5 mm T1W with MTC axial and sagittal images as well as 5 mm T1W with fat saturation coronal images were obtained.

Types of Seizure	Frequency	Percentage (%)
Simple	11	7.3
Complex Partial	15	10.0
Complex Partial with Secondary Generalisation	7	4.7
Absence	1	0.7
Tonic	1	0.7
Myoclonic	0	0.0
Atonic	0	0.0
Generalised Tonic Clonic	73	48.6
Unclassified	42	28.0
Total	150	100.0

[Table/Fig-1]: Distribution of number of patients according to seizure types.

STATISTICAL ANALYSIS

The data were analysed by SPSS. Statistical analysis was done by using percentages and proportions.

RESULTS

The age range of patients was from 4 months to 82 years and the maximum number of patients i.e., 27 (18%) were in the age group of 11-20 years. There was a male predominance with 94 (62.67%) males and 56 (37.33%) females.

Abnormal MRI findings were noted in 93 (62%) patients, rest of patients showed normal findings. Out of abnormal findings, the most common findings were chronic ischemic small vessels disease in 25 (16.7%), atrophy in 20 (13.3%), cystic encephalomalacia with gliosis in 15 (10%), neoplasms in 13 (8.7%), edema in 11 (7.3%) and acute infarct in 11 (7.3%) patients with epilepsy.

The distribution of MRI findings in number of patients and according to seizure duration as well as in different age group are tabulated in [Table/Fig-2-4].

MRI Findings	No. of Patients	Percentage (%)
Acute Infarct	11	7.3
Chronic Infarct	4	2.7
Chronic Ischaemic Small Vessesl Disease	25	16.7
Cystic Encephalomalacia with Gliosis	15	10
Hydrocephalous	4	2.7
Haemorrhage	7	4.7
Thrombosis	5	3.3
Hypoxic Injury	5	3.3
Meningitis	2	1.3
Encephalitis	8	5.3
Foci of Demyelination	9	6
Edema	11	7.3
Arterial Venous Malformation	3	2.0
Granulomas	3	2.0
Ring Enhancing Lesion	5	3.3
Atrophy	20	13.3
Neoplasms	13	8.7
Mesial Temporal Sclerosis	5	3.3
Developmental Malformation	1	0.7
Others	4	2.7
Normal	57	38

[Table/Fig-2]: Distribution of MRI findings in the study group.

MRI Findings	<1	1 month	1-5	> 5	p-value
Acute Infarct	10	1	0	0	0.001
Chronic Infarct	1	2	0	1	0.309
Chronic Ischemic Small Vessesl Disease	13	3	6	3	0.337
Cystic Encephalomalacia with Gliosis	5	4	5	1	0.421
Hydrocephalous	1	2	1	0	0.459
Haemorrhage	7	0	0	0	0.008
Thrombosis	5	0	0	0	0.053
Hypoxic Injury	4	1	0	0	0.214
Meningitis	2	0	0	0	0.532
Encephalitis	8	0	0	0	0.003
Foci of Demyelination	5	0	2	2	0.461
Edema	10	0	0	1	0.001
Arterial Venous Malformation	2	1	0	0	0.524
Granulomas	0	0	2	1	0.194
Ring Enhancing Lesion	3	2	0	0	0.267
Atrophy	7	5	6	2	0.578
Neoplasms	4	4	4	1	0.467
Mesial Temporal Sclerosis	0	0	3	2	0.041
Developmental Malformation	0	0	1	0	0.633
Others	1	1	0	2	-
Normal	12	13	15	17	-

[Table/Fig-3]: Distribution of Magnetic Resonance Imaging (MRI) findings according to duration of seizures.

In patients with simple partial seizures, most common findings were neoplasm (n=6) and normal MRI (n=3), chronic ischemic small vessel disease (n=2) and atrophy (n=2). The distribution of MRI findings in patients with complex partial seizures showed normal MRI (n=4) as most common finding. Other findings were MTS (n=2), chronic ischaemic small vessel disease (n=2), atrophy (n=2), and edema (n=2).

In patients of partial seizures with secondary generalisation, normal MRI was the most common finding (n=2), and other findings were one each of neoplasms, MTS, chronic ischaemic small vessels disease, atrophy, edema, foci of demyelination, chronic infarct and acute infarct.

There was only one patient of absence seizures in the study group showing mild cerebellar atrophy and one patient with tonic seizures showing hydrocephalous on MRI.

MRI findings in patients with generalized tonic clonic seizures in the study group showed normal MRI as the most common finding (n=33), and other common findings being chronic ischaemic small vessels disease (n=10), cystic encephalomalacia with gliosis (n=9), atrophy (n=8), edema (n=8) and foci of demyelination (n=7). MRI findings in patients with unclassified seizures in the study group showed normal MRI as the most common finding (n=15), and other common findings were chronic ischaemic small vessels disease (n=10), atrophy (n=7) cystic encephalomalacia with gliosis (n=4), acute infarct (n=4).

DISCUSSION

Epilepsy considered a disease of the brain is defined by any of the following conditions [6]:

1. At least two unprovoked seizures occurring more than 24 hours apart.

2. One unprovoked seizure and a probability of further seizures similar to the general recurrence risk (at least 60%) after two unprovoked seizures, occurring over next 10 years.

3. Diagnosis of an epilepsy syndrome.

MRI has revolutionized neuroimaging and it provides the best method of non-invasive structural evaluation of the brain. The MRI spectrum in patients with seizure could range from almost a normal scan to a scan showing the culprit lesion. In almost 15-30 % epilepsy patients, the seizures do not respond to medical therapy, hence surgery may become mandatory [10-12] . The purpose of presurgical evaluation is to identify the

Findings	< 1 Year	1-10 Years	11-20 Years	21-30 Years	31-40 Years	41-50 Years	51-60 Years	>60 Years	p-value
Acute Infarct	1	1	2	0	1	0	2	4	0.349
Chronic Infarct	0	1	0	0	1	0	1	1	0.812
Chronic Ischemic Small Vessesl Disease	0	1	0	0	2	0	7	15	<0.0001
Cystic Encephalomalacia with Gliosis	0	1	2	2	2	1	2	5	0.652
Hydrocephalous	1	1	0	0	0	0	1	1	0.268
Haemorrhage	1	0	2	1	1	0	0	2	0.675
Thrombosis	0	0	3	2	0	0	0	0	0.287
Hypoxic Injury	2	0	2	0	1	0	0	0	0.136
Meningitis	0	1	0	0	0	0	1	0	0.458
Encephalitis	2	4	2	0	0	0	0	0	0.024
Foci of Demyelination	1	4	0	0	3	1	0	0	0.007
Edema	0	3	2	2	3	0	1	0	0.581
Arterial Venous Malformation	0	0	1	1	0	1	0	0	0.534
Granulomas	0	0	2	0	0	1	0	0	0.176
Ring Enhancing Lesion	0	0	0	2	0	0	1	2	0.381
Atrophy	1	0	2	0	0	1	5	11	<0.0001
Neoplasms	0	0	2	0	1	1	3	6	0.019
Mesial Temporal Sclerosis	0	1	2	1	1	0	0	0	0.943
Developmental Malformation	0	1	0	0	0	0	0	0	0.660
Others	0	0	1	1	0	1	1	0	-
Normal	4	10	12	12	10	4	3	2	-

[Table/Fig-4]: Distribution of MRI findings in different age groups.

focus of epileptogenesis, conceptually a cortical area which becomes the source of epileptic seizure [13] .

MRI has become critical component of pre-operative evaluation as both the type of surgery and the outcome depends on the cause and location of the epileptogenic foci. E.g., in tumours, vascular malformations, hippocampal sclerosis.

NICE (National Institute of Health And Clinical Excellence) guidelines have recommended MRI of brain as the investigation of choice in epilepsy for both children and adults for the purpose of identifying structural abnormalities. The reason is the superior soft tissue contrast, multiplanar imaging capability and lack of beam hardening artefacts (in evaluation of the temporal fossa). This helps particularly in delineating discrete lesions like mesial temporal sclerosis, focal cortical dysplasia or hypothalamic hamartoma, which may pave the way to surgery in refractory epilepsy.

Hence, MRI is indicated in those who develop epilepsy with suggestion of focal onset on history, examination or EEG and in refractory seizures [14].

The present study suggests the efficacy of high resolution 1.5T MR imaging in depicting abnormalities in patients with epilepsy and correlating the abnormal findings with age, type and duration of seizures in rural Inida.

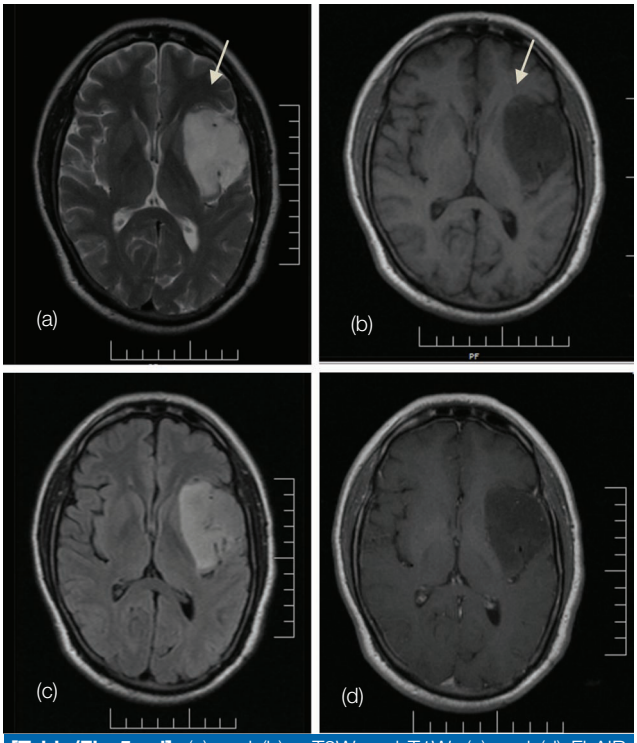
Epilepsy is considered as a benign process, most of the patients are free of neurological deficits and therefore neuroimaging is not much encouraged due to its limited availabilty and expensive nature in rural communities. The present study clearly disapprove this conjecture as we identified many causative factors which were not only surgically treated but also medically provided a curative relief.

Epilepsy-associated developmental tumours are usually low grade tumours like ganglioglioma, gangliocytoma, dysembryoplastic neuroepithelial tumour, desmoplastic infantile ganglioglioma and pleomorphic xanthoastrocytoma. They are thought to be associated or coexistent with focal cortical dysplasia [15], however we could not identify any associated FCD in our group of patients which suggests the importance of higher field strength MRI and more advanced imaging to be promising [16].

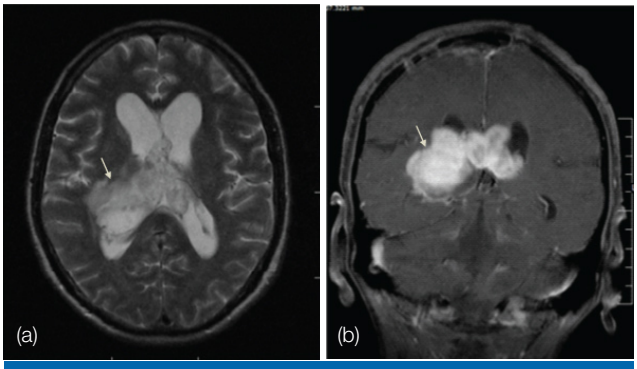
Our study showed similar prevelance of tumours as in studies by Mercy NN [17] and Lefkopoulos A et al., [18]. However In a study by Nguyen DK et al., [19] , the prevelance was three times more as compared to our study probably due to a much larger sample size.

Low grade tumours were observed in the paediatric age group. However, the elderly group showed the high grade variety [Table/Fig-5-7].

Hydrocephalus was observed to be more in our study (2.6%) as compared to study conducted by Bakhsh A et al., which was only 0.2 % [20]. All four patients were in paediatric age



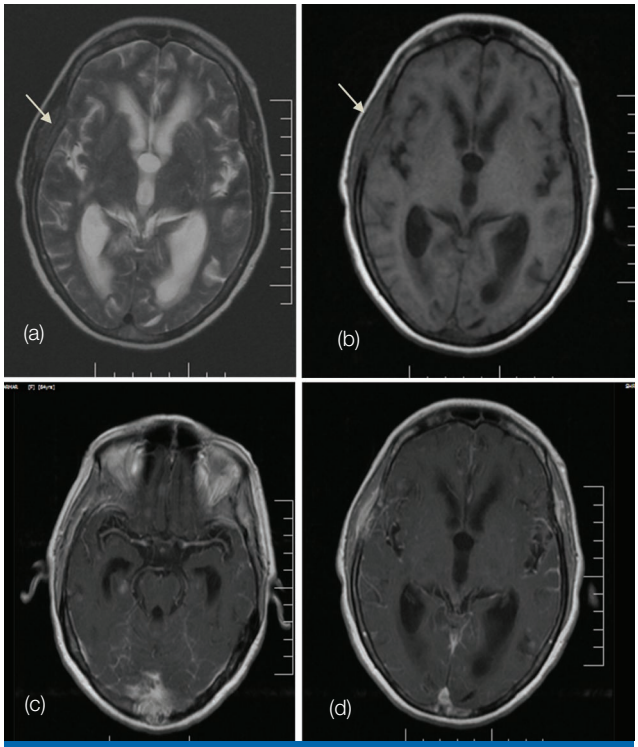
[Table/Fig-5a-d]: (a) and (b) – T2W and T1W; (c) and (d) FLAIR and contrast enhanced T1W axial images well demarcated, non-enhancing, lesion (small white arrow) in the antero-superior portion of left temporal lobe, left insular cortex, left fronto-temporal operculum, left external capsule and left putamen appearing hyperintense on the T2W & FLAIR images; hypointense on T1W images. This suggests possibility of a low grade glioma.



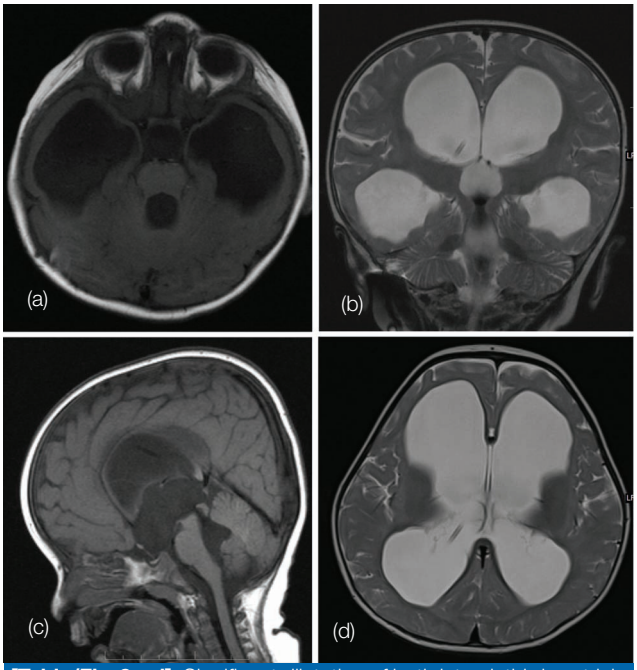
[Table/Fig-6a,b]: T2W axial and T1W CE coronal images : A well-defined, intensely enhancing lesion in intraventricular and right temporal lobe suggestive of a high grade neoplasm (small white arrow).

group with two showing cerebral aqueduct stenosis, one with developmental malformation and one with meningitis. [Table/Fig-8,9]. Other studies with similar sample size had shown higher prevelance of congenital malfromations [18,21]. Nguyen DK et al., with a five times bigger sample size had shown a prevelance of 10% [19].

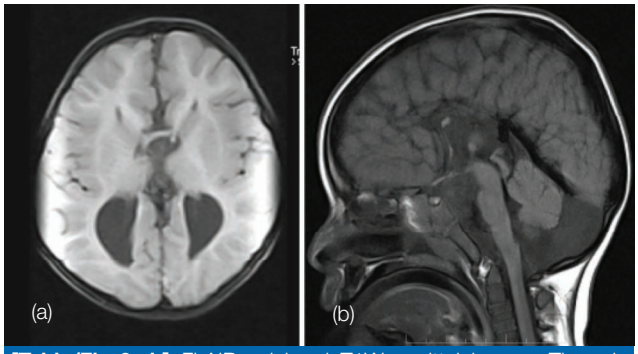
Mesial Temporal Sclerosis (MTS) is characterised by small atrophic hippocampus which is due to neuronal loss and gliosis



[Table/Fig-7a-d]: (a) and (b) – T2W and T1W axial images; (c) and (d) – contrast enhanced T1 W axial images. Small, enhancing, altered signal intensity areas in the calvarium in right antero-inferior temporal region (small white arrow) suggest osteolytic bony metastases and in the occipital region in the midline suggests dural metastasis (bold white arrow).



[Table/Fig-8a-d]: Significant dilatation of both lateral, third ventricle with narrowing of cerebral aqueduct suggest Severe obstructive hydrocephalus with possibly cerebral aqueduct stenosis/web.



[Table/Fig-9a,b]: FLAIR axial and T1W sagittal images. There is non-visualisation of corpus callosum with presence of radially oriented divergent Probst bundle on the medial aspects of frontal lobe. The occipital horns and trigones of both the lateral ventricle are dilated. These suggest complete agenesis of corpus callosum with colpocephaly with mega cisterna magna.

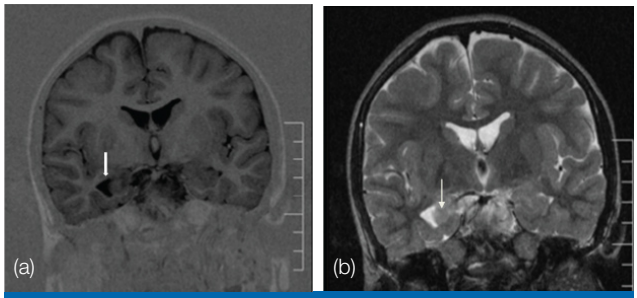
in CA1, CA3, and CA4. In patients with repeated seizures and an advanced form of disease, atrophy of additional structures of limbic system like the mammillary body and fornix, entorhinal cortex, and amygdala, may be seen [22]. In our study there were five patients with T2 hyperintensity and atrophy out of which only one patient showed a bilateral involvement. Though, temporopolar changes like loss of gray-white matter interface and white matter volume loss are commonly seen in TLE but none of our patients showed such findings.

This study found same prevelance of MTS [Table/Fig-10] to that in the study of Elster AD et al., [23]. High resolution MRI with dedicated epilepsy protocol was able to pick up the changes and therefore, it should be the investigation of choice.

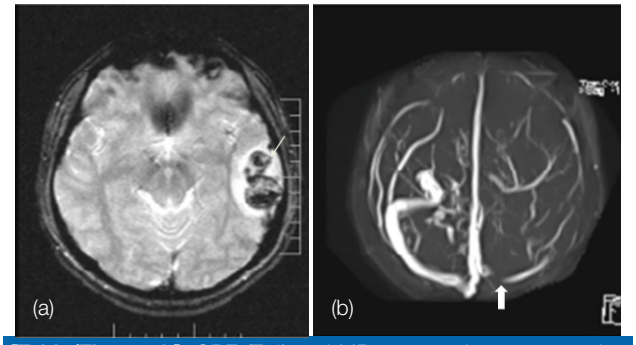
Various other studies with similar sample size showed a higher prevalance of MTS [17,18]. Hakami T et al., [24] and Nguyen DK et al., [19] showed prevalance of 9 % and 17 % respectively, however, with a much bigger sample size.

Post traumatic, cerebrovascular disease, and CNS infections are some of the acquired causes of epilepsy.

These etiologies are easily identified on routine-protocol brain MRI. Seizures are a mode of presentations for patients with haemorrhage and CVT as well [Table/Fig-11].



[Table/Fig-10a,b]: IRMTC and T2 coronal images
subtle hyperintensity on T2 involving right hippocampus, (small white arrow) representing changes of gliosis. The temporal horn of right lateral ventricle appears prominent (bold white arrow). These favour changes of mesial temporal sclerosis.

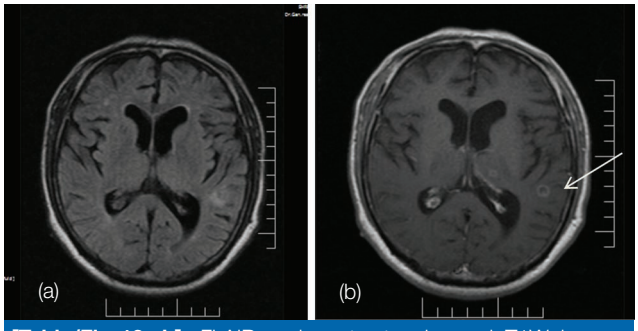


[Table/Fig-11a,b]: GRE (T2*) and MR venography reconstruction images: An altered signal intensity lesion in cortical and subcortical white matter in left temporal lobe with blooming on GRE (T2*) images suggests hemorrhagic infarct (white arrow).
Absence of flow void (bold white arrow) in distal part of left transverse sinus, left sigmoid sinus and left internal jugular vein suggest sinus thrombosis.

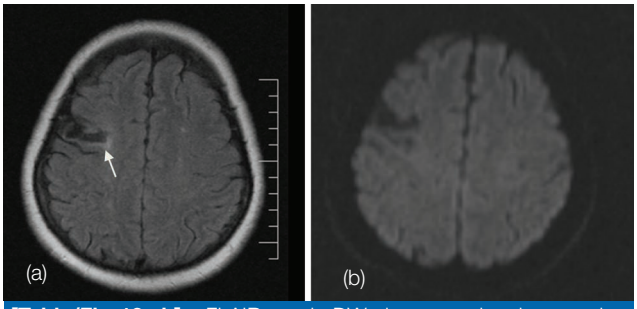
Ferro JM et al., [25,26] , in his two studies showed seizures as the mode of presntation in CVT.

Worldwide, neurocysticercosis is the most common parasitic infection of the human CNS. Although, seizures are reported to be the most common clinical presentation, the clinical assosciation between neurocysticercosis and epilepsy is not clearly understood as the severity does not correlate with the number of lesions nor the location explains the epileptogenic focus [27]. In our study, collectively prevelance of infective etiology was observed as 10 percent. The study of Mercy NN showed 7.3 % prevelance of infection [17] . In an Indian series by Gulati P et al., [21] of 170 children with chronic epilepsy, MRI revealed 64 tuberculomas, 27 cases of cysticercosis and 3 gliomas. In our study the number of paediatric patients were 53 out of which 26 showed normal findings and out of the abnormal findings only two showed granulomas [Table/Fig-12].

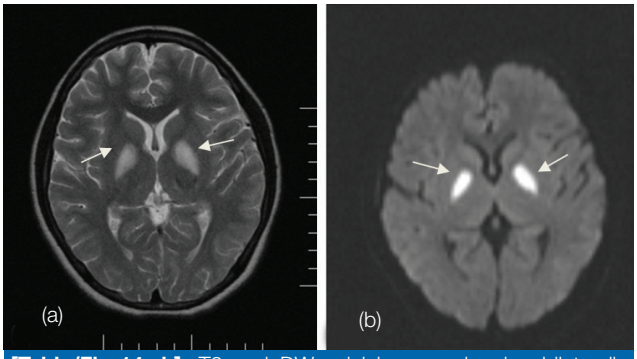
Infarctions, gliosis, or encephalomalacia might be due to past history of head trauma or as a result of injuries associated with seizures [Table/Fig-13,14]. Their presence does not clearly explain the true epileptogenic nature. Surgical interventions of such areas could be beneficial to patients if they were found to be the cause of epilepsy. Such cases needs further



[Table/Fig-12a,b]: FLAIR and contrast enhanced T1W images show ring enhancing lesions (white arrow).



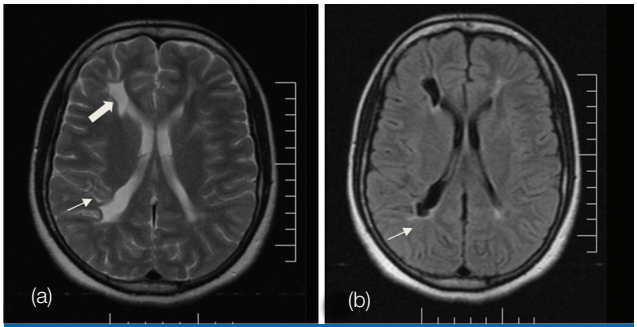
[Table/Fig-13a,b]: FLAIR and DW images showing wedge shaped non enhancing, CSF intensity area involving the cortical and subcortical region of right high frontal lobe with peripheral hyperintense rim on FLAIR (white arrow) suggesting chronic Infarct with gliosis.



[Table/Fig-14a,b]: T2 and DW axial images showing bilaterally symmetrical, altered signal intensity areas involving globus pallidi and cerebral peduncles, which appear hyperintense on T2W and show water motion restriction on DW images; suggest acute hypoxic changes involving deep grey nuclei (white arrow).

investigations with better imaging advances to understand their proclivity for epileptogenesis [20].

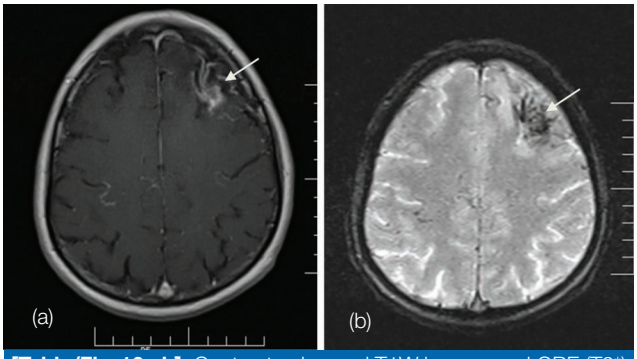
Mercy NN [17], Lefkopoulas A et al., [18], Elster AD et al., [23] and Mengistu G et al., [28] with nearly similar sample size as ours showed similar prevelance of infarcts in their studies. Our study, showed a higher prevelance of patients with cystic encephalomalacia and gliotic changes [Table/Fig-15] as compared to the study of Mengistu G et al., which showed



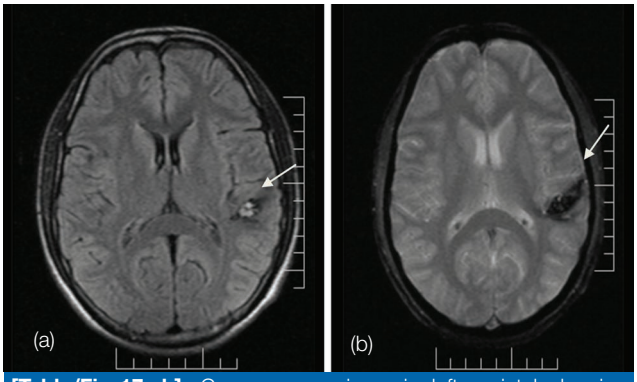
[Table/Fig-15a,b]: T2W and FLAIR axial images showing periventricular leukomlacia evident by peritrigonal irregulairty of margins (white arrow), cyst along right frontal horn (white bold arrow).

3.9 % [28]. Hakami T et al., [24] showed prevelance of 49% with a bigger study group of 993 patients of epilepsy.

In the study by Josephson CB et al., [29], the risk of a first seizure was higher for adults with an AVM who had an intracranial haemorrhage or focal neurological deficit as compared to those with incidentally detected AVMs, and compared to all modes of cavernous malformations. Moreover adults without prior ICH or FND, and an episode of seizure, the location of AVMs were more frequent in the temporal lobe, however no such association was noted in CMs, which were more frequently multiple in adults with epileptic seizures. Our study showed very little number of patients with arteriovenous



[Table/Fig-16a,b]: Contrast enhanced T1W images and GRE (T2*) axial images show pial arteriovenous malformation with glomerular (compact) type of nidus (white arrow).

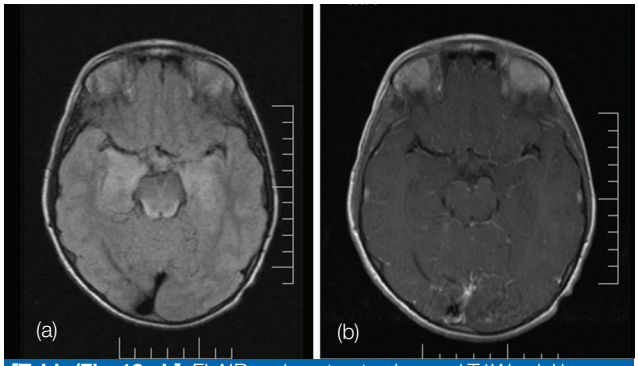


[Table/Fig-17a,b]: Cavernous angioma in left parietal showing peripheral signal drop out on FLAIR and gradient sequence suggestive of hemosiderin rim (white arrow).

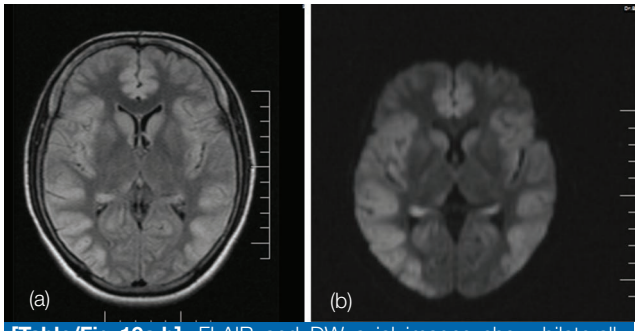
malformations for such conclusions to be drawn [Table/Fig-16,17].

Transient reversible changes after a prolonged seizure activity is often observed as T2 hyperintensity and restricted diffusion of the cerebral cortex or subcortical white matter in addition to gyral swelling. Though, not proven pathologically the reversibility and location of signal changes helps exclude the possibility of structural lesions. These changes are expected to normalise over time, however some patients might develop cortical volume loss, laminar necrosis, and hippocampal sclerosis [30].

In our study 7.3% patients had shown changes of post ictal edema without any underlying etiology which resolved in follow up scan [Table/Fig-18 and 19]. In a study by Kim JA et al., eight out of 33 patients had shown oedema, which had resolved in follow-up imaging [30].



[Table/Fig-18a,b]: FLAIR and contrast enhanced T1W axial images showing Prominent, non-enhancing, hyperintense areas in the dorsal aspect of midbrain, both superior cerebellar peduncles, both the parahippocampal gyri, uncus of the both the temporal lobes involving head & body of both the hippocampi suggesting post ictal oedema.



[Table/Fig-19a,b]: FLAIR and DW axial images show bilaterally symmetrical areas of altered signal intensity in cortical and subcortical white matter areas in bilateral temporal lobes, bilateral occipital lobes, bilateral parietal lobes, bilateral centrum semiovale and bilateral corona radiata suggesting transient periictal oedema.

Non specific findings identified on MRI brain like atrophy and white matter foci whether have any association with epilepsy are yet to be understood. In our study 13.33 % patients had shown changes of cerebral and/or cerebellar atrophy; out of which 16 were age related and four patients had shown premature atrophy. 6% patients had shown foci of demyelination on MRI in our study group. Mengistu G et al., [28] showed a prevelance of 5%, Amirsalari S et al., [31] in his study showed prevelance of 10% of atrophy, Mercy NN [17] showed 7.3% of patients with atrophy as compared to Bakhsh A et al., [20] who had a 0.2% prevelance of atrophy in his study group with similar sample size.

In patients with epilepsy of longer duration, we expect to see both the etiology of the seizure disorder as well as the effect of the seizure disorder on brain to be reflected in the MRI findings; which is in contrast to the findings of the present study. This may emphasise the importance of using MRI machines with higher resolution like 3 Tesla and onwards and also using advance or hybrid studies like functional MRI/PET-MRI/MR spectroscopy in patients with epilepsies of longer duration/idiopathic epilepsies [32].

LIMITATION

Though, high resolution MRI sequences have helped us diagnose many causes of seizure, but more recent advances like MR spectroscopy, receptor PET, and magnetic source imaging could enhance the understanding of the biomarkers of the epileptogenic process and can aid in localising the epileptogenic focus when routine MRI is normal.

CONCLUSION

The findings of this study may throw some light on the role of MRI in epilepsy management in the setting of a developing country like ours and guide further research in the direction of cost effectiveness and optimisation of use of MRI in epilepsy diagnosis and management. It would also provide a gateway to incorporate the advanced or hybrid studies like functional MRI/PET-MRI/MR spectroscopy in patients with epilepsies of longer duration/idiopathic epilepsies.

In a country with more prevelance of epilepsy in rural poulation, it may be a ray of hope for people living with epilepsy amidst a storm of myth.

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