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Diagnostic efficacy of dedicated MRI seizure protocol and standard protocol in evaluating seizures -A comparative study

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***Abstract*---**Seizure episode is most common in males than in females in this study. Among the males, age group of 21-40 years is most affecting with seizures. Major occurrence of seizure is when the patient is in awake state. Most of the patient around 80% in this study presented with single episode of seizure. Generalized Tonic Clonic seizure is the most common form of seizure in this study. Infection and inflammation were most common cause of seizure. Neurocysticercosis is common cause of seizure under infectious cause of seizure, followed by tuberculomas. Ischemia is second most common cause of seizure in this study. Incidence of mesial temporal sclerosis is 17 % in this study. Mesial temporal sclerosis is more common in age group of 21- 40 years of age. From this study it is seen that there is an increase in diagnostic yield (23%) in finding

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epileptogenic lesions in patients who presented with seizure by adding “dedicated epilepsy protocol”. Standard protocol sequences failed to detect those 23% of the lesion that were diagnosed using epilepsy protocol. Standard protocol issued to predict all lesion types except for hippocampal sclerosis and cortical malformation. There is a significant association between seizure protocol and epileptogenic lesions with a p-value <0.05 stating that Seizure protocolis capable of predicting all types of lesions.

Keywords---Epilepsy, Seizures, MRI, Patients.

Introduction

A seizure is a momentary abnormality in muscular tone or movements (stiffness, twitching, or limpness), behavior, sensations, or state of awareness caused by an uncontrolled electrical activity in brain cells. Epilepsy affects both sexes and people of all ages, and it is found all throughout the world [1]. Epilepsy is more common in males than in females, and it tends to increase in the elderly age group, which reflects higher prevalence of stroke, malignancies and neurological disorders, in elderly age group. Generalized seizures are uncommon when compared to focal seizures in both pediatric and adult patient. The etiology of epilepsy differs based on the socio demographic features of the affected population and the completeness of the diagnostic workup [2]. When assessed by seizure freedom, the general prognosis of seizure is favorable in the majority of individuals. In Low or middle- income countries (LMICs), epilepsy patients are mostly untreated, have increased prevalence and remission rates that are similar to HICs. Wide range of prognostic patterns, including early and late remission, a relapsing-remitting course, and even a worsening trend (characterized by remission followed by relapse and unremitting seizures) was identified in the recent findings on the long-term prognosis of epilepsy.

Epilepsy has a low mortality rate per se, however when comparing incidence and prevalence rates, pediatric and adult patients, individuals with idiopathic and symptomatic seizures, significant discrepancies in fatality rates are expected. Patients who had generalized Tonic-clonic seizures, nocturnal seizures, and drug-resistant epilepsy have increased morbid rates. Epilepsy is a brain disorder characterized by an enduring predisposition to generate seizures and by the neuro biologic, cognitive, psychological, and social consequences of seizure recurrences [3, 4]. A number of clinical condition characterized by temporary changes in awareness and/or behavior are included in the differential diagnosis of epilepsy. In most cases, the disease can be identified by taking detailed medical history and observing a seizure. The cause is unknown in around half of the cases even if an etiologic agent can be identified. [5]. The heterogeneity of the disease's occurrence, course, and outcomes around the world can be described by a varying genetic pre disposition to exhibit

seizures and the varying environmental risk factors. The underlying cause and side effects of treatment have neurologic, cognitive, and psychosocial effects that have a huge impact on the affected individuals' quality of life, which makes the disease a complex nosographic entity in addition to the recurrence of seizures.

The assessment of patients presenting with seizures is an issue that clinicians face on a regular basis in medical practice. Number of neuro radiological investigations helps to diagnose and determine the cause of the lesion. [6] Skull x- rays, CSF analysis, CT, and MRI EEG, pneumocephalography, and carotid angiography are some of them. Because of the high soft tissue contrast, MR imaging has emerged as the most efficient modality with more diagnostically valuable modality for identifying epileptogenic lesion, also for more accurate localization of lesions and better depiction of anatomy. The chances of identifying a cause have considerably increased with the introduction of high-resolution MRI and a specific seizure protocol. As a result, there is a positive outcome clinically on the management of these patients [7,8]. Finding an effective treatment requires an accurate diagnosis of the cause of the seizure [9]. The purpose of this study is to compare the diagnostic efficacy of standard MRI protocol to dedicated seizure MRI protocol, as well as to assess the diagnostic yields of MRI.

Materials and Methods

This study was aimed to identify the structural abnormalities causing seizure and to study the spectrum of findings and to compare the diagnostic accuracy of the standard MRI brain protocols /sequences vs dedicated seizure MRI brain protocols / sequences.

The research was carried out in the Radiology department of Sree Balaji Medical College and Hospital

Type of Study: prospective study

Period of study: From June 2020- June 2021

Study Participants

The study included the participants who are attending the department of Radiology of age more than 5 years presenting with seizure.

Selection criteria of the patients for the study

Based on The International League against Epilepsy (ILAE) 1981 criteria patients were clinically diagnosed who presented with the history of seizure. Detailed history regarding was asked from the patient and the observer of the episode followed which clinical and neurological examination was done. Based on the history and examination, a clinic-etiological diagnosis was made.

Inclusion

criteria:

- All patients with age 5 years or more presenting with seizure- (Cutoff value of five years of age was taken to exclude febrile seizures from the study)

- Patients who are consented for this study.

Exclusion

criteria:

- Patients with known contraindication of MRI (metallic implants, pacemakers, claustrophobia, aneurysmal clips, anxiety disorders exacerbated byMRI)

- Patients with known renal problems and contraindication for gadolinium basedcontrast

- Patients who are not consented were excluded from thestudy.

Study Procedure:

After obtaining the informed consent, detailed history regarding socio-demographic status and past medical history, the method of study including risks of contrast examination was explained to the patients. Emergency drugs such as Inj. Adrenalin, Inj. Avil, Inj.Dexamethasone and, syringes 5mI, 10mI and 20 ml were made sure it is available at the time of study. Patients underwent brain scanning on 3Tesla MRI (GE SIGNA POINEER) with both standard MRI brain protocol and dedicated seizure protocol.

Protocols

All patients were taken for both “standard protocol” and “dedicated epilepsy protocol.”

Standard protocol – includes T2 weighted axial, T1 weighted sagittal, fluid attenuated inversion recovery (FLAIR) axial, and diffusion weighted imaging/apparent diffusion coefficient.

Dedicated epilepsy protocol- includes T1 weighted inversion recovery coronal oblique, T2 weighted and FLAIR coronal oblique plane perpendicular to the long axis of hippocampus, magnetization prepared rapid gradient echo, susceptibility weighted imaging, and contrast enhanced MRI if required.

Statistical Analysis:

- All the data's collected was entered in MS-Excel and the same was analyzed using IBM -SPSS - version23.
- Quantitative variables were expressed in terms of mean, standard deviation, or median interquartile range with confidence interval of 95%. The qualitative variable was expressed in terms ofproportion
- Chi square test of significance (P < 0.05) was used to test for the difference in proportion

Results

A total number of 60 subjects have been studied. Out of 60 subjects, Males – 34 in number Females – 26 in number

Table/Fig 1
Gender Distribution According To Age Group

Age in years	**Males**		**Females**	
	n	**%**	**n**	**%**
5- 20	7	21	6	23
21-40	14	41	13	50
41-60	8	24	4	15
>60	5	15	3	12
Total (n=)	34	100.0	26	100.0
Mean ± SD	36.44± 20.83		26.23± 17.24	

Table/Fig 2
Time of Occurrence of Seizure

Time of occurrence of seizure	**n**	**Percentage**
Awake	52	87.3

Sleep	8	13.3
Total	60	100

Table/Fig 3
No of Episodes of Seizure

No of episodes of seizure	**n**	**Percentage**
Single	48	80
Multiple	12	20
Total	60	100

Table/Fig 4
Type of Seizure Presented By Study Participant

Type of seizure	**n**	**Percentage**
GTCS	44	73.3
SPS	12	20
PSSG	4	6.6
TOTAL	60	100

Table/Fig 5
Magnetic Resonance Imaging Diagnostic Yield

MRI	**n**	**Percentage**
Normal	19	32
Abnormal	41	68
Epileptogenic lesions – 35 Non epileptogenic lesions - 6		
TOTAL	60	100

Table/Fig 6
Type of Lesion with No of Seizure episode

NO OF SEIZURE EPISODE		MRI FINDING			TOTAL
		NORMAL MRI	EPILEPTO-GENIC	NON-EPLEPTOGNIC	
SINGLE	COUNT	16	27	5	48
	PERCENTAGE	26.60	45	8.30	80
MULTIPLE	COUNT	3	8	1	12
	PERCENTAGE	5	13.30	1.60	20
TOTAL	COUNT	19	35	6	60
	PERCENTAGE	31.60	58.30	10	100

Table/Fig 7
Type of Seizure and MRI Finding

TYPE OF SEIZURE	MRI FINDING		
	NORMAL MRI	EPILEPTOGENIC	NONEPLEPTOGNIC
GTCS	18	20	6
SPS	0	4	0
PSSG	1	11	0
TOTAL	19	35	6

Table/Fig 8
Gender Distribution with MRI Finding

GENDER		NORMA L	EPILEPTOGEN IC	NON EPILEPTOGEN IC	TOTAL
MALE	COUNT	10	19	5	34
	PERCENTAGE	29.40	55.80	15	100
FEMALE	COUNT	9	16	1	26
	PERCENTAGE	34.60	61.50	4	100
TOTAL	COUNT	19	35	6	60
	PERCENTAGE	31.60	58.00	10	100

Table/Fig 9
MRI finding according to age group

AGE		NORMAL	EPILEPTOG ENIC	NON-EPILEPTOG ENIC	TOTAL
0-20	COUNT	9	5	0	14
	PERCENTAGE	64.20	35.70	0	100
21-40	COUNT	5	21	0	26
	PERCENTAGE	19.20	80.70	0	100
41-60	COUNT	2	6	4	12
	PERCENTAGE	16.60	50	33.30	100

>60	COUNT	3	3	2	8
	PERCENTAGE	37.50	37.50	25	100
TOTAL	COUNT	19	35	6	60
	PERCENTAGE	31.60	58.30	10	100

Table/Fig 10
Epileptogenic Lesions in MRI

MRI Epileptogenic Lesions		
	n	**Percentage**
Infection & Inflammation	12	34.2
Ischemia	7	20
Mesial Temporal sclerosis	6	17.1
Gliosis	3	8.5
Focal cortical dysplasia	3	8.5
Tumor or tumor like lesion	3	8.5
Vascular malformation	1	2.8
Acute hypertensive encephalopathy	1	2.8
Total	35	100

Table/Fig 11
Epileptogenic Lesion According To Age Group

EPILEPTOGENIC LESION		**AGE GROUP**				**total**
		0-20	**21-40**	**41-60**	**>60**	
Infection & Inflammation	**COUNT**	1	10	1	0	12
	PERCENTAGE	8.30	83	8.30	0	100
	COUNT	0	2	4	1	7

Ischemia	**PERCENTAGE**	0	28.50	57	14.20	100
Mesial Temporal sclerosis	**COUNT**	1	5	0	0	6
	PERCENTAGE	16.60	83.30	0.00	0.00	100
Gliosis	**COUNT**	1	0	1	1	3
	PERCENTAGE	33.30	0	33.30	33	100
Focal cortical dysplasia	**COUNT**	1	1	0	0	2
	PERCENTAGE	50	50.00	0	0.00	100
Tumor or tumor like lesion	**COUNT**	1	1	1	0	3
	PERCENTAGE	33.30	33.30	33.30	0.00	100
Vascular malformation	**COUNT**	0	1	0	0	1
	PERCENTAGE	0.00	50	0.00	50	100
Acute hypertensive encephalopathy	**COUNT**	0	1	0	0	1
	PERCENTAGE	0	100.00	0	0.00	100
					TOTAL	**35**

Table/Fig 12
Gender Distribution for Epileptogenic Lesion

EPILEPTOGENIC LESION		**GENDER**		**total**
		males	**females**	
Infection& Inflammation	COUNT	6	6	12
	PERCENTAGE	50.00	50	100

Ischemia	COUNT	5	2	7
	PERCENTAGE	71	28.60	100
esial Temporal sclerosis	COUNT	4	2	6
	PERCENTAGE	66.70	33.30	
Gliosis	COUNT	0	3	3
	PERCENTAGE	0.00	100	100
Focal cortical dysplasia	COUNT	1	1	2
	PERCENTAGE	50	50.00	100
Tumor or tumor like lesion	COUNT	3	0	3
	PERCENTAGE	100.00	0.00	100
Vascular malformation	COUNT	0	1	1
	PERCENTAGE	0.00	100	100
Acute hypertensive encephalopathy	COUNT	0	1	1
	PERCENTAGE	0	100.00	100
			TOTAL	35

Table/Fig 13
Standard Magnetic Resonance Imaging versus Epilepsy Protocol Magnetic Resonance Imaging

	n	Percentage
Diagnosed using Standard protocol MRI	**27**	**77**
Diagnosed using Epilepsy protocol MRI	**8**	**23**
TOTAL	**35**	**100**

Table/Fig 14
Association between Seizure Protocol And Standard Protocol

EPILEPTOGENIC LESIONS	STANDARD PROTOCOL	SEIZURE PROTOCOL	P-value
INFECTION/INFLAMMATION [N=12]	+	+	
ISCHEMIA [N=7]	+	+	
HIPPOCAMPAL SCLEROSIS [N=6]	_	+	
GLIOSIS [N=3]	+	+	
TUMOR /TUMOR-LIKE LESION [N=3]	+	+	
CORTICAL MALFORMATION [N=2]	_	+	0.009
VASCULAR MALFORMATION [N=1]	+	+	
ACUTE HYPERTENSIVE ENCEPHALOPATHY [N=1]	+	+	

Table/Fig 15
Association between Standard Protocol and Epileptogenic Lesions

EPILEPTOGENIC LESIONS	Standard protocol				P-Value
	Yes		No		
	N	%	N	%	
INFECTION/INFLAMMATION	12	44	0	0	0.02
ISCHEMIA	7	25.9	0	0	
HIPPOCAMPAL SCLEROSIS	0	0	6	75	
GLIOSIS	3	11.1	0	0	
TUMOR /TUMOR-LIKE LESION	3	11.1	0	0	
CORTICAL MALFORMATION	0	0	2	25	
VASCULAR MALFORMATION	1	3.7	0	0	
ACUTE HYPERTENSIVE ENCEPHALOPATHY	1	3.7	0	0	

Table/Fig 16
Association between Seizure Protocol and Epileptogenic Lesions

EPILEPTOGENIC LESIONS	Seizure protocol				P-Value
	Yes		No		
	N	%	N	%	
INFECTION/INFLAMMATION	12	34.2	0	0	0.01
ISCHEMIA	7	20	0	0	
HIPPOCAMPAL SCLEROSIS	6	17	0	0	
GLIOSIS	3	9	0	0	
TUMOR /TUMOR-LIKE LESION	3	9	0	0	

CORTICAL MALFORMATION	2	5.7	0	0
VASCULAR MALFORMATION	1	2.8	0	0
ACUTE HYPERTENSIVE ENCEPHALOPATHY	1	2.8	0	0

Discussion

In the study we had evaluated 60 patients with seizure were selected as per ILAE 1981criteria.Detailed Clinical history and examinations were done, followed by biochemical investigation. 60 patients from this study underwent scan in 3 TESLA MRI scanners.

Gender distribution:

In this study we conclude that male patients dominated the study. Male: female ratio was 56.3%: 43.3%**.** Out of few studies done to know the seizures' gender predominance in our country, Hakimi et al., [10] in 2013, showed the ratio of M: F - 61:39 where the results are close to this study result. Maher Arabi et al [11] found, in a total of 101 patients who were studied with history of seizure 57% were male and 43% of them were female, which is very similar to this study.

Gender distribution according to age group:

In this study it was found that maximum patients affected were male group with the Mean ± SD calculated for age was found to be 36.44± 20.83 and for female it was 26.23±17.24 **(Table/Fig 1)**. In the male group patients under the age of 21-40 years (14 patients) which is about 41% were found to be affected more, followed by the age group of 41-60 years (8 patients – 24%), and the age group of 05-20 years (7 patients-21%) and > 60 years (5 patients-15%)**.** On comparing our result with the study done by Hakimi et al., [10] in 2013 where 993 patients were studied and found 61% male and 39% females had seizure with the mean age of 42.2 years, range 14.3–94.3 years and it is almost similar to this study.

Time of occurrence of seizure:

We divided time of occurrence of seizure as Awake and sleep during the episode. Out of 60 patients, 52 patients gave history of being awake which came to 87.3% and 8 were asleep amounting for 13.3% during the seizure episode **(Table/Fig 2).**

No of episodes of seizure:

Patient gave history of single and multiple episodes of seizure, we found that 48 of them had single episode and 12 had multiple episode which was 80% and 20% while studying patients **(Table/Fig 3).** But in a study of 101

seizure patients, done by Maher Arabi et al [11], patients presented with a single episode seizure while 45 patients experienced more than one episode seizure.

Type of seizure presented by study participant:

Based on the history provided by the study patients, we divided seizure into GTCS (Generalized tonic clonic seizure), SPS (Simple partial seizure) and PSSG (Partial seizure with secondary generalization). Out of 60 patients 73.3% (44 patients) of the patient had GTCS, 20 % (12 patients) had SPS and 6.6 % (4 patients) had PSSG **(Table/Fig 4).** All our 60 patients were subjected to both Standard Brain MRI protocol and Seizure specific protocol.

Magnetic resonance imaging diagnostic yield:

Based on the analyzed images, the result of 32% of the patients' MRI Scanned using both standard and seizure protocol were normal **(Table/Fig 5)**, and 68% of the patients showed abnormal MRI findings , out of which 35 patients (58%) had epileptogenic lesions and 6 had non – epileptogenic lesions (10%). A study done among 100 patients with seizure showed epileptogenic lesion in 55 (55.5%) and a non-epileptogenic lesion in 16 (16.2%) patients, whose results are almost close to this study results.

Type of lesion with no of seizure episode:

Among the patient presented with single episode seizure, 45% of then showed epileptogenic lesions. In this study, **(Table/Fig 6)** patient presented with single episode seizure showed epileptogenic lesion in MRI in 27 out of 48 patient (56%) almost half of the patient, and 5 had non-epileptogenic lesion where the result is almost close to the to the study done by Wieshmann [12] in which MRI was abnormal in 67% of patients who presented with first- onset seizures. Out of 12 patients who presented with multiple episodes, 8 patients had epileptogenic lesion and 3 were normal.

Type of seizure and MRI finding:

Out of 35 patients who had epileptogenic lesion in MRI, 20 of them presented with GTCS type of seizure, 4 of them had SPS and 11 of them had PSSG type of seizure (**Table/Fig 7**).

Gender distribution with MRI finding:

Out of 35 epileptogenic lesions studied, 19 (55.80%) out of 24 abnormal MRI in male patient were found to have epileptogenic lesions and 16 (61.50%) out of 17 abnormal female MRI had epileptogenic lesion **(Table/Fig 8**).

MRI finding according to age group:

Table/Fig 9 describes the MRI finding based on age group; among 14 patients in 0-20 age groups 5 (35.7%) had epileptogenic lesions were noted. In 21 to 40 age group, out of 26 patient, 21(80.70%) of them had epileptogenic lesion, 6 patients out of 12 (50%) among 41-60 age group and among 8 patients 3 (37.5%) patients more than 60 years showed epileptogenic lesion.

Epileptogenic Lesions in MRI:

In this study potential epileptogenic lesions were classified into infection and inflammation, ischemia, mesial temporal sclerosis, gliosis, focal cortical dysplasia, tumor like lesion, vascular malformation and acute hypertensive encephalopathy **(Table/Fig 10).**

- Infection and inflammation:

Among these lesions Infection and inflammation were most common cause which was seen in 12 patients (34.2%) out of which 4 patients having Neurocysticercosis, 4 had calcified granuloma followed by 3 patients with tuberculoma. In similar study by Del Brutto in 2012 concluded that Neurocysticercosis is the leading cause of acquired epilepsy worldwide, and the main reason for a higher prevalence of epilepsy in developing countries [13].

- Ischemia

7 out of 35 patients (20%) had ischemia, out of which 3 were chronic infarct with hemorrhage , 2 sub-acute infarct , 1 chronic infarct and 1 venous hemorrhagic infarct with sinus thrombus. A prospective cohort study done by Scott [14] found that, out of 661 patients with early onset seizure, 23% of them had cerebral infarct, whose results are close to our results.

- Hippocampalsclerosis:

Hippocampal sclerosis / mesial temporal sclerosis came around 17.1 % (6 patient), out of which 2 had bilateral hippocampal sclerosis, 3 had right hippocampal sclerosis and 1 had left hippocampal sclerosis. A study done by Saad et al shows 25 (45.5%) patients were found to have hippocampal sclerosis out of 55 epileptogenic lesions [15].

- Gliosis:

Gliosis is noted in 8.5% of the patients (3 patients). A case carried out with 100 patients, out of which 55 had epileptic lesions, in which 10.9 % had gliosis as seizure focus and it is almost similar to this study.

- Tumor and tumor likelesion:

Out of 35 epileptogenic lesions, 8.5% of the patients, were found to have tumor and tumor like lesions in which one of them had glioma In 3 patients (8.5%), who had tumor/ tumor like lesion, 2 had glioma and 1 of the 3 patient had rathke's cleft cyst. In a case study by Saad et al with 100 seizure patients, eight (14.5%) patients had tumor like lesions [15].

- Corticalmalformation:

Focal cortical dysplasia is one of the cortical malformations characterized by cortical thickening, grey- white matter junction showing blurring interface, white matter T2/FLAIR hyper intensity with abnormal pattern of sulci and gyri. In this study 2 patients were found to have these findings (8.5%). Another study done similar to this study show 10.9 % out of 55 epileptogenic lesion showed focal cortical dysplasia. [16].

- Vascular malformation:

Vascular malformation is noted in 1 patient (2.8%) with the features of multiple serpiginous vascular lesions and flow voids at left tempero-parietal region in T2. Saad et al [15] carried out a study in 100 patients with epilepsy, which showed only 1 patient with vascular malformation out of 70 abnormal lesions [15].

- Acute hypertensive encephalopathy:

1 out of 35 patients with epileptogenic lesion was found to have acute hypertensive encephalopathy also known as posterior reversible encephalopathy with the features of T1 hypo intensity, T2 hyper intense region with increased diffusion.

Epileptogenic lesion based on age group:

Table 11 describes diagnosis based on age group; out of 12 patients with infection and inflammation 83% of the lesion is seen among 21- 40 age group, and 8.3 % each in 0-20 and 41-60 age groups. Among 7 patients with ischemia 57% is noted among 41-60 age groups followed by 28.5 % in 21- 40 age and group and 14.20% in more than 60 age group. Other studies show 34-50% of cases of seizures is found in elderly patients [15].

Maximum mesial temporal sclerosis (83.3%) is noted among 21-40 age group followed by 0-20 age group (16.6). Gliosis was noted in 33.3% each in 0- 20, 41-60 and more than 60 age groups. 50 % each of focal cortical dysplasia is noted in 0-20 and 21-40 age groups. Out of 3 tumor and tumor like lesions 33, 3% of them were seen 0-20, 21-40 and 41–60 age groups. Vascular malformation and acute hypertensive encephalopathy were noted in 21-40 age groups.

Gender distribution for epileptogenic lesion:

Table 12, describes the gender distribution in epileptogenic lesion. It shows infection and inflammation are seen 50% in males and females 6 patients each. Ischemia accounts for about 71% in male and 28.6 % in female (5- male, 2- female). Out of 6 patients with mesial temporal sclerosis, 66.7 % (4 patients) were male and 33.3% (2 patients) were female. Gliosis was seen in 3 female patients. Focal cortical dysplasia was seen in 50% each in male and female (1 male and 1 female). Tumor and tumor like lesion were noted only in male patients and acute hypertensive encephalopathy is noted in only female patients in this study.

Imaging by MRI standard protocol versus MRI epilepsy protocol:

In this study, out of 35 patients, 27 (77%) lesions were found with standard protocol itself and 8 lesions (23%) were found only on adding seizure protocol **(Table 13).** From this study it is seen that there is an increase in diagnostic yield (23%) in finding epileptogenic lesions in patients who presented with seizure by adding "dedicated epilepsy protocol". Standard protocol sequences failed to detect those 23% of the lesion that were diagnosed using epilepsy protocol.

Table 14 shows that there is a significant association between seizure protocol and standard protocol compared with epileptogenic lesions with a p-value <0.05. There is a significant association between standard protocol and epileptogenic lesions with a p-value <0.05 as shown in table 20. Standard protocol is used to predict all lesion types except for hippocampal sclerosis and cortical malformation. Similar to this study, Ponnatapura et al [16] studied 59 patients with epileptogenic lesion and found that 63% of the lesion was found using standard protocol and 37% were found using dedicated epilepsy protocol on MRI. A case study done by 2 radiologists without knowing the clinical history, subjected the patient to both standard and epilepsy protocol and kappa value of 0.908 was demonstrated stating good inter observer agreement.

Oertzen et al., [17] did similar study in 2002 studying 123 patients by using standard MRI and epilepsy-dedicated MRI and concluded that standard MRI sequence failed to detect 57% of focal epileptogenic lesions. Mc Bride et al., [18] found significant abnormalities on epilepsy-dedicated protocol MRI scans in 93% of patients whose results of standard MRI performed outside an epilepsy center were reported as normal.

Out of 35 epileptogenic lesion, 17.1% (5 patients) was detected as mesial temporal sclerosis and 5.7 % (2 patients) of cortical malformation. Seizure protocol detected 100% of the mesial temporal sclerosis and focal cortical dysplasia in this study. In a study of 59 epileptogenic lesion 11 patient with hippocampal sclerosis was detected using seizure protocol similar to this study.

According to the study done by Saad et al, diagnostic value of finding epileptogenic lesions by using “dedicated epilepsy protocol” is more. In their study they detected mesial temporal sclerosis only by adding epilepsy protocol. Standard protocol alone failed to detect significant findings [15].

Conclusion

The commonest cause of epilepsy in this study is Lacunar infarct, gliosis and neurocysticercosis. The most common epileptic lesions are ischemia and mesial temporal sclerosis. MRI is should be the first choice of investigation in first onset seizure presentation. A dedicated epilepsy protocol MRI should be done in all patients who presents with first on set seizures.

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