ORIGINAL RESEARCH PAPER

General Medicine

ROLE OF EEG IN ACUTE STROKE IN CORRELATION WITH CT SCAN

KEY WORDS:

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ABSTRACT

INTRODUCTION : Stroke is defined as abrupt of focal neurological deficit due to a focal vascular cause. Stroke is the third most common cause of mortality andmorbidity. EEG can be used as a diagnostic tool in patient with seizures. In 30-50% of patient with an acute ischemic stroke, the CT scan shows no abnormality. CT scan takes 1 to 5 days detect infarct. The main interest in this topic is because MRI is superior to CT scan in detecting small lesions. In most of the centers MRI is not available, due to its high cost. In most of the center's EEG is available. Hence in these centers' EEG changes can be used as a second line investigation to localize cerebralischemia.

AIMS & OBJECTIVES: 1.   To assess the role of EEG in patients with acute cerebrovascular accident and its correlation with CTScan.
2.   To study EEG changes in cortical and sub cortical infarct.
3.   To study the effects of stroke in the opposite hemisphere.

METHODOLOGY: Its a cross sectional study conducted in Patients with acute cerebrovascular accident admitted to General Medicine and Neurology department of Meenakshi medical college hospital research institute (MMCH&RI), Enathur, Kanchipuram from February 2019-August 2020were included in the study where included in the study. All patients irrespective of age and sex were included. Patients who present within 24-72 hours of cerebrovascular accident

RESULTS: In our study conducted on 35 patient's EEG was abnormal in 16 patients with infarct and was normal in 19 patients with infarct. Out of 5 patients with subcortical infarct, 1 patient EEG showed fronto parietal slowing

INTRODUCTION

The electroencephalogram has made a remarkable contribution to the diagnosis of cerebrovascular lesion after its discovery by HANS BERGER in an acute stroke a massive and highly impressive EEG focus may be present before computerized tomography can demonstrate the lesion. EEG has a sensitivity of 77% and specificity of 75%[8]. EEG findings can also provide physiological data, in that the cortical lesions are likely to be due to embolism, while the subcortical lesion are more likely to be due to the pathological process of intracerebral blood vessels and the lesion of the watershed territories to hemodynamic phenomena[8]. Electroencephalography is particularly useful following stroke, if the initial CT excludes hemorrhages but does not detect infarction. In conjunction with clinical details, EEG can then be used to indicate the likely pathophysiological mechanism of infarction[9].Preservation of background activity is a prognostically favorable sign for patients recovering from stroke[2] The EEG can be used for continuous monitoring after stroke[2].

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METHODOLOGY
MATERIALS AND METHODS

It's a cross sectional study conducted inGeneral Medicine and Neurology department of Meenakshi medical college hospital research institute (MMCH&RI), Enathur, Kanchipuram from February 2018-August 2019. MMCH&RI is a tertiary care teaching hospital situated in Semi-Urban area of Tamil-Nadu.. All patients irrespective of age and sex were included. Patients who present within 24-72 hours of cerebrovascular accident .Approval from competent authority was taken for the study

TOOLS USED
A .CT SCAN BRAIN

CT Scan brain done within 24 to 72 of admission and analyzed for
1. The site of thelesion;
2. Depth oflesion
3. Cortical
4. Sub cortical and multipleinfarct,
5. Haemorrhage
6. The middle line shift ,cerebral oedema

B. ELECTRO ENCEPHALOGRAM

An EEG is taken within 24 hours after admission for all patients with cerebrovascular accident and analyzed for the following waveforms,
1. Slow or fast wave.
2. Focal slowing or diffuseslowing;
3. spike and sharp wave activity;
4. preserved backgroundactivity;
5. local or diffuse polymorphicslowing,
6. FIRDA,
7. Epileptiform activity,Involvement of both hemisphere

Table I- AGE AND SEX DISTRIBUTION

AGE SEX	<40	41-50	51-60	60-70	>70	TOTAL
MALE	2 (5.71)	3 (8.57)	8 (22.86)	5 (14.29)	1 (2.86)	19
FEMALE	2 (5.71)	6 (17.14)	4 (11.43)	3 (8.57)	1 (2.86)	16
TOTAL	4 (11.43)	9 (25.71)	12 (34.29)	8 (22.86)	2 (5.71)	35

In this study cerebrovascular accident commonly in the age group of 50 to 60 years in males. In females it occurred commonly in the age group of 40 to 50 years.

Table II-ASSESMENT OF RISK FACTORS

SEX	Male	Female
Diabetes Mellitus	7(36.84)	2 (12.5)
Hypertension	15(78.9)	9(56.2)
CAHD	7 (936.84)	2 (12.5)
Rheumatic heart disease	0	3 (18.75)
Smoker	8 (42.10)	0
Alcoholic	7 (36.84)	0

In this study 12.5 percent of females patients have diabetes mellitus; 56.2 percent of female patients have hypertension; 12.5 percent of female patients have coronary heart disease; 18.75 percent of female patients have rheumatic heart disease. In this study most common risk factor associated with cerebrovascular Accident is Hypertension followed by smoking.In the female's hypertension is commonest risk factor associated with cerebrovascular accident.

Table III – CT SCAN BRAIN

S.No.	TYPE OF LESION	MALE	%	FEMALE	%
1	CORTICAL INFARCT	6	31.58	2	12.5
2	SUBCORTICAL INFARCT	1	5.26	4	25
3	MULTIPLE INFARCT	9	47.37	5	31.25
4	NORMAL	3	15.79	5	31.25
TOTAL	19			16	

Out of 35 study patients 6 male patients had cortical infarct; 1 male patient had sub cortical infarct. 9 male patients had multiple infarct; and 3 male patients had normal CT scans. Among the 16 female patients 2 female patients had cortical infarct; and 4 female patients had sub cortical infarct. 5 female patients had multiple infarcts. 5 female patients had normal CT scan findings. In this study multiple infarcts was common among males than females.

Table IV-EEG FINDINGS

S.No	ELECTROENCEPHALOGRAPHY	MALE	FEMALE
1	FAST BACKGROUND	1	0
2	SLOW BACKGROUND	3	3
3	FOCAL SLOWING	5	2
4	DIFFUSE SLOWING	1	0
5	FOCAL POLYMORPHIC	2	0
6	DIFFUSE POLYMORPHIC	1	0
7	FIRDA	2	0
8	SPIKE AND SHARP WAVE	2	1
9	EPILEPTIFORM	1	1
10	NORMAL	7	11

Out of 35 patients, 5 male patients had focal slowing; and 2 female patients had focal slowing. I male patient had diffuse slowing. I male patient had fast background. 3 male patients had slow background and 3 female patients had slow background. 2 male patients had focal polymorphic slowing. 1 male patient had diffuse polymorphic slowing. 2 male patients had focal intermittent rhythmic delta activity. 2 male patients had spike and sharp wave pattern. 1 female patient had spike and sharp wave pattern. 1 male patient had epileptiform activity; 1 female had epileptiform activity. 7 male patients had normal EEG and 11 female patients had normal EEG.

Table V- CT SCAN AND EEG CORRELATION

S.No	SEX	CT Scan		EEG	
		Normal	Abnormal	Normal	Abnormal
1	MALE	3	16	8	11
2	FEMALE	5	11	11	5

Among the19 male patients CT Scan was normal in 3 patients ; 16 male patients had abnormal CT Scan. Among the 19 male patients EEG was normal in 8 patients; and 11 male patients had abnormal EEG.Among the 16 female patients 5 female patients had normal CT Scans; and 11 female patients had abnormal CT Scan. Among the 16 female patients EEG was normal in 11 patient and 5 female patients had abnormal EEG.

Table V1-NORMAL CTSCAN AND ABNORMAL EEG

Sex	Normal CT Scan	Abnormal EEG
Male	3	3
Female	1	1

Out of 19 male patients, 3 male patients had normal CT Scan and an abnormal EEG. Out of 16 female study patients 1 female patient had normal CT Scan and an abnormal EEG.In 2 male patients with left hemi paresis CT Scan was normal. But EEG showed focal slowing in the right fronto parietal region. In one male patient with right hemi paresis the CT Scan was normal. But the EEG showed bilateral focal slowing more on right side with intermittent sharp wave activity. In one female patient with right hemiparesis CT Scan was normal and EEG showed bilateral slow wave more on the left side.

Table V11-ABNORMAL CT SCAN AND NORMAL EEG

Sex	Abnormal CT	Normal EEG
Male	7	7
Female	7	7

Out of 19 study patients 7 male patients had normal EEG and abnormal CT Scan. Out of 16 Female study patients 7 female patients had normal EEG an abnormal CT Scan.

Table V111-ABNORMAL EEG AND ABNORMAL CT SCAN

SEX	ABNORMAL EEG	ABNORMAL CT SCAN
MALE	9	9
FEMALE	4	4

Out of 19 male patients 9 male patients had abnormal EEG an abnormal CT scan. Out of 16 female study patients 4 female patients had abnormal EEG and abnormal CT scan.

Table IX-NORMAL EEG AND NORMAL CTSCAN

Sex	Normal EEG	Normal CT
Male	0	0
Female	3	3

Out of 35 study patients no male patient had normal EEG and normal CT Scan. Out of 35 study patients 3 female patients had normal EEG and normal CT Scan.

DISCUSSION:
In our study conducted on 35 patient's EEG was abnormal in 16 patients with infarct and was normal in 19 patients with infarct. Out of 5 patients with subcortical infarct, 1 patient EEG showed fronto parietal slowing. This is due to relative ischemia in superficial branches of middle cerebral artery. In 4 patients with subcortical infarct EEG was normal due to cortical garland of normal tissue. In our study EEG detected abnormalities in 16 out of 35 case

Limitations of the study-
1. A small population was used for this study and they were taken from the patients admitted in the hospital.

CONCLUSION:
This study shows that EEG useful in detecting the infarct in a group of patients with normal CT Scan and acute stroke. Hence active intervention can be started to prevent the death ofneuron. It also shows EEG can be used in patients where CT scan is normal and MRI facilities are notavailable.This study also shows that in future. EEG may be used for continuous monitoring. In patients with acute cerebrovascular accident it can also be used to assess the severity ofstroke.

Conflicts of interest: Nil

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