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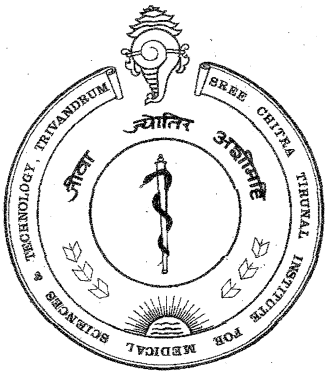


Project Report

Title of the Project:

EMOTIONAL FACIAL PARESIS (MIMIC FACIAL PALSY) IN TEMPORAL LOBE EPILEPSY- FREQUENCY AND LATERALISING VALUE.

Name: Dr. Anu Jacob.

Programme: DM Neurology

Month & Year of Submission: November 2001

CERTIFICATE

I, Dr. Anu Jacob hereby declare that I have actually carried out the project

EMOTIONAL FACIAL PARESIS (MIMIC FACIAL PALSY) IN TEMPORAL LOBE EPLILEPSY- FREQUENCY AND LATERALISING VALUE

independently under supervision and guidance in the institution.

Thiruvananthapuram, Signature .....

Date: 20 November 2001 Name: **Dr. Anu Jacob.**

Forwarded.

He has carried out the above mentioned project in the department of Neurology, SCTIMST, Thiruvananthapuram.

Signature .....

Prof. K Radhakrishnan
Head of the department of Neurology,
SCTIMST, Thiruvananthapuram.

Contents

Acknowledgement

This work has involved the inspiration, support and co-operation of many. Foremost among them was that of Dr. Joseph Cherian Assistant Professor of the department of Neurology, who had taken a personal interest in the study. At the outset, let me express my heart felt respect and gratitude towards him for his invaluable support, constant review and keen interest.

Prof.K Radhakrishnan professor and head of The Department of Neurology has been a constant source of inspiration and advice. I thank him earnestly for the help and guidance.

This study would never have been possible but for the, support of the EEG technicians and ward staff of the R.Madhavan Nayar centre for comprehensive Epilepsy Care.

I am grateful to my parents for their silent encouragement and support. Finally I must put on record my indebtedness and love for my wife Ligy and my two sons who in the last 3 years have coped with me when I was there and without me when I was not there..... ***ANU JACOB***

INTRODUCTION

Epilepsy is a major health problem worldwide, with a prevalence rate of ~5 per 1000[1]. Despite optimal antiepileptic drug therapy, 20-30% of patients with epilepsy continue to exhibit chronic recurrent seizures. Surgical treatment is an option in selected patients with medically refractory epilepsy. Concordance of data from multimodal diagnostic evaluation, like clinical history, examination, electrophysiological and imaging tests, is required for selecting a patient for surgical treatment of epilepsy [2].

Mesial temporal lobe epilepsy (MTLE), a type of temporal lobe epilepsy associated with hippocampal sclerosis, is the most common form of surgically remediable epilepsy. Accurate lateralization and localization is a necessary prerequisite for a good outcome after epilepsy surgery. Surgical removal of the epileptogenic zone leads to cure rates of 70-80 % in patients with MTLE [2]. General Neurological examination is often unrewarding in patients with TLE

Emotional Facial Paresis (EFP) refers to weakness of emotionally evoked facial movements such as smiling with normal volitional activation. Emotional facial paresis contralateral to the side of lesion has been found to be an important lateralising sign in patients with partial epilepsy of temporal lobe origin [3-4].

The frequency of EFP in Temporal lobe Epilepsy needs to be validated before its use in presurgical evaluation. No study has been reported so far on this subject from India.

Aims

1) To describe the frequency of emotional facial paresis in patients with temporal lobe epilepsy.

2) To see if this is a useful sign in lateralizing the side of seizure origin.

Review of Literature

Emotional Facial Paresis (EFP) refers to weakness of emotionally evoked facial movements such as smiling with normal volitional activation. Emotional facial paresis (EFP) was first characterised by Stromeyer who described a young girl in whom the right side of face remained "expressionless" in emotions with retained volitional control of muscles [5]. Nothnagel reported similar cases providing autopsy evidence of tumors of the contralateral thalamus producing EFP, suggesting a thalamic origin of EFP[6].

This is the converse of the commonly observed central or voluntary facial paresis (VFP) where damage to motor cortex or descending corticobulbar pathways of voluntary control of facial musculature is impaired while the response to emotional stimuli is preserved or exaggerated.

The neurological literature prior to the advent of CT scanning contains numerous reports of lesions purported to cause EFP; however, precise anatomic verification of locations is rare, and the pathways of emotional expression have remained poorly delineated.

Wilson (1924) reported three cases of EFP, two with pathologic findings; a tumor involving the right internal capsule and subthalamic region, and a tumor situated in the midbrain tegmentum and rostral pons. Based on stimulation experiments in monkey, he postulated two paths for emotional activation of the faciorespiratory mechanism- one

arising from the basal frontal lobe, the other from the sensory cortex, and converging at the mesial optic thalamic nucleus [5]

Current neurological texts have referred to Wilson's postulated tracts of emotional expression as "anterior frontothalamopontomedullary connections", descending rostral to the genu of the internal capsule although evidence supporting this pathway's further localization is not cited [7].

Kahn ascribed the absence of facial expression in Parkinson's disease or with contralateral thalamic tumors to interruption of pathways traversing or synapsing in extrapyramidal structures (amygdala and hypothalamus) and distributing to the facial nucleus by way of the dorsal longitudinal fasciculus [8].

Subsequently EFP has been described with unilateral lesions of contralateral temporal lobe [3], contralateral supplementary motor area, thalamus & sub thalamus dorsal mid brain and post encephalitic Parkinsonism and infarcts in the striatocapsular region[9-13].

Aspects of emotional facial expression (responsivity, appropriateness, intensity) were examined in brain-damaged adults with right or left hemisphere cerebrovascular lesions and in normal controls .[14] Patients with right hemisphere pathology were less responsive and emotions were less appropriate than patients with left hemisphere pathology or normal controls. These results corroborate other research findings that the right cerebral hemisphere is dominant for the expression of facial emotion.

Convergence of results from various presurgical evaluation procedures results in lateralization and localization of the epileptogenic zone in TLE.

The localisation is based on clinical semiology of seizures, physical findings, Neuropsychological evaluation, neuroimaging (MRI) interictal and ictal video EEG. Ictal SPECT and iInvasive long term monitoring are done in select cases which cannot be localised with conventional methods. Any additional indicator for lateralizing the seizure focus is invaluable.

underwent anterior temporal lobectomy, mesial temporal sclerosis was found.

Contralateral Emotional Facial Paresis (EFP) has been found to be an important lateralising sign in patients with partial epilepsy of temporal lobe orign [3-4]. In patients with unilateral lesions, contralateral lower facial weakness of mild to severe degree was seen in 73 % patients, while 13 % had ipsilateral weakness. In 13 % no facial asymmetry was seen [3]. In Remillard's series 1/3 rd of the 25 controls showed asymmetry. This finding was substantiated by Cascino et al, who found facial asymmetry in 13 patients in a series of 50 patients with non-lesional medically refractory epilepsy [4]. In 12 of these patients who subsequently

PATIENTS AND METHODS

The study was done at the R. Madhavan Nayar Centre for comprehensive epilepsy care, located at, Sri Chitra Tirunal Institute for Medical Sciences and Technology(SCTIMST), a tertiary referral Centre for Neurological and Cardiac diseases in the city of Thiruvananthapuram, in Kerala state of southern India . This centre has a 6- year- old epilepsy surgery programme , the first of its kind in the country.

This was a prospective case control study done from November 1999 to July 2001.

Fifty three consecutive patients with MTLE, who underwent extensive evaluation prior to anterior temporal lobectomy with amygdalohippocampectomy (ATL & AH)] were studied .

Patients with volitional facial palsy or other focal neurological deficit or were excluded.

Fifty-six age and sex matched controls without history of seizures, CNS insults or focal neurological deficits were assessed for EFP (emotional facial paresis)

A relevant history and examination, especially the presence of facial asymmetry (volitional and emotional facial paresis) were noted. In the resting position the patient was asked to keep an expressionless face and any asymmetry (nasolabial groove, facial wrinkles etc ;)was noted.

Then the patients and subjects were asked to demonstrate various facial movements[15].

1. Raise Eye brows and wrinkle forehead (Frontalis)

2. Close eyes firmly (Orbicularis oculi)

3. Show upper teeth by saying "cheese" (Levator anguli oris, Risorius,zygomaticus major)

4. To protrude & purse lips as in whistling (Orbicularis oris)

5. To blow up cheeks as in blowing a balloon (Buccinator & Orbicularis oris)

The emotional facial weakness was assessed during conversation, by making the patient smile, by asking questions like, "What would you do if you found an elephant in your bathroom?",. "Can you tell me a joke?" "Would you like to act in a movie?" "Can you tell me about your plans for the future?" "Which movie star do you like the best?". Subjects were filmed using a video Camera during testing.

All patients underwent interictal scalp EEG, ictal video EEG, MRI and neuropsychology assessment as part of presurgical work up as described previously [16]. Wada test was done in some of the patients prior to surgery. All patients underwent ATL with AH and the surgical specimens were histopathologicaly examined.

The side of mimic facial palsy, when present, was compared with the side of ATL.

Patients were followed up for variable periods and seizure outcome was quantified using Engel's scoring system [17].

Results

A pilot study was done with twenty patients to ascertain observer bias. These twenty patients were assessed independently by 2 observers (AJ & JC) for the presence or absence EFP. The interrater agreement was 80% with kappa value 0.63. Subsequently all the patients were assessed by only one observer (AJ).

53 patients with medically refractory TLE who later underwent anterior temporal lobectomy with amygdalohippocampectomy (ATL with AH) after extensive investigations were included in study. 56 controls with out any history of seizures or neurologic deficits were taken. The characteristics of patients and controls are shown in Table 1.

Table I Sex Distribution of patients & controls

	Male	Female	Total
No. of patients	31 (56%)	22 (44%)	53
No. Of controls	26 (46%)	30 (54%)	56

Table 2. Age distribution of patients and controls

	Mean	Max	Min
Age of patients	26.7	55	14
Age of controls	33.9	60	21

FEBRILE SEIZURES AND OTHER RISK FACTORS

60% of patients had history or febrile seizures in childhood. 1 patient had history of CNS insult (encephalitis) 2 patients had family history of seizures.

NEUROIMAGING

4 patients had a normal MRI. The remaining 49 patients had features consistent with Mesial temporal sclerosis (MTS).

Table 3. OTHER PATIENT CHARACTERISTICS

Age of onset seizures	Mean 9.03 years	Range(27 - .5)
Duration of seizures	Mean 17 Years	Range(33 - 3)
Mean Frequency of seizures	5/month	
H/o Febrile seizures	32 (60%)	

PRESENCE OF EMOTIONAL FACIAL PARESIS

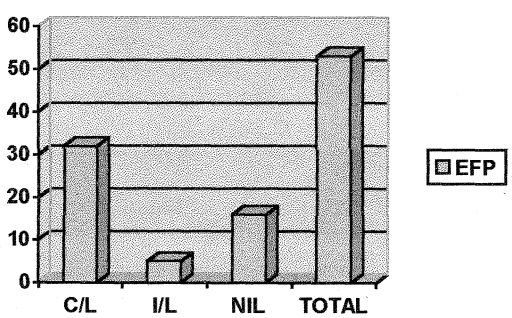
37/53 (70%) patients had emotional facial paresis.

62.5% had EFP contralateral and 7.5% had ipsilateral to the side of surgery. 30% patients did not demonstrate any EFP. Among patients with TLE and EFP (37/53), 87 %,(32/37) had it contralateral to side of surgery.

Table 4 DISTRIBUTION OF EMOTIONAL FACIAL PARESIS

CONTRALATERAL	IPSILATERAL	NIL	TOTAL
32	5	16	53

DISTRIBUTION OF EMOTIONAL FACIAL PARESIS IN TLE



MESIAL TEMPORAL LOBE EPILEPSY

EFP	Left	Right	Total
Nil	4	12	16
Right	22	2	24
Left	3	10	13
Total	29	24	

Among the controls only 7/56 12.5% had EFP

All the patients underwent anterior temporal lobectomy with amygdalohippocampectomy (ATL with AH) Pathological examination showed MTS in 50 patients. 1 patient had gliosis and one had a glioma, and one was normal. Post operatively at 3 months 43/53 patients were seizure free on AEDS. The duration of follow up varied from 3 months to 2 years, with a median of 1 year. No relation between presence of EFP and seizure recurrence was seen, either at 3 months or subsequently.

Table VI Seizure recurrence at 3 months and EFP

	Seizure recurrence at 3 months		
EFP	Absent	Present	
Absent	13 (81.2%)	3(18.8%)	16
Present	30 (81%)	7(19%)	37
	43	10	53

Any seizure recurrence and EFP

	Any seizure recurrence		Total
EFP	Absent	Present	
Absent	11 (68%)	5(32%)	16
Present	26 (70%)	11(30%)	

There was no significant gender differences among patients with emotional facial palsy

EFP	Male	Female	Total
Absent	8 (26%)	8(37%)	16
Present	23(74%)	14(63%)	37
Total	31	22	53

Discussion

This prospective study was primarily aimed at finding out the frequency of EFP in temporal lobe epilepsy and its lateralising value.

70% patients with TLE had emotional facial paresis of which 62.5% had it contralateral and 7.5% had it ipsilateral to side of TLE. This is comparable with Remillard et al's findings where 86% had predominant emotional facial paresis, 73% being contralateral and 13% being ipsilateral [3]. Cascino et al found only 26% (13/50) of TLE patients to have contralateral EFP. None had ipsilateral EFP in this series [4].

Amongst the TLE patients with EFP, (37/50) 87% (32/37) had it contralateral to the side of TLE, thus showing a high lateralising value. This is similar to Cascino et al's findings that 100% patients with EFP had TLE contralaterally (13/13) [4]. In Remillard's series 73% had TLE contralaterally [3].

No correlation between seizure recurrence and presence or absence of EFP was seen.

The frequency of EFP in normal population was found to be only 12.5% (7/56). Remillard et al had found 1/3rd of their 25 controls to have mild EFP [3].

50/53 patients with TLE had MTS histopathologically and our findings are therefore most relevant to patients with MTS. Whether non MTS-MTLE patients will have similar findings are not clear. But logically it seems likely.

The possibility of observer bias cannot be excluded since all the patients were not evaluated independently by 2 observers. But the pilot study with 20 patients had shown high (80%) interrater agreement.

Conclusions

Contralateral emotional facial paresis has a high frequency in temporal lobe epilepsy and is an important clinical clue to the side of lesion.

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