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Neurosurgery

SURGICAL OUTCOME OF REFRACTORY EXTRA TEMPORAL EPILEPSY SURGERY

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ABSTRACT

AIM: The aim of the study was to find surgical outcome for refractory extratemporal epilepsy and identify factors associated with prolonged postsurgical freedom from seizures.

METHODS: In this prospective and retrospective cohort study, we included all refractory cases of focal, multifocal, non localized drug-resistant extratemporal epilepsy seizures occur the age between 3 to 28 years, from July 2015 to November 2017,all were treated surgically and followed up in a single tertiary care centre for mean follow up period of 12 months.

RESULTS: There was total of 30 cases, 11 hemispherotomies, 2corpuscallosotomy,1 posterior quadrantectomy and 16 leisonectomy. Mean follow up of months of 14 months (range-8months to 26 months) in which 23/30(76.6%) cases are 100% seizure free Engel class-1 ,and 6/30 (20%) 75% reduction but all of the patients who underwent surgery have 100% satisfactory score of seizures occurrence. most of the patients pre operatively with 3-4 AED after surgery 12/30 are 1 drug, 2 AEDs are in 6 cases, 3AEDs in 6 cases and on 5 cases 4AEDs . Also a subjective significant improvement in cognition level was noticed in all these cases.

CONCLUSION: surgical treatment(epilepsy surgery) is effective in controlling seizures in both leisonal and nonleisonal extratemporal epilepsies, and the outcome after surgery exceeds the result of only AED treatment. Disconnection procedure is the best surgical option for non localized multi focal refractory seizures when localized to a lobe And corpus callosotomy when involved both lobes.

KEYWORDS : Refractory seizures, Extratemporal, Hemispherotomy, Engel class.

Epilepsy is a common chronic brain disease1, which is affecting about 60 million people worldwide with 34–76 per 100,000 new cases (incidence) being added annually.2 Epilepsy statistics are relatively well documented in developed countries and addressed in a systemic way, but values are lacking in developing countries. About two-thirds of newly diagnosed cases of epilepsy achieve remission with or without antiepileptic drug (AED) treatment and about a third persist to have seizures.3 However, around 20-30% are not seizure free with drugs. Of these, 40-50 % of patients are responsive to surgical treatment and 50-60 % are not responsive inspite of any treatment.4
Epilepsy as a chronic brain disease contributes significantly to the mortality and morbidity of the patient and makes a huge socio-economic burden. Epilepsy is one of the most prevalent non communicable neurologic conditions and an important cause of disability and mortality. It is estimated to affect almost 70 million people worldwide.[2]

International League Against Epilepsy (ILAE) Commission classifies the aetiology of epilepsies into genetic (electro-clinical syndromes), and non-syndromic epilepsies. These non-syndromic epilepsies can be structural, metabolic, and unknown (idiopathic) causes.[1]

Refractory epilepsy/drug resistant epilepsy Defined as " failure of two or more appropriately , selected and adequately tried AEDs to achieve seizure freedom"- ILAE (International league against Epilepsy). Up to 70% of the patients with epilepsy are well controlled with AEDs, Around 20 – 30 % of total epilepsy cases are refractory, of which only 40- 50 % are surgically treatable.[4]

Most commonly epilepsy is contributed by the temporal lobe. Focal epilepsy is however most prevalent in adults. The aetiology of focal epilepsy include genetic, structural, metabolic or idiopathic.[1]

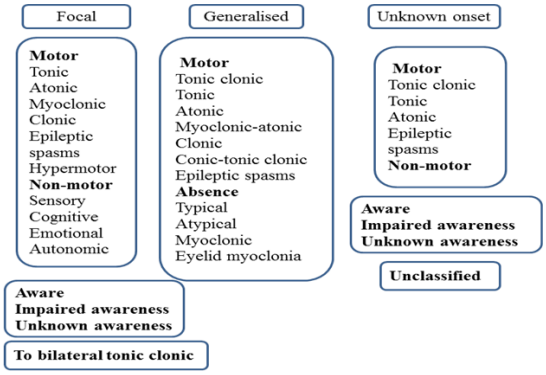
According to ILAE, seizures are classified in to generalized seizures and focal seizures. Partial seizures are classified into temporal seizures and extra-temporal seizures. Extra-temporal epilepsy is mostly contributed by the frontal lobe(20 - 22%).5 They are difficult to diagnose and treat as they are not controlled well by anti-epileptic drugs(AED). Parietal lobe epilepsy accounts for a small percentage of extratemporal epilepsies.6 Posterior head region which contributing to epilepsy is only 3.6 – 12%.[13]

Treatment of epilepsy is mostly by medical management in the form of monotherapy or combination of drugs.1 Majority of extra- temporal epilepsy which are refractory to AED can be treated by surgery. However, the efficacy of extra-temporal epilepsy surgery of focal resection of epileptogenic zone are less effective than temporal lobe epilepsy surgery due to its involvement of functional cerebral cortex and the need for a large cortical resection in order to significantly reduce seizure reccurence. This also results in higher complications as compared to temporal lobe epilepsy.

The results of surgery for epilepsy has improved considerably due to the improvement in the diagnostic localization and ever increasing surgical knowledge of epilepsy. Estimated range of 40-70% epilepsies are treatable with surgery in children which, as a positive side effect has a significant effect on improvement in the quality of life of children.[6,7]

Success of extra-temporal lobe epilepsy surgery depends on the proper selection of patients and accuracy of diagnostic localization in resection of the focus.8,9 First statistics according to a recent survey, over 7000 epilepsy surgery procedures have been performed across 38 centres in India between 1995 and 2016.10 Still, only 1 in 1000 eligible patients in India undergo epilepsy surgery because of which the enormous surgical treatment gap continues to persist. Epilepsy surgery remains largely under utilized in developing countries. With a medical treatment gap as large as 50-60% in majority of the low and middle income countries (LAMIC), where epilepsy surgery remains in the nascent stage in these countries.11

ILAE- 2017 classification of seizures [12]



PRESURGICAL EVALUATION

The preoperative evaluation is done to identify the epileptogenic zone and to determine the localization of functional cerebral cortex. The strict protocol contains routine tests like EEG, video EEG monitoring, neuropsychology tests, and imageologies at the first level. Imageology includes MRI with a standard epilepsy protocol in case of temporal lobe epilepsy. Special sequences like DWI, DTI, f MRI, and other sequences are done as and when demanded. The sensitivity and specificity of MRI in patients with localization-related epilepsy has been confirmed. The high diagnostic yield of MRI to "reveal" the common pathologies like post-trauma, vascular malformation, tumour, disorders of cortical development, mesial temporal sclerosis (MTS), has been demonstrated in patients undergoing epilepsy surgery. A 3 Tesla MRI is preferred to 1.5 Tesla though the later also is very sensitive.

presurgical evaluation is summarized in the table below:[14]

Performed always	Performed as and when required	Performed in selected cases
History and examination	Video-EEG with implanted electrodes	SISCOM
Routine EEG	Electro corticography	MRS
MRI brain	FDG- PET	PET receptor studies
Video-EEG(extracranial)	Interictal-ictal SPECT	Functional MRI
Neuropsychology	Sodium amytal study	MRI volumetry

Only a few reports of the long-term outcome of extratemporal epilepsy.[15,16]

MATERIALS AND METHODS

- Study design: Retrospective and prospective observational study.
- Study population: Patients attending Department of Neurology and Neurosurgery at Nizam's Institute of Medical Sciences (NIMS), for refractory seizures and getting operated for extra temporal refractory epilepsy .
- Study period: Aug 2015 to Nov 2017 [n = 30].

STATISTICAL ANALYSIS

- Statistical analysis was done using EPI INFO VERSION 7 which was provided by CDC ATLANTA. The level for statistical significance was set at $P < 0.05$.
- (c^2 Pearson, c^2 Yates Corrected, c^2 Mantel-Haensze, Fisher's Exact Test, Odd's Ratio: significantly different from 1, Odd's Ratio: significantly < 1, Odd's Ratio: significantly >1, Rosner: 2 * minimum(0.5, Left-Tail, Right-Tail), Youden's J Index)

INCLUSION CRITERIA

All patients with medically refractory extra temporal epilepsy, operated at NIMS with all the following criteria were included in the study.

1. Patients with complete pre-operative assessment as per the pre surgical evaluation protocol.

2. Patients who gave informed consent for participation in the study.

3. Patients who were willing for follow up and had follow up of at least 6months in the post operative period.

EXCLUSION CRITERIA

1) Any lesional pathology, in imaging studies, in the temporal region.
2) Inadequate pre operative assessment.
3) Those who were not willing to participate in study.
4) Those who are not willing for follow up and those lost to follow-up post surgically.
5) Any other pathology like MTS were excluded from analysis.

The pre surgical evaluation and surgery were carried in accordance with an established protocol developed as part of a 'Comprehensive Epilepsy Surgical Program', at Nizam's Institute of Medical Sciences, Hyderabad. This includes multi disciplinary patient management conference, comprising of epileptologists, neurosurgeons, a neuro radiologist, and a neuropsychologist. Neuropsychological evaluation was done using a comprehensive test battery . In contrast to the inclusion criteria for surgical evaluation, the selection criteria for epilepsy surgery included (1) a confirmed diagnosis of epilepsy, (2) the presence of medically intractable or disabling seizures, medically refractory epilepsy is defined as failure of adequate trials of two tolerated and appropriately chosen and used AED schedules (whether as mono therapies or in combination) to achieve sustained seizure freedom (ILAE, 2010). (3) concordance of the localization data to a resectable focus, and (4) high probability that seizure control will significantly improve the patient's quality of life.

OPERATIVE PROCEDURE

Depending on the lesion location and nonleisonal epileptogenic zones , adequate craniotomy was performed.after placing the patient in required position. Head was fixed with a Mayfield clamp. A limited craniotomy was made as per requirements. ECOG with surface strips was done after dural opening . ECOG done from pre operatively localization hypothesis of seizures , recorded for 2 minutes as a standard protocol. Following, that,leisonectomy or posterior quadrantectomy, corpuscallosotomy or hemis pherotomy was done depending on the surgery planned.

A final ECOG was done from the resected borders, and establishment of corticographically silent or significantly reduced spikes was taken as end of the procedure. Hemostasis secured, dura closed and bone replaced back.

RESULTS

The results of this study are given mostly in the tabular forms.Most of the patients in this study were between 20-30 years. The age distribution is given in table 1 and graph 1. Mean age is 20.36 ± 8.06 in this study.

Table I: Descriptive data for study cohort (n=30)

	n	%
Sex		
Male	22	73
Female	8	27
Age distribution of seizure (y)		
<10yrs	7	23.33
11 – 20yrs	11	36.66
>20	12	40
Positive family history for epilepsy	1	3.33
History of febrile seizures	2	6.66
History of status epilepticus	0	0
Age at surgery (y)		
<5	13	43.33
6–10	9	30
11– 20	8	26.66
Timing of last postsurgical follow-up (y)		
<10 months	7	23.33
11–20 months	15	50
20—30 months	7	23.33
Lesion aetiology		
Gliosis	12	40
Focal cortical dysplasia(FCD)	8	26.66
Others	7	23.33
Nodefenitive pathology / aetiology (NDP)	3	10
Lesion side		
Left	20	66.66
Right	10	33.33
Lesion lobe		
Frontal	11	36.66
Parietal	6	20
Occipital	4	3.33

TABLE 2 :- The Comprehensive Summary Chart Of Listed Cases Shown In The Form Of Surgicalindications, Surgical Procedures (anatomical & Lobar Pattern) Presumed Seizure,eeg, With Preoperatve Radiological Diagnosis And Post Oprative (hpe) Histopathological Correlation.

S. NO	CASE NO	TYPE OF SURGERY	PRESENTING PATTERN	LOBE INVALVEMENT	EEG-CORRELATION	RADIOLOGICAL DIAGNOSIS	HPE-REPORT
1	1	LESIONECTOMY	CPS	LT.FRONTAL	LT.FL EGF	HEALED GRANULOMA	GLIOSIS
2	2	LESIONECTOMY	CPS	LT.OCCIPITAL	LT.OL EGF	HEALED GRANULOMA	NDP
3	3	LESIONECTOMY	CPS	LT.PARIETAL	LT.PL EGF	CALCIFIED LESION	NDP
4	4	LESIONECTOMY	CPS	LT.FRONTAL	LT.FL EGF	FOCAL ATROPHY &GLIOSIS.	NDP
5	5	LESIONECTOMY	CPS	LT.OCCIPITAL	LT.OL EGF	FOCALATROPHY &FCD	FCD
6	6	LESIONECTOMY	CPS	LT.FRONTAL	LT.FT EGF	CALCIFIED FOCUS	GLIOSIS
7	7	LESIONECTOMY	CPS	RT.FRONTAL	BI.FL EGF	ATOPHY& FCD	FCD
8	13	LESIONECTOMY	CPS->S.GTCS	LT.FRONTAL	LT.HS EGF	GLIOSIS/ENCEPHALOMALACIA	GLIOSIS
9	20	LESIONECTOMY	CPS->S.GTCS	LT.OCCIPITAL	LT.OL EGF	CORTICAL ATROPHY/ FCD	ACELLULAR CALCIFICATION
10	21	LESIONECTOMY	CPS	LT.FRONTAL	LT.FL EGF	CALCIFIED GRANULOMA	ENCEPHALOMALACIA
11	22	LESIONECTOMY	CPS	LT.FRONTAL	LT.FL EGF	GLIOSIS&ENCEPHALOMALACIA	RASMUSSIA ENCEPHALOPATHY
12	23	LESIONECTOMY	GTCS	LT.FRONTAL	LT.FL EGF	JUNCTIONAL ATROPHY &FCD	GLIOSIS
13	27	LESIONECTOMY	CPS	RT.FRONTAL	RT.FL EGF	ATROPHY &FCD	FCD
14	28	LESIONECTOM	CPS	RT.PARIETAL	RT.HS EGF	CALCIFIED LESION	GLIOSIS
15	29	LESIONECTOMY	CPS	LT.PARIETAL	LT.PL EGF	CALCIFIED LESION	DYSTROPHIC CALCIFICATION
16	30	LESIONECTOMY	CPS	LT.OCCIPITAL	LT.POL EGF	CALCIFIED GRANULOMA	ENCEPHALITIS
17	8	FUNCTIONAL HEMISPHEROTOMY	CPS->S.GTCS (HHE)	LT.HEMIPHERIC	LT.HS EGF	FOCALATROPHY& CYSTIC ENCEPHALOMALACIA	GLIOSIS
18	9	FUNCTIONAL HEMISPHEROTOMY	CPS->S.GTCS (HHE)	RT.HEMISPHERIC	RT.HS EGF	ATOPHY& MCA INFRACT	GLIOSIS
19	10	FUNCTIONAL HEMISPHEROTOMY	CPS->S.GTCS (HHE)	RT.HEMIPHERIC	RT.HS EGF	DIFFUSE ATROPHY &GLIOSIS	GLIOSIS
20	11	FUNCTIONAL HEMISPHEROTOMY	CPS->S.GTCS (HHE)	LT.HEMIPHERIC	RT.FTP EGF	DIFFUSE ATROPHY &GLIOSIS	GLIOSIS
21	12	FUNCTIONAL HEMISPHEROTOMY	CPS->S.GTCS (HHE)	RT.HEMISPHERIC	RT.HS EGF	ATROPHY &POLYMICROGYRIA	FCD
22	14	FUNCTIONAL HEMISPHEROTOMY	CPS->S.GTCS (HHE)	RT.HEMISPHERIC	RT.HS EGF	DIFFUSEATROPHY& GLIOSIS	FCD
23	15	FUNCTIONAL HEMISPHEROTOMY	CPS->S.GTCS (HHE)	LT.HEMISPHERIC	LT.HS EGF	DIFFUSE ATROPHY & GLIOSIS	FCD
24	17	FUNCTIONAL HEMISPHEROTOMY	CPS->S.GTCS (HHE)	RT.HEMISPHERIC	RT.HS EGF	DIFFUSE ATROPHY	GLIOSIS
25	18	FUNCTIONAL HEMISPHEROTOMY	LGS	BI.PARIETO OCCIPITAL	BI.HS EGF	DIFFUSE ATROPHY	CYSTI
26	19	FUNCTIONAL HEMISPHEROTOMY	CPS->S.GTCS (HHE)	LT.HEMIPHERIC	LT.FTP EGF	HEMISPHERIC ATROPHY	FCD
27	26	FUNCTIONAL HEMISPHEROTOMY	CPS->S.GTCS (HHE)	LT.HEMISPHERIC	LT.HS EGF	HEMISPHERIC ATROPHY	GLIOSIS
28	16	CORPUSCALLOSOTOMY	LGS/POLYSPIKE SEIZURES /ATONIC	BI.LAT HEMISPHERIC(LT> RT)	BI.PARIETO OCCIPITAL EGF	ATROPHY INFRACT	MICRODYSGENESIS
29	25	CORPUCALLOSOTOMY	CPS->S.GTCS	BI.FRONTAL	BI.FRONTAL AND LT.PARIETAL EGF	GLIOSIS & ATROPHY	GLIOSIS
30	20	POSTERIOR QUADRANTECTOMY	CPS->S.GTCS	BILATERAL.OCCIPITAL LOBE	OCCIPITAL. LOBE EGF(RT>LT)	CORTICAL ATROPHY & GLIOSIS	FCD

NOTE:- CPS- COMPLEX PARTIAL SEIZURES, S.GTCS- SECONDARY GENERALIZED TONIC CLONIC SEIZURES. HHE- HEMIPLEGIA-HEMICONVULSANT SYNDROME, FCD- FOCAL CORTICAL ATROPHY, NDP- NO DEFINITIVE PATHOLOGY NOTED, LGS- LENNOX GASTAUT SYNDROME, FL- FRONTAL LOBE, OL-OCCIPITAL LOBE, PL- PARIETAL LOBE, EGF - EPILEPTOGENIC FOCUS, SWS-STURGE WEBER SYNDROME.

TABLE 3. pre and post operative AED's .

AED's	Pre operative no.of cases	Post operative no.of cases
1	0	12(40%)
2	0	6(20%)
3	11(36.66%)	6(20%)
4	17(56.66%)	5(16.66%)
5	2(6.66%)	0

Death in 1(3.33%) case at 6.5 months due to roadtraffic accident.

ICTAL EEG- FINDINGS

Ictal EEG findings showed Left Frontal localization in 13.33% of cases, Left Parietal in 3.33%, Left Occipital in 13.33%, Right frontal in 13.33%, Right Parietal in 6.66%, Right Occipital in 13.33%, Right Hemisphere in 20%, Left Hemisphere in 16.66%, Bilateral Hemisphere in 3.33%, Bilateral Frontal in 3.33% and Normal 3.33% of total subjects. Concordance was achieved in 24 cases . In 6 cases concordance was not achieved and further investigations were done. They included PET CT and SPECT which were described .

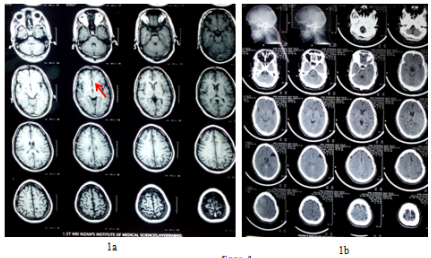
TABLE 4A: FINDINGS ON IMAGING, REPRESENTING THE MRI WITH VEEG CORRELATION IN 16 CASES OF LEISONECTOMY.

S.NO	SURGERY	MRI BRAIN	VEEG	CON CORDANT	DIS CORDANT
1	LEISONECTOMY	16	16	12	4
2	TOTAL	16	16	12	4

S.NO	CASES LOCALISATION	MRI BRAIN	VEEG	CON CORDANT	DIS CORDANT	SURGERY
1	RT.HEMI SPHERE	6/14	6/14	6	0	RT.HEMISPHEROTOMY
2	LT.HEMI SPHERE	5/14	4/14	4	1	LT.HEMISPHEROTOMY
3	Left PHR (posterior head region EGF)	1/14	1/14	1/14	0	POSTERIOR QUADRANTECTOMY
4	BI-LATERAL	2/14	2/14	0	2	CORPUS CALLOSOTOMY
5	TOTAL	14/14	14/14	11	3	-

Table4b: OTHER SURGICAL PROCEDURES(n=14).

Illustrated cases are



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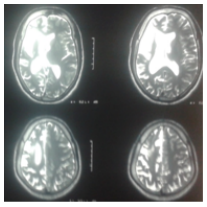

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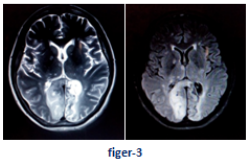

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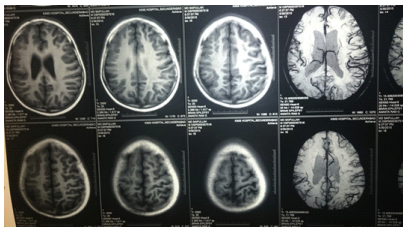
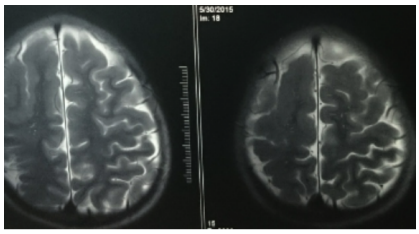
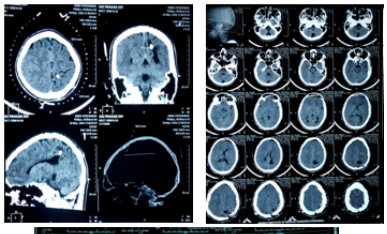




Figer-4



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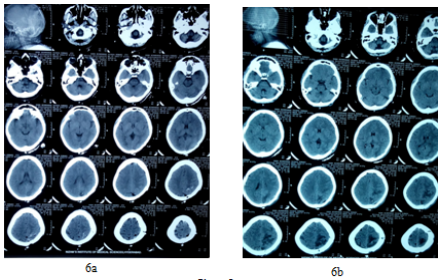

6a 6b

Figer-6

METHODOLOGICAL CONSIDERATIONS

The analysis of the outcome is essential to assess the efficacy of epilepsy surgery. Seizure relapses may occur after initial freedom from seizures or on the other hand, "running down of fits" has been reported in a substantial percentage of patients. In contrast to our methodology, previous studies of extratemporal epilepsy surgery included a heterogeneous group of patients (nonlesional and lesional epilepsies) and little is known about the long-term outcome.[15,16,17]

In large patient groups, diagnostic and surgical protocols usually vary over time, whereas in present the preoperative diagnostic workup remained relatively unchanged and epilepsy surgery was performed by the same team. Other studies are older and do not reflect recent technological advances in diagnosis and surgery; in contrast, all of our patients had extensive EEG video monitoring, and in the majority of them high-resolution MR imaging was performed. Few studies analyze the outcome after fixed periods of time so that changes in seizure status could not be taken into account.In our study we used the time-to-event analysis, which allowed for better investigation of the long-term seizure outcome.

Seizure Outcome

In our study, the outcome after extratemporal epilepsy surgery in adults and childrens (n=30) with a mean follow up of 14 months is encouraging. 83.33% of patients are seizure free, 73.33% has a good outcome (ENGEL I) and 23.33% has a favourable out come (ENGEL 2) . The better outcome in our study might reflect a general improvement in extratemporal epilepsy, due to good localization and

selection of patients for surgery .

As per literature, the out come as per First international Palm Desert Conference on epilepsy surgery in 1987 was only 43.2% of patients being seizure free, 27.8% were improved, and 29.1% were unchanged. Six years later, at the second Palm Desert Conference, investigators reported that 45.1% of patients were seizure free, 35.2% improved, and 19.8% remained unchanged[15,19]

Overweg and coworkers in 1987 20 reported that 32% of their patients(n= 62) became seizure free. In other studies 40% of patients became seizure free and 30% improved.

Luigi D'argenzio, M Chiara Colonnelli in their study of seizure outcome after extratemporal epilepsy surgery in children where a retrospective cohort of 80 children were treated surgically. Out of 80 children, 42 were males, 38 were Females; median age was 9yrs. At last follow-up, 50% of the children had been completely seizure free since surgery (Engel class Ia); of these 40 individuals, 15 were discontinued of all antiepileptic drugs. (In 50% of cases, children with surgically treated drug-resistant extra temporal epilepsies had an excellent long-term outcome). The aetiology of the epileptogenic lesion in this study appears to be the only significant determinant of surgical outcome in this population of children.[21]

In Alaa Eldin Elsharkawy study in 2008 the long-term outcome after extratemporal epilepsy surgery in adults and children, 51.1% of patients were seizure free, 88.9% had a favorable outcome (Classes I–III), and 11.1% had no appreciable change.[22]

In Van ness study, surgical outcome of neocortical focal epilepsy surgery,24 and Cohen-Gadol AA, study of long term outcome of epilepsy surgery in non –leisonal seizures foci.25 Non lesional groups 33.3% of the patients were seizure free at 6-month follow-up review, but this number increased to 50% after 14 years. Previous studies reported 20–42% of patients who were seizure free among the nonlesional & nonlesional groups [23,24,25]

Resection Area

In present study, the seizure-free outcome in patients with frontal resections (n=11/30) was 61.53%. 72.72% have good out come (ENGEL1), and 27.77% have ENGEL-2 . Those with parietal lobe lesions (n=6/30),ENGEL 1 was in 50% and 50% ENGEL 2.

In occipital lobe resections (n= 4/30), ENGEL 1 in 75%, and ENGEL 2 25%.

Those in HHE syndromes (n= 9/30) , 88.88% had ENGEL 1 out come , and 11.11% had ENGEL 2 . Corpus callosotomy have only less amount of seizure controle (ENGEL 2).

Rasmussen reported in his series of frontal lobe epilepsy, in 1991 that long-term seizure free outcome in 26% of his patients, they remained seizure free. Another 30% had a marked reduction of seizures.[26]

In 2002, Zaatreh et al.27 reported that 35.1% of patients in Class I and 32.4% of patients in Class II had tumor-related frontal lobe epilepsy.

The Commission for the Neurosurgery of Epilepsy reported freedom from seizures in up to 41.2% of patients in1997.[28]

Histopathological Aspects(HPE)

In this Present study, patients with a well-defined lesion, for example a calcified lesions n=8/30.yhe out come was noted ENGEL 1 in 75% , and ENGEL 2 was noted in 25% . The seizure-free outcome in the range of 25%-75%. In contrast, patients with less well circumscribed lesions, such as FCD and focal brain atrophy, encephalitis and gliosis cases and HHE syndromes, total n= 22/30, was the out come 72.72% had ENGEL 1, and 18.88% are ENGEL 2. The seizure-free outcome is in the range of 18.88%–72.72%.

Literature also reports better outcome in well defined leisonas rather than poorly defined lesions such as FCD .27,15 In long-term seizure-free outcome after 10 years was 52.6% in patients with cortical dysplasia, 56% in those with neoplasms, 50% in those with vascular malformation, and 33.3% in patients with MCDs.27,15,18

Antiepileptic Drugs

In our study 83.33% of the cases, the number and doses of AED could be reduced. However in 16.66% of the cases, the same number of AEDs are being continued. 40% of the patients are on single AED and 20% on 2 AEDS. Another 20% of cases are on 3 AEDS. There was no increase of seizure frequency after reduction of AEDs.

This is in accordance with Alaa Eldin Elsharkawy study in 2008 22, of extratemporal resections in which AEDs could be withdrawn in 31.1% of the patients without seizure relapses. There was no relapse of seizure in our study. However literature shows that Recurrence of seizures after the discontinuation of AEDs in medically treated patients has been described in previous studies of Frequency of recurrence after discontinuance of anticonvulsant therapy in patients with epileptic seizures Juul-Jensen P et al in 1991.29,30 In the study of relapse following discontinuation of antiepileptic drugs by Berg AT and Shinnar S, the relapse rates were 25% after 1 year and 29% after 2 years. This probably proves a therapeutic effect of resective epilepsy surgery. Even in those patients who still need AEDs after surgery, epilepsy surgery can transform pharmacoresistant epilepsy to pharmaco sensitive ones.

Prognostic Factors

The present study reveals that of 43.3% cases where surgery is done in < 5 years duration of resistant epilepsy, 36.66% cases have ENGEL 1 and 6.66% cases have ENGEL 2 out come. However in cases where surgical treatment was done with a resistant epilepsy duration of 5-10 years only, 20% are in ENGEL 1 and 10% in ENGEL 2 outcome. Cases which were with duration of 11-20 years of resistant epilepsy, 23.33% were ENGEL 1 and 3.33% were ENGEL 2 out come. So there is a strong relationship between short duration of epilepsy and good out come as similarily reported by Alaa Eldin Elsharkawy in their study in 2008[22].

The relationship between the good outcome and duration of epilepsy is however controversial as some authors observed that duration of epilepsy was not a prognostic factor and had no relation ship to the outcome.18,31,32,33, Other authors showed significant correlations between shorter duration of preoperative epilepsy and improved outcomes.34,35. Most of the previous studies established this relationship in the short-term outcome. Our results are supportive that there is a positive relation between good outcome and duration of extra temporal lobe epilepsy.

In present analysis, (GTCS) tonic–clonic seizures was found in 3.33% of cases. It had a good surgical out come (ENGEL1). This could be good prognostic factor. But in Alaa Eldin Elsharkawy study22 reported in 2008, tonic–clonic seizures were a bad prognostic factor. This is known temporal lobe epilepsy surgery but not clear with extratemporal lobe epilepsy surgery.[18,36]

Postoperative Complications

Van Ness et al.24,37 found postoperative complications in 88% of their 57 consecutive patients who underwent neocortical resections at the Cleveland Clinic between 1979 and 1992; 37% of them had unexpected morbidity, including a single death. The persistent deficits were of minor clinical relevance in the majority of patients. In another study, 44.8% of patients experienced transient complications after cortical resections, compared to 14.8% after lesionectomies.24,37,38 Recent studies of temporal and extratemporal resections 39,,40 report persistent complications related to surgery in only 4% of patients.31 Alaa Eldin Elsharkawy study22 in 2008, shows comparable figures of transient (11%) and persistent (3.2%) complication rates. This decline of postoperative complications is most likely due to improvement in the surgical techniques and technology. Present study shows comparable figures of transient (13.33%) and persistent complications (6.66%). And the transient complications are in the form of transient aphasia in (6.66%), pseudo menigocele (3.33%) and meningitis (3.33%). And the persistent complications were in the form of worsening of hemiparesis (6.66%) and death (3.33%) due to an unrelated cause of road traffic accident after 6.5 months of follow up.

Limitations of This Study

Small number of cases and short duration of follow up.

CONCLUSION

Our study demonstrates that resective epilepsy surgery is effective in controlling seizures in patients with both lesional and non-lesional focal epilepsies of extra temporal origin. The outcome after surgery

exceeds the results of pure AED treatment. The best outcome could be achieved in patients with detectable lesions, parietal lobes and where duration of drug resistance was less than 5 years. In our study we had no different outcome in patients with FCD or gliosis as reported otherwise. The significant finding in this study was the reduction in doses and number of drugs in 86.66% of patients which was satistically significant. In view of similar findings in other studies we attribute our better results to more precise imaging and seizure mapping techniques and appropriate surgery.

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