International Journal of Surgery 36 (2016) 443–447

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.journal-surgery.net

Outcome of surgery for temporal lobe epilepsy in adults – A cohort study

Sita Jayalakshmi [a, *], Sudhindra Vooturi [a], Rammohan Vadapalli [b], Shanmukhi Somayajula [a], Sailaja Madigubba [c], Manas Panigrahi [d]

[a] Department of Neurology, Krishna Institute of Medical Sciences, Minister Road, Secunderabad – 03, Telangana, India
[b] Department of Radiology, Vijaya Diagnostic Centre, Himayath Nagar, Hyderabad – 29, Telangana, India
[c] Department of Pathology, Krishna Institute of Medical Sciences, Minister Road, Secunderabad – 03, Telangana, India
[d] Department of Neurosurgery, Krishna Institute of Medical Sciences, Minister Road, Secunderabad – 03, Telangana, India

HIGHLIGHTS

- The age at surgery was lower in the patients with favourable outcome.
- Mean duration of epilepsy with age of onset below 12 years was higher than the rest.
- Isolated focal cortical dysplasia was associated with unfavourable outcome.
- At five years follow up 73% were seizure free.
- Young age at onset, acute post operative seizures predict unfavourable outcome.

ARTICLE INFO

Article history:
Received 25 March 2015
Accepted 4 May 2015
Available online 12 May 2015

Keywords:
Temporal lobe epilepsy
Surgery
Outcome
Predictors

ABSTRACT

Introduction: The aim of the current study was to evaluate the factors associated with post-operative outcome in patients with temporal lobe epilepsy (TLE) undergoing Surgery.
Methods: We analyzed data of 288 consecutive patients operated for drug-resistant TLE. All the patients had at least one year post surgery follow-up. Logistic regression model was used to evaluate the predictive value of different factors for outcome.
Results: The mean age at onset of epilepsy of the study population was 15.51 ± 9.79 years; whereas the mean age at surgery was 32.16 ± 9.45 years, with 125 (43.4%) women. The age at surgery was significantly lower in the patients with favourable outcome (30.26 ± 9.05 vs. 34.06 ± 9.85 years; $p = 0.007$). The mean duration of epilepsy with age of onset below 12 years was higher than the rest (19.84 ± 7.30 vs. 13.00 ± 8.45 years; $p < 0.001$). The histopathology showed hippocampal sclerosis in 203 (70.4%) of the patients; isolated focal cortical dysplasia was associated with unfavourable outcome (9.3% vs.2.6%; $p = 0.036$). The duration of follow up ranged from 1 to 10.3 years. Three patients died late in the follow up. At the last follow 73% were seizure free and Engel's favourable outcome was noted in 82%. Duration of epilepsy greater than ten years ($\beta = 6.997$; 95%CI; 2.254–21.715; $p = 0.01$), younger age of onset of epilepsy ($\beta = 1.07$; 95%CI; 1.014–1.132; $p = 0.015$) and acute post operative seizures (APOS) ($\beta = 4.761$; 95%CI; 1.946–11.649; $p = 0.001$) were the predictors of unfavourable outcome.
Conclusion: Following surgery for TLE, 73% were seizure free and Engel's favourable outcome was noted in 82%. The predictors of unfavourable outcome were younger age of onset, pronged duration and of epilepsy and APOS.

1. Introduction

Epilepsy affects nearly 50 million people around the globe; despite optimal medical management, few of them become intractable to treatment [1]. Amongst patients who become refractory to treatment, one-third are those with partial epilepsy [1].

* Corresponding author. Consultant Neurologist, Krishna Institute of Medical Sciences, 1-8-31/1, Minister Road, Secunderabad, 500003 Telangana, India.
E-mail address: sita_js@hotmail.com (S. Jayalakshmi).

http://dx.doi.org/10.1016/j.ijsu.2015.05.006
1743-9191/

Temporal lobe epilepsy (TLE) is a common form of focal epilepsy that becomes refractory to drug management and hence surgery has become a standard of care [2].Wiebe et al. have previously reported that in drug-resistant TLE, surgery is more effective and efficient than prolonged medical care [3]. However, post-operative seizure freedom varies widely from 30% to 80% [4]. Outcome of surgery in TLE patients has been associated with various isolated predictors ranging from age of onset of epilepsy to findings in magnetic resonance imaging (MRI) [5–7]. However, lack of a "comprehensive global" outcome prediction tool makes it difficult for risk stratification of the patients, counselling of the caregivers and hence timing of surgery [8].

Planning and timing of surgery become more relevant in developing countries with limited resources which host nearly 90% of global epilepsy patients [9]. Studies conducted on epilepsy surgeries in India, that included all types of seizures have previously reported duration of medical management of 15 years before referring for surgery [10]. The lack of enough number of epilepsy surgery facilities is the major reason behind the lack of awareness about the benefits of epilepsy surgery and hence delayed referrals [11]. Moreover, with delayed referral, surgery may have little impact on the quality of life of the patients [12]. Early identification of medically refractory epilepsy and prompt referral for surgical treatment may hence be an important step [13].

Campoos et al. [14] investigating role of pre-surgical non-invasive screening, in a small cohort of 17 patients from Chile showed that "well-selected" TLE patients derive maximal benefit from Anterior temporal lobectomy (ATL). Encouragingly, epilepsy surgery done at the right time is five times more cost effective than lifelong medical management [15]. However, small study population and limited variables fail to give a comprehensive understanding of predictors of outcome post ATL.

Gracia et al. [8], suggested that pre-surgical counselling of patients posted for epilepsy surgery is mandatory and should be supported with evidence based objective data. The authors further note that this critical process of informing the patient and family has unclear expectations probably because the existing literature is based on generalised data with predictors that cannot fit to specific patient's complexity. The current study therefore aims to evaluate pre-operative factors associated with post-operative outcome in TLE patients undergoing ATL.

2. Materials & methods

We analyzed data of 288 consecutive patients operated for drug-resistant TLE between 2005 and 2014, at Krishna Institute of Medical Sciences, a tertiary referral centre with a comprehensive epilepsy surgery centre in South India. All the patients had at least one year post surgery follow-up. The presurgical, surgical and post surgical parameters were collected retrospectively. Seizure classification was done according to the ILAE task force on classification and terminology guidelines [16]. Preoperative seizure frequency was calculated for the year preceding the surgery excluding temporal lobe auras. The study was approved after review by the institutional ethics committee.

2.1. Pre-surgical evaluation

Pre-surgical evaluation and surgery were performed after the necessary consent of the patient and/or the parent was obtained. The pre-surgical evaluation included variables such as age, gender, aetiology, semiology, age of onset of epilepsy, type and frequency of seizures, neonatal seizures, febrile convulsions, and clinical findings of neurological examination.

Imaging of brain was done with 1.5 and/or 3 T MRI. All the patients underwent prolonged video-EEG (VEEG) monitoring and at least two seizures were recorded. Inter-ictal spikes were grouped as unilateral (>75% on the ipsilateral side of the imaging abnormality) and bilateral/multifocal. The ictal EEG patterns were classified as follows: focal—activity maximal at a single electrode with no more than two contiguous electrodes within 80–100% of the maximal activity; regional— activity involving electrodes overlying a single lobe having a 2:1 or greater amplitude predominance than that seen over other regions of the same hemisphere; hemispherical—lateralized activity involving multiple electrodes over multiple lobes of a single hemisphere having a 2:1 or greater amplitude predominance than that seen over the contralateral hemisphere; generalized—activity involving multiple electrodes over both cerebral hemispheres having a less than 2:1 amplitude predominance of one side over other. Ictal single photon emission computed tomography (SPECT) and interictal fluoro deoxy-D-glucose positron emission tomography (FDG PET) was performed in selected patients.

Neuropsychological tests done were-tests for intelligence, complex figure test for visual memory, Rey auditory verbal learning test for verbal memory, block design test for visuospatial functions, visuoconstructional test, object assembly test for visual integration and montreal handedness test. For quality of life - QOLIE-31 was used; psychiatric and behavioural disorders were assessed according to clinical interview and diagnosed with reference to ICD-10 classification for mental and behavioural disorders.

2.2. Surgery

The type of surgeries performed were standard anterior temporal lobectomy with amygdalohippocampectomy (ATL with AH) and lesionectomy guided by electrocorticography. Pathological examination of the resected tissue was done by an experienced neuropathologist trained in epilepsy pathology.

2.3. Post surgical evaluation and outcome

The postoperative hospital course, complications, and outcome data were collected and analyzed. Acute postoperative seizures (APOS) were defined as seizures occurring within 7 days after surgery. All the patients underwent routine inter-ictal EEG, neuropsychology and visual fields evaluation at one month, three months and one year post surgery; MRI brain was done at 1 year post surgery. The outcome at the end of one year was assessed using to the Engel's classification [17] where Engel's class I and IIA outcome was grouped as favourable outcome.

2.4. Statistical analysis

After ensuring homogenous distribution of the data, the study population was divided into two groups based on post-operative outcome. Differences between the groups for categorical variables were analyzed using chi-square test. Whereas, continuous variables were analyzed using un-paired student t-test. Variables that were significantly different between the groups were included in a binary logistic regression model to evaluate the predictive value of different factors for outcome. A probability (p) value of less than 0.05was considered statistically significant. The data were analysed using Statistical Package for social Sciences version 17.0(IBM computers, New York, USA).

3. Results

3.1. Patient characteristics

Among the 288 patients who formed the study population, 125