Seizure 57 (2018) 56–62

Contents lists available at ScienceDirect

Seizure

journal homepage: www.elsevier.com/locate/yseiz

Long-term outcome after epilepsy surgery in older adults

Johannes D. Lang[a,*], Laura Grell[a], Mareike Hagge[a], Müjgan Dogan Onugoren[a], Stephanie Gollwitzer[a], Wolfgang Graf[a], Michael Schwarz[a], Roland Coras[b], Ingmar Blümcke[b], Björn Sommer[c], Karl Rössler[c], Michael Buchfelder[c], Stefan Schwab[a], Hermann Stefan[a], Hajo M. Hamer[a]

[a] Epilepsy Centre, Department of Neurology, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
[b] Institute of Neuropathology, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
[c] Department of Neurosurgery, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany

ARTICLE INFO

Article history:
Received 18 October 2017
Received in revised form 3 January 2018
Accepted 22 February 2018

Keywords:
Drug resistant epilepsy
Older adults
Operation
Seizure outcome
Engel score

ABSTRACT

Purpose: The incidence of epilepsy in older adults is growing, as does the incidence of comorbidities. Therefore, when it comes to epilepsy surgery in medically intractable epilepsy, age is often seen as a limiting factor. To investigate the outcome after epilepsy surgery in a population of older adults, we compared the benefit for patients aged 50–59 years with those aged 60 years and older in respect of efficacy and safety.

Method: Patients aged ≥50 years with medically intractable epilepsy who underwent epilepsy surgery from 1990 to 2013 were selected from the database of a German epilepsy center. All of them received a standardised and detailed presurgical diagnostic evaluation. Follow-up included at least four scheduled visits with EEG, MRI and neuropsychological testing. Outcome was assessed using the Engel outcome scale.

Results: 79 patients aged between 50 and 67 years were followed-up for a median of 4.7 years (2–16 years). 68% of patients were free of disabling seizures (Engel class I, ≥60 years: 75%) and 58% were seizure-free (Engel class IA, ≥60 years: 70%). 90% of our patients suffered from temporal lobe epilepsy (TLE), 9% from frontal lobe epilepsy (FLE) and one occipital lobe epilepsy (OLE). After surgery, 9% discontinued or tapered their medication. Permanent surgical complications occurred in 10% of cases and transient neurological deficits were seen in 11%. Older patients had a higher risk for postoperative hygroma (≥60 years 15%; <60 years 8%) and were more prone to postoperative memory deficits (≥60 years 45%), especially after resection of the dominant temporal lobe. Verbal and figural memory testing did not differ significantly between the groups.

Conclusions: The results support the view that in selected older patients, epilepsy surgery shows equal or even higher success rates as compared to younger patients. However, patients of older age may be at greater risk for postoperative hygroma and memory deficits, especially after dominant temporal lobe resections.

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1. Introduction

People of higher age are the most rapidly growing part of the population in industrialised countries. The prevalence of epilepsy in this group exceeds those of younger ages [1,2]. Therefore, in recent years epilepsy in later life has been brought to focus by a series of studies that addressed the similarities and differences of the epilepsies in younger and older people [3–5]. In general, epilepsy of higher age is still underreported [2].

Overall, estimations suggest that one third of all epilepsy patients do not achieve seizure freedom through antiepileptic drugs (AED) [6,7]. For a significant subset of drug refractory patients with focal epilepsy, epilepsy surgery has been shown to be the superior therapy over continued drug treatment [8,9].

In the majority of cases, new onset epilepsies in later life are symptomatic focal epilepsies which may be in part amenable to epilepsy surgery [10,11]. In addition, due to the potentially long latency to diagnosis and reluctance for surgery some patients who were referred to our center grew old with their epilepsy. To date

* Corresponding author at: Epilepsy Centre Erlangen, Schwabachanlage 6, 91054 Erlangen, Germany.
E-mail address: johannes.lang@uk-erlangen.de (J.D. Lang).

https://doi.org/10.1016/j.seizure.2018.02.012
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however, little is known about the risks and benefits of epilepsy surgery in patients of higher age, because most studies concentrate on patients under the age of 50 years [5,12–15]. In selected conditions such as hippocampal sclerosis, the efficacy and safety appear to be similar compared to younger patients [12,13]. Nevertheless, epilepsy surgery in older adults may still follow its own characteristics due to etiological differences in this age group with higher incidence of stroke, haemorrhage and tumours and higher prevalence of comorbidities such as cardiovascular diseases [5,16]. Despite positive reports that showed good postoperative outcome in 90% of 12 patients aged 60 years and older [17], postoperative seizure freedom has to be balanced against the operative risks and postoperative neuropsychological deficits as well as psychiatric morbidity in this age group [18,19].

To better investigate the chances and risks of epilepsy surgery in patients of older age, we conducted a retrospective study on the long-term outcome of patients aged 50 years and older after epilepsy surgery at our center between 1990 and 2013.

2. Methods

2.1. Patients

The study cohort was identified from our database in which all patients are recorded who were seen at the Epilepsy Centre Erlangen since 1990. Inclusion criteria were ≥50 years of age at the time of surgery and availability of postoperative follow-up information at a minimum of two years after surgery. All patients' charts were reviewed and analysed retrospectively. Missing information was integrated from telephone interviews.

2.2. Presurgical diagnostics

All patients received a standardised presurgical diagnostic evaluation which consisted of a detailed clinical history (including epilepsy characteristics, seizure semiology and frequency, co-morbidities and medication), ictal and interictal video-EEG monitoring, 1.5- or 3-T magnetic resonance imaging (MRI) according to a standardised epilepsy protocol and a structured neuropsychological evaluation. If necessary, additional diagnostic procedures such as voxel-based morphometry, single-photon emission computed tomography, positron emission tomography, Wada test, functional MRI, magnetoencephalography or invasive EEG recordings with depth and/or subdural electrodes were amended. The surgical procedure was designed by integrating all available data and weighing chances for postoperative seizure freedom against potential risks for deficits induced by the resection. Surgical decision was made in our interdisciplinary board of epilepsy surgery.

2.3. Follow-up, outcome assessment and complications

Until 2011, the standard postoperative follow-up at our center included an outpatient visit after three months, 24 h of video-EEG monitoring, MRI and neuropsychological evaluation at six months and additional clinical follow-up visits at one, two, five and 10 years postoperative. Since 2011, the standard postoperative follow-up was extended to schedule additional visits at three and 20 years after surgery. In addition to the standard follow-up, many patients return to our outpatient clinics on a yearly basis. Seizure related outcome was determined through retrospective information from clinical files at the patients' most recent visit according to the Engel outcome scale [20]. Neuropsychological data were reviewed and categorised for all patients at six months after surgery and at the last available testing in the case of repeated neuropsychological tests. A combined overall score comprised all aspects of the testing and was rated by a neuropsychologist according to the relevance of any changes into the categories «better», «no change» or «worse». Further memory tests included verbal and figural memory using the Berliner Amnesietest (BAT) and the Wechsler Memory Scale (WMS). Z-Scores were calculated and differences were rated as relevant if Δz was $\geq|\pm 1|$. In addition, we recorded the most recent information on past and current medication, controlled for possible postoperative complications and comorbidities. In this respect, we distinguished expected and accepted deficits and transient loss of function from unexpected and persistent deficits.

2.4. Statistical analysis

This retrospective study was designed as explorative analysis. The cohort was split into the two subgroups according to age: 50–59 years (<60yrs) and patients aged 60 years and older (≥60yrs). Results are given in median, total numbers, and percentage of the respective subgroup or the whole cohort and range, where appropriate. Due to the lack of a Gaussian distribution of our data, non-parametric tests were used to test group differences. For nominal and ordinal data, contingency tables and Pearson's chi square were applied. Continuous data were analysed using the Wilcoxon rank sum test. Because of the explorative nature of the study, we did not adjust for multiple testing. All *p*-values were interpreted as descriptive measures, rather than results of hypothesis testing. For computation, jmp® software (SAS institute, version 12) was used.

3. Results

3.1. Patients' characteristics

We included 79 patients who underwent epilepsy surgery at the age of 50–67 years, of which 30 patients (38%) were female (Fig. 1,Table 1). 20 patients were 60 years or older at the time of surgery (25%, 60–67yrs) and 59 patients were between 50 and 59 years old (75%). The median age at epilepsy onset was 24 years, ranging from the earliest onset at the age of one year in the younger group to 63 years in the older group. Median epilepsy duration was 32 years, ranging between less than one to 57 years.

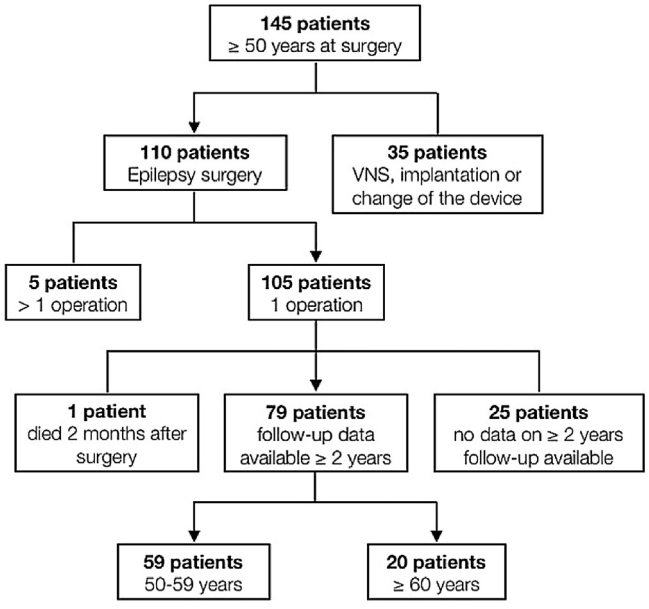

Fig. 1. Flow-chart on patient number and data retrieval.

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