Posterior cortex epilepsy

Epilepsy originated from the occipital, parietal and/or the posterior edge of the temporal lobe are grouped together into posterior cortex epilepsy (PCE).

Etiology

Lesions such as tumors, cortical dysplasia, and ulegyria constitute the major cause of posterior cortex epilepsy.

Case series

2017

The objective of Sierra-Marcos et al. was firstly to describe electro-clinical and imaging findings in the presurgical evaluation of children with PCE, and secondly to identify potential factors associated with surgical and cognitive function outcomes.

From the total of patients referred to the Epilepsy Monitoring Unit of 'Hospital Universitario Niño Jesús' from 2003 to 2016, 55 had drug-resistant PCE. Different variables obtained from the multimodal presurgical work-up were analyzed among patients achieving seizure freedom after surgery (ILAE class 1) and patients with persistent seizures. Categorical variables were compared with Fisheŕs exact test and numeric variables with t-Student for independent samples, and multiple logistic regression were used to analyze predictive values.

Median duration of epilepsy until surgery was 5 years [3-10 years]. Fifty patients showed lesions in the MRI, and 62.5% had concordant MRI-PET corregistration. 37 (67%) patients were operated (lesionectomy in 21 subjects, tailored resection based on intracranial studies in 16), and 23 (62,2%) reached ILAE class 1, with a mean follow-up period of 3.51 [1-12] years. A lower number of basal seizures and antiepileptic drugs, a well-defined lesion on the MRI, an epileptogenic zone (EZ) restricted to the posterior quadrant and the normalization of postsurgical EEGs were associated with seizure freedom ($p<0.05$). Additionally, 65% of patients had a long-term improvement of cognitive performances.

Epilepsy surgery should be considered in children with drug-resistant PCE, especially in those with a restricted EZ [1].

Ramantani et al. retrospectively analyzed the data of 50 consecutive patients aged 11.1 (mean) ± 5.1 (standard deviation) years at surgery. All patients but one had a magnetic resonance imaging (MRI)-visible lesion. Resections were parietal in 40%, occipital in 32%, and parietooccipital in 28% cases; 24% patients additionally underwent a resection of the posterior border of the temporal lobe. Etiology included focal cortical dysplasia in 44%, benign tumors (dysembryoplastic neuroepithelial tumor, ganglioglioma, angiocentric glioma, and pilocystic astrocytoma) in 32%, peri- or postnatal ischemic lesions in 16%, and tuberous sclerosis in 8% cases.

At last follow-up (mean 8 years, range 1.5-18 years), 60% patients remained seizure-free (Engel class I): 30% had discontinued and 20% had reduced antiepileptic drugs. Most seizure recurrences (71%) occurred within the first 6 months, and only three patients presented with seizures ≥2 years after surgery. Independent predictors of seizure recurrence included left-sided as well as parietal epileptogenic zones and resections. Longer epilepsy duration to surgery was identified as the only modifiable independent predictor of seizure recurrence.

The study demonstrates that posterior cortex epilepsy surgery is highly effective in terms of lasting seizure control and antiepileptic drug cessation in selected pediatric candidates. Most importantly, our data supports the early consideration of surgical intervention in children and adolescents with refractory posterior cortex epilepsy [2)].

2014

Liava et al. present a paediatric cohort of 62 children who underwent surgery for drug resistant posterior cortex epilepsy before the age of 16 years with a mean post-operative follow-up of 6.94 years (range: 2-16). Mean age at epilepsy onset was 3.2 years and 28 children (45%) had onset before 1 year of age. The mean age at surgery was 7.9 years (range: 1-16). Daily seizures were present in 63% of children. MRI was positive in 58 cases (93.5%) and invasive stereo-EEG was judged mandatory in 24/62 (39%) of patients. Surgery was confined to the parietal lobe in 11 children, the occipital lobe in 8, the occipito-parietal region in four, the occipito-temporal region in 18, and involved both the temporal and parietal lobes in the remaining 21. Following surgery, 53 subjects (85.5%) remained seizure-free and among those who underwent a SEEG procedure, 75% achieved seizure freedom. Focal cortical dysplasia was the most frequent histopathological diagnosis (50%), followed by tumoural (24%) and gliotic lesions (14.5%). An older age at epilepsy onset, the presence of a rather restricted epileptogenic area, and a complete resection of the epileptogenic zone were predictive of a favourable surgical outcome. These results demonstrate that a good surgical outcome is possible in children with drug resistant posterior cortex epilepsy. Accurate analysis of the chronology of ictal semiology and electrophysiological features, viewed in the context of the complete electroclinical pattern, provides a topographical orientation for posterior cortex epilepsy and, together with the presence of a lesion detectable on imaging, may improve the rate of surgical success of posterior cortex epilepsy at paediatric age [3)].

2009

A retrospective analysis of clinical and laboratory data from 43 PCE patients referred for surgery was performed. The diagnosis was established by standard pre-surgical evaluation modalities including semiology, MRI, interictal and ictal scalp video-EEG as well as additional intracranial EEG monitoring in selected cases.

The 43 patients included 11 parietal lobe epilepsies, 13 occipital lobe epilepsies, and 19 patients with seizures originating from parieto-occipito-posterior temporal cortex. Thirty-three (76.7%) patients experienced at least one type of aura. Seventeen patients showed complex focal seizures, which were followed by secondarily generalized tonic-clonic seizures in seven of them; eighteen patients predominantly showed simple motor seizures (clonic seizures in 6, tonic seizures in 7, and versive seizures in 5). Long-term visual field deficits were observed in 8 patients. Other transient neurological deficits occurred in 7 patients. All patients received the follow-up study lasting 1-5 years, and achieved Engel's I in 26 cases, II in 5, III in 5, and IV-V in 7. Malformation of cortical development was

diagnosed in 41.9% of our surgical population. No significant relationship was found between the diagnostic accuracy of any pre-surgical evaluating modality and surgical outcome in this series.

Surgical treatment is effective for PCE. Accurate localization of epileptogenic zone and eloquent cortex are two key factors for favorable outcome. None of the diagnostic modalities shows obvious predictive value for favorable surgical outcome [4].

2004

Luerding et al. retrospectively studied changes in cognition in the neuropsychological data of 28 patients prior to and 6 months after posterior cortical resections.

Cognition significantly showed differences in performance intelligence quotient compared with verbal intelligence quotient. Post-operative verbal intelligence consistently increased, whereas performance intelligence decreased. There was no effect regarding the lesion side, continuation of seizures, or reduction of visual field after surgery. Epilepsy surgery in this area did not lead to significant differences in general intelligence after surgery.

Functions of posterior areas could be described by standardised neuropsychological measures. Posterior regions contribute to explicit attentional and visuoconstructional abilities. Epilepsy surgery in the posterior cortex bears no risk for substantial decline in general cognition although some discrete impairment in performance intelligence may occur [5].

1991

Fourteen (74%) of 19 patients obtained a significant reduction in seizures after posterior corticectomy; 6 (32%) were seizure-free over a median follow-up of 3.7 years (range, 1 to 14 years). Surgery included limited resections of the occipital lobe in 16 patients, posterior temporal region in 11, and posterior portion of parietal lobe in 7. Surgical failure related to probable multiple areas of epileptogenesis (4 patients), or limited resections (2 patients) to preserve visual fields (2 patients) and to avoid dyslexia (1 patient). Of 14 patients without a complete hemianopia preoperatively, 6 (43%) developed a new or increased visual field deficit, 2 (14%) of which were hemianopia. Four (36%) of 11 occipital lobe resections resulted in a new or increased visual field deficit: quadrantanopia in 3 and hemianopia in 1. Visual phenomena were the most common initial ictal symptoms, occurring in 13 (68%) of the 19 patients. Twelve patients had complex partial seizures: in 2, always without warning; in 7, always following an aura, usually visual; and in 3 patients, with or without warning. Scalp electroencephalography identified the origin of most recorded seizures in 12 (63%) of the 19 patients. A principal interictal spike focus appeared in 15 patients (79%), and always correlated with the epileptogenic lobe as defined by scalp and/or subdural-recorded seizures (14 patients) or by clinical analysis and computed tomography (1 patient) [6].

1)
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