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Research Article

**HISTOPATHOLOGICAL FINDINGS IN BRAIN TISSUE  
OBTAINED DURING EPILEPSY SURGERY**<sup>1</sup>Dr. Rabeah Raza, <sup>2</sup>Dr. Syed Shahzaib Naqvi, <sup>3</sup>Dr. Uzma Sarwar<sup>1</sup>WMO,RHC Halla,Kasur.<sup>2</sup>MO,RHC Halla,Kasur.<sup>3</sup>WMO,BHU Rangpur,Gujrat.**Abstract:**

*A structural brain lesion regarding information of neuropathological essential seizures is important for drug-resistant pivotal epilepsy indulgence.*

*This diagnosis report is made on the foundation of 9523 patients with resected brain samples who experienced the surgery of epilepsy specifically for drug-resilient seizures from 12 European countries in 36 centers. Histopathological analysis was regulated by local hospital specimen with the ratio of 41% and 59% at the GNRCES ("German Neuropathology Reference Centre for Epilepsy Surgery").*

*The beginning of seizures happened 75.9% before the age of 18 years and surgery of adults were 72.5%. The overall epilepsy duration was 20.1 years, among adults before surgical resection and in between children the duration was 5.3 years. The temporal section seemed in 71.9% of overall operations. In 7 main disease groupings, the number of histopathological was thirty-six. General categories were sclerosis of hippocampal, which found in 36.4% patients, 23.6% of patients were affected by a tumor (ganglioglioma) and 19.8% were affected by cortical development. In 7.7% of patients, there was no histopathological effect diagnosed.*

*Hippocampal sclerosis is the main histopathological diagnosed disease, in those patients who need drug-resistant pivotal epilepsy surgery, specifically in the adult. Focal cortical dysplasia diagnosed in children and tumors were most general lesion both in adult and children.*

**Keywords:** Brain Tissues, Histopathological Disease, Epilepsy Surgery, Hippocampal Sclerosis

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## INTRODUCTION:

According to the World Health Organization, more than 50 million people of the globe have epilepsy and more importantly, among those patients, 30% have insufficient seizure control facilities through drug therapy. The surgery of epilepsy always considered an appropriate way of treatment if difficult to treat epilepsy patients were selected in a careful way. It is obvious that epilepsy efficacy surgery has further been recognized from tertiary centers of epilepsy in retrospective series and some analysis has described the underlying pathologic lesions of the brain (ALBAYRAK, GÜLER MESCİ and GÜLER, 2015).

Our study is based on the EEBB (“European Epilepsy Brain Bank”) specimen database, which gathered during the epilepsy surgery and on brain lesions epileptogenic surveys. The EEBB procedure of gathering data is very simple and inception of that database also highlighted the ILAE (“International League against Epilepsy”) while developing the focal cortical dysplasia both for hippocampal sclerosis and clinicopathological subtypes. We demonstrate here the histopathological diagnoses from large-scale EEBB database specifically on epilepsy surgery and drug-resistant epilepsy (Anderson, Wojno and Grossniklaus, 2003).

## 2.0METHODS:

### Study Procedure

With the use of the EEBB database for this study and we analyze 4944 men and 4579 women specimen of epilepsy with surgical treatment. Selected period of underwent surgery is from 1990 to 2014 in epilepsy surgery specialized centers in Portugal, Spain, Czech Republic, Germany, Austria, Greece, the United Kingdom and Turkey. As we used last surgical procedural histopathological diagnoses and clinical data, according to that given data, all patients had experienced a vast and meticulous clinical examination before going to surgery that examinations are based on electroencephalographic investigation and head’s magnetic resonance imaging (Chiesa et al., 1999).

Testing of neuropsychology and psychiatry, video EEG, and invasive EEG were executed when indicated clinically. According to EEBB database, it was making sure that every patient has well informed through written content regarding his/her histopathological data use for advanced research purpose. On the basis of prescribed EEBB database information, we divide patients into two categories; not seizure free or seizure free after surgery. Seizure free corresponded IA category (which

consider zero seizure) to IVC aggravated seizures (Engel, 2009).

### Statistical Analysis

We examined variances through the seven categories of histopathological in age at beginning of seizures (<18 years as compared with  $\geq 18$  years). As per the affected hemisphere, basically developed through 28 tests; “Bonferroni correction” has been used with  $P \leq 0.0017$  (which is  $P < [0.05/28]$ ) measured to specify the significances of statistics. Variances between age groups were analyzed through a sample t-test specifically for continuous variables while a chi-square test led for categorical data, and most importantly, that result which is not conveyed by statistical assessments are descriptive only (FEINDEL, 2005).

## 3.0RESULTS:

### Patients and Specimens

Specifically, for the purpose of histopathological review, resected brain tissues was accessible for 3901 (41%) patients of epilepsy centers in locale while 5622 (59%) has been available at “German Neuropathology Reference Centre for Epilepsy Surgery in Erlangen”. There were 367 patients (which is 3.8% of total) experienced a minimum of two resections: specifically for these kinds of patients, clinical data has been used for histopathological diagnoses from a surgical procedure (Lee, 2018).

That specific data set was 97.5% complete but some points have been missing specifically surgery year and anatomical localization. From overall 36 centers, twenty reported the outcomes of seizure after surgery process for 85.2 (out of 100%) of patients and the same data used for post hoc assessment between surgery outcome and histopathological diagnoses. For 5248 patients, who were associated with twenty centers, seizure outcomes information was accessible, specifically after the completion of one year surgery period, similarly, additional twenty-four months information about 1920 patients also available (Lee, 2018).

The given sample showed 98.4% patients for whom any data outcome was available. According to these twenty centers, as post hoc assessment showed regarding surgical outcomes, in all adults anti-epileptic drug medication was sustained after surgery and same condition represented in almost 90% children. There are 6900 (72.5%) adult patients and remaining 2623 (27.5%) were children. Male patients were 51.9%, seizures start happened in 75.9% in childhood (<18), and earlier than six years in 36%. This shown in below table 1:

Characteristic	Female Patients	Male Patients	Overall
All patients (N=9523)			
Male sex (%)			51.9
Age at surgery (yr)	28.2±15.2	27.9±15.3	28.1±15.3
Age at seizure onset (yr)	11.6±11.2	12.1±11.7	11.9±11.4
Duration of epilepsy (yr)	16.4±12.6	15.6±12.5	16.0±12.6
Adults (N=6900)			
Male sex (%)			51.4
Age at surgery (yr)	35.1±11.3	35.2±11.2	35.2±11.2
Age at seizure onset (yr)	14.6±11.6	15.5±12.0	15.0±11.8
Duration of epilepsy (yr)	20.5±12.2	19.7±12.4	20.1±12.3
Children (N=2623)			
Male sex (%)			53.1
Age at surgery (yr)	9.3±5.2	9.2±5.2	9.3±5.2
Age at seizure onset (yr)	3.8±4.1	3.9±4.1	3.8±4.1
Duration of epilepsy (yr)	5.4±4.1	5.3±4.2	5.3±4.1

Table 01 Source: Blumcke et al., 2017)

There was basically thirty-six histopathological analysis which further categorized into 7 main groups. Major ten recurrent histopathological diagnoses were accounted for 86.7% of cases. Accordingly, 7168 postsurgical patients' outcomes were accessible, through post hoc assessment designated that (66.4% children whereas 58.6% adults) which are 60.7% in total were seizure free one year after surgery (Blumcke et al., 2017).

### Hippocampal Sclerosis

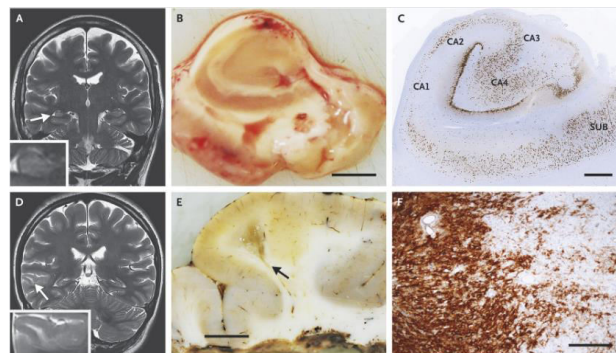


Figure 01 Source: Blumcke et al., 2017)

The abovementioned findings are taken from three patients with "Conditions Commonly Diagnosed in the European Epilepsy Brain Bank". According to these findings "Panel A" represents a coronal "T2-weighted MRI" 51 years old male patient scanning shows hippocampal sclerosis which had epilepsy at right temporal lobe since twelve years of age. The arrow also pointed out "atrophic right hippocampus" (Engel, 2009).

According to these findings "Panel B" represents a slab of 5 millimeters of "en bloc resected hippocampus", this image also belongs to the same patient of "Panel A". "Panel C" represents "NeuN immunohistochemical" discoloration (hematoxylin counterstaining with brown color) specimen representing a segmental neuronal loss in cells, specifically in CA "Cornu Ammonis Area", which is basically hippocampal sclerosis type two. "Panel D" represents "a coronal T2-weight MRI

Scanning" which belongs to thirteen years of a female with "ganglioglioma" who had epilepsy since then when she was only 8 years of age. Arrow indicates a lesion on the right side of the superior temporal gyrus. And finally, "Panel E" represents a specimen of "formalin-fixed en bloc" from the patient, the arrow indicated with moderately cystic subcortical rarefaction white matter and it is 4 millimeters (Blumcke et al., 2017).

Hippocampal sclerosis was very important and general diagnosis of histopathological; this basic condition further recognized in a surgical specimen of 36.4% patients from which 44.5% adults and 15% were children. Hippocampal sclerosis was analyzed with the ratio of 54.4% obtained specimens from the temporal lobe. Accordingly, another histopathological analysis was made in 1.5% hippocampal sclerosis specimens, which also

including glial scars of (23.7%), “ganglioglioma” (25.2%), focal cortical dysplasia (8.6%), encephalitis (7.2%), dysembryoplastic neuroepithelial tumors (8.6%) and cavernous angioma 5.8% (Blumcke et al., 2017).

### **Tumors**

Brain tumors were on the number second most general diagnosis of histopathology, happening in the specimens of 23.6% with ganglioglioma which found in 10.4% in patients according to prescribed EEBB database for this study. In the temporal lobe, overall 82.5% of gangliogliomas existed, similarly, “dysembryoplastic neuroepithelial tumors” also found frequently in 5.9% of overall patients. In 68.1% of patients, this tumor is basically located in the temporal lobe. Early seizure commencement happened in link with tumor’s both types with a mean age ( $\pm$ SD) at beginning of  $13.1 \pm 10.7$  years of age (Jehi, 2018).

Additional tumors linked with the beginning of epilepsy which happened mostly before the age of 18 years, that were gangliocytoma, angiocentric glioma, pilocytic astrocytoma, isomorphic astrocytoma, pleomorphic xanthoastrocytoma and neurocytoma, whereas low-grade neuroepithelial tumors and the comprehensive features of which may not quantify by a neuropathologist. Mostly these tumors were linked as low grade (World Health Organization grade I) and combined with dysembryoplastic neuroepithelial and gangliogliomas tumors they justify 79.2% of this series’ tumors. After one year of surgery, 68.4% tumors holders patients (63.5% adults and 79.9% of children) were seizure free (Lee, 2018).

### **Irregularities of Cortical Growth**

Irregularities of cortical growth appeared in 19.8% patient’s specimens and associated with the number three most frequent category of histopathology. These irregularities appeared in 39.3% of children patients. Sub-categories of focal cortical dysplasia considered most general irregularity of cortical growth appeared in 70.6% of patients. Mostly these irregularities were features by cytoarchitectural and architectural abnormalities with cerebral cortex six layers. The balloon cells and dysmorphic neurons’ combination, which basically featured of type II focal cortical dysplasia, associated the most sub-categorized irregularity. It existed in 17.0% of overall child patient’s time of surgery series and this located in the frontal lobe of 51.6% children (Blumcke et al., 2017).

### **No Lesion**

After the microscopic investigation, no particular lesion could be diagnosed in 7.7% overall patients (including 6.1% of children and 8.4% of adults).

This also comprised outputs of generic gliosis reactive as a single abnormality of histopathology in neocortex, hippocampus or white matter. Seizures freedom after one year of surgery happened in 50.2% (through which there were 48.7% of adults and 55.2% of children) (Naito, 2017).

### **Glial Scars, Encephalitis and Vascular Lesions**

In 6.1% of patients, vascular irregularities were found through which there was temporal lobe in echoing angiomas found as most frequent type. Among patients, seizure beginning with vascular irregularities happened at 22.2 years of mean age, where the eldest age between histopathological categories. After one year of surgery, freedom from seizure happened in 64.8% of total patients, specifically with vascular irregularities (63.4% adults and 73% children). In 4.9% patients, glial scars were found and mostly placed in multiple lobes. In the patients, the beginning of seizures with glial scars happened at the mean age of 10.6 years and the epilepsy mean duration was 14.8 years (Blumcke et al., 2017).

Mostly glial scars happened in men patients (with the ratio of 61%) while women patient suffered from the ratio of 39%. Positive freedom rate from seizures was typically at bottommost in this category of histopathology (which is 46.9%). Accordingly, 1.5% patients had encephalitis histopathological diagnosis which mostly affecting multiple lobes of Rasmussen encephalitis. Among these patients, seizures beginning with encephalitis happened at 10.1 years of mean age and after one year of surgery, 50% of patients were seizure free (YU et al., 2015).

### **4.0DISCUSSION:**

According to the specific 10000 specimens of brain tissues series found during the surgery of epilepsy, the ten most recurrent diagnoses histopathological accounted for 86.7% of patients regarding epilepsy drug-resistant. The described analysis could be further split into seven comprehensive categories. Through all categories, hippocampal sclerosis was an utmost recurrent lesion, a constant finding with outputs of different studies involving patient’s smaller series who experienced the surgery of epilepsy. Pathological analysis was assisted by anatomical landmarks of identification and best escalated in gross anatomical sampling.

There was a proposal by “ILEA Commission on Diagnostic Methods” to a global consensus endorsement for brain tissue procurement from epilepsy patients on the identification of anatomical milestones basis. In adults and children, 8.4% and 6.1% respectively of sample tissues had astrogliosis



only be considered as conventional lesion type. This does not suggest that functionally normal tissues, according to 50.2% of patients with seizures of drug-resistant before surgery of epilepsy and unclassifiable samples tissues were free from seizure in the period of one year after surgery, furthermore, it associates the resected tissues in seizures genesis.

It is also imaginable that alteration of a molecule that may decline threshold of seizure but is not ostensibly as irregularities on delicate microscopy was a factor complicated in the patient groups. The findings of vague histopathology may also effect from the unpredictable neurosurgical sampling nature. Newly functioned histopathological objects in sample patients with focal epilepsies, as per the oligodendroglial hyperplasia in a hyaline astrocytopathy protoplasmic white matter which may decline the histopathological nonlesional diagnoses number in the obtained sample in the period of epilepsy surgery in future times (YU et al., 2015).

### 5.0CONCLUSION:

The concluding remarks of the study comprise the retrospective analysis of data and have limitations of biases that are intrinsic in patients selecting with surgical departmental epilepsy. Moreover, some surgical practices in the period which tissues were found concerned interruption practices that do not specifically permit for the minuscular brain lesion identification. These large scales data based on series on microscopically distinct information of pathologic conditions in patients' specimen found from resection of surgical in specimens with drug-resistant pivotal epilepsy.

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