Epilepsy case series

Fujita et al. obtained resting-state MEG and magnetic resonance imaging in 90 patients with epilepsy during their preoperative evaluation and in 90 healthy participants. They used the cortical currents estimated from MEG and magnetic resonance imaging to calculate Power in the δ (1-3 Hz), θ (4-7 Hz), α (8-13 Hz), β (13-30 Hz), low γ (35-55 Hz), and high γ (65-90 Hz) bands and functional connectivity in the θ band. Phase-amplitude coupling (PAC) was evaluated using the synchronization index (SI) for eight frequency band pairs: the phases of δ, θ, α, and β and the amplitudes of low and high γ. First, they compared the mean SI values for the patients with epilepsy and the healthy participants. Then, using features such as PAC, Power, functional connectivity, and features extracted by deep learning individually or combined, yhey tested whether PAC improves discrimination accuracy for the two groups.

The mean SI values were significantly different for the patients with epilepsy and the healthy participants. The SI value difference was highest for θ/low γ in the temporal lobe. Discrimination accuracy was the highest, at 90%, using the combination of PAC and deep learning.

Abnormal PAC characterized the patients with epilepsy in the interictal state compared with the healthy participants, potentially improving the discrimination of epilepsy [1].

Twenty-one pediatric patients with epilepsy or temporal lobe pathology underwent ECS mapping using visual (n = 21) and auditory (n = 14) tasks. Fisher's exact test was used to determine whether the frequency of errors in the stimulated trials was greater than the patient's baseline error rate for each tested modality and subregion.

While the medial superior temporal gyrus was a common language site for both visual and auditory language (43.8% and 46.2% of patients, respectively), other subregions showed significant differences between modalities, and there was significant variability between patients. The visual language was more likely to be located in the anterior temporal lobe than was auditory language. The pediatric patients exhibited fewer parietal language sites and a larger range of sites overall than did adult patients in previously published studies.

There was no single area critical for language in more than 50% of patients tested in either modality for which more than 1 patient was tested (n > 1), affirming that language function is plastic in the setting of dominant-hemisphere pathology. The high rates of language function throughout the left frontal, temporal, and anterior parietal regions with few areas of overlap between modalities suggest that ECS mapping with both visual and auditory testing is necessary to obtain a comprehensive language map prior to epileptic focus or tumor resection [2].

Hsu et al. from Taipei, conducted a retrospective cohort study of 6746 patients with newly diagnosed epilepsy and 26,984 persons without epilepsy between 2000 and 2008, in the database of National Health Insurance in Taiwan. The incidences and risks of stroke during the follow-up period were compared between cohorts until the end of 2013. In Study II, they conducted a nested cohort study of 484,990 hospitalized patients with newly diagnosed stroke between 2000 and 2009. They compared the short-term mortality and complications during stroke admission between stroke patients with previous epilepsy and those without epilepsy.

The epileptic cohort had an increased stroke risk (hazard ratio [HR] 2.24, 95% CI 2.02 to 2.49). The relationship between epilepsy and stroke risk remains significant in every age group and both sexes. Among hospitalized stroke patients, history of epilepsy was associated with complications, including pneumonia (odds ratio [OR] 1.08, 95% CI 1.00 to 1.18), urinary tract infection (OR 1.16, 95% CI 1.08 to 1.26), and longer stay ($p < 0.0001$) during the index stroke admission.

Epileptic patients face increased stroke risk and adverse outcomes of stroke admission. It is necessary to develop a prevention strategy for stroke in epileptic patients [3].

Kwan et al prospectively studied 525 patients (age, 9 to 93 years) who were given a diagnosis, treated, and followed up at a single center between 1984 and 1997. Epilepsy was classified as idiopathic (with a presumed genetic basis), symptomatic (resulting from a structural abnormality), or cryptogenic (resulting from an unknown underlying cause). Patients were considered to be seizure-free if they had not had any seizures for at least one year.

Among the 525 patients, 333 (63 percent) remained seizure-free during antiepileptic-drug treatment or after treatment was stopped. The prevalence of persistent seizures was higher in patients with symptomatic or cryptogenic epilepsy than in those with idiopathic epilepsy (40 percent vs. 26 percent, P=0.004) and in patients who had had more than 20 seizures before starting treatment than in those who had had fewer (51 percent vs. 29 percent, P<0.001). The seizure-free rate was similar in patients who were treated with a single established drug (67 percent) and patients who were treated with a single new drug (69 percent). Among 470 previously untreated patients, 222 (47 percent) became seizure-free during treatment with their first antiepileptic drug and 67 (14 percent) became seizure-free during treatment with a second or third drug. In 12 patients (3 percent) epilepsy was controlled by treatment with two drugs. Among patients who had no response to the first drug, the percentage who subsequently became seizure-free was smaller (11 percent) when treatment failure was due to lack of efficacy than when it was due to intolerable side effects (41 percent) or an idiosyncratic reaction (55 percent).

Patients who have many seizures before therapy or who have an inadequate response to initial treatment with antiepileptic drugs are likely to have refractory epilepsy [4].

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