Age-Related Variations and Subgroup Differences in Non-Lesional Epilepsy: Implications for Etiology and Treatment

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Introduction
Epilepsy is a chronic disorder which affects people of all ages, however, a clear increase in its prevalence is observed in the elderly [1]. The correlation between epilepsy and age is an expression of brain diseases with epileptogenic potential (e.g. stroke or dementia) being more often present at an older age, as well as by the effects of the aging processes happening in brain networks with focal or generalized distributions [2]. This study aims to explore age-related differences in the epidemiology of patients with different epilepsy syndromes.

Methods
We retrospectively enrolled patients diagnosed with idiopathic generalized epilepsy (IGE) (n=35), focal lesional epilepsy (n=389), and non-lesional epilepsy (n=62) from the database present at the Geneva University Hospital. We conducted analyses on patient demographics and electroencephalographic (EEG) data to highlight age-related differences between epilepsy types and the yield of EEG. Statistical analyses, including t-tests and chi-square tests were performed.

Results
We observed that IGE patients were significantly younger (26.8 ±11) than those in the focal lesional (58.3 ± 19.5, p < 0.001) and non-lesional epilepsy groups (47 ± 22.5, p < 0.001). The non-lesional epilepsy cohort exhibited two distinct age peaks, i.e. around 25 years old and 65 years old, suggesting the presence of differing etiologies. Regarding routine EEG, there was no significant difference in rates of interictal epileptiform discharges (IEDs) between younger and older non-lesional epilepsy patients (p = 0.439). However, among those who underwent a long-term EEG, only 50% (11/22) of the younger subgroup presented IEDs, while 82.4% (14/17) of the older subgroup exhibited interictal epileptiform discharges (IEDs) (p = 0.08).

Discussion
Our findings indicate age-related differences between the three main epilepsy syndromes. Within the group of patients with non-lesional epilepsy, we observed two peaks suggestive of different etiologies, i.e. dysplasia in the younger group vs a neurodegenerative origin in the elderly. No difference of IEDs were noted as a function of age in routine EEGs, while there was a strong tendency for long-term EEG to pick-up more IEDs in older patients suffering from focal non-lesional epilepsy.

References