



Utilizing the MoCA test to discriminate the cognitive profile in temporal and frontal lobe epilepsies

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Introduction

Temporal and frontal lobe epilepsies (TLE and FLE) are the most common focal epilepsies. While comprehensive neuropsychological testing is valuable for characterizing their distinct features and informing presurgical planning, it is time-consuming and resource-intensive. The Montreal Cognitive Assessment (MoCA) test is a brief cognitive tool assessing multiple domains. In this study, we evaluate the MoCA's ability to distinguish the cognitive profiles between TLE and FLE.

Methods

We recruited patients with TLE or FLE who underwent pre-surgical evaluation, and reviewed their clinical data from medical records. We matched both groups for age, sex, and education. We administered the MoCA to all participants in clinic setting. We compared total MoCA scores and domain-specific sub scores between groups. Additional analyses assessed the impact of epilepsy etiology, MRI findings, and age on cognitive profiles across subgroups.

Results

We studied 240 patients (106 FLE, 134 TLE) with a mean age of 31 years (range: 14-68), balanced sex distribution (120 males, 120 females), and predominantly right-handed individuals (90%). Median MoCA score was 23 (IQR: 21, 26). Total MoCA scores did not differ between FLE and TLE ($p=0.17$). However, key cognitive differences emerged in specific domains. The executive function sub score was significantly lower in FLE compared to TLE (mean: 3.29 vs. 3.70, $p = 0.03$), particularly in patients with an unknown etiology ($p = 0.02$) and those without a structural MRI abnormality ($p = 0.03$). Attention scores trended lower in FLE (mean: 4.02 vs. 4.40, $p = 0.08$), reaching significance in younger patients (<33 years) ($p = 0.003$) and those with an unknown etiology ($p = 0.04$). Memory recall, naming, language, and abstraction sub scores did not significantly differ between groups ($p > 0.05$).

Conclusion

Overall MoCA scores were similar between FLE and TLE. However, FLE was associated with greater executive dysfunction and reduced attention, particularly among younger patients and those with unknown etiology. These findings highlight the value of domain-specific cognitive assessment when characterizing cognitive profiles in focal epilepsies. Further evaluation with a larger sample size would help validate these findings and enhance our understanding of cognitive profiles in these epilepsies.

