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Free fatty acids level in CSF, stroke severity and comorbidity indices as independent short-term prognostic factors in acute ischemic stroke

Thesis Submitted for Fulfillment of doctorate Degree In critical care by

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Introduction

Brain ischemia initiated significant increase in FFAs in animal studies. Accumulation of FFA can lead to liberation of inflammatory byproducts that contribute to neuronal death. Increased risk of systemic thromboembolism was seen in animal models after FFA infusion possibly through activation of factor XII by stearic acids. The clinical studies that examined the relation between stroke in humans and CSF biomarkers are infrequent. *Aim of Work*. We tried to evaluate the potential role of FFAs in CSF in the diagnosis and the prognosis of ICU patients with AIS while comparing the results to traditional neurological scoring systems. *Patients and Methods*. Our study included 80 patients who were admitted to ICU with acute ischemic stroke (AIS) within 24 hours of the onset of cerebral infarction. CSF samples were obtained at admission. The FFA levels were measured using the sensitive enzyme-based colorimetric method. The NIHSS, GCS, and mRS were evaluated at admission and at 30 days. Univariate and multivariate analysis were used to evaluate the stroke outcome according to FFA levels in CSF.

Results

Worsening of the GCS (<7) at 30 days showed a significant correlation with FFA in CSF. The ROC curve showed a cutoff value of 0.27 nmol/μl, sensitivity of 62.9%, and specificity of 72.2%. There was a significant correlation between FFA in CSF and the mRS >2 at 30 days. The ROC curve showed a cutoff value of 0.27 nmol/μl, specificity of 69.2%, and sensitivity of 59.7%. There was a significant correlation between FFA in CSF and the NIHSS ≥ 16 at 30 days. The ROC curve showed a cutoff value of 0.27 nmol/μl, specificity of 72.2%, and sensitivity of 62.9%. Our study subdivided patients according to infarction volume and compared the 2 subgroups with FFA in CSF. We found a significant difference between 2 subgroups. FFA levels showed a positive correlation with infarction volume ≥145 ml. The ROC curve showed a cutoff value of 0.25 nmol/μl, sensitivity of 76.9%, and specificity of 71.4%. Our study showed that FFA in CSF was a significant predictor of all-cause mortality (0.37 + 0.26, *P* value 0.007). The ROC curve showed a cutoff value of 0.27, specificity of 72.2%, and sensitivity of 62.9%. There was a positive correlation between FFA in CSF and neurological causes of mortality (0.48 + 0.38, *P* value 0.037). The ROC curve showed a cutoff value of 0.37 nmol/μl, specificity of 76.1%, and sensitivity of 61.5%.

Conclusion

FFA in CSF may serve as an independent prognostic biomarker for assessing the prognosis of acute ischemic stroke and the clinical outcome. It might be a useful biomarker for early detection of high-risk patients for poor outcome and hence more aggressive treatment.