Comparison of circulating Endothelial Cell/Platelet Count ratio to Aspartate Transaminase/platelet ratio index for identifying patients with cirrhosis

Abstract:

Background/Objectives: Circulating endothelial cells (CECs) are indicative of vascular injury and correlate with severity of vascular diseases. A pilot study showed that the ratio of CEC to platelet count (CEC/PC) was effective in predicting cirrhosis. Therefore, we evaluated CEC/PC in a larger cohort of patients, correlated it with cirrhosis, and compared its operating characteristics with previously described biomarker for cirrhosis, the AST/platelet ratio index (APRI). Methods: Fifty-three patients with cirrhosis, 20 matched healthy controls, and 9 patients with noncirrhotic liver disease were recruited. Peripheral blood sample was collected and analyzed to enumerate nucleated CEC CD146+, CD105+, CD45- using a commercial assay. Results: Median CEC counts were significantly higher in patients with cirrhosis (62 cells/4 mL, interquartile range [IQR]: 43.5–121) as compared with controls (31 cells/4 mL, IQR: 22.2–40). The CEC/PC was also significantly elevated in cirrhotics (0.69, IQR: 0.39–1.48) compared with controls (0.12, IQR: 0.09–0.20) and noncirrhotics (0.21, IQR: 0.08–0.43). Receiver operator characteristic (ROC) analysis revealed that CEC cutoff value of ≥37 cells/4 mL showed sensitivity of 81% and specificity of 75% for differentiating cirrhosis from controls (area under the curve [AUC]: 0.80; 95% confidence interval [CI] 0.67–0.91). The CEC/PC ratio cutoff value of ≥0.23 showed sensitivity of 91% and specificity of 82% (AUC: 0.92; 95% CI 0.83–0.99). The APRI cutoff value of ≥0.4 showed sensitivity of 94% and specificity of 85% for differentiating cirrhosis from control patients (AUC: 0.96; 95% CI 0.90–1.0). A product of CEC and APRI, termed CAPRI (CEC-APRI), effectively distinguished patients with cirrhosis from controls; with cutoff value of ≥12.7, showing higher sensitivity of 98% and specificity of 85% (AUC: 0.98; 95% CI 0.96–1.0). Conclusion: The CEC/PC ratio is significantly elevated in patients with cirrhosis and demonstrates comparable operating characteristics to previously described APRI. Furthermore, CAPRI, compiled as product of CEC to APRI showed outstanding ability to distinguish patients with cirrhosis from controls, although larger studies are necessary for validation.

Keywords:

CEC, APRI score, Cirrhosis

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