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C-reactive Protein, Albumin, Urea, CRP/Albumin Ratio, and Urea/Albumin Ratio: A Retrospective Evaluation in COVID-19 Patients

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Abstract

Introduction: C-reactive protein (CRP), urea, albumin, CRP/albumin ratio (CAR) and urea/albumin ratio (UAR) could be valuable biomarkers for determining the severity of illness in patients with COVID-19. This study aimed to determine the association between these markers and disease severity in COVID-19 patients on admission and days five to seven after admission. Methods: This retrospective study includes 153 adult COVID-19 patients admitted to Hospital Raja Perempuan Zainab II and Hospital Ampang from January 2021 to December 2021. Patients' serum CRP, urea, albumin and creatinine levels were recorded on admission and on days five to seven after admission. The patients were categorised based on the Annex 2e guidelines published by the Ministry of Health, Malaysia and further classified as mild to moderate disease (stages 1-3) and severe to critical illness (stages 4-5). Results: On admission, urea, creatinine, CRP, UAR and CAR were significantly higher in the severe to critical group ($p < 0.001$). The optimal cut-off value for the UAR was 0.16; the area under the curve (AUC) was 0.760, and sensitivity and specificity were 63.6% and 85.7%, respectively. The AUC of the CAR was 0.752, with 54.2% sensitivity and 91.4% specificity at an optimal cut-off value of 1.63. In severe to critical COVID-19 patients, albumin levels decreased significantly on days five to seven after admission, while urea levels remained significantly higher in this group ($p < 0.001$, $p < 0.05$, respectively). Conclusion: CRP, urea, albumin, CAR and UAR are promising biomarkers for predicting the severity of disease in COVID-19 patients. © 2023 UPM Press. All rights reserved.

Author Keywords

albumin; c-reactive protein; COVID-19; CRP/albumin ratio; urea; urea/albumin ratio

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