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Role of Basal Cortisol as Indicator of Adrenal Insufficiency and Predictive Factors of Critical Illness-related Corticosteroid Insufficiency: A Cross-Sectional Study

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INTRODUCTION

Critical illness-related corticosteroid insufficiency (CIRCI) is defined as the presence of impaired cortisol production during critical illness. The early identification of CIRCI is important as these patients may benefit from corticosteroid treatment. However, despite decades of debate, the role of corticosteroid therapy, diagnostic criteria and predictive factors of CIRCI remain controversial. The aim of this study is to determine basal cortisol level that will predict critical illness-related corticosteroid insufficiency in septic shock and its predictive factors.

METHODOLOGY

We performed a prospective analysis of 70 patients who were admitted for septic shock. All subjects underwent short corticotrophin test with 250 mcg of corticotrophin within 48 hours of onset of septic shock. CIRCI was defined as an increase of serum cortisol of <250 nmol/L after administration of corticotrophin. The Acute Physiology and Chronic Health Evaluation II (APACHE II) and Sequential Organ Failure Assessment (SOFA) scores were used to assess severity.

RESULTS

Overall, the incidence of CIRCI was 51% (36/70). SOFA score ($p<0.001$), APACHE II score ($p<0.001$) and serum lactate ($p=0.02$) were significantly higher in patients with CIRCI. There was no significant difference in basal cortisol in both groups (CIRCI: 502.44 nmol/L \pm 257.14 vs no CIRCI: 526.32 nmol/L \pm 226.39) ($p=0.882$). A receiver operating curve (ROC) analysis performed calculated level of cortisol of 606 nmol/L (ROC curve: 0.542, sensitivity of 0.69 and specificity 0.38) (95%CI, 0.41–0.68). Multivariate analysis showed that only SOFA score was an independent predictor of CIRCI (OR: 2.54, $p=0.001$). ROC curve analysis calculated SOFA threshold of 5.5 with sensitivity 0.92 and specificity 0.71.

CONCLUSION

CIRCI is commonly found in septic shock. High SOFA score is the only independent predictor of CIRCI. Although basal cortisol alone cannot be used to predict CIRCI but the combination with other clinical parameters may be useful.