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Relationship between serum albumin and anion gap among patients admitted to intensive care units at Teaching hospital, Jaffna

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Background: Anion gap is a calculated parameter used to interpret acid-base disorders. For the clinical interpretation of anion gap, serum albumin which is the most abundant anion in human serum is not taken into account. Acid-base disorders and hypoalbuminemia are common findings among critically ill patients.

Objective: This study aimed to find the relationship between serum albumin and anion gap among patients admitted to Intensive Care Units (ICUs), Teaching hospital, Jaffna.

Method: This study was conducted among 48 patients admitted to medical and surgical ICUs, Teaching hospital, Jaffna. Serum albumin level was estimated by bromocresol green method. Serum electrolytes concentrations were obtained from patient's bed head ticket to calculate the anion gap. Simple linear regression analysis was performed.

Results: Of the 48 patients, 28 were from medical ICU and 20 from surgical ICU. Mean serum albumin levels of patients admitted to medical and surgical ICUs were 27.9 ± 6.0 g/L and 31.3 ± 5.1 g/L respectively and the mean anion gap was 12.7 ± 1.9 mmol/L and 13.4 ± 1.8 mmol/L respectively. Both serum albumin and anion gap among patients admitted to both ICUs were not significantly different among gender (medical ICU p=0.18, surgical ICU p=0.72 and among age groups I (21-40 years), II (41-60 years) and III (61-80 years) (medical ICU p=0.12, surgical ICU p=0.24). Hypoalbuminemia among total patients, patients admitted to medical ICU, and surgical ICU were 75.0%, 78.6% and 70.0% respectively. There was a significant (p<0.001) strong positive correlation (r) between serum albumin and anion gap among all patients (r=0.85), patients admitted to medical ICU (r=0.86), and patients admitted to surgical ICU (r=0.83). The slope of regression between serum albumin and anion gap exhibited 0.27-0.29 mmol/g/L (p<0.001).

Conclusion: Anion gap positively correlates with serum albumin. A variance of 0.27-0.29 mmol in anion gap for every 1g/L difference in serum albumin was observed. Therefore, anion gap could be adjusted for serum albumin. Future studies can be conducted on other parts of the country for validation.