

ABSTRACTS OF E-POSTERS RESEARCH AND AUDITS CONTD.

RP 05

Comparative Analysis of Albumin Measurement by Bromocresol Green Versus Capillary Zone Electrophoresis

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Introduction

Quantitative assessment of albumin and globulins in serum protein electrophoresis (SPE) relies on the calculation derived from total protein measurements obtained from the biuret assay. Validation of these results involves comparing sample albumin concentration assessed using the bromocresol green (BCG) method to those obtained from capillary zone electrophoresis (CZE). This study aimed to assess the relationship between albumin values derived from SPE and routine spectrophotometric analysis with BCG method, and to establish a cut-off value to identify significant differences between the two values in SPE validation process.

Methods

187 serum samples were subjected to total protein assessment by biuret method, albumin assessment by BCG method, and SPE by CZE method. SPE derived albumin level using total protein values and BCG method indicated albumin values were analyzed by correlation analysis. The standard error for the difference (SEd_{if}) between the two albumin results were calculated, with statistical significance set at $p < 0.05$. Internal and external quality assessments were deemed acceptable for all three analytical procedures.

Results

Mean albumin levels obtained via BCG and CZE methods were 38.3 mg/dL and 33.2 mg/dL, respectively, indicating a negative bias for the latter method. A strong correlation ($r=0.844$, $p<0.001$) was observed between albumin levels measured by BCG and CZE methods, with Bland-Altman analysis revealing an average negative bias of 5 mg/dL. Using SEd_{if} at 95% significance, the maximum acceptable difference between the two albumin values was determined to be -5.4 mg/dL.

Conclusions

BCG method yielded higher albumin results compared to CZE method. This positive bias could be attributed to potential lack of specificity of BCG assay for albumin. A maximum allowable difference of 5.5 mg/dL between the two methods is suggested. Exceeding this threshold indicates potential issues with either the BCG albumin assay, biuret total protein assay, or SPE assay, necessitating further investigation for assay reliability, particularly in reporting SPE by CZE.

Keywords

Bromocresol green, Capillary electrophoresis, Dye-binding, Albumin, Correlation