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Ektachem Slides Overestimate Serum Albumin in Patients with Nephrotic Syndrome

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Summary: In a non-selected patient population ($n = 140$), serum albumin concentrations obtained with Ektachem slides were very significantly correlated with results determined with serum protein electrophoresis on Olympus Hite 200. In 7 patients with nephrotic syndrome, however, no such correlation existed, concentrations on Ektachem being 20 to 200% higher (up to 16 g/l difference). In other samples, albumin concentrations on Ektachem were 10 g/l lower. Between-method differences appeared most closely correlated with the sum of α_1 - and α_2 -globulins as determined by serum protein electrophoresis. Immunonephelometric determination of various serum proteins demonstrated that haptoglobin concentrations most closely paralleled the observed between-method differences.

Introduction

Bromcresol green and, to a lesser degree, bromcresol purple are widely used "chromogens" for the rapid colorimetric determination of albumin in serum (1–6). In spite of its lower specificity, bromcresol green has often been preferred over bromcresol purple in commercial reagents (7–9). Arguments against bromcresol purple include:

- 1) underestimation of albumin in cases of renal insufficiency (10) and obstructive jaundice (11);
- 2) lesser precision and sensitivity of bromcresol purple assays because of the 2 times lower molar absorptivity for the bromcresol purple-albumin dye complex as compared with bromcresol green-albumin (9);
- 3) difficulties in the standardization and monitoring of bromcresol purple-based assays with non-human fluids, due to the fact that bromcresol purple – unlike bromcresol green – does not strongly bind to bovine serum albumin, often present in calibrators and quality control materials (9).

On the other hand, bromcresol green suffers from a more pronounced reactivity with various globulins (5). These undesirable side-reactions proceed, how-

ever, at a much slower rate. Consequently, by making spectrophotometric readings shortly after the addition of reagent, the specificity of bromcresol green assays for albumin is safeguarded, keeping it at a level comparable to that of bromcresol purple-assays (12–15).

Bromcresol green has been incorporated into Ektachem multilayer film elements (Eastman Kodak, Rochester, NY) for the automated and selective determination of serum albumin, especially in stat-situations (8, 9). With these slides, serum albumin concentrations were reported to compare well with results obtained with liquid reagents of similar composition (8, 9). In the present study, we compared serum albumin concentrations determined with Ektachem slides on an Ektachem 700XR instrument (Eastman Kodak) with those obtained by serum protein electrophoresis on cellulose acetate (Olympus Hite 200, Hamburg, Germany) in a number of clinical situations, including nephrotic syndrome. In patient groups, where the albumin results from Ektachem and serum protein electrophoresis appeared not to be significantly correlated, albumin concentrations were also determined by immunonephelometry (Behring Nephelometer Analyser, Behring, Marburg, Germany).