

Measurement of Serum Fructosamine as an Index of Glycated Protein in Patients with Nephrotic Syndrome and with Chronic Liver Diseases

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Objectives: To determine the usefulness of measuring serum fructosamine as a guide for glycaemic state in patients with acute and chronic liver diseases, chronic renal failure and nephrotic syndrome.

Design: Case-series study from 1st January 1998 to 30th September 1998.

Setting: Ibn Al-Ather Hospital, Central Virology Laboratory and Artificial Kidney and Dialysis Unit at Ibn-Sena Hospital.

Participants: A total of 200 normoglycaemic subjects including 40 healthy subjects (aged 11-66 years), 40 with acute liver diseases (6-72 years), 40 with chronic liver diseases (16-60 years), 40 with chronic renal failure on peritoneal dialysis (8-72 years) and 40 with nephrotic syndrome (9-50 years).

Main outcome measures: Measures were fasting plasma glucose, serum fructosamine, albumin and total protein. Correction of fructosamine concentration according to albumin level was done. Standard statistical methods, linear regression analysis and t-test (paired and unpaired) were used.

Results: The distribution of fructosamine in the control group showed a normal gaussian pattern with the reference range calculated as mean \pm 2SD was 1.53-2.21 mmol/l. A significant positive correlation was noted between fructosamine and albumin in the controls ($r = 0.615$, $P < 0.001$) and in patients with acute liver diseases ($r = 0.638$, $P < 0.001$) with no significant difference between measured and corrected fructosamine. In patients with chronic liver diseases, measured fructosamine was significantly higher ($t=6.25$, $P < 0.001$) with no significant correlation with albumin. Following correction according to albumin, the values were significantly elevated ($t=18.68$, $P < 0.001$) and so further deviated from the controls ($t=15.12$, $P < 0.001$). In patients with chronic renal failure, measured fructosamine was not significantly different from the controls with no significant correlation with albumin. Following correction, the values were significantly elevated ($t=6.04$, $P < 0.001$) and became significantly higher than the controls ($t = 3.63$, $P < 0.001$). In patients with nephrotic syndrome measured fructosamine was significantly lower ($t=7.31$, $P < 0.001$) with positive correlation with albumin ($r=0.779$, $P < 0.001$). Following correction, the values were significantly elevated ($t=13.99$, $P < 0.001$) and became not significantly different from control.

Conclusion: Measured serum fructosamine is a useful index of glycaemic state and requires no correction for albumin in normal subjects, in patients with acute liver diseases and with chronic renal failure. In patients with chronic liver diseases, measured fructosamine is not a good index for assessment of glycaemic state. Its usefulness is not improved and it is even worsened when correction for albumin concentration is made. In patients with nephrotic syndrome, measured fructosamine is also not a good index for assessment of glycaemic state as it underestimates the level of glycated protein. Its usefulness is improved following correction.