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Serum Beta2-Microglobulin as biomarker in early stages of chronic kidney disease

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BACKGROUND: Chronic kidney disease (CKD) is a global health problem with rising incidence. Serum creatinine (SCr) is insensitive to moderate reductions in glomerular filtration rate (GFR). Low molecular weight proteins like beta$_2$-microglobulin (BMG) are cleared by the plasma through glomerular filtration. Hence serum concentrations increase progressively with reduction of GFR.

OBJECTIVE OF THE STUDY: To correlate serum concentrations of BMG with creatinine and estimated GFR (eGFR) in patients with early stages of CKD.

MATERIALS AND METHODS: 74 adults in early stages of CKD were included based on eGFR, calculated using the 4 variable MDRD (Modification of Diet in Renal Disease) equation and albumin creatinine ratio. They were divided into four groups based on the stages of CKD. SCr was measured using Jaffes reaction with Rosche Hitachi P800 autoanalyser and serum BMG was measured using Calbiotech ELISA kit and compared using one way ANOVA, followed by post hoc Tukey's test and Pearson's correlation tests with SPSS version 16 software.

RESULTS: Levels of serum BMG were significantly elevated in all groups, ($p<0.01$) while SCr levels were in normal range in patients with eGFR >60ml/min/1.73m^2. Both BMG($r=-0.792$) and SCr($r=-0.913$) increased with reduction of eGFR ($p<0.01$). Correlation with eGFR in stage1 CKD showed serum BMG ($r=-0.824$, $p<0.01$) and SCr ($r=-0.362$) and in stage2 CKD, BMG ($r=-0.705$ $p<0.01$) and SCr ($r=-0.609$, $p<0.01$).

CONCLUSION: Serum beta2-microglobulin is elevated in asymptomatic patients with normal creatinine, thereby demonstrating its reliability in detecting early stages of CKD.