Original Article

Study of serum C-reactive protein, serum protein and urine protein in diabetes mellitus with and without chronic renal failure

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Abstract

Serum CRP (C-reactive protein), serum protein and urine protein were done in 50 patients of Diabetes Mellitus (DM) without Chronic renal failure (CRF), 50 patients of DM with CRF on Dialysis and 50 age and sex matched healthy control. Mean level of serum CRP and urine protein were significantly increased in DM without CRF group as compared to control, and DM with CRF on dialysis group as compared to control and DM without CRF group. While mean level of serum protein was significantly decreased in DM with CRF on Dialysis group as compared to control and DM without CRF group. Thus higher value of CRP and urine protein with lower serum protein suggest un-favourable condition aggravated by renal insufficiency and DM.

Key word: CRP, Serum protein, urine protein, DM, CRF

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INTRODUCTION

Diabetes mellitus (DM), the most common endocrine disorder is characterized by metabolic abnormalities and long-term microvascular and macrovascular complications. Renal involvement in diabetes mellitus is a leading cause of morbidity and mortality leading to end stage renal disease. Diabetes mellitus is the leading cause of end stage renal disease (ESRD) and is responsible for 30-40 % of all ESRD. Although Type 1 and Type 2 diabetes mellitus lead to ESRD, the great majority of patients are those with Type 2 diabetes mellitus.[1] Diabetic nephropathy is an important cause of morbidity and mortality and is now among the most common cause of end stage renal disease. However there is an early phase of diabetic renal disease called incipient diabetic nephropathy. Chronic renal failure (CRF) is a worldwide public health problem with adverse outcome. CRF is defined as kidney damage or glomerular filtration rate <60 ml /min/1.73m^2 for 3 months or more irrespective of the cause. Primary glomerulonephritis is the commonest cause of CRF in developing countries of the world where as diabetic glomerulosclerosis is emerging as the most common cause of CRF in developed Countries where life expectancy of diabetics has increased considerably as a result of better diabetic care. In view of such observations, the present study was conducted to estimate the serum CRP (C-reactive protein), serum protein and urine protein level in diabetes mellitus with and without chronic renal failure.

MATERIAL AND METHODS

Present observational study was conducted in Department of Biochemistry, Dr. Shankarrao Chavan Government medical college nanded on total of 150 adult subjects which included 50 healthy controls, 50 diabetes mellitus without CRF, and 50 diabetes mellitus with CRF on haemodialysis patients. While patients having liver disease, alcoholics, endocrine diseases, Hypertension, debilitating diseases like tuberculosis, cancers, AIDS etc were excluded from the study. Serum CRP, Serum protein and urine protein were estimated on selected patients. Serum CRP was measured by using CRP

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turbilatex kit of Beacon diagnostics onErbaChem -7semi-autoanalyzer based on agglutination of the latex particles coated with anti-human CRP. Serum protein was measured by using Biuret - end point method kit of bio lab diagnostics on ErbaChem -7 semi auto analyser. Urine protein was measured by using Pyrogallol red – end point method kit of bio lab diagnostics on ErbaChem-7 semi auto analyser based on binding of protein to pyrogallol red in presence of sodium molybdate and form a coloured complex.

Statistical Methods

ANOVA test has been used to find significance of association of Serum CRP, Serum protein and urine protein in above groups.

RESULTS

A comparison of Serum CRP, Serum protein and urine protein in controls, DM without CRF and DM with CRF on dialysis are presented in Table 1.

Table 1: Comparison of biochemical parameters between Control and Cases

Parameter	Controls	DM without CRF	DM with CRF on dialysis	p Value
CRP (mg/l)	0.64± 0.66	1.33± 0.93	14.76±8.63	< 0.0001
Protein (g/dl)	6.46± 0.61	6.43± 0.58	5.64± 0.46	< 0.0001
Urine protein (mg/day)	6.74± 7.31	49.14± 54.54	2658 ± 820.2	< 0.0001

In control group mean CRP level was 0.64± 0.66, mean serum protein level was 6.46± 0.61 and mean urine protein level was 6.74± 7.31 In DM without CRF group mean CRP level was 1.33±0.93, mean serum protein level was 6.43± 0.58 and mean urine protein level was 49.14± 54.54 In DM with CRF on dialysis groupmean CRP level was 14.76± 8.63, mean serum protein level was 5.64± 0.46 and mean urine protein level was 2658± 820.2. Mean level of CRP was significantly increased in DM without CRF group as compared to control, In DM with CRF on dialysis group as compared to control and DM without CRF group. Mean level of serum protein was significantly decreased in DM with CRF on Dialysis group as compared to control and DM without CRF group. Mean level of urine protein level was significantly increased in DM without CRF group as compared to control and In DM with CRF on Dialysis group as compared to control and DM without CRF group.

DISCUSSION

CRP in different groups

The results of the present study show that CRP level was significantly increased in DM without CRF group as compared to control and In DM with CRF on Dialysis group as compared to control and DM without CRF group. This increase in CRP level might be due of intermittent activation of the acute phase response during the dialysis procedure. It has been suggested also that aspects of the dialysis procedure, such as the water source, the type of dialyser, or other processes may cause inflammation. Another possible reason for CRP increase is infection and inflammation associated with renal failure. The reason why renal failure is source of infection has not been fully elucidated , but recent studied have shown that even at initial stages of CRF, the CRP level is elevated. Present study was consistent with the findings of various studies. In a study conducted by kaushikbhowmick, *et al* [2] shows significant increase in CRP in DM patients. Studies ofHaubitz M, Brunkhorst R[3]who has shown that highest values were in hemodialysis patients compared with peritoneal dialysis or conservative treatment groups. Caglar K, *et al*[4] and Pupim L B, *et al*[5] who have shown that the procedure of hemodialysis or other methods of renal replacement treatment prime, in diverse ways, the immune response and contribute to the formation of microinflammations although more longitudinal studies are needed to confirm this in CRF patients. Stenvinkel C, P, Wanner *et al* [6] who has shown that the majority of the studies where CRP was measured in CRF patients, reporting values of between 8 and 15 mg/l

Serum protein in different group

In present study serum protein level was significantly decreased in DM with CRF on Dialysis group as compared to control and DM without CRF group. The decreased level of serum protein in diabetes mellitus with CRF patients in the present study was presumably caused primarily by significantly higher excretion of urinary protein. Furthermore, other factors such as malnutrition, deficient protein intake seems the likely explanation.

Urine protein in different groups

In present study urine protein level was significantly increased in DM without CRF group as compared to control and In DM with CRF on Dialysis group as compared to control and DM without CRF group. Microalbuminuria marks the onset of endothelial dysfunction related to the kidney. Microalbuminuria is the earliest manifestation of diabetic nephropathy and predictor of incipient nephropathy in diabetic patients. study of Melidonis A, Tournis S[7] who has shown that urinary albumin levels were higher in DM patients with signs of nephropathy. Murussi M, Campagnolo N, *et al*; [8] who has shown in DM patients, the development of micro- or macroalbuminuria and mortality rates was independently and positively associated with higher

levels of albuminuria, although still in the traditionally established normal range.

CONCLUSION

From above discussion, study concludes that High values of CRP in DM with CRF on dialysis group should indicate an un-favourable condition – aggravated by renal insufficiency, diabetes, while a lower one should show a relatively good condition of their health, less aggravated by the above-mentioned parameters. Research interest focused on understanding the role of CRP and inflammation as well as the associated risk factors, may contribute to a better understanding the risk of morbidity and mortality in diabetes mellitus with CRF patients. In the present study we found the decreased level of serum protein in diabetes mellitus with CRF presumably caused primarily by significantly higher excretion of urinary protein. Furthermore, other factors such as malnutrition, inflammation, deficient protein and calorie intake seem the likely explanation. Efforts aimed at reducing sources of inflammation, maintaining nutrition may prove of value. Present study also found microalbuminuria in diabetes mellitus without CRF and macroalbuminuria in diabetes mellitus with CRF on conservative management and hemodialysed patients which suggest microalbuminuria is the earliest clinical sign of Diabetic kidney disease. Progression to macroalbuminuria is associated with increased progression of chronic kidney disease and chronic renal failure. Therefore all the diabetics should be regularly screened for microalbuminuria. This will provide an important opportunity to further improve the prognosis of individuals with diabetes mellitus.

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