STUDY OF SERUM URIC ACID, HBA1C AND URINARY MICROALBUMIN IN GERIATRIC PATIENTS OF TYPE 2 DIABETES MELLITUS IN AMRAVATI REGION

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ABSTRACT:- The present Study was planned to understand the relation amongst the serum uric acid, Glycosylated Hemoglobin (HbA1c) and urinary Microalbumin in geriatric type 2 diabetes patients.Thirty patient of type diabetes mellitus with age and sex matched controls were included. The study was conducted using a single center in serial camps organized by Diabetic Association of India, Amravati branch. We found multiple correlations (P<0.05) among the serum uric acid, HbA1c and urinary microalbumin in type2 Diabetes.

KEYWORDS: - Diabetes, Uric acid, HbA1c, Urinary Microalbumin

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INTRODUCTION:

Geriatric age is defined by various authorities, nations, states for different purposes and there is no general consensus about the exact numerical figure of geriatric age. However, for the purpose of this scientific study, 55 years and above is considered as a geriatric person. For such scientific study Thane defined the geriatric age as above 50 years (Thane;1978). Diabetes, also referred to as diabetes mellitus, describes   a group of metabolic disorders in which the person has high blood glucose, either because of inadequate insulin production or the body's peripheral cells don't respond properly to insulin or both. Patient with high blood glucose typically experience polyuria, become increasingly thirsty (polydipsia) and hungry (polyphagia) (Yum *et al*;2014). Uric acid is a waste product that is normally found in the blood. It is produced by the breakdown of ''Purines'' that are part of many foods (Bhole *et al*;2010). High levels of uric acid in blood can form crystals in the joints leading to gout. (Fukui *et al*;2008). When one eats, body pulls the glucose or sugar from those foods and uses it for energy. It eventually ends up in blood stream so that it can be carried to all parts of body. Some of the glucose that ends up in bloodstream attaches to the hemoglobin on red blood cells   and stay there for up to three months. Most of red blood cells are recycled

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after four months, so cells show only the past three month's history (Gill;2014). If elevated levels of Glucose are present in blood, as many people with diabetes do, then more of that sugar will be attached to red blood cells. The higher concentration of Glucose in the blood, the more the Glucose attaches to hemoglobin (Gill;2014) .Microalbuminuria is a well- known predictor of poor renal out come in patients with type II diabetes and in essential hypertension (Mogensen ;1984).

MATERIAL AND METHODS:

We selected 30 known geriatric diabetic type 2 patients from the diabetes camps and carried out the study on blood samples these patients. Equal number of age and sex matched normal healthy individuals were randomly selected as a control group, which was similarly investigated as study group. The study was conducted in a single diabetes center of India in serial camps organized by Diabetic Association, Amravati Branch . Serum uric acid was estimated by uricase/Pap method (Fossati *et al* ;1980). HbA1c was estimated by a Nycocard colour reflectometry (Japsson; 2002). Microalbumin was also estimated by Nycocard U

Albumin method (Gomes *et al*; 1997)).The results were presented as mean standard deviation. The correlations between microalbumin and other parameters were done using multiple correlation analysis (P<0.05 being defined as the limit of statistical significance).

RESULTS:

Thirty subjects included in the study, compared with control group values obtained for uric acid ,HbA1c and urinary microablumin are shown in the Table 1. The statistical analysis showed multiple correlations amongst uric acid, HbA1c and urinary microalbumin i.e., 4.23, P<0.05 proved multiple correlation in Type II diabetic patients(study group). The values obtained for uric acid, HbA1c and urinary microalbumin for control group was 7.21 (P>0.05) which proved no multiple relation among the uric acid, HbA1c and urinary microalbumin in control group. All variables are presented as the standard deviation. Multiple correlation tests were conducted to assess statistical multiple relation among uric acid, HbA1c and urinary microalbumin. Significant correlation was observed among the uric acid, HbA1c in type II diabetic Patients.

Table 1: Multiple Correlations

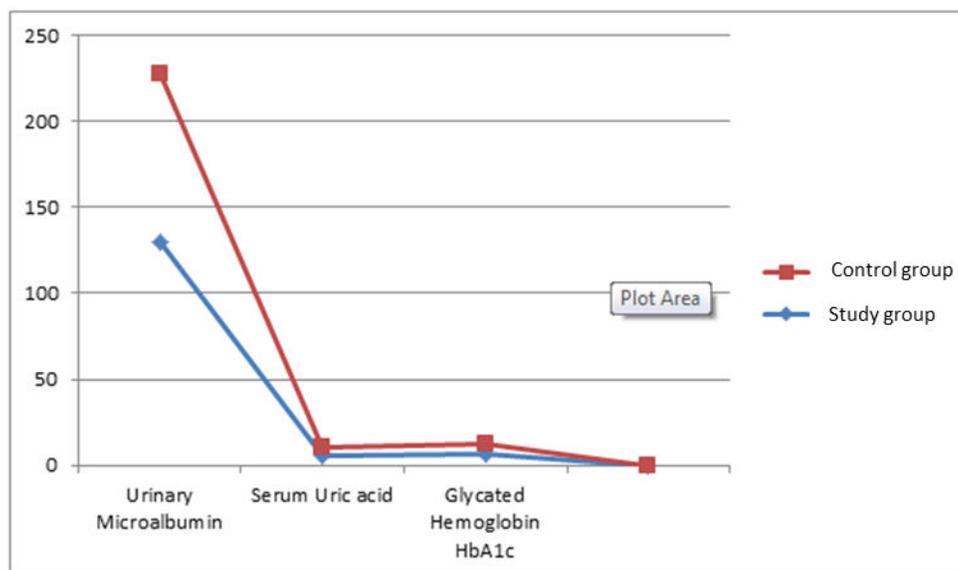| Sr No.	Biochemical Parameters	SD mean(Study Group)	Study group	SD mean (Control group)	Relation (Control Group)
1	Urinary Microalbumin	130 SD	4.23 Multiple Correlation (P < 0.05)	98 SD	No Multiple Correlation 7.21 (P>0.05)
2	Serum Uric acid	5.62 SD		4.71 SD	
3	Glycated Hemoglobin HbA1c)	6.83 SD		5.13 SD	

Figure 1. Graphic Representation Showing Multiple Correlation in study and control group

DISCUSSION:

The present study was carried out on samples of 30 patients of type 2 diabetes having more than four, five and six year's (4-6) duration of diabetes. Findings were tabulated and compared with study of other workers. Hyperuricemia is common among diabetic patients and it's easy to lower serum uric acid concentration with life style modifications and medications (Nakagawa *et al* ;2006). Serum uric acid concentration was higher in patients treated with insulin than in patients treated with oral hypoglycemic agents (Bhole *et al;*2010). No correlation was found between serum uric acid concentration and blood pressure in another study (Fukui *et al* ;2008). Community –based study has suggested that baseline HbA1c is a stronger predictor of subsequent diabetes and cardiovascular events than fasting glucose (Selvin *et al* ;2010). However , very few studies have focused on the relationship between an HbA1c (cut off value <6.5%) and hyper - filtration(American Diabetes Association ;2013).

Measurement of EGFR (Estimated Glomerular Filtration Rate) and detection of microalbuminuria are the main methods recommended by the (ADA) American Diabetes Association, the National Kidney Foundation and the International Society of Nephrology for the screening of DN(Diabetic Nephropathy) , (Kodoqu ;2007). However the UK prospective Diabetes study found that 51% of patients with T2DM without albuminuria subsequently developed chronic renal insufficiency (Perkin *et al*; 2009). Moreover, microalbuminuria does not necessarily lead to macroalbuminura, and in fact may regress spontaneously (Retnakaran *et al*; 2006). Microaluminuria is a marker of an increased risk of diabetic nephropathy in patients with Type 2 diabetes (Casper *et al*; 1999).

CONCLUSION:

In the present study we found multiple relations amongst uric acid, urinary microalbumin and HbA1c ingeriatric type 2 diabetic patients.

REFERENCES:

1. American Diabetes Association (2013): Standards of medical care in diabetes, Diabetes care .11:66.

2. Bhole, V, Jeewoong,J., Choi,S., Wokim, and Hyon, C.(2010): Serum uric acid levels and the risk of type 2 diabetes, HHS public Acces. 10:957-961.

3. Braz, J. (1997):Estimation of microalbumin, Microalbumin estimation by NycoCard U-Albumin method. Bio Res.30 (2): 191-196.

4. Casper, G.S.,Nicole, L., Harry,T.(1999) :Albumin in Type 1 Diabetic correlation with markers of endothelial function, Association with Diabetic Nephropathy and localization in Retinal Capillaries, Diabetes, 2446:2453.

5. Fossati,P.andPrencipe,L.(1980):Estimati on of serum uric acid, Uric acid estimation by Uricase/PAP method. Clin Chem. 26:27.

6. Fukui, M., Tanaka, M, Shiraishi E, Harusato,I, Hosod, H., Asano, M., (2008): Serum uric acid is associated with microalbuminuria and subclinical atherosclerosis in men with types 2 diabetes mellitus.Metabolism.57:625-9.

7. Gilles,G. (2014):Hemoglobin and Diabetes :How are They Related ? Very well, Manipal University.

8. Gomes,M.B.,Lucchetti,Concalves,M.F., Gazzolla,H.,Dimetz,Mattos,H.(1997):- Influence of first morning urine volume, fasting blood glucose and Glycated hemoglobin. Braz J,30.191-196.

9. Japsson, J.O. (2002): Estimation of Glycated Hemoglobin, Approved IFCC reference method for the measurement of HbA1c in human blood. NycoCard. Clin Chem: 78-87.

10. Kodoqu (2007): Clinical practice guidelines and clinical practice recommendations for diabetes and chronic kidney disease. AMJ kidney dis. S12-154.

11. Mogensen, C.E. (1984): Microalbumin predicts clinical proteinuria and early mortality in mature onset diabetes. The New England Journal of Medicine 310:356

12. Nakagawa, T, Hu, H. Zharikov, S. Tuttle, R. A., Glushakova, O. (2006): A causal role for uric acid in fructose – induced metabolic syndrome. 290.

13. Perkin, B. A., Krolewski, A. S. (2009) :Early nephropathy in type 1 diabetes . Nephrol Hypertens.18:223.

14. Retnakaran, R. , Cull, C. A. , Thorne, K., l. ,Adler ,A. I., Holman, R. R.(2006): Group U.S. Risk factors for renal dysfunction in type 2 diabetes. UK prospective diabetes study; 1822-9.

15. Selvin, E, Steffes. M. W., Zhu, H, Matsushita K., Wagenkhecht L., & Ponkow,K.(2010): Glycated hemoglobin, diabetes and cardio vascular risk in non diabetic adults. 362:800.

16. Thane, P., (1978);- History and sociology of aging .Social History of medicine 2(I) ; 93-96.

17. Yun, Y, H., Wei, Jing, B. Q. , & Xiao, H. W. (2014): Efficacy of blood glucose self-monitoring on glycemic control in patients with non-insulin- treated type II diabetes. International journal of nursing sciences. 5(22):32-34