Section A-Research paper

Correlation of diabetics with Serum biomarkers in subhimalayan diabetics: Hospital based, Cross sectional study.

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Background-According toInternational Diabetes Federation and World Health Organisation, endemic diabetes is growing challenges in developed & developing countries. In India about 8.7% diabetics, is estimated in age group of 20- 70 years. This Non communicable diseasesare mobilized by urbanization, unhealthy food intake & lake of physical workout.**Aim**-This study was conducted to correlate blood serum biomarker (HbA1C, urea, creatinine& uric acid) among diabetic& non-diabetics subjects. **Material and Method:**Out of 250 subjects: 200 subjects were recited in Study Group (Group A) as per diagnosis in medicine department & 50 in Control Group (Group B). Blood samples were collected for fasting blood sugar, HbA1C, urea, creatinine & uric acid with limit of age 35-60 years. **Result-** P-value of all the biomarkers showed statistically significant difference in both diabetics and non-diabetic group.**Conclusion-**This study showed that increasedserum biomarkers can be use to reduce the severity of diabetic nephropathy.

Introduction-According to the International Diabetes Federation(IDF)[1] and World Health Organisation, approximately 415 million adults between the ages of 20 to 79 years had diabetes mellitus in 2015[2]. Expected to rise by350 million up to2030 [3,4]. Diabetes mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycaemia [5]. It may be due to impaired insulin secretion, resistance to peripheral actions of insulin, or both. Chronic hyperglycaemia in synergy with the other metabolic aberrations in patients with diabetes mellitus can cause damage to various organ systems, leading to the development of disabling and life-threatening health complications, most prominent of which

are microvascular and macrovascular complications leading to a 2-4-fold increased risk of cardiovascular diseases [6]. The main subtypes of the DM are T1DM and T2DM, which classically results from defective insulin secretion or action. The T2DM affect middle-aged and older adults who have prolonged hyperglycemia due to poor lifestyle and dietary choices. The pathophysiology, presentation, and management are different for hyperglycemia [7].

Complications of diabetes and Diabetic Nephropathy

Uncontrolled diabetes mellitus can causehypoglycaemia, diabetic ketoacidosis, hyperglycaemic hyperosmolar state, and hyperglycaemic diabetic coma. Chronic microvascular complications are nephropathy, neuropathy, and retinopathy, whereas chronic macrovascular complications are coronary artery disease (CAD), peripheral artery disease (PAD), and cerebrovascular disease. It is estimated that every year 1.4 to 4.7% of middle-aged people with diabetes have a CVD event [8]. Notably, patients with DN and T1DM almost always present with other signs of diabetic microvascular disease (retinopathy and neuropathy) [9].

The different biomarkers are thus need of the hour so that the sensitivity and specificity of different biomarkers can be determined and thus mandatory to reduce the burden of chronic kidney diseases in the human population and [10] act as an indicator of response to treatment.

Material and method

This study was preceded in the Dept. of Biochemistry in collaboration with medicine department, Government Medical College, and associated **S.T.M. Hospital, Haldwani, Uttarakhand,** after the ethical clearance by **Shri Guru Ram Rai University, Dehradun, and Uttarakhand, India.**

Out of 250 subjects, 200 diabetic Miletus type 2 OPD and IPD patients were included as subjects to study group (Group A) of Internal Medicine, aged between 35 to 60 years. The 50 attendants of the patients who were non-diabetic were enrolled as control group (Group B) after the written informed consent.

Inclusion criteria:

Diagnosed type 2 diabetics patients of both gender (male and female) aged between 35-60**,** were enrolled with symptoms of Diabetes polyuria, polydipsia, and weight loss.

Exclusion criteria: Pregnant women, renal failure, acute illness red blood cell wall defects, hemoglobinopathies,cardiovascular diseases or medication which may interfere with the result assessments were excluded.

Methodology

Hospital based; Cross sectional study was proceededafter the collage Ethical approval.A detailed base line parameters were assessed including medical history, Body mass index (BMI), blood pressure in sitting position after signed informed consent.

Blood sampling-A volume of 5-10 ml of peripheral venous blood of all the subjects were drawn for biochemical and pathological analysis.

Biochemical Assays

Estimation of Urea levels: Urea levels were estimated using kinetic test kit based on urease and glutamate dehydrogenase method supplied by Roche, Diagnostics USA

Estimation of Creatinine levels: Creatinine levels were estimated using kinetic colorimetric test kit based on Creatinine Jaffe method supplied by Roche, Diagnostics USA.

Estimation of Uric Acid levels: Uric acid levels were estimated using an Enzymatic Colorimetric Uricase peroxidase method supplied by Roche, Diagnostics USA

Estimation of Glucose Levels: Glucose levels were estimated using an Enzymatic test kit based on Glucose Hexokinase method supplied by Roche, Diagnostics USA.

Estimation of HbA1c levels: HbA1c levels were estimated using kit turbidimetric inhibition immunoassay (TINA) supplied by Roche, Diagnostics USA.

HbA1c, Blood sugar fasting, Blood Urea, serum creatinine – Autoanalyzer method.method.

Statistical analysis- Data were analyzed using statistical ExcelMicrosoft 365 version.Quantitative data were expressed as mean± standard deviation(SD).Probability(P-value) is consider as <0.01 statistical significantto compare control group (Group -A) with study group (Group-B).

Result-

Table 1. Mean Anthropometric findings as per diabetic status

Variables	**Studycohort**			
	All(N=250)	Group-A(N=50)	Group-B(N=200)	P-value
Age (y)	51.68±6.2	49.5±6.0	52.43±6	0.031
Height (ft)	5.52±0.2	5.6±0.2	5.5±0.21	.769

Weight (kg)	79.4±10.8	71.4±6.8	82.3±10	<0.01
BMI(kg/m2)	27.66±3.2	24.7±1.5	28.7±3.0	<0.01

There was statistically non significant difference between the mean values of age and height but the weight and body mass index P-value shows statistical significant difference.

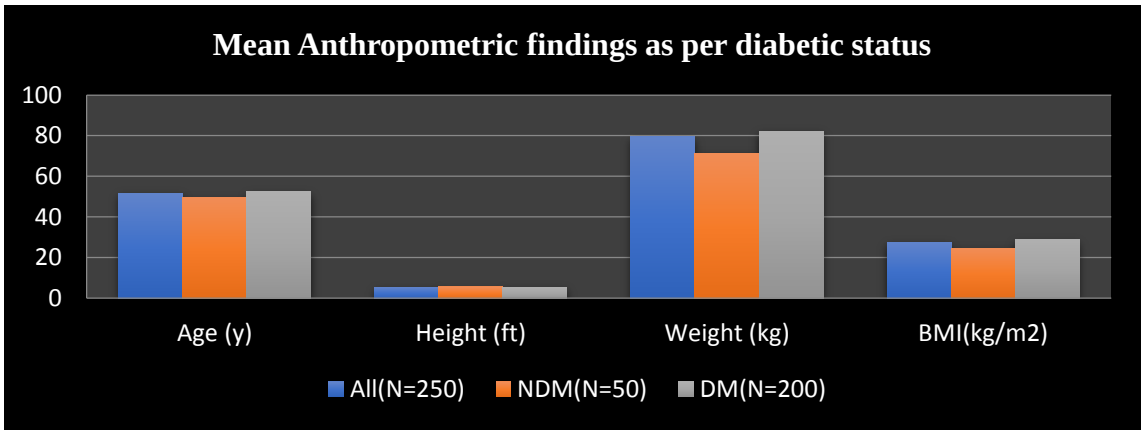

Figure 1

There was statistically non significant difference between the mean values of age and height but the weight and body mass index P-value shows statistical significant difference

Table 2. Blood Pressure findings as per diabetic status

Variables	**Studycohort**			
	All(N=250)	NDM(N=50)	DM(N=250)	P-value
Systolic BP	143.3±8.9	136±6.0	145±8.3	<0.01
Diastolic BP	88.22±7.3	82.1±3.1	90.4±7.1	<0.01
Diab. Duration(y)	6.31±4.3	---------	8.58±2.3	<0.01

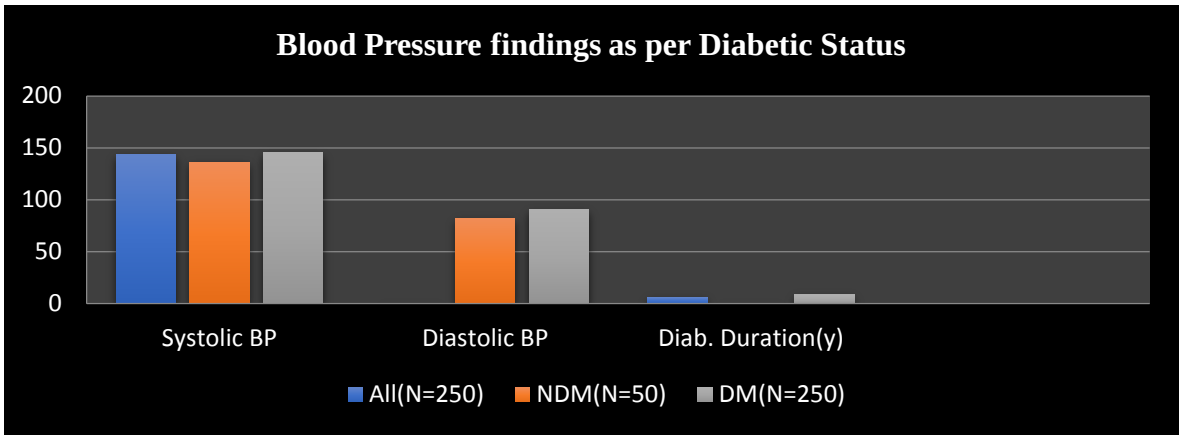

Figure 2

There was statistically significant difference between the mean values of Systolic blood pressure, Diastolic blood pressure and diabetes duration between study group and control group.

Table 3: Serum biomarkers of the study cohort

Variables	**Studycohort**		
	Group-A(N=50)	Group-B(N=250)	P-Value
FBG (mg/dl)	5.35±0.18	9.32±2.37	<0.01
HbA1c (%)	5.32±0.34	9.23±2.23	<0.01
Urea (mg/dl)	33.28±2.89	44.31±3.56	<0.01
S.Creat (mg/dl)	0.75±0.18	1.51±0.98	<0.01
Uric Acid(mg/dl)	4.44±1.40	9.61±5.76	<0.01

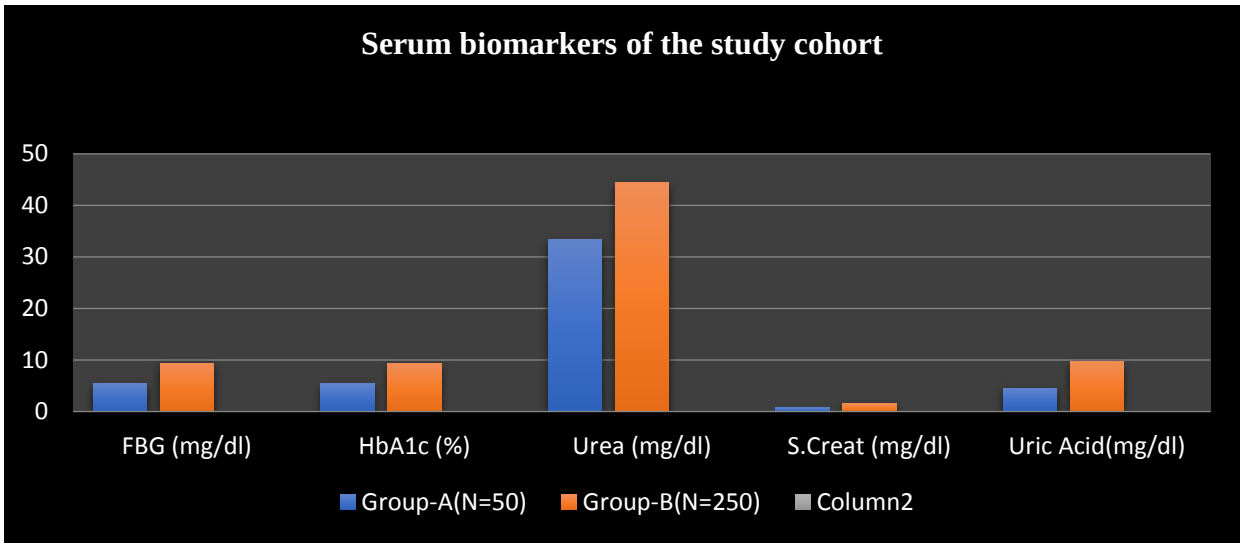

Figure 3

There was statistically significant difference between the mean values of fasting blood glucose, glycated haemoglobin, and serum creatinine, urea and uric level among diabetics and non-diabetics in our study.

Discussion-As perInternational Diabetes Federation (IDF),Diabetes Miletus is one of the leading causes of death by impaired renal function [1]. Measurement of serum biomarkers helps in early detection to prevent renal failure. So, this study was focused on the diabetic & non-diabetic group to compare diabetic neuropathy and prevent early neuropathy.

Serum creatinine: We observed a statistically significant correlation between diabetic and non -diabetic group levels in serumcreatinine, serum uric acid and serum glucose levels at univariate analysis. It was also observed that Serum creatinine and glucose levels were independent predictors of Diabetic Neuropathy. A study by Shemesh et al. [11] reported that in a reasonable proportion of patients with highly compromised serum creatinine concentration remained within the reference interval.

Serum uric acid: These findings agree with previous studies by Shah N et al. [12] and Kiconco R et al. [13] who found a positive association between hyperuricemia and DN in comparison to those without diabetes, and this attributed to the elevated glomerular filtration rate (GFR).

Fasting Blood Glucose: A study by Bakrisand Roett et al. [14, 15] noted that chronic hyperglycemia is significant risk factor of progression to nephropathy. This study observed a high blood glucose level,serum urea, creatinine & uric acid.

Glycosylated hemoglobin: In this present study, a significant difference was observed in the percentage of HbA1c in study group with and controlled group. As Nathan DM observed in study their study that chronic glycemia is the risk of renal complication which acts as silent killer [16].

Conclusion-This study showed a linear relationship serum creatinine, urea, uric acid with increased level of HbA1C in Diabetes millitus patients. Regular check-up can prevent the progression of diabetic nephropathy.So,this study concluded that HbA1C, serum creatinine, urea,uric acid serum are the predictive and preventive biomarkers to decrease nephropathy in diabetic patients.

Source of funding-Nill

Compliance with Ethical standards

Conflict of interest-No conflict of interest

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