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Research Paper

Evaluation of lipid profile in normotensive and hypertensive type-2 diabetic population in Rajasthan

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Abstract
Background: *The present study was aimed to evaluate the lipid abnormalities among type 2 diabetic subjects in hypertension.*
Introduction: *Diabetes mellitus, a major health concern throughout the world, is often coexisting with obesity, hypertension and dyslipidemia. Several studies have shown that dyslipidemia and hypertension, But interplay among them still to be elucidated.*
Material & Methods: *The present study includes of 500 type 2 diabetic subject & divided into two groups based on hypertension. Biochemical parameters such as total cholesterol (TC), triglycerides (TG), high density lipoprotein-cholesterol (HDL), and lipoprotein-cholesterol (LDL) were analysed in the department of biochemistry of NIMS medical college. Hypertension was taken according to definition of WHO; as systolic blood pressure (SBP) ≥140 mmHg and diastolic (DBP) ≥90 mmHg.*
Result: *The hypertensive type 2 diabetic subjects shows more TG levels than the normotensive type 2 diabetic subjects where as serum total cholesterol levels are higher in both the cases of normotensive & hypertensive type 2 diabetes subjects.*
Conclusion: *It can be concluded that hypertriglyceridemia highly significant in hypertensive type 2 DM.*
Keywords: *Diabetes mellitus, cholesterol, Hypertriglyceridemia.*

Introduction

Diabetes mellitus, a major health concern throughout the world, contributing significantly to mortality and morbidity, thus adversely affect the quality and length of life. The incidence and prevalence of type 2 diabetes are increasing day by day[1, 2], it is projected that the total number of people with diabetes will rise from 171 million in 2000 to 366 million by 2030[1]. This life threatening disease is often coexisting with obesity, hypertension and dyslipidemia[3]. But interplay among them still to be elucidated.

The number of adults with hypertension is predicted to increase by 60% to a total of 1.56

billion people by 2025. It affects approximately 70% of patients with diabetes and is approximately twice as common in persons with type 2 diabetes as in that without[4]. The prevalence of coexistent hypertension an type 2 diabetes varies across different ethnic, racial, and social groups. Importantly, hypertension in patients with type 2 diabetes causes a significant increase in the risk of vascular complications, and together both conditions predispose to chronic kidney disease[5,6]. The overlap between hypertension and type 2 diabetes substantially increases the risk of ischemic cerebrovascular disease, retinopathy, and sexual dysfunction[7]. Type 2 DM is also associated with dyslipidemia [8]. Hypertension is also associated with obesity [9] which are characterized by dyslipidemia [10]. But the factors contributing the hypertension in overweight to obese subjects are not fully known. Moreover, life style and genetic factors contribute to both hypertension and diabetes [11]. Like other developing countries, the prevalence of obesity and type2 DM is increasing day by day due to urbanization. These further exaggerating the hypertensive scondition. So the present study is designed to lipid abnormalities (TC, TG, HDL and LDL) in hypertensive type 2 DM.

Materials and Methods

The present study includes 500 adult type 2 diabeties mellitus patients with microalbuminuria coming to NIMS Medical College & Hospital, Jaipur were considered for the study. Based on blood pressure, they were divided into two groups. 250 normotensive patients were considered in Group A and 250 hypertensive patients were considered in group B.

Inclusion Criteria Cases

Diabetes mellitus, Age 26 to 65 years, Pressure ≥140/90, over weight to Obese patient and for Control Healthy subjects, No diabetes, Age 26 to 65 years, Pressure ≤140/90

Exclusion Criteria

1. Patients with infection.
2. Overt nephropathy.
3. Pre-existing kidney/ prostatic disease.
4. Congestive heart failure.
5. Pregnancy.
6. Receiving any hypolipidaemic drugs.
7. On oestrogen therapy.
8. Receiving ACE inhibitors or ARB’s.
9. On insulin therapy.

Results

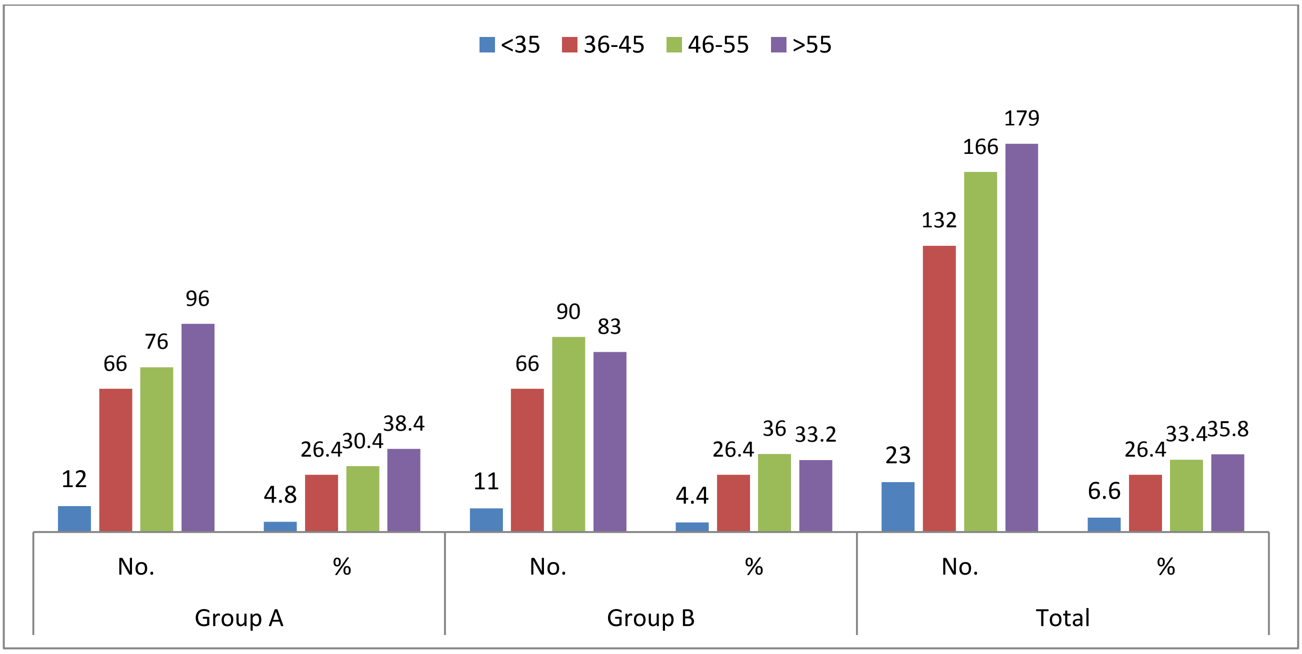
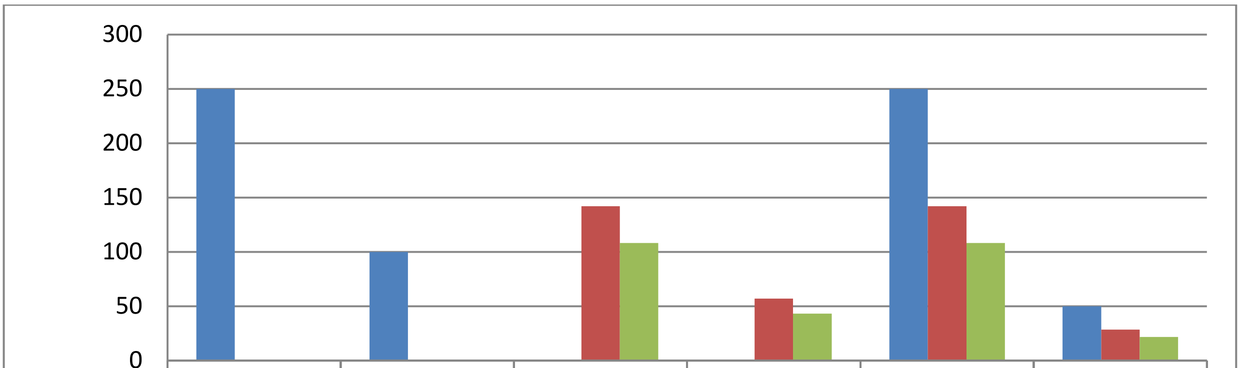


Fig:-1 Age wise distribution of patients

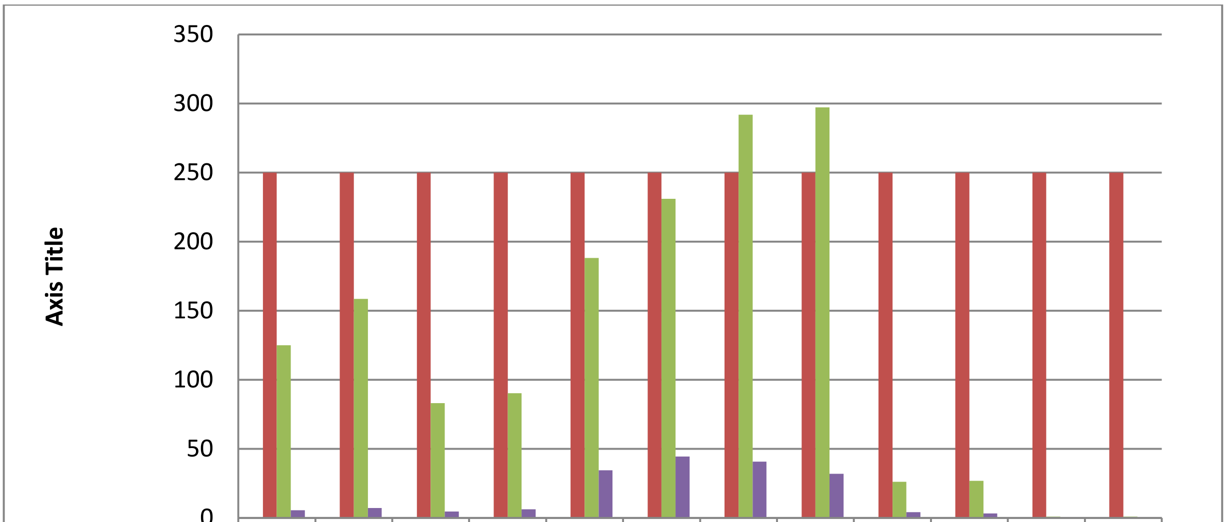
In this study the minimum age was 26 years old and maximum age was 65 years old. Out of total 500 patients, 58% were males while 42% were females. The table above shows that in normotensive diabetic group (Group A) patients were maximum in age group >55 (38%) whereas in hypertensive diabetic group (Group B). Maximum number of patients (36%) were in the age group of 46-55 years.



	No.	%	No.	%	No.	%
	Group A		Group B		Total	
Normal	250	100	0	0	250	50
Stage 1	0	0	142	56.8	142	28.4
Stage 2	0	0	108	43.2	108	21.6

Fig:-2 Distribution of patients according to Hypertension

This table shows that in group A all patients had normal blood pressure while in group B 142 (56.8%) patients had stage 1 hypertension and 108 (43.2%) had stage 2 hypertension.



	SBP		DBP		FBS		PPBS		UREA (mg/dL)		CREAT (mg/dL)	
Group	0	0	0	0	0	0	0	0	0	0	0	0
N	250	250	250	250	250	250	250	250	250	250	250	250
Mean	125	158.5	82.9	90.1	188	231	291.8	297	26.06	26.86	0.89	0.88
Std. Deviation	5.49	7.05	4.59	6.055	34.4	44.31	40.7	31.84	4.02	3.15	0.11	0.14

Fig:-3 Comparison of Clinical & Laboratory Variables in two groups

On applying statistics to the various values of 2 groups it was found that both group A and B Systolic blood pressure and Diastolic blood pressure were statically different (p<0.001) with SBP and DBP being higher in group B. While comparing FBS, PPBS, Urea and Creatinine, the

FBS was highly significant ($p<0.05$), Urea was statistically significant ($p<0.05$) & PPBS & creatinine was not statistically significant ($p>0.05$)

Table-1 Distribution of patients according to Lipid Profile

		Group A		Group B		X^2	P value	Inference
		No.	%	No.	%			
TC	Deranged	75	15	142	28.4	36.54	0.0001	HS
	Normal	175	35	108	21.6			
TG	Deranged	84	16.8	158	31.6	43.85	0.0001	HS
	Normal	166	32.2	92	18.4			
HDL	Deranged	75	15	150	30	45.45	0.0001	HS
	Normal	175	35	100	20			
LDL	Deranged	84	16.8	158	31.6	43.85	0.0001	HS
	Normal	166	32.2	92	18.4			

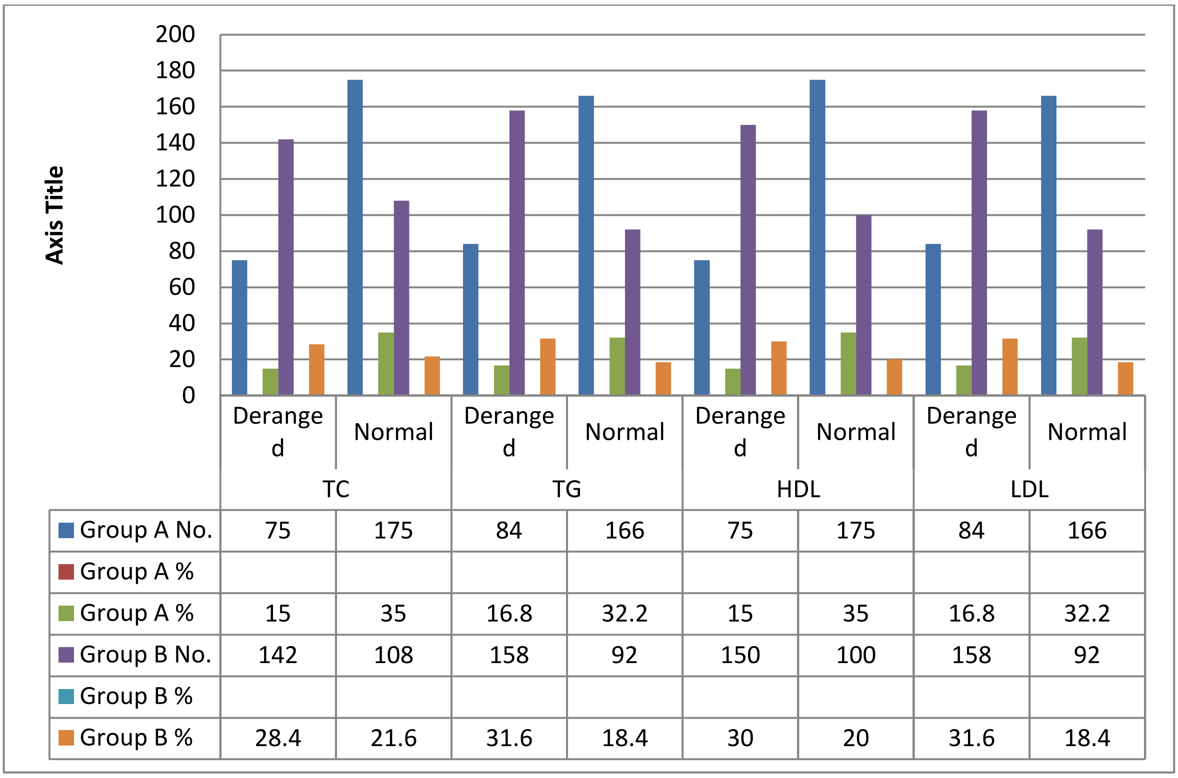


Fig:-4 Distribution of patients according to Lipid Profile

In our study overall 43.4% patients had deranged total cholesterol (TC) (i.e. >200mg/dl). In group A only 75 (15%) patients had deranged total cholesterol, while in group B 142 (28.4%) patients had deranged total cholesterol levels. The difference in both group on basis of TC was statistically highly significant with $P<0.05$. While calculating Triglyceride (TG) levels overall 48.4% patients had deranged TG levels (i.e. >150mg/dl). In group A only 84 (16.8%) patients had deranged Triglycerides while in group B 158 (31.6%) patients had deranged triglycerides levels. The difference in both group on basis of TG was statistically highly significant with $P<0.05$. While calculating HDL levels in both the group 45% patients have deranged HDL levels (<50mg/dl). In group A only 75 (15) patients had deranged HDL levels while in group B 150 (30%) patients had deranged HDL levels. The difference in both groups on the basis of HDL was statistically highly significant with $P <0.05$. Similarly, While calculating LDL levels overall 48.4% patients had deranged LDL levels (>100mg/dl). In group A only 84 (16.8%) patients had deranged LDL levels while in group B 158 (31.6%) patients had deranged LDL levels. The difference in both groups on the basis of LDL was statistically highly significant with P<0.05.

Discussion

In group A all patients had normal blood pressure while in group B 142 (56.8%) patients had stage 1 hypertension and 108 (43.2%) had stage 2 hypertension. Group A with SBP & DBP of 125±5.49 & 82.9±4.59 respectively as compared to both SBP & DBP (mm Hg) were higher in group B i.e. 158±7.05 & 90.1±6.055 respectively. When groups A & B were compared statistically there was highly significant difference in the mean values of SBP & DBP (p<0.001). There was no correlation of CRP with SBP in group A while when correlation coefficient (r) was applied there was statistically significant correlation of CRP with systolic blood pressure (SBP) (P<0.05) (r=0.6) in group B. Also there was no correlation of CRP with SBP in group A, While there was statistically significant correlation of UACR with systolic blood pressure (P<0.05) (r=0.158) in group B. On the other hand, there was no correlation found between CRP or UACR with diastolic blood pressure in both the groups.

The above mentioned data shows that systolic blood pressure is strongly correlated with CRP and UACR while diastolic blood pressure is not our finding is supported by Lakoski et al[12] who conducted a study in 6814 men and women ages 45 to 84 years old recruited in six U.S. communities and they concluded that systolic BP and pulse pressure, but not diastolic pressure, were associated with CRP (p=0.0001,0.0001 & 0.5 respectively).Similar study done by schillaci et al[13] in 135 newly diagnosed, never treated patients with hypertension and 40 healthy matched non-hypertensive controls concluded that among hypertensive patients, plasma CRP was related to 24-h systolic blood pressure (r=0.28, p<0.01) and pulse pressure (r=0.32, p<0.01), but not to diastolic blood pressure (r=0.12, p<0.2). Similar results were found in other studies done by stuveling et al[14], Tsioufis et al[15] and Nakamura et al[16].

Conclusion

Our study suggested that there is significant increase in the levels of triglyceride and total cholesterol of type 2 diabetic patients poor hypertensive rather than the normotensive. In conclusion, hypertriglyceridemia highly significant in hypertensive type 2 DM.

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