

Study on correlation between high density lipoprotein and cardiac markers in patients of type II diabetes mellitus complicated with hypertension

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Abstract

Problem statement: Diabetes mellitus is characterized by loss of the insulin-producing beta cells of the isolates of Langerhans is the pancreas, leading to insulin deficiency. In the early stage of type 2, the predominant abnormality is reduced insulin sensitivity. At this stage, hyperglycemia can be reversed by a variety of measures and medications that improve insulin sensitivity or reduce glucose production by the liver. Plasma homocysteine is considered to be a maker of endothelial dysfunction and suggested to be a causative factor for atherosclerosis and arterial stiffness. It is clear that hyperhomocysteinemia can promote atherosclerosis. **Methods:** A prospective short study was undertaken to find out the correlation between high density lipoprotein and cardiac markers in various age groups, this study was carried out randomly in 100 patients having Type-II Diabetic Mellitus complicated with hypertension who was attending the OPD in the department of Medicine in MGM Medical College & L.S.K. Hospital, Kishanganj. The duration of the study was, from June 2015 to October 2016. The data collection was carried out after selection of sampling unit according to the inclusion and exclusion criteria. The biochemical test parameters were measured using appropriate and standard with standard operating protocol in the clinical biochemistry laboratory of the institute. The SPSS statistical package was used for analysis. \pm standard deviation was recorded. P value <0.05 was considered significant. **Results:** The age of 100 cases enrolled in this study ranged between 17 to 76 years. The 2% of cases was of age group of <20 yrs., 18% were between 21 to 40 yrs, 55% were between 41 to 60 yrs. and 25% were >60 yrs. of age group. The majority of cases 62% were male and 38% were female. Suggesting that the type-II complicated with pretension is more common in males than the females. Out of 100 cases studied 22 patients were having abnormal homocysteine and HDL. Most of the patients with abnormal homocysteine and HDL is having positive CRP (19 out of 22 that means approximately 79%) however only 21% (3 cases out of 22) were having negative CRP. The 19 cases out of 22 having positive CRP, abnormal homocysteine and HDL, 15 were male and 4 were female. Out of these 19 cases having positive CRP abnormal homocysteine and HDL. One patient was of age group between 0-20 yrs., 4 were age group between 20-40 yrs., 8 were of age between 41 to 60 yrs. and remaining 6 were of >60 yrs. of age. Out of 3 cases having negative CRP with abnormal homocysteine and HDL, 2 were and 1 was female. The 2 cases of it was of age group between 41 to 60 yrs., 1 was of >60 yrs. of age. **Conclusion:** No significant correlation has been found between homocysteine level and CRP. There was significant correlation with HDL levels and CRP.

Key Word: Diabetes mellitus, Atherosclerosis.

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INTRODUCTION

The majority of type 1 diabetes is of the immune-mediated nature, in which beta cell loss is a T-cell-mediated autoimmune attack.¹ There is no known preventive measure against type 1 diabetes, which causes approximately 10% of diabetes mellitus cases in North America and Europe. Most affected people are otherwise healthy and of a healthy weight when onset occurs. Sensitivity and responsiveness to insulin are usually normal, especially in the early stages. Type 1 diabetes can affect children of adults, but was traditionally termed

“juvenile diabetes” because a majority of these diabetes cases were in children. “Brittle” diabetes, also known as unstable diabetes or labile diabetes is a term that was traditionally used to describe to dramatic and recurrent swings in glucose levels, often occurring for no apparent reason in insulin-dependent diabetes. This term, however, has no biologic basis and should not be used.² There are many reasons for type 1 diabetes to be accompanied by irregular and unpredictable hyperglycemias, frequently with ketosis, and sometimes serious hypoglycemia's, including an impaired counter-regulatory response to hypoglycemia, occult infection, gastroparesis (which leads to erratic absorption of dietary carbohydrates), and endocrinopathies (e.g., Addison's disease).² These phenomena are believed to occur no more frequently than in 1% to 2% of persons with type 1 diabetes.³

Type 2 diabetes mellitus is characterized by insulin resistance, which may be combined with relatively reduced insulin secretion.⁴ The defective responsiveness of body tissues to insulin is believed to involve the insulin receptor. However, the specific defects are not known. Diabetes mellitus cases due to a known defect are classified separately. Type 2 diabetes is the most common type.

In the early stage of type 2, the predominant abnormality is reduced insulin sensitivity. At this stage, hyperglycemia can be reversed by a variety of measures and medications that improve insulin sensitivity or reduce glucose production by the liver. Gestational diabetes mellitus (GDM) resembles type 2 diabetes in several respects, involving a combination of relatively inadequate insulin secretion and responsiveness. It occurs in about 2%-5% of all pregnancies and may improve or disappear after delivery. Gestational diabetes is fully treatable, but requires careful medical supervision throughout the pregnancy. About 20% - 50% of affected women develop type 2 diabetes later in life. Though it may be transient, untreated gestational diabetes can damage the health of the fetus or mother. Risks to the baby include macrosomia (high birth weight), congenital cardiac and central nervous system anomalies, and skeletal muscle malformations. Increased fetal insulin may inhibit fetal surfactant production and cause respiratory distress syndrome. Hyperbilirubinemia may result from red blood cell destruction. In severe cases, perinatal death may occur, most commonly as a result of poor placental perfusion due to vascular impairment. A 2008 study completed in the U.S. found the number of American women entering pregnancy with pre-existing diabetes is increasing. In fact, the rate of diabetes in expectant mothers has more than doubled in the past six years.⁵ This is particularly problematic as diabetes raises the risk of complications during pregnancy, as well as increasing

the potential for the children of diabetic mothers to become diabetic in the future. Pre-diabetes indicates a condition that occurs when a person's blood glucose levels are higher than normal but not high enough for a diagnosis of type 2 DM. Many people destined to develop type 2 DM spend may years in a state of pre-diabetes which has been termed “America's largest healthcare epidemic.”^{6,7} DM, Cooke DW *et al.* 2008.⁸ Latent autoimmune diabetes of adults (LADA) is a condition in which type 1 DM develops in adults. Adults with LADA are frequently initially misdiagnosed as having type 2 DM, bases on age rather than etiology. Some cases of diabetes are caused by the body's tissue receptors not responding to insulin (even when insulin levels are normal, which is what separates it from type 2 diabetes); this form is very uncommon. Genetic mutations (autosomal or mitochondrial) can lead to defects in beta cell function. Abnormal insulin action may also have been genetically determined in some cases. Any disease that causes extensive damage to the pancreas may lead to diabetes (for example, chronic pancreatitis and cystic fibrosis). Diseases associate with excessive secretion of insulin-antagonistic hormones can cause diabetes (which is typically resolved once the hormone excess is removed). Many drugs impair insulin secretion and some toxins damage pancreatic beta cells. The ICD-10 (1992) diagnostic entity, malnutrition-related diabetes mellitus (MRDM or MMDM, ICD-10 code E12), was deprecated by the World Health Organization when the current taxonomy was introduced in 1999.⁷

METHODOLOGY

A prospective short study was undertaken to find out the correlation between high density lipoprotein and cardiac markers in various age groups among patients attending Medicine OPD an diabetic clinic in M.G.M. Medical College and L.S.K. Hospital, Kishanganj, Bihar.

Study design: A prospective short study.

Study area/setting: Medicine OPD and Diabetic Clinic in M.G.M. Medical College and L.S.K. Hospital, Kishanganj (Bihar). Patients were heterogeneous and immigrated from different districts and states.

Study duration: The duration of the study was, from June2015 to October 2016.

Data Collection: The data collection was carried out after selection of sampling unit according to the inclusion and exclusion criteria. The biochemical test parameters were measured using appropriate and standard with standard operating protocol in the clinical biochemistry laboratory of the institute. The SPSS statistical package was used for analysis. \pm standard deviation was recorded. P value <0.05 was considered significant.

Study Population: A prospective short study was undertaken to find out the correlation between high

density lipoprotein and cardiac markers in various age groups, this study was carried out randomly in 100 patients having Type-II Diabetic Mellitus complicated with hypertension who was attending the OPD in the department of Medicine in MGM Medical College and L.S.K. Hospital, Kishanganj.

RESULTS

Table 1: Distribution of patients with negative CRP with abnormal Homocysteine and HDL

Sex	CRP (-ve), abnormal Homo. and HDL
Male	2
Female	1

P Value = 0.56(non-significant)

Table 2: Distribution of study patients with positive CRP abnormal Homocysteine and HDL according to sex

Sex	CRP (+ve) abnormal Homo. and HDL
Male	15
Female	4

P Value = 0.011 (significant)

Table 3: Distribution of study patients having positive CRP with normal Homocysteine and abnormal HDL according to age group

Age Group	CRP (+ve) abnormal HDL and normal Homo.
0 - 20	0
21 - 40	3
41 - 60	12
>60	5

P Value = 0.001 (significant)

Table 4: Distribution of Total Cholesterol in the study population According to age group and family history

Age Group	Positive Family H/O	Negative Family H/O
0 - 20	2	0
21 - 40	11	7
41 - 60	24	31
>60	10	15

P Value = 0.21 (non-significant)

Table 5: Distribution of total cholesterol in the study population According to age group

Age Group	Normal	Boarder Line High	High
0 - 20	2	0	0
21 - 40	15	2	1
41 - 60	40	8	7
>60	20	3	2

P Value = 0.92 (non-significant)

Table 6: Distribution of LDL in the study population according to age groups

Age Group	Normal	Boarder Line High	High	Very High
0 - 20	2	0	0	0
21 - 40	15	3	0	0
41 - 60	43	11	1	0
>60	20	3	2	0

P Value = 0.66 (non-significant)

Table 7: Distribution of TG in the study population according to age group

Age Group	Normal	Boarder Line High	High	Very High
0 - 20	2	0	0	0
21 - 40	16	2	0	0
41 - 60	47	7	1	0
>60	22	2	0	1

P Value = 0.87 (non-significant)

DISCUSSION

The study was conducted to establish any correlation between high density lipoprotein and other cardiac markers in subject of Type-II DM complicated with HT. this study was carried out randomly in 100 patients having Type-II Diabetic Mellitus complicated with hypertension who was attending the OPD in the department of Medicine in MGM Medical College and L.S.K. Hospital, Kishanganj.

The age of 100 cases enrolled in this study ranged between 17 to 76 years. The 2% of cases was of age group of <20 yrs., 18% were between 21 to 40 yrs, 55% were between 41 to 60 yrs. and 25% were >60 yrs. of age group. The majority of cases 62% were male and 38% were female. Suggesting that the type-II complicated with hypertension is more common in males than the females (Table and Fig.-1).

Out of 100 cases studied 22 patients were having abnormal homocysteine and HDL. Most of the patients with abnormal homocysteine and HDL is having positive CRP (19 out of 22 that means approximately 79%) however only 21% (3 cases out of 22) were having negative CRP. The 19 cases out of 22 having positive CRP, abnormal homocysteine and HDL, 15 were male and 4 were female. Out of these 19 cases having positive CRP abnormal homocysteine and HDL. One patient was of age group between 0-20 yrs., 4 were age group between 20-40 yrs., 8 were of age between 41 to 60 yrs. and remaining 6 were of >60 yrs. of age. Out of 3 cases having negative CRP with abnormal homocysteine and HDL, 2 were male and 1 was female. The 2 cases of it was of age group between 41 to 60 yrs., 1 was of >60 yrs. of age. Majority of patients (79%) abnormal homocysteine and HSL had some inflammation causing positive CRP however only few cases were not having inflammation but were having abnormal homocysteine and HDL.

Out of 100 cases studied 20% of the cases were having positive CRP and abnormal HDL but normal homocysteine. 13 out of them were male and 7 were female. Out of these 20 cases, 3 were of age group 21 to 40 yrs., 12 were of 40 to 60 yrs. and 5 were of >60 yrs. of age group.

Out of 100 cases studied only 3% of the cases were having positive CRP, abnormal homocysteine and normal

HDL, 1 out of 3 as male and 2 were female. Out of 3 cases, 1 of age group 41 to 60yrs. and 2 were of age group >60yrs.

77% of the cases were having normal Total Cholesterol, 12% were having borderline high T. Cholesterol and only 10% were having high Total Cholesterol levels. Among the normal Total Cholesterol levels, 2 cases were of age group 0-20yrs., 15 were of between 21-40yrs., 40 were of between 41 to 60yrs., and 20 cases were of >60 yrs. of age group. Among the borderline high Total Cholesterol none of them were of age <20rs., 2 were of age group 21 to 40 yrs., 8 were of 41 to 60 yrs., and 3 were of 60yrs., among between 21 t 41yrs., 7 were of 41 to 60 yrs. and 2 were of >60 yrs. of age.

CONCLUSION

The present work entitled ‘study the correlation between HDL and cardiac markers in patients of type-2 diabetic mellitus complicated with Hypertension had been carried out on 100 subjects chosen randomly from the OPD in the department of Medicine of MGM Medical College and L.S.K. Hospital, Kishanganj (Bihar) in the year 2011-2012.

No significant correlation has been found between homocysteine level and CRP. There is significant correlation with HDL levels and CRP.

REFERENCES

1. Rother KI (April 2007). “Diabetes treatment – bridging the divide”. The New England Journal of Medicine 356 (15): 1499-501.
2. “Diabetes Mellitus (DM): Diabetes Mellitus and Disorders of Carbohydrate Metabolism: Merck Manual Professional”. Merck publishing. April 2010.
3. Dorner M, Pinget M, Brogard JM (May 1977). “Essential labile diabetes”. MMW Munch Med Wochenschr (in German) 119(19): 671-4.
4. Shoback, edited by David G. Gardner, Dolores (2011). Greenspan’s basic and clinical endocrinology (9th ed.) New York: McGraw-Hill Medical. pp. Chapter 17. ISBN 0-07-162243-8.
5. Lawrence JM, Contreras R, Chen W, Sacks DA (May 2008). “Trends in the prevalence of preexisting diabetes and gestational diabetes mellitus among a racially/ethnically diverse population of pregnant women, 1999-2005”. Diabetes Care 31(5): 899-904.
6. Handelsman Y, MD. “A Doctor’s Diagnosis: Prediabetes”. Power of Prevention 1 (2).
7. “Definition, Diagnosis and Classification of Diabetes Mellitus and its Complications” (PDF) world Heath Organization. 1999.
8. Cooke DW, Plotnick L (November 2008). “type 1 diabetes mellitus in Pediatrics”. Pediatric Rev 29 (11): 734-84; quiz 385.

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