Original Research Article

Prevalence of anemia and dyslipidemia in patients with Diabetes Mellitus Type 2

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Abstract

Introduction: Diabetes is the leading cause of dyslipidemia and is associated with excessive cardiovascular morbidity and mortality. Anemia is common among those with diabetes and greatly contributes to patient outcomes. Observational studies indicate that low hemoglobin levels in such patients may increase risk for progression of kidney disease and cardiovascular morbidity and mortality in diabetic patients.

Aim: The aim of the study was to find prevalence of anaemia and dyslipidemia in our population of patients with diabetes.

Materials and methods: This was a descriptive analytical cross-sectional study carried out in GMERS Medical College and Hospital, Valsad. Total 100 consecutive patients with diabetes were enrolled and serum lipid profile, blood sugar estimation and complete blood count of all patients were done. All the results were noted and analysed statistically.

Results: Anemia was present in 44% diabetic patients and 53% of the patients were dyslipidemics out of 100 patients in our study. Anemia and dyslipidemia were significantly higher in patients with diabetes, chronic kidney disease and diabetes with chronic kidney disease.

Conclusion: Anemia and dyslipidemia was more prevalent in patients with diabetes and diabetes associated with chronic kidney disease. Correction of anemia may have a significant role in prevention of other diabetic complications.

Key words

Hemoglobin (Hb), Diabetes mellitus (DM), Dyslipidemia.

Introduction

Diabetes mellitus (DM) is a common metabolic disease [1]. Anaemia is a frequently associated in patients with type 2 diabetes [2, 3]. This reflects the pivotal role of the kidney in the control of hemopoiesis, in sensing changes in tissue oxygenation, and subsequently in stimulating hemopoietic precursors in the bone marrow through the production of erythropoietin by peritubular interstitial fibroblasts of the renal cortex and outer medulla. Uremia is associated with a range of hemopoietic stressors including reduced red cell survival, occult blood losses, malnutrition, and systemic inflammation. However, the failure of the kidney to increase erythropoietin release in response to a decreasing hemoglobin (Hb) level appears to be the key contributor to the development of renal anemia [4, 5]. The prevalence of anaemia in cross-sectional studies of patients with diabetes is in the region of 14 to 23% (anemia defined as Hb <13g/dl for men and <12g/dl for women) [2, 6, 7]. Anemia is associated with a more rapid decline in the GFR and is considered to be an important cardiovascular risk factor [8-10]. It is therefore important to diagnose and correct anemia. Dyslipidemia is one of the most important cardiovascular risk factor that co-occurs with diabetes and it can be termed as diabetic dyslipidemia. The aim of this study was to determine the prevalence of anemia and dyslipidemia in diabetics.

Materials and methods

The proposed study was conducted at the GMERS Medical College, Valsad during April 2017 to June 2017. The subjects for the study were included 100 adult patients with age more than 20 years and having diabetes attending the OPD or admitted in ward (IPD) of Hospital.

Blood specimens were collected for fasting glucose (FSG), Post prandial blood sugar (PPBS) and lipid profile measurements which includes total cholesterol (TCHOL), triglyceride (TG), high density lipoproteins (HDL-C), low density lipoproteins cholesterol (LDL-C) levels. All the biochemical analysis was performed and findings were recorded.

Operational definitions used in present study are as follow. Dyslipidemia means abnormal lipid profile consists of the following abnormalities either singly or in combination. These include triglyceride (TG) levels ≥ 150 mg %, high density lipoprotein cholesterol (HDL-C) (for men ≤ 40 mg% and women ≤ 50 mg%), low density lipoprotein cholesterol (LDL-C) ≥ 100 mg% [11-13]. Also considered abnormal is an elevated total cholesterol level ≥ 200 mg% [12]. Definition for anemia hemoglobin values <13.0 g/dl for men and <12.0 g/dl for women (14). Statistical analyses were performed with the SPSS version 20.

Results

Out of 100 diabetic patients studied, 66 (66.00%) were male and 34 (34.00%) were females. They were from 24 to 72 years of age. Total 41 (41%) patients were between 51-60 years of age, 39 (39.00%) were of 41 to 50 years of age, 5 (5.00%) were more than 60 years of age and only 2 patients were less than 30 years of age as per **Table – 1**.

If <13 mg/dl was taken as cut off for male and <11 mg/dl was taken as cut off for women, total 44 out of 100 subjects (44%) turned out to be anemic, which include 31 female and 13 male. According to our study, female were more prone to anemia than male (p= <0.05). Total 53 (53%) patients were dyslipidemic as per **Table – 2**. Of the combined lipid abnormalities, the combination of elevated LDL and reduced HDL-C was the prevalent abnormality as this was detected in 15 subjects.

Discussion

Diabetes mellitus, a common metabolic disorder, which accounts for a high incidence of morbidity leads to various events including micro and macro vascular complications [15]. Diabetes is characterized by a state of chronic hyperglycemia resulting from a diversity of

etiologies, environmental and genetic, acting jointly [16]. In our study the levels of TC and LDL-C were significantly higher in female as compared to male diabetic patients. This finding is in agreement with the previous studies [15, 18-23]. Hyperlipidemia in females may be attributed to the effects of sex hormones on body fat distribution, which leads to differences in altered lipoproteins [23]. Reduced HDL was also noted mostly in females as compared with males which were similar to study by Cook, et al. [24].

Table – 1: Age and sex wise distribution of study population.

Age (in years)	Male	Female	Total	
	No of cases	No of cases	No of cases	%
21-30	01	01	02	2.00
31-40	10	03	13	13
41-50	20	19	39	39
51-60	31	10	41	41
61-70	03	01	04	04
71-80	01	00	01	1.00
Total	66	34	100	100

Table – 2: Dyslipidemic profiles in study population.

Variables	Male	Female	Total
	No. of cases	No. of cases	No. of cases
HDL (M - <40 mg %, F - <50 mg %)	02	04	06
LDL (>100 mg %)	12	15	27
Triglyceride (>150 mg%)	05	07	12
TCHOL (>200 mg%)	03	05	08
Total	22	31	53

We report elevated LDL-C and reduced HDL as the prevalent lipid abnormalities in our study. Similar findings had been noted in a recent Nigerian report [25] and that carried out in an African-American population [24]. A Kenyan report [26] on the lipid abnormalities in DM had elevated cholesterol and LDL as the commonest lipid abnormalities noted in their study. The relationship between insulin resistance and compensatory hyper insulinemia may partly explain the afore-stated scenario [27].

Insulin resistance often leads to increased intracellular hydrolysis of triglycerides and release of fatty acids into the circulation and the resultant inability of fat cells to store triglyceride is the initial step in the development of dyslipidemia.

Conclusion

In our study, the prevalence of anemia was increased in patients with diabetes and diabetes associated with chronic kidney disease. Women with diabetes had increased prevalence of anemia than men. In patients with diabetes, anemia is primarily a risk factor for CKD.

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