Correlation between diabetes mellitus and hyperlipidemia in patients with ischemic heart disease

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Abstract

Diabetic is commonly associated with abnormalities in plasma lipids and lipoproteins levels .In particulars, diabetes mellitus, usually presents with concomitant elevations in the plasma triglycerides levels and reductions in plasma HDL-cholesterol concentration. These abnormalities certainly play a role in the increased risk for cardiovascular disease, particularly ischemic heart disease (IHD). Blood samples were taken from (150) healthy control subjects (86 male and 64 females), (150) patients suffer from previous signs of IHD (84 males and 66 females) were involved in this study. The blood samples from these groups were analyzed for measuring serum total cholesterol, triglycerides, phospholipids, low-density lipoprotein, very low density lipoprotein, high- density lipoprotein and fasting blood glucose .All control subjects have a normal fasting blood glucose, normal resting electrocardiograph, blood pressure and serum lipids. Diabetics have been shown to have high levels of serum lipids than non diabetics and it also important role in the occurrence of IHD particularly in hyperlipidemic patients.

العلاقة بين مرض السكري وفرط الدهون لدى مرضى احتشاء عضلة القلب

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المستخلص

هناك علاقة وثيقة بين مرض السكري واضطرابات الدهون والبروتينات الدهنية في الدم وخاصة الارتفاع في مستويات الجيلسيريدات الثلاثية وانخفاض البروتينات الدهنية عالية الكثافة والكولسترول وتلعب هذه التغيرات دورا اساسيا في زيادة الاصابة بامراض القلب وخاصة احتشاء عضلة القلب. تم اخذ عينات دم من 150 أصحاء (86 ذكور و64 أناث) و 150 مريض (84 ذكور و 66 أناث) شاركوا في هذا البحث. تم تحليل العينات لمعرفة كميات الكولسترول الكلي والجليسيريدات الثلاثية والدهون المفسفرة والبروتينات الدهنية واطئة الكثافة والواطئة الكثافة جدا والعالية الكثافة وكلوكوز الدم بعد الصيام كما ان جميع الاصحاء لديهم الكلوكوز بعد الصيام الاعتيادي وكذلك تخطيط القلب وضغط الدم والدهون في الدم ، اما في حالات المرضى فقد تبين ان لديهم نسب عالية من دهون الدم اكثر من غير مرض السكري كما ان هناك دور اساسي لوجود امراض القلب وخاصة المرضى ذوي الدهون العالية .

Introduction

Diabetes is associated with marked increase in ischemic heart disease (IHD)[1]. The form of dyslipidemia, that is most characteristic of the diabetes has increased triglyceride and decreased HDL-Cholesterol level [2,3]. In many studies, the dyslipidemia in type II diabetic subject relative to nondiabetic subjects is more severe in women than in men [2], which is consistent with the relatively greater risk of IHD in diabetic women than in diabetic men [1,4].Insulin resistance results in impaired capacity to catabolize chylomicrons and VLDL as well as excess hepatic triglyceride and VLDL production [5] and may be present in nondiabetic, usually obese, people who are still able to secrete sufficient insulin to maintain control of blood sugar, but in such people there is often hypertriglyceridemia with low HDL-Cholesterol and hypercholesterolemia, hypertension and increased risk of IHD [6].

Diabetes particular (NIDDM) is commonly associated with abnormalities in plasma lipid and lipoproteins levels. In particular NIDDM usually presents with concomitant elevations in triglyceride (TG) and reduction in the plasma high density lipoprotein–Cholesterol (HDL-Cholesterol) [7] .The regulation of plasma (TG) and (HDL-Cholesterol) concentration is extremely complex, numerous genes regulating the synthesis of apoliploprotein, lipid enzyme and receptors. The environment, particularly factors related to energy balance, has a major impact on lipoprotein metabolism as well. [8]

The present report describes the correlation between diabetes mellitus and hyperlipidemia in ischemic heart disease in both sexes.

Subjects and methods

The study group conducted on 150 patient with IHD, their age ranging between 20 to 79 years and 150 aged matched healthy control subjects. The IHD group comprised of patients with myocardial infarction, and angina pectoris admitted to the cardiac care unit (CCU) of Saddam general hospital – Tikrit from November 1999 to July 2000. The healthy control group subjects were volunteers. They had normal resting electrocardiogram (ECG), had no history of IHD, hypertension (HT) or diabetes mellitus (DM). Patients were considered diabetic if having a definite history of diabetes mellitus and received the specific treatment before admission to the hospital or when fasting blood glucose more than one occasion of more than 140 mg/dl [9]. Ten ml venous blood was collected from each patient and control subjects after 12-hour fast. Sera were separated and divided into aliquots. Glucose and lipids (triglycerides, total cholesterol, high and low density lipoprotein cholesterol (HDL- and LDL-Cholesterol) measurements were done on fresh sera using kit from bioMeriux Charbonnier- les France with calibrators.

Results

The distribution of diabetics in IHD at upper limit of lipids showed in the Figure (1), while in IHD with hyperlipidemia as in Figure (2) and also in the Table (1) The figures revealed the frequency of diabetics in the females were more than males. It was also found that females diabetics suffered from IHD with hyperlipidemia were higher than IHD at upper limit of lipids. In our study diabetes mellitus represented as (19.5%) of the male among IHD cases at upper limit of lipids, and (27.91%) in IHD with hyperlipidemia are diabetics, we also found that in females were (22.5%), (28.57%) respectively as shown in the Figure (1and 2).The relationship of diabetes mellitus on hyperlipidemia and IHD was statistically insignificant in the both sexes.

Discussion

Diabetes mellitus is a relatively common chronic disease in the developing countries. In these countries it is not associated with an increased risk of IHD .In countries where IHD is prevalent, diabetes is associated with the two- fold increase in the risk of a major IHD event [10]. It is generally recognized that serum lipids and lipoproteins concentrations of diabetics were highly variable. This might be attributed to the heterogeneity of the disease and other associated factors such as

metabolic control, insulin sensitivity of the patients, insulin dose and the way of its administration (for type I diabetes mellitus), and the amount of body fat. In addition the presence or absence of renal disease and different genetic or exogenous factors, normally influencing serum lipoprotein, also play a role in the dyslipidemia of diabetes [11].

The elevation of triglycerides level and reduced concentrations of HDL-cholesterol are very common in patients with diabetes particularly NIDDM [12]. These abnormalities certainly play a role in the increased risk of cardiovascular disease. Duan et al. [13] found that the prevalence of hypertension, diabetes mellitus and hyperlipidemia were (17.2%), (4.6%) and (27.4%) respectively and they also showed that the prevalence of hypertension and diabetes mellitus increased with age. These finding indicate that aging is an important risk factor to the prevalence of hypertension, diabetes mellitus and hyperlipidemia, while Carmena et al. [14] reported that metabolic control might influence serum lipids in type I (IDDM) but not type II (NIDDM) patients, and rationalized that this fact is related to the effect of insulin deficiency. Al-Hamadani [15] found that 19.76 % of the males and 24.48 % of females were diabetics.This is in contrast to our study which showed that males with pervious signs of IHD at upper limit of lipids was 19.5 % and in males with pervious signs of IHD with hyperlipidemia was 27.91%, while in females, 22.5 % and28.57 %respectively. The higher percentage shown in this study may due to drug mismanagement, which increased the prevalence of uncontrolled diabetes mellitus. It is interesting to note that diabetes mellitus was strong predictor of hypercholesterolemia and hypertriglyceridemia in the analysis. Elevated triglycerides and lowered HDL-cholesterol have been consistently observed in patients with non –insulin-dependent diabetes mellitus (NIDDM). Elevated LDL–cholesterol was observed in some studies [16] but not in others [17].

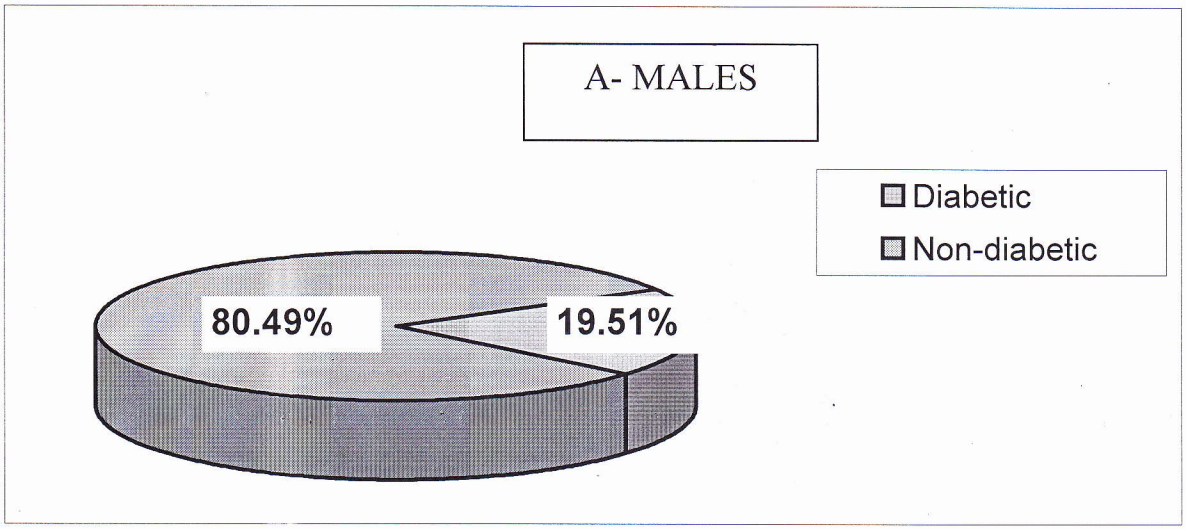
Conclusion

In conclusion our study indicates as in previous studies, that diabetes mellitus play an important role in the incidence of ischemic heart disease.

Table (1): The proportion of (IHD) cases compared to control group according to history of Diabetes Mrllitus

History of Diabetic	Males No (%)*			Females NO(%)*			Total
	Control	IHD at upper limit of lipids	IHD with hyperlipidemia	Control	IHD at upper limit of lipids	IHD with hyperlipidemia	
Diaabetic	0	8 (91.51)	12 (27.91)	0	7 (22.5)	10 (28.57)	37
Not Diabetic	86	33 (80.49)	31 (72.09)	64	24 (77.42)	25 (71.43)	263
Total	86	41	43	64	31	35	300

Figure(1):The proportion of the IHD cases at upper limit of lipids according to history of diabetes mellitus



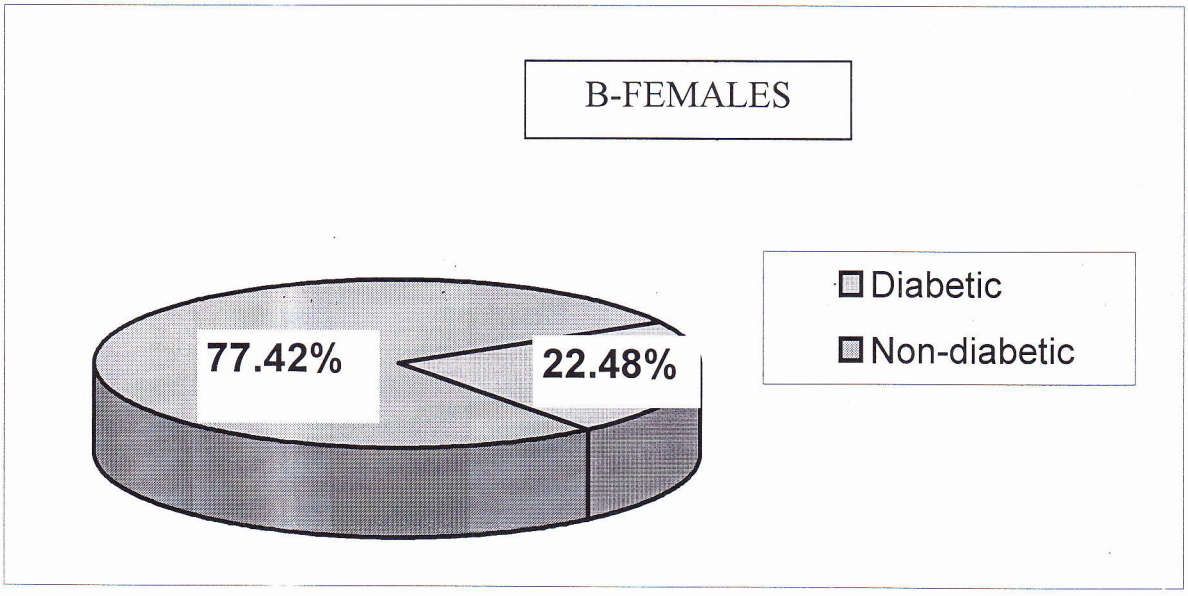
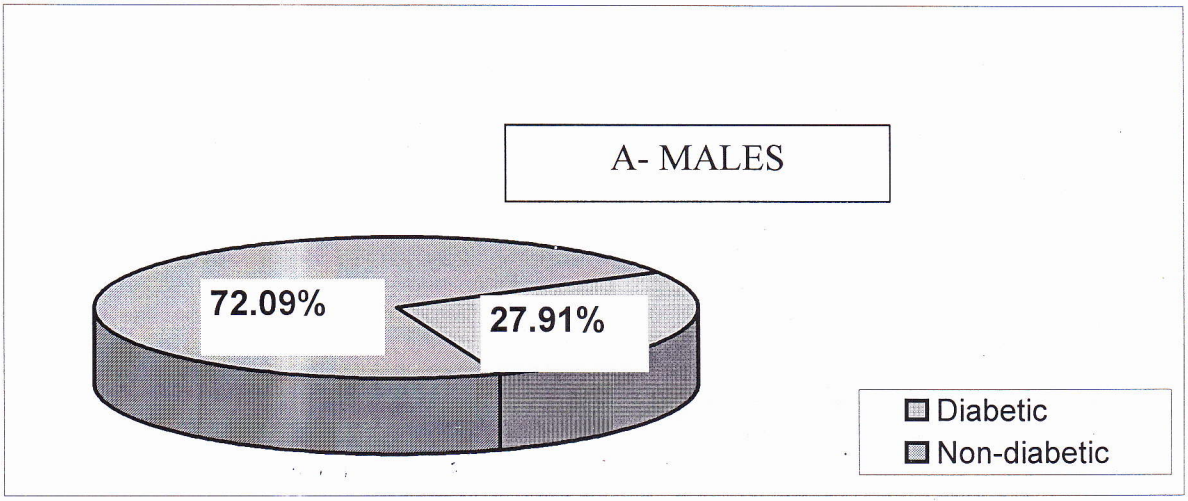
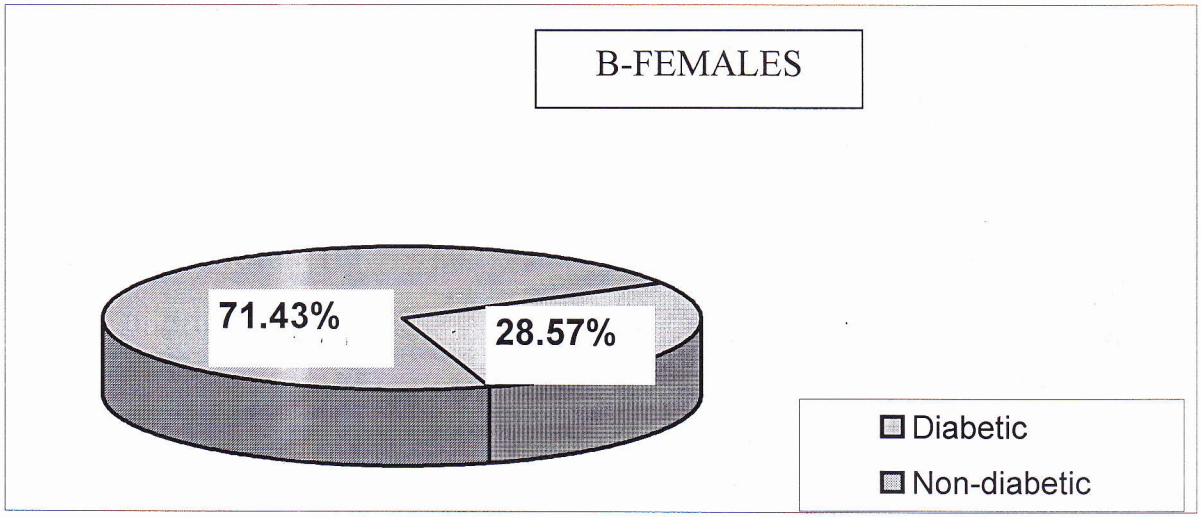


Figure (2):The proportion of the IHD cases with hyperlipidemia according to history of diabetes mellitus





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