Fasting LIPID PROFILEs , and Risk of MYOCARDIAL INFARCTION

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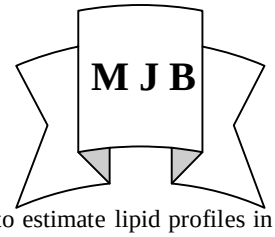

Abstract

The present study was conducted to estimate lipid profiles in MI patients. It was found significant elevation for total cholesterol , LDL, and triacylglycerides levels, while HDL level decrease significantly , and the incidence of these abnormalities in females more than males patients. However VLDL was found to have positive correlation with total cholesterol and triacylglycerides. The results also showed increase total cholesterol /HDL ratio that consider as a good indicator for the prognosis of atherosclerosis and CAD. Our data indicated that abnormal lipid profiles represent a useful marker for risk of CAD.

الخلاصة

تم تصميم الدراسة الحالية لتقدير معالم الدهون لدى المرضى المصابين باحتشاء العضلة القلبية. لوحظت زيادة معنوية في كل من مستوى الكولسترول الكلى وكولسترول البروتين ألشحمي الواطئة الكثافة والثلاثيات الكليسيرايد بينما لوحظ نقصانا معنويا في مستوى كولسترول البروتين ألشحمي العالي الكثافة. وأظهرت النتائج إن حدوث معظم هذه التغيرات لدى الإناث كان أكثر من الذكور. ولوحظت أيضا علاقة ارتباطيه لكولسترول البروتين ألشحمي الواطئة الكثافة جدا مع الكولسترول الكلى والثلاثيات الكليسيرايد. كما وأظهرت النتائج زيادة عامل الخطورة الذي اعتبر مؤشر جيد لتشخيص مرضى تصلب الشرايين ومرض القلب الوعائي . تشير النتائج إلى أن معالم الدهون الغير طبيعية تعتبر كمؤشر لخطورة أمراض القلب الوعائية.

Introduction

Myocardial infarction (MI), more commonly known as a heart attack, is a medical condition that occurs when atherosclerotic plaque slowly builds up in the inner lining of a coronary artery and then suddenly ruptures, totally occluding the artery and preventing blood flow downstream [1].The resulting ischemia or oxygen shortage cause damage and potential death of heart tissue [2]. MI diagnosis at the end of the spectrum of

myocardial ischemia or acute coronary artery syndromes [3] , classical symptoms include chest pain, the pain may radinte to one or both arms, there may be association with anxiety , sweating and breathlessness [4].

Many factors, such as hypertension, diabetes mellitus and hyperlipidemia contribute to the developing of coronary artery disease (CAD) and MI [5] . Risk factors and lipid profile help to determine risk of (CAD) [6].

Lipid profile is a group of blood test conducted by a healthcare provider to calculated various lipid in patients blood [7].The lipid profile includes total cholesterol, high density lipoprotein (HDL) often called good cholesterol, low density lipoprotein (LDL) , often called bad cholesterol , and triacylglycerides [8].Cholesterol is a type of lipid in fat, its produced by body and also comes from food (animal product), it is a major component of the atherosclerotic plaque that is associated with MI [9] . VLDL, LDL, HDL, and chylomicron which responsible for transported triacylglycerides and cholesterol through out the body. LDL provide cholesterol to the tissue, while HDL system transfer cholesterol to the liver which then excreted in bile [10]. While chylomicrons that comprises from 10% cholesterol and 90% triacylglycerid [11] , responsible for transporting dietary cholesterol and triacylglycerid to the rest of the body [12]. Elevated levels of cholesterol and LDL with lower level of HDL are associated with an increased incidence of MI [13].

Subjects and Methods

Subjects with myocardial infraction (n-13) males with-mean age (47.84) and (n-12) females with mean age (63.75) admitted to Merjan Teaching Hospital, as well as the control group consisted of (n-25) healthy person with no history of myocardial infraction. They were (n-13) male, their mean age about (42.78) and (n-12) female with mean age about (45.75). Venous blood samples were collected, from them. Blood samples were centrifuged at (3000 xg),then the serum obtained was kept at 4 C° until the time of analysis, for determination of lipids profile parameters.

To measure the levels of total cholesterol, triacylglycerides, HDL-cholesterol, LDL-cholesterol, and VLDL-cholesterol as well as total cholesterol to HDL cholesterol ratio, all participants were asked to fast for 12-14 hours.

Total cholesterol[14], triacylglycerides[14], and HDL-cholesterol [15] were determined by using commercially available kits (Biomegreb kit, iMorocco kit). LDL-cholesterol, and VLDL-cholesterol was calculated using the following formula that developed previously , in which: Total cholesterol = (HDL-cholesterol) + (VLDL-cholesterol) + (LDL-cholesterol (fasting)) and VLDL-cholesterol = triacylglycerides / 5.

Results and Statistical Analysis

As shown in table (1), total cholesterol , triacylglycerides , LDL and VLDL increased while HDL decrease significantly in MI patients when compared with appearantly healthy control.

Linear regression analysis of lipid profiles indicated significant positive correlation of VLDL with total cholesterol and triacylglycerides ($r = 0.485$, $p<0.05$ and $r = 0.752$, $p < 0.0025$) , figures (1 , 2) respectively, and negative correlation of HDL with age ($r = -0.764$,$p <0.0025$) figure (3) . In addition to that linear regression analysis of lipid profile with sex did not show any significant statistical correlation .

All values were expressed as mean± standard deviation (SD). Student's *t*-test was used to estimate differences between the groups and differences were considered

significant when the probability was ($p< 0.05$).

Discussion

The incidence of heart disease is strongly associated with serum cholesterol and LDL concentrations [16].The results of present study show that total cholesterol and LDL concentrations were increased significantly , while HDL was low. High total cholesterol levels are a major contribute to CAD[17], because hypercholesteremia causes endothelial damage and it becomes more permeable admitting lipid and cholesterol in to the intema, then plaque formation [18]. In addition to that excess LDL levels contribute to the build up of atherosclerotic plaque [19], However the increase total cholesterol and LDL incurrent study suggest the development of endothelial dysfunction precedes the development of overt atherosclerosis in MI patients . while low levels of HDL failed to clear cholesterol from arteries in to the liver to removed from the body [20]. Comparing of these results with previous finding showed marked consistence [21,22, 23].

Our results also indicated significant elevation of serum triacylglycerides and VLDL then the controls. Our data suggest that there are a complex metabolic interrelationships between the triacylglycerides and VLDL[24] , , because triacylglycerides levels are elevated in the setting of decrease lipoprotein lipase (LPL) activity, this lead to high chylomicron remnant and VLDL (both of which may be atherogenic) and lower HDL levels (which clearly promote atherogenesis [25], positive correlation of very low density lipoprotein with triacylglycerides inpresent study confirm this hypothesis . [26, 27] suggested that chylomicrons and VLDL may also play a role in atherosclerosis , while [28] suggested that elevated fasting triacylglycerid are strongly associated with risk of MI .

However it can be indicated that increase triacylglycerides was independent risk factor for coronary heart disease [29], but hypertriacylglyceridemia was occurred mainly as lipoprotein disorder [30].

Ratio of total cholesterol to HDL cholesterol well established as predictor of CAD [31]. High ratio that have been reported in present study may be a good indicator of abnormal total cholesterol metabolism[32], moreover our data suggested that increase this ratio associated with increase risk of MI, and may provide valuable additional information about which the atherogenic potential of lipid profiles.

One of the most important finding that increase incident of hyperlipidemia in females more than males, Indeed females naturally higher level of HDL and lower of total cholesterol due to higher estrogen levels[33], and this in consistence with our finding , because most females in this study were menopause and the differences disappear after menopause [34] . Our finding also show negative correlation between HDL and age.

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Table (1): Lipid profiles in myocardial infarction patients and control group.

	Males					Females				
	control		MI patients			control		MI patients		
	Mean ± SD	No.	Mean ± SD	No.	P. value	Mean ± SD	No.	Mean ± SD	No.	p. value
Total cholesterol (mg/dl)	157±39.5	13	187.5±44.09	13	o.o5	134±33.51	12	204.5±22.5	12	0.0003
Triacylglycerides (mg/dl)	76±35.52	13	248±72.89	13	0.0008	66±26.59	12	251±43.47	12	0.0005
HDL (mg/dl)	40±11.97	13	30±9.66	13	0.05	38.2±5.67	12	25.5±8.96	12	0.007
LDL (mg/dl)	89.4±22.4	13	100.5±18.19	13	0.05	73.6±30.69	12	102±12.42	12	0.05
VLDL (mg/dl)	19±10.83	13	52±35.17.11	13	0.05	13±9.42	12	50±8.5	12	0.0003
Total cholesterol/HDL	3.3	13	5.7	13	0.005	3.7	12	8.4	12	0.05

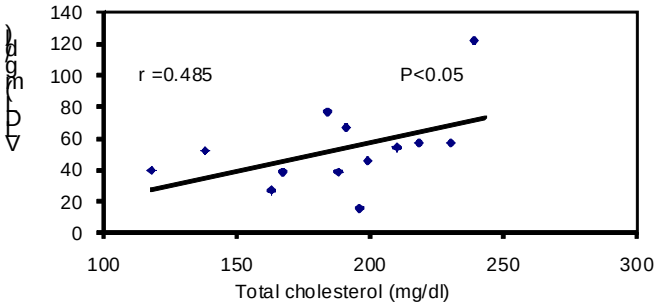

Figure 1: Correlation of serum total cholesterol concentrations with VLDL in MI patients

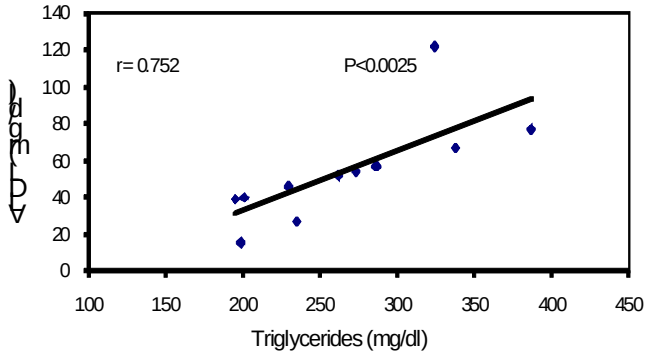

Figure 2: Correlation of serum tiglycerides with VLDL concentrations in MI patients

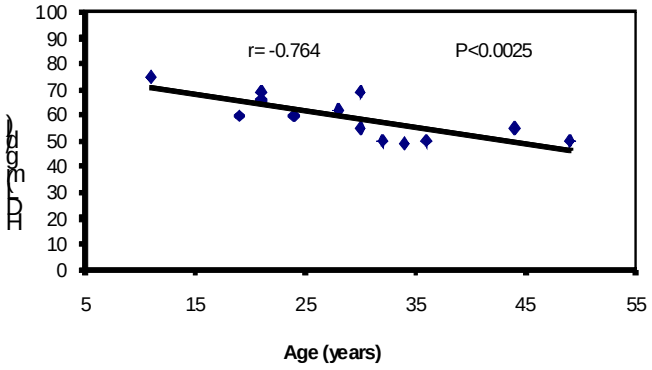

Figure 3: Correlation of serum HDL concentration with age in MI patients