Original Article

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FREQUENCY OF DYSLIPIDAEMIA IN YOUNG PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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ABSTRACT

Objective: To study the frequency of dyslipidaemia in young patients aged between 20-40 years, with Acute Myocardial Infarction in our population.

Study design: Descriptive study

Place and duration of Study: Coronary Care Unit (CCU) of Armed Forces Institute of Cardiology (AFIC)/ National Institute of Heart Diseases (NIHD), Rawalpindi from December 2008 to May 2009.

Subjects and Methods: *One* hundred patients of acute myocardial infarction (AMI) fulfilling the World Health Organization (WHO) diagnostic criteria of AMI, having ages between 20-40 years, were included in the study after full informed consent using non-probability consecutive sampling. Blood samples for serum lipid profile were taken after 12 hours fasting (within 24 hours of presentation), and analyzed in laboratory of AFIC. Individual patients' results were compiled with respect to age, gender, serum total cholesterol, serum triglycerides, serum low density lipoprotein (LDL) cholesterol, serum very low density lipoprotein (VLDL) cholesterol and serum high density lipoprotein (HDL) cholesterol. The data was entered in SPSS (version 11.0) and analyzed.

Results: Of the 100 patients with AMI, 47 were found to have dyslipidaemia. Hypertriglyceridaemia was the most common lipid abnormality as it was found in 32 (68.1%) patients; followed by raised serum VLDL, hypercholesterolemia, raised serum LDL and low serum HDL found in 25 (53.2%), 16 (34.0%), 4 (8.5%) and 2 (4.3%) patients respectively. Out of 47 patients with dyslipidaemia, 28 (59.6%) had more than one lipid abnormality.

Conclusion: Frequency of dyslipidaemia in young patients with AMI in our population is high.

Keywords: Acute Myocardial infarction, Dyslipidaemia, Frequency , Young patients.

INTRODUCTION

Ischaemic heart disease (IHD) is the leading cause of morbidity and mortality all over the world and is likely to become the most common cause of death worldwide including Pakistan by the year 2020[1,2]. The most life threatening manifestation of IHD is Acute Myocardial Infarction (AMI) and the incidence of AMI is increasing in our population[3]. IHD had traditionally been considered as a phenomenon of middle and old age but is not uncommon in younger age groups. The disease seems to follow an accelerated course with ischaemic events occurring a decade earlier in Pakistani population compared to those reported from developed world[4]. Young patients with AMI have multiple risk factors for IHD. Some of these factors like age, gender, family history and race cannot be changed and are therefore called "fixed factors" while others such as smoking, diabetes mellitus, hypertension and dyslipidaemia can be modified[5]. Dyslipidaemias are the third most common and major modifiable risk factor for IHD after smoking and lack of regular exercise[4,6,7]. Increased levels of serum triglycerides, lipoprotein cholesterol especially LDL, VLDL and low levels of HDL cholesterol contribute to atherosclerosis in IHD[8,9]. The incidence is highest in patients with premature IHD in whom dyslipidaemia is present in 80-88% of cases, compared to approximately 40-48% in age-matched controls without IHD[10]. Epidemiologic data reflects a continuous, graded relationship between the serum total cholesterol concentration and risk of IHD[10]. This stands true even for younger men (those under the age of 40)[11].

LDL cholesterol particles are especially important in causation of atherosclerosis[12] and the risk of IHD can be reduced by reducing LDL cholesterol levels. Hypertriglyceridemia

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also increases risk for cardiovascular disease[13,14]. A low level of HDL is associated with increased risk of atherosclerosis and overt IHD[15], while a high serum HDL (above 60 mg/dl or 1.6 mmol/l) is cardio-protective[16, 17].

The significance of this study is to determine the frequency of dyslipidaemia in young patients with AMI in our population so as to plan primary and secondary prevention of the disease.

SUBJECTS AND METHODS

This descriptive study was carried out in the Coronary Care Unit (CCU) of Armed Forces Institute of Cardiology (AFIC)/ National Institute of Heart Diseases (NIHD), Rawalpindi in collaboration with department of pathology AFIC, from December 2008 to May 2009. Hundred (n=100) patients admitted to CCU of AFIC/NIHD fulfilling the WHO diagnostic criteria of AMI, either male or female, having ages between 20-40 years were included in the study by non-probability consecutive sampling after approval of hospital ethics committee and full informed consent of the patients. Patients having diabetes mellitus, renal failure, hypothyroidism; those with history of smoking and alcohol intake, pregnant ladies and patients taking drugs like statins, thiazide diuretics, carbamazepine, estrogen and cyclosporine and foreign nationals were excluded form the study.

Diagnosis of AMI was made on the basis of symptoms, signs and ECG changes. Cardiac markers including CK-MB were sent to laboratory in all patients. Venous blood samples for serum lipid profile were taken in the morning after 12 hours fast (within 24hours of presentation) and immediately sent to AFIC laboratory. The sera were then analyzed by enzymatic colorimetric technique for lipid profile, i.e. serum total cholesterol, LDL cholesterol, HDL cholesterol and triglycerides concentration. The VLDL cholesterol was calculated using the Friedewald formula (taking care of its limitations in greatly raised triglyceride levels i.e. >400mg/dl or 4.5 mmol/l). Patients having total serum cholesterol more than 200 mg/dl (5.2 mmol/l), serum LDL cholesterol greater than 130mg/dl (3.4mmol/l), serum VLDL cholesterol greater than 40 mg/dl (1.0 mmol/l), serum triglyceride concentration exceeding 200mg/dl (2.3mmol/l) and HDL cholesterol less than 35mg/dl (0.9mmol/l) were labeled as having dyslipidaemia. Patients were discharged according to existing hospital regulations. There was no follow up.

The data was entered in SPSS (version 11.0) and analyzed. Descriptive statistics were used to calculate Mean and Standard deviation (SD) for numerical data. Frequency (%) was calculated for qualitative data i.e. gender and presence or absence of dyslipidaemia.

RESULTS

A total of 100 patients of AMI were enrolled. The mean age of patients was 35.5 (SD= 4.5) years (range 20-40 years). Out of 100 patients, 89 % were male with mean age 35.4 ± 4.5 years and 11% were female having mean age 35.7 ± 5.2 years. Male to female ratio was 8.1: 1. Out of 100 AMI patients 47 % had dyslipidaemia, out of which 42 (89.4%) were male and 5 (10.6%) were female (Fig.1). Male to female ratio of dyslipidaemia was 8.4: 1. Hypertriglyceridaemia was most common lipid abnormality in patients with dyslipidaemia as it was found in 32 (68.1%) patients; followed by raised serum VLDL, hypercholesterolemia, raised serum LDL and low serum HDL found in 25 (53.2%), 16 (34.0%), 4 (8.5%) and 2 (4.3%) patients respectively (Fig.2). Out of 47 patients with dyslipidaemia, 28 (59.6%) had more than one lipid disorders. In male patients with dyslipidaemia, hypertriglyceridaemia was the most common lipid abnormality, followed by raised serum VLDL, hypercholesterolemia, raised serum LDL and low HDL (Fig.3). In female patients with dyslipidaemia, hypercholesterolemia was the most common lipid disorder, followed by hypertriglyceridaemia, raised serum LDL and raised serum VLDL. However, none of the females had low HDL levels (Fig.3).

DISCUSSION

Although IHD primarily occurs in patients over the age of 40, younger men and women can be affected and make up approximately 9 %

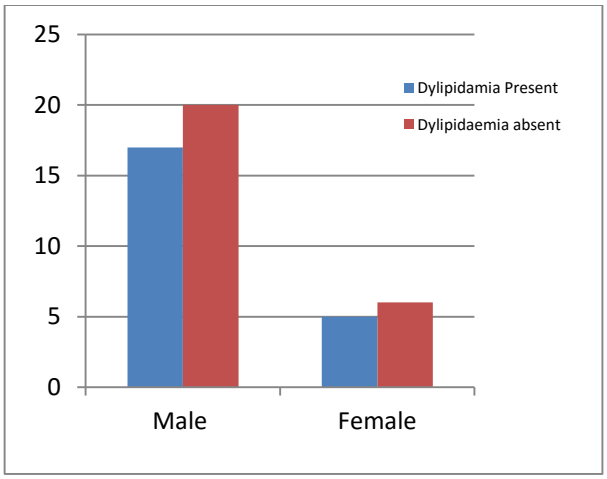

Fig. 1: Gender distribution of dyslipidaemia.

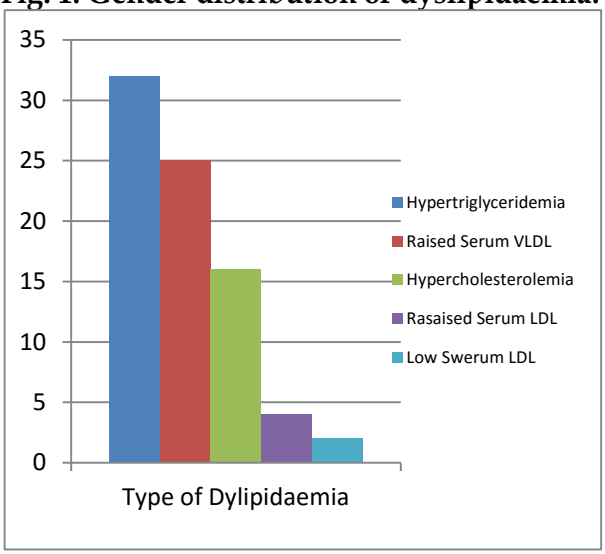

Fig. 2: Patterns of dyslipidaemia in young patients with AMI

of all AMI cases[18]. IHD in young patients constitutes an important problem for the patient and the treating physician because of the devastating effect of this disease on the productivity of the young individuals. Younger patients with AMI have different risk factor profiles, clinical presentations and prognoses than older patients. Most studies done on this subject like those by Cole et al[19], Hoit et al[20], Chouhan et al[21] and al-Koubaisy et al[22] have used an age cut-off of 40 to 45 years to define young patients, which is the same as in our study.

In a study by Hoit et al[20], 92% of young patients with AMI were men and 8% were women. In two other studies done by Fournier et al[23] and Cole et al[19] on patients with IHD at

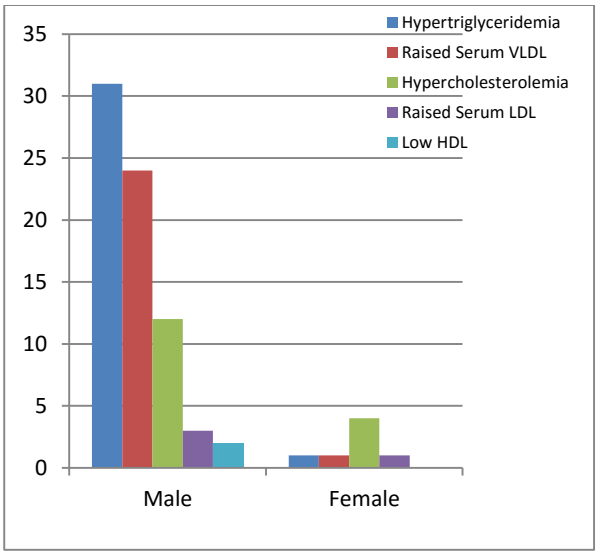

Fig. 3: Gender distribution of patterns of dyslipidaemia

40 years of age, women comprised 5.6% and 11.4% of patients respectively. While in our study 89% of young patients with AMI were male and 11% were female. In our study mean age was 35.4 years for male and 35.7 years for female patients with AMI while in a study conducted by Cole et al[19], the mean age was 36 for men and 35 for women.

Different studies of young patients with AMI, have reported prevalence of dyslipidaemia ranging from 41-80%. Our study has revealed that frequency of dyslipidaemia in young patients with AMI is high, as it was present in 47% of patients. This fact is in accordance with the results obtained by Yusuf et al[24] in the worldwide INTERHEART study on patients from 52 countries, in which dyslipidaemia was second among nine potentially modifiable risk factors and it accounted for 49 % of the population attributable risk of a first AMI. A local study conducted by Safdar et al[25] showed hyperlipidemia as the second most common modifiable risk factor for AMI in young patients, most common being smoking, whilst in our study smokers were excluded and dyslipidemia came out to be a major modifiable risk factor, present in 47% of cases.

Study done by Genest et al[26] revealed that more than half of the patients with premature IHD have an underlying lipid disorder while in our study dyslipidaemia was present in 47% of

patients with premature IHD. Studies conducted by Uhl and Farrell[27] and Geofman et al[28] have also suggested that dyslipidaemia is a more reliable predictor of recurrent MI in patients aged between 30 to 39 years than in older age group. In our study hypertriglyceridaemia was most common lipid abnormality (32%) in patients with AMI and it was predominant in male patients (73.8%). These results are similar as obtained in a study by Malmberg et al[29] which revealed hypertriglyceridaemia as the most common lipid abnormality in men with a first myocardial infarction before age 45.

The serum total cholesterol concentration is a clear risk factor for IHD with the risk increasing progressively with higher values for serum total cholesterol. The concentrations of lipid fractions such as LDL, VLDL and HDL are also important. Hypercholesterolemia was present in 48% of young men with AMI in a study done by Fournier et al[23]. While in our study hypercholesterolemia was the most common lipid abnormality in young females (36.4%) but it was present in only 13.5% of young males. This gross difference in findings is primarily because of the fact that, in Fournier et al study, the upper limit of normal serum total cholesterol was 240mg/dl (6.2mmol/l), while in our study it was 200mg/dl (5.2mmol/l). Other possible causes of this difference could be varied ethnicity, dietary pattern and sedentary life style. In a study done by Chen et al[30] mean serum triglycerides concentration was 239mg/dl (2.7mmol/l) and mean serum HDL cholesterol concentration was 35mg/dl (0.9mmol/l). While in our study mean serum triglycerides concentration was 180mg/dl (2.0mmol/l) and mean concentrations was 41mg/dl (1.1mmol/l).

CONCLUSION

Our study highlights that dyslipidaemia is present in a significant proportion of young patients with AMI. This fact holds true for either gender. Hypertriglyceridaemia is the most common lipid abnormality in young patients with AMI followed by raised serum VLDL, hypercholesterolemia, raised serum LDL and low serum HDL cholesterol. In young males having AMI, hypertriglyceridaemia is the most common lipid disorder. On the other hand, hypercholesterolemia is the most common type of dyslipidaemia in young females with AMI. To conclude, dyslipidaemia is a major modifiable risk factor in young patients with acute myocardial infarction in our population.

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