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THE PROGNOSTIC ROLE OF NON-ALCOHOLIC FATTY LIVER DISEASE IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

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Abstract

Non-alcoholic fatty liver disease (NAFLD) affects up to a third of the population worldwide and may confer increased cardiometabolic risk with consequent adverse cardiovascular outcomes independent of traditional cardiovascular risk factors and the metabolic syndrome. We aimed at studying the prognostic role of NAFLD presence in patients with acute myocardial infarction. 166 patients with acute myocardial infarction either with ST elevation or non ST elevation were evaluated for presence of non-alcoholic fatty liver disease and under follow up period of 12 months to assess prognostic major cardiovascular events.

Results of study showed that presence of non-alcoholic fatty liver disease in patients with acute myocardial infarction is associated with increased mortality (by the use of χ^2 test, $p<0.01$). Meanwhile there was no association between presence of non-alcoholic fatty liver disease and rehospitalizations ($p>0.05$) in acute myocardial infarction patients. Study shows that NAFLD may play an important role in the further clinical prognosis in this group of patients. Obtained results provide evidence for its consideration as a novel hepatic prognostic risk faction in patients with acute myocardial infarction.

Keywords: nonalcoholic fatty liver disease, acute myocardial infarction, prognosis, cardiovascular death, rehospitalization.

Introduction

Non-alcoholic fatty liver disease is the most common cause of chronic liver disease in the Western world (Fitzpatrick E. et al., 2012, Sanyal A., 2005). Over the last decade it has been shown that the clinical manifestation of NAFLD is not only related to liver, morbidity and mortality, that there is growing evidence that it is a multisystem disease, affecting other systems and regulatory pathways. In patients with NAFLD the increased risk of cardiovascular pathologies, type 2 diabetes mellitus and chronic kidney disease is observed (Sanches P. et al., 2014). Patients with non-alcoholic fatty liver have clinical symptoms of metabolic syndrome (Martins M. et al., 2010). This finding has important clinical implication for the development of cardiovascular events among these patients (Campos G. et al., 2008).

We aimed to study the prognostic role of NAFLD presence in patients with acute myocardial infarction. As prognostic major cardiovascular adverse events (MCAE) we assessed following states: non-fatal and fatal acute myocardial infarctions, rehospitalizations, cardiovascular deaths after 12 months of primary admission of patients to hospital related to acute myocardial infarction.

166 patients with acute myocardial infarction either with ST elevation or non ST elevation admitted to Yerevan State Medical University Cardiology Department of University Hospital №1 were included in the study from January 2012 until April 2014.

Fatty liver diseases have been increased among Armenia's population which is most conducive to such factors as lack of healthy lifestyle, lack of movements, inadequate physical activity, excess weight, hypercholesterolemia, dyslipidemia. The

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above mentioned reasons are the most significant risk factor for development of cardiovascular events (Alkhouri N. et al., 2008, Dixon J. et al., 2001, Munteanu M. et al., 2008, Campos G. et al., 2008).

Methods

Patients involved in research personally with their written and signed consent have agreed to include their clinical data in the scientific work carried out by our research work.

Patients with acute myocardial infarction either with ST elevation or non ST elevation were evaluated and cases were found with rehospitalization and death.

In all patients the diagnosis of acute myocardial infarction was made according to European Society of Cardiology guidelines (Fishbein M. et al., 2005) (Figure 1).

Patients with diabetes and arterial hypertension were studied and the standard error of mean was separated in both groups – patients with presence and absence of NAFLD (Figure 2a, Figure 2b).

For defining Gamma Glutamyl Transpeptidase (GGT) and C-Reactive peptide (CRP) the enzymatic - colorimetric method on ROSH COBAS C-311 analyser (System Test: Roche Diagnostics Switzerland) was used.

NAFLD was diagnosed when GGT levels in blood plasma was elevated and echographic evidence of fatty liver in the absence of any other detectable cause of the liver disease was present (Targher G. et al., 2008). Ultrasound diagnosis of NAFLD was based on the presence of increased liver echogenicity (bright) with stronger echos of hepatic vessel burning and narrowing of the limen of hepatic viens (Browning J. et al., 2004). The follow up period composed 12 months. Cardiovascular deaths, non-fatal and fatal myocardial infarctions and other causes of rehospitalization were assessed after 12 months of observational period.

Statistical analysis: The data was represented as a mean and standard error of mean (SEM). Independence testes of non-numerical variables has been done by the χ^2 test for independence as a null hypothesis (H_0) served a fact that there is not association between variables. In order to check the difference between means of variables student's T test was used, with a null hypothesis of absente of difference.

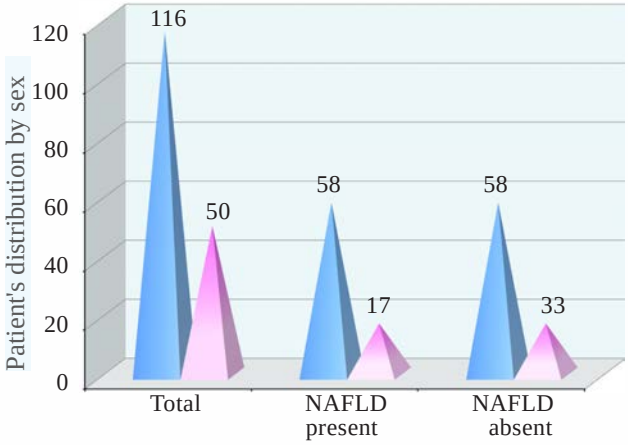

Figure 1. Clinical characteristics of studying patients with acute myocardial infarction according to presence of NAFLD. Blue columns - male and pink columns - female.

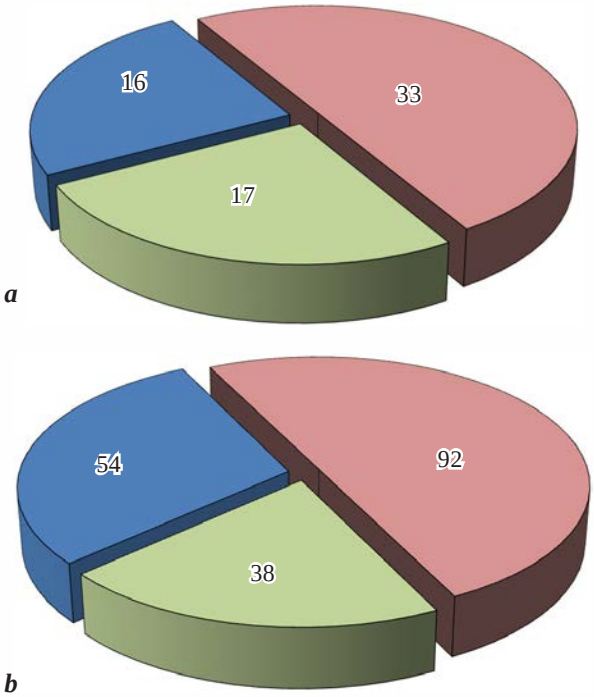

Figure 2. Distribution of diabetes (a) and arterial hypertension (b) in the sample
Total, NAFLD present, NAFLD absent

Results

The clinical characteristics of patients with acute myocardial infarction and their subgroups are presented in Table. Patients with NAFLD have higher levels of GGT and CRP compared to patients without NAFLD.

We have compared the mean value of GGT between groups of categorical variable Death. The comparison has been done with Student's T test for independent samples. The test showed the existence

TABLE.

Clinical characteristics of studying patients with acute myocardial infarction according to presence of non-alcoholic fatty liver disease

Factors	Total n=166	NAFLD	
		Present n=91	Absent n=75
Age	63 ± 0.96	62.8 ± 1.38	63.1 ± 1.34
C-Reactive peptide (mm/l)	5.51 ± 0.38	8.57 ± 0.62	5.25 ± 0.48
Gamma Glutamyl Transpeptidase (mm/l)	82.35 ± 3.4	100.84 ± 3.8	66.95 ± 3.4

of significant difference between the means ($p<0.05$) which is also obviously visible from the figure 3a.

The independence test χ^2 for NAFLD and acute myocardial infarction proved the association between NAFLD and death ($p<0.05$) There was no association between presence of NAFLD and re-hospitalization during 12 months in patients with acute myocardial infarction ($p>0.05$).

Independent sample mean comparison of GGT has been done between re-hospitalization groups with Student's T test, which proved the statistically significant difference between the means ($p<0.05$). From the figure 3b it is easy to see that patients with higher GGT have been re-hospitalized.

Similar test has been done with presence and absence of NAFLD in order to understand its dependence on GGT (Figure 3c). Similar to previous 2 results, test proved ($p<0.05$) the difference between means, which means that patient with NAFLD in average have higher level of GGT.

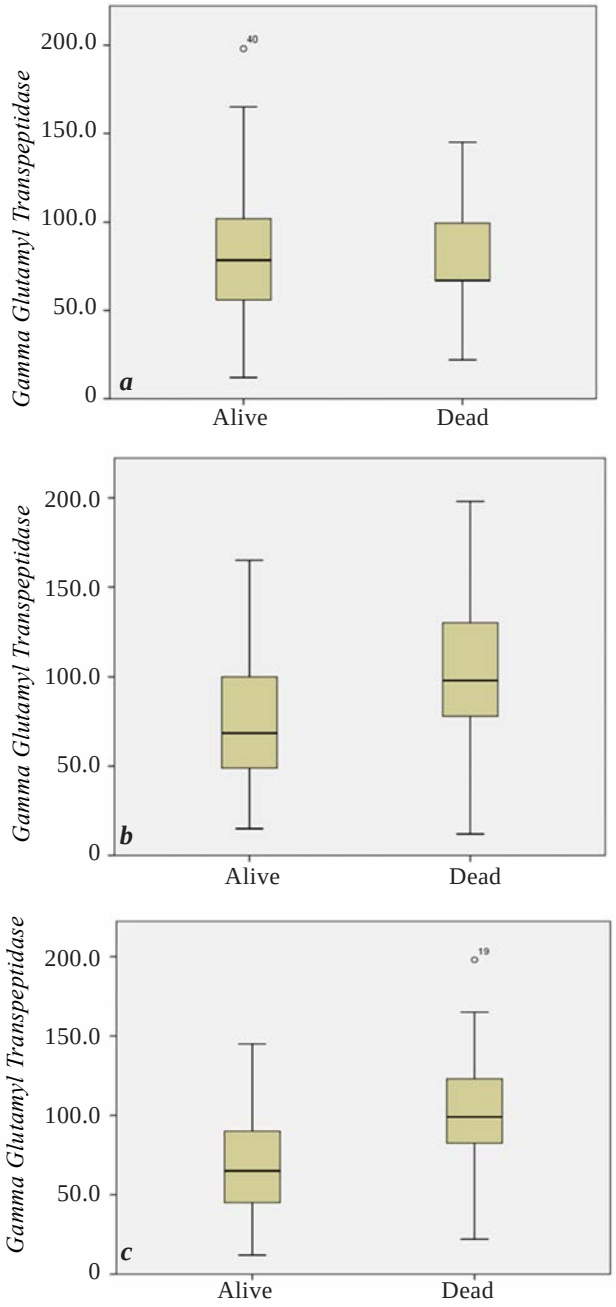

FIGURE 3. Gamma Glutamyl Transpeptidase Mean difference between death groups (a), Re-hospitalization groups (b) and NAFLD groups (c).

DISCUSSION

It is now becoming increasingly evident that NAFLD is associated with high cardiovascular risk and myocardial metabolism. Studies, using cardiac magnetic resonance imaging, show that nonbere, non-diabetic young individuals with NAFLD had impaired myocardial energy metabolism (i.e. lower phosphocreatinin, adenosine triphosphate ratio) and excessive that accumulation in epicardial area compared with control subjects (Mandato C. et al., 2005).

Our study is the first aiming to assess the prognostic role of NAFLD in patients with acute myocardial infarction. Several prognostic markers are commonly used in clinical practice in such patients. Global Registry of acute coronary events (GRACE) score, the Thrombolysis in Myocardial Infarction (TIMI) risk score In all these scores there is no any liver clinical or laboratory date scaled. Taking into most common pathological abnormality of liver and pathogenesis of NAFLD has several overlapping relationships with cardiovascular diseases, endothelial dysfunction, our investigation provided new date in prognostic role of NAFLD in acute myocardial infarction.

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