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NON-HDL-C MIGHT PREDICT MAJOR ADVERSE CARDIOVASCULAR EVENT OCCURRENCE IN STATIN-NAÏVE PATIENTS FOLLOWING FIRST-TIME MYOCARDIAL INFARCTION – A PRELIMINARY REPORT

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SUMMARY – The aim of this study was to examine the effect of the lipid parameter non-high-density lipoprotein cholesterol (non-HDL-C) on the occurrence of major cardiovascular event (MACE) in patients after first-time ST-elevation myocardial infarction (STEMI) treated with primary percutaneous intervention (pPCI) and implantation of drug-eluting stent (DES). Seventy-eight patients (54 male and 24 female, median age 58.62±11.14 years) with the diagnosis of first-time STEMI who were treated with pPCI with DES implantation in the period from January 2018 until January 2020 were included in the study. Patients were followed for two years of the intervention for the occurrence of MACE and its association with baseline non-HDL-C, as well as total cholesterol, LDL-C, HDL-C and triglycerides. During 2-year follow-up, 20 (25.6%) patients had MACE. There was no significant difference in baseline parameters such as age, hypertension, presence of diabetes mellitus, and post-interventional use of statin therapy between patients with and without MACE. The levels of baseline lipid parameters were significantly higher in patients who experienced MACE, as follows: total cholesterol (p=0.009), LDL-C (p=0.028) and non-HDL-C (p=0.007). Pearson χ^2-test showed that both non-HDL-C and LDL-C were significant predictors of MACE occurrence during 2-year follow-up, but non-HDL-C had a more significant correlation than LDL-C (p=0.007 *vs.* p=0.028). Our initial report shows that baseline non-HDL-C was a more significant predictor of the occurrence of MACE after first-time STEMI than LDL-C, which reflects the importance of the residual risk of MACE occurrence while enabling identification and close monitoring of high-risk patients.

Key words*: Acute myocardial infarction; Major adverse cardiovascular event, Non-high-density lipoprotein cholesterol; Low-density lipoprotein cholesterol*

Introduction

In the last three decades, there is a noticeable trend of reduced mortality caused by ischemic heart diseases,

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which is due to widely available early reperfusion techniques, modern antiplatelet therapy, and secondary prevention. However, despite major advances in treatment, ischemic heart disease is still responsible for up to 20% of mortality of hospitalized patients annually in Europe. Major adverse cardiovascular events (MACE) are the main cause of mortality and morbidity in patients with ST-elevation myocardial infarction (STEMI)[1-4]. The crucial factor for the development of atherosclerosis and consequent coronary disease is low-density lipoprotein cholesterol (LDL-C)[5]. In numerous studies, it has been unequivocally proven that lowering LDL-C, primarily with statins, has an undeniable effect on the reduction of atherosclerotic cardiovascular diseases[6]. The traditional approach to the treatment of coronary disease involves lowering LDL-C, which is the primary therapeutic goal in current guidelines for the management of dyslipidemias[1,5,7]. However, despite low LDL-C, 22.7% of patients had a recurrent coronary event over 2 years in a large randomized controlled trial of Pravastatin or Atorvastatin Evaluation and Infection Therapy (PROVE-IT TIMI 22)[8]. Recent studies have shown that LDL-C could be a suboptimal marker of coronary disease, since LDL-C concentration shows only the amount of cholesterol in LDL-C and does not include other lipoprotein fractions such as very-low-density lipoprotein (VLDL) and lipoprotein (a) (Lp(a)), the role of which is crucial in the development of atherosclerosis[5].

Proper identification of risk factors for the occurrence of cardiovascular events and screening in the general population for their prevention has been demonstrated in several large studies[9-12]. Non-high-density lipoprotein cholesterol (non-HDL-C) is a recognized risk marker of adverse cardiovascular events, firstly introduced in 2001 in the third report of the US National Cholesterol Education Program's Adult Treatment Panel (ATP-III). Non HDL-C was identified as a secondary treatment target in patients with triglyceride levels >200 mg/dL[13]. Non-HDL-C contains all atherogenic lipoproteins that contain apolipoprotein B (apo B), i.e., LDL-C, VLDL, intermediate-density lipoprotein (IDL), Lp(a), chylomicrons, and remnants rich in triglycerides[11]. In patients with stable coronary disease treated with statins, non-HDL-C is more significantly associated with cardiovascular outcomes than LDL-C[13]. Non-HDL-C is also considered to be a predictor of the occurrence of coronary heart disease and its severity[14-16].

Although prospective studies which evaluate non-HDL-C as a predictor of non-fatal cardiovascular events in population cohort exist[17], prospective evaluation of the role of non-HDL-C as a risk factor for MACE following STEMI has not been extensively published.

To our knowledge, there have been no prospective studies so far that evaluated the occurrence of MACE in patients following first acute STEMI in statin-naïve patients treated with primary percutaneous coronary intervention (pPCI) in respect to their baseline non-HDL-C level. A screening project attempting to evaluate risk factors for MACE occurrence following first-time STEMI in patients who did not take hypolipidemic therapy prior to index event was initiated at our Department in January 2018. Here we report our initial, preliminary findings on the role of non-HDL-C as a predictor of MACE in statin-naïve patients treated for their first-time STEMI with pPCI and drug-eluting stent (DES) implantation. The purpose of this study was to determine the impact of baseline non-HDL-C on outcomes in patients with STEMI treated with pPCI.

Patients and Methods

All patients diagnosed with first-time STEMI who were admitted to the Department of Internal Diseases and Hemodialysis, Zenica Cantonal Hospital, University of Zenica, Zenica, Bosnia and Herzegovina, from January 2018 until January 2020 were included in this prospective cohort. STEMI was diagnosed according to clinical presentation consistent with myocardial ischemia and evidence for STEMI on 12-channel electrocardiogram (ECG) in concordance with the Guidelines for the Management of Acute Myocardial Infarction with ST-Segment Elevation[1]. Additional test included high-sensitivity troponin T, with a value >14 ng/L considered to be pathological[18]. Following diagnosis, the patients were urgently (<2 hours following diagnosis) transferred to the nearest interventional center (Department of Cardiology, Sarajevo University Clinical Center) where PCI could have been performed (approximately one hour away

with hospital transport); pPCI with DES implantation was performed in all patients. All patients were administered loading doses of 300 mg aspirin and 300-600 mg clopidogrel before pPCI. Patients were monitored for two years after index event for the occurrence of MACE. The criteria for inclusion in the study were diagnosis of first-time STEMI according to the above parameters, treatment with pPCI with DES implantation, and fully available laboratory lipid profile including total cholesterol, LDL-C, HDL-C, non-HDL-C and triglycerides. Patients with previous MI and cardiovascular events, patients treated with pPCI and bare metal stent implantation, patients with incomplete documentation, patients without complete laboratory lipid profile, patients under hypolipidemic therapy for at least three months before the index event, patients with earlier revascularization, as well as patients who were lost to follow-up were excluded from the study.

Patient data were obtained from patient medical documentation including admission, discharge, follow-up examinations, and initial laboratory findings. Clinical parameters (systolic and diastolic blood pressure, heart rate), as well as detailed medical history were obtained from all patients. Demographic patient characteristics (age and gender), comorbidities, smoking, baseline lipid parameters (total cholesterol, LDL-C, HDL-C, non-HDL-C, triglycerides), localization of MI, and number of implanted stents were analyzed. The correlation between lipid parameters (total cholesterol, LDL-C, HDL-C, non-HDL-C, and triglycerides) and the occurrence of MACE was monitored.

Venous blood samples for lipid profile screening were collected during first 24 hours after hospital admission in fasting state. Lipid levels were measured by a routine laboratory technique. LDL-C was calculated using Friedewald equation when triglyceride (TG) level is <4.5 mmol/L. In case of TG level ≥4.5 mol/L, LDL-C levels were measured directly. Non-HDL-C was calculated as difference between total cholesterol and HDL-C.

Major adverse cardiovascular event was defined as non-fatal myocardial reinfarction, hospitalization for unstable angina pectoris, hospitalization for heart failure, non-fatal stroke, and cardiovascular death. Patients presented to our Department following intervention and DES implantation for regular follow-up after six weeks, three and six months, one year, and every six months thereafter. In case of MACE, clinical documentation obtained during hospital stay was analyzed. Additionally, each patient was contacted by phone two years after index event for final check up for possible events which were not recorded in our system.

The primary objective was to determine correlation between baseline non-HDL-C levels and occurrence of MACE during 2-year follow-up. Secondary objectives were to assess correlation between other lipid parameters (total cholesterol, LDL-C, HDL-C and TG) and MACE occurrence.

Ethics

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the institutional Ethics Board of Zenica Cantonal Hospital (protocol code 00-3-02-12954-10/20). Patient consent was waived because the research had less than minimal risk for patients and it had no influence on participants, since the investigated clinical and laboratory parameters were obtained as part of clinical routine.

Statistical analysis

Statistical analyis was performed with IBM SPSS 20.0 software (released in 2011, IBM statistics for Windows version 20, IBM Corp., Armonk, NY, USA). Numerical data were reported as mean with standard deviation (SD). Categorical variables were reported as percentage. Categorical variables were compared by ANOVA test. Pearson's correlation coefficient was used to examine the association between two continuous variables. A two-tailed p-value <0.05 was considered statistically significant.

Results

A total of 219 patients with primary diagnosis of first-time STEMI were treated at our Department in the period from January 2018 until January 2020. A total of fifty-seven patients were managed with pPCI and bare metal stent implantation, whereas thirteen received fibrinolytic therapy. Hypolipidemic therapy prior to the index event was documented in sixteen patients. Follow-up data were unavailable for

twenty-four patients, while thirty-one were excluded from the analysis due to incomplete documentation, specifically the absence of a complete lipid profile at admission. In January 2018, a screening project was initated at our Department for evaluation of the role of lipid parameters in the occurrence of MACE following pPCI with DES implantation in patients with first-time STEMI. Seventy-eight patients hospitalized for STEMI were eligible for inclusion in the study. Table 1 contains clinical and demographic data of study patients. Median age of the study population was 58.62±11.14 years, with male predominance (n=54; 69.2%). The most common comorbidities included hypertension (n=51; 65.4%) and diabetes (n=12; 15.4%). Fifty-eight (74.4%) patients were smokers. The mean values of lipid parameters obtained at admission were elevated: total cholesterol 5.2±1.15 mmol/L (normal range <5.1 mmol/L), LDL-C 3.25±1.1 mmol/L (normal range <2.6 mmol/L), non-HDL-C 4.06±1.11 mmol/L (normal range <3.4 mmol/L) and triglycerides 1.78±0.88 mol/L (normal range <1.7 mmol/L). During 2-year follow-up, MACE occurred in 20 (25.6%) patients, while all-cause mortality was recorded in 4 (5.1%) patients. The most common MACE components were hospitalization for unstable angina (n=9; 45%), non-fatal MI (n=5; 25%), heart failure (n=3; 15%), non-fatal stroke (n=2, 10%) and cardiovascular death (n=1; 5%). Four (5.1%) patients died during the follow-up period (one cardiovascular death, two deaths due to cancer, and one due to infectious lung disease). All patients were regularly monitored for the occurence of MACE. Monitoring of these patients continues, yet here we present our preliminary results obtained during 2-year follow-up after STEMI.

Table 1. Clinical characteristics of STEMI patients treated with pPCI and DES implantation

Clinical and demographic characteristic	Value (%)
Age (years)	58.62±11.14
Sex: Male Female	54 (69.3) 24 (30.7)
Smoking, n (%)	58 (74.4)
Hypertension, n (%)	54 (65.4)
Diabetes, n (%)	12 (15.4)
BP systolic (mm Hg) (mean ± SD)	137.90±23.67
BP diastolic (mm Hg) (mean ± SD)	87.15±13.85
Heart rate (bpm) (mean ± SD)	76.82±12.38
Total cholesterol (mmol/L) (mean ± SD)	5.20±1.15
LDL-C (mmol/L) (mean ± SD)	3.25±1.10
HDL-C (mmol/L) (mean ± SD)	1.13±0.26
Non-HDL-C (mmol/L) (mean ± SD)	4.06±1.11
Triglycerides (mmol/L) (mean ± SD) MACE, n (%) All-cause mortality	1.78±0.88 20 (25.6%) 4 (5.1%)

STEMI = ST elevation myocardial infarction; pPCI = primary percutaneous coronary interventnion; BP = blood pressure; DES = drug-eluting stent; bpm = beats *per* minute; LDL-C = low-density lipoprotein cholesterol; HDL-C = high-density lipoprotein cholesterol; non-HDL-C = non-high-density lipoprotein cholesterol; MACE = major adverse cardiovascular event; SD = standard deviation

Clinical characteristics of patients with MACE

Table 2 shows clinical characteristics of patients with and without MACE. Smoking was significantly more prevalent in patients who did not have MACE. Total cholesterol levels, LDL-C, HDL-C, and non-HDL-C were significantly higher in patients with MACE. There was no difference in MACE *versus* non-MACE group in terms of prescription of statins (rosuvastatin or atorvastatin were prescribed to all patients) and daily dosage of antihypolipidemic therapy following STEMI (Table 3). There were no significant between-group differences according to MI localization and number of implanted stents in culprit artery, or in total number of implanted stents (Table 4). There were no peri-interventional complications.

Lipid parameters as predictors of MACE occurrence

Total cholesterol (p=0.009), non-HDL-C (p=0.007), and LDL-C (p=0.028) were predictors of MACE in patients with STEMI treated with pPCI and DES implantation during a 2-year follow-up. Total cholesterol correlated with the occurrence of MACE at the p<0.01 level and LDL-C at the p<0.05 level.

The mean non-HDL-C was 3.86±1.03 and 4.63±1.17 in patients without MACE and those with MACE, respectively. Mean non-HDL-C was

Table 2. Clinical characteristics of patients divided into groups according to the occurrence of MACE

Clinical and demographic characteristic		**No MACE N=58**	**MACE N=20**	**p**
		Value	**Value**	
Age (years) / (mean ± SD)		57.52±10.8	1.80±11.80	0.139
Sex:	Male, n (%) Female, n (%)	40 (69%) 18 (31%)	14 (70%) 6 (30%)	0.93
Smoking, n (%)		45 (78.9%)	13 (61.9%)	0.042
Hypertension, n (%)		40 (69%)	11 (55%)	0.258
Diabetes, n (%)		10 (17.2%)	2 (10%)	0.439
BP systolic (mm Hg) / (mean ± SD)		138.70±24.71	135.60±20.79	0.618
BP diastolic (mmHg) / (mean ± SD)		88.10±14.10	84.40±13.03	0.305
Heart rate (bpm) / (mean ± SD)		77.19±12.30	75.75±12.88	0.657
Total cholesterol (mmol/L) / (mean ± SD)		5.00±1.08	5.77±1.19	0.009
LDL-C (mmol/L) / (mean ± SD)		3.09±0.97	3.71±1.27	0.028
HDL-C (mmol/L) / (mean ± SD)		1.13±0.29	1.14±0.19	0.953
Non-HDL-C (mmol/L) / (mean ± SD)		3.86±1.03	4.63±1.17	0.007
Triglycerides (mmol/L) / (mean ± SD) All-cause mortality, n (%)		1.80±0.96 1 (1.7%)	1.72±0.59 3 (15%)	0.734 0.020

BP = blood pressure; bpm = beats *per* minute; LDL-C = low-density lipoprotein cholesterol; HDL-C = high-density lipoprotein cholesterol; non-HDL-C = non-high-density lipoprotein cholesterol; MACE = major adverse cardiovascular event; SD = standard deviation

Table 3. Prescription of statins following index event

Statin treatment	**No MACE N=58**	**MACE N=20**	**p**
Rosuvastatin, n (%)	34 (58.6%)	14 (70%)	0.36
Atorvastatin, n (%)	24 (41.4%)	6 (30%)	
Rosuvastatin Dose (mg/day) (mean ± SD)	20.58±10.13	23.57±11.50	0.37
Atorvastatin Dose (mg/day) (mean ± SD)	32.12±22.18	52±26.8	0.07

MACE = major adverse cardiovascular event; SD = standard deviation

significantly lower in patients without MACE compared to patients with MACE (p<0.01).

Pearson χ^2-test showed that both non-HDL-C and LDL-C were significant predictors of MACE occurrence during 2-year follow-up, but non-HDL-C had a more significant correlation than LDL-C (p=0.007 *vs*. p=0.028). The correlation of lipid parameters with the occurrence of MACE is shown in Table 5.

Discussion

This study aimed to show the impact of baseline non-HDL-C values on long-term outcomes after first-time STEMI treated with pPCI and DES implantation. Our preliminary analysis of prospectively acquired data demonstrated a positive correlation of baseline non-HDL-C values with MACE occurrence

Table 4. Myocardial infarction localization, coronary disease severity and number of implanted stents

		MACE		p
		No	**Yes**	
Myocardial infarction localization	Anterior, n (%)	32 (55.2%)	14 (70.0%)	0.24
	Non-anterior, n (%)	26 (44.8%)	6 (30.0%)	
Coronary artery disease	One-vessel disease, n (%)	30 (51.7%)	7 (35.0%)	1.67
	Two-vessel disease, n (%)	24 (41.4%)	11 (55.0%)	
	Three-vessel disease, n (%)	4 (6.9%)	2 (10.0%)	
Number of stents	1 stent, n (%)	44 (75.9%)	16 (80.0%)	0.7
	2 stents, n (%)	13 (22.4%)	4 (20.0%)	
	3 stents, n (%)	1 (1.7%)	0 (0.0%)	
Number of stents in culprit artery	1 stent, n (%)	47 (81.0%)	16 (80.0%)	0.91
	2 stents, n (%)	11 (19.0%)	4 (20.0%)	

MACE = major adverse cardiovascular event

Table 5. Correlation of lipid parameters and occurrence of MACE

	No MACE	**MACE**	**Correlation coefficient**	**p**
Total cholesterol (mmol/L)	5.00±1.08	5.77±1.19	0.294**	0.009
LDL-C (mmol/L)	3.09±0.97	3.71±1.27	0.249*	0.028
HDL-C (mmol/L)	1.13±0.29	1.14±0.19	0.007	0.953
Non-HDL-C (mmol/L)	3.86±1.03	4.63±1.17	0.303**	0.007
Triglycerides (mmol/L)	1.80±0.96	1.72±0.59	-0.039	0.734

LDL-C = low-density lipoprotein cholesterol; HDL-C = high-density lipoprotein cholesterol; non-HDL-C = non-high-density lipoprotein cholesterol; MACE = major adverse cardiovascular event; *correlation significant at 0.05 level (2-tailed); **correlation significant at 0.01 level (2-tailed)

during 2-year follow-up, which adds to the body of literature on the role of this parameter in the setting of cardiovascular incident occurrence following MI.

The occurrence of MACE after STEMI is variable and depends on many factors, such as treatment modality, comorbidities, type and localization of coronary lesion. According to observational and randomized clinical studies, the incidence of MACE after STEMI ranges from 4.2% to 51% regardless of treatment modality during follow-up of up to 10 years[4]. In a prospective multicenter study by Stone *et al.*, the cumulative MACE rate over three years in patients after acute coronary syndrome and PCI was 20.4% (in the study, MACE was defined as cardiovascular death, cardiac arrest, MI, rehospitalization for unstable or progressive angina pectoris)[19]. The prevalence of MACE in our study was 25.6% during 2-year follow-up, which is in concordance with previously published studies.

Our results showed that non-HDL-C was a significant predictor of MACE after STEMI treated with pPCI. The predictive role of non-HDL-C in the occurrence of MACE in different populations and patients with different risk profiles has been proven in numerous studies. Although LDL-C is the primary treatment target in primary and secondary prevention of atherosclerosis and cardiovascular diseases, i.e., prevention of adverse cardiovascular events, it is well known that even with statin treatment, a significant residual risk of atherosclerotic events remains, and it seems that non-HDL-C is more appropriate for

assessing residual cardiovascular risk compared to LDL-C[20]. Several studies emphasized the importance of non-HDL-C levels in hypertriglyceridemic patients[21]. In patients with triglyceride level >200 mg/dL, VLDL level is also raised and consequently non-HDL-C. In these conditions, since non-HDL-C is a sum of LDL and VLDL, the correlation between LDL-C and non-HDL-C, i.e., total atherogenic lipoprotein burden is weaker[22]. The superiority of non-HDL-C over LDL-C as a prognostic factor of non-fatal cardiovascular disease in general population without cardiovascular diseases has been shown in a prospective cohort study after a follow-up of 10.7 years[17]. Non-HDL-C and apoB were stronger predictors of coronary heart disease than LDL-C among 18,225 male participants without cardiovascular disease, particularly in hypertriglyceridemic patients[20]. Data from a meta-analysis support non-HDL-C as a more accurate marker of cardiovascular risk than LDL-C, and suggest that a non-HDL-C strategy would prevent 300,000 more events than an LDL-C strategy[23].

However, to our knowledge, the predictive role of non-HDL-C in a specific population of statin-naïve patients with first-time STEMI who were treated with pPCI with DES implantation has not been investigated so far. Since pPCI is the treatment of choice for STEMI patients, studies which evaluate residual risk of MACE following STEMI are necessary[24].

In addition to LDL-C, non-HDL-C contains other atherogenic lipoproteins containing apo B (VLDL, IDL and Lp(a)). Measuring non-HDL-C has several advantages over LDL-C. Unlike LDL-C, non-HDL-C can be determined in non-fasting patients. It is also a very useful marker in high triglyceride values (>400 mg/dL) when LDL-C cannot be calculated by Friedewald equation, and commercially available direct measurements of LDL-C are not standardized. Measuring non-HDL-C has a special advantage in patients with diabetes mellitus, in whom the relationship between triglycerides and VLDL can be altered, which can lead to falsely low values of LDL-C calculated by Friedewald formula, especially with elevated triglyceride values[25]. Since non-HDL-C is the sum of all atherogenic lipoproteins containing apo B, its role in predicting cardiovascular risk is equal to or greater than that of LDL-C[23,26-28].

Data from a study that had cardiovascular mortality as the primary endpoint in a population without cardiovascular disease during a mean follow-up of 19 years showed that non-HDL-C was a slightly better predictor of mortality than LDL-C[21]. Population studies have identified differences between LDL-C and non-HDL-C in predicting atherosclerotic cardiovascular diseases. According to a meta-analysis of 12 independent epidemiologic studies that included 233,455 subjects and nearly 30,000 CV events, the relative risk of a fatal or non-fatal CV event was lowest for LDL-C, intermediate for non-HDL-C, and highest for apoB[23]. The population-based Strong Heart Study particularly highlighted the importance of non-HDL-C in predicting cardiovascular disease in diabetics, as a marker reflecting the combined risk of characteristic atherogenic dyslipidemia in diabetes[25].

Few studies have investigated the impact of non-HDL-C on outcomes in patients with known coronary artery disease. In the BARI study (Bypass Angioplasty Revascularization Investigation), which included 1,514 patients with multivessel coronary disease, non-HDL-C was a strong and independent predictor of MI and angina pectoris (during a 5-year follow-up), whereas LDL-C and HDL-C did not have an impact on the occurrence of cardiovascular events. None of the observed three parameters had an impact on mortality during the observed period[29]. The study by Kathariya *et al.* demonstrated the superiority of non-HDL-C over LDL-C in assessing coronary artery disease in patients with elevated triglyceride levels[30]. A Thai study of 868 patients with acute MI showed that failure to achieve non-HDL-C target values had a predictive value for the occurrence of MACE (defined as total mortality, non-fatal coronary event, and non-fatal stroke) while failure to achieve LDL-C target values was not associated with an increased risk of MACE during long-term follow-up. In the aforementioned study, the majority of patients had STEMI, of which 59.2% were treated with pPCI[31].

Researchers from Japan investigated the impact of non-HDL-C on the occurrence of recurrent MI in a subgroup of patients from the CHART-2 study (Chronic Heart Failure Analysis and Registry in the Tohoku District-2 study), who had previously had MI and were treated with statins. The study showed that higher values of non-HDL-C and not LDL-C

at baseline could predict recurrent MI in a selected subgroup of patients[32]. Non-HDL-C was a better predictor of the severity of coronary disease than LDL-C in a large study of 1,757 patients[16].

Study limitations

There were several limitations in this study. It was conducted as part of the screening program in a single center and reflects initial experience of our Department and Zenica Cantonal Hospital. Furthermore, our initial report contains a low number of patients. However, our preliminary results serve as a basis for continuation of the prospective evaluation of the role of non-HDL-C and its impact on MACE occurrence and outcome following pPCI-treated STEMI. Large prospective studies are needed for more thorough evaluation of this subject. Since many patients following STEMI start with hypolipidemic therapy, a trend of non-HDL-C under this therapy, as well as patient adherence to the prescribed therapy and its effect on MACE occurrence need to be investigated. The effect of prescribing and taking statins following intervention and the impact of patient adherence to hypolipidemic therapy following STEMI on the occurrence of MACE pose a risk of bias in the interpretation of results; however, since all patients were statin-naïve prior to intervention, evaluation of baseline non-HDL-C and its correlation to outcome is not without merit. A cutt-off level of non-HDL-C that poses risk of adverse events needs to be determined. Routine screening of patients at risk of MI and MACE prior to any adverse cardiac, cardiovascular or cerebrovascular incident, with timely identification of red flags in lipidogram parameters could enhance primary prevention.

Conclusions

Initial results of this study demonstrate that higher baseline value of non-HDL-C might pose a significant risk of MACE occurrence in statin-naïve patients after first-time STEMI treated with pPCI and DES implantation, since patients who experienced MACE following treatment had a significantly higher mean non-HDL-C value. Non-HDL-C was a more significant predictor of the occurrence of MACE after first-time STEMI than LDL-C. With respect to previous studies that confirmed the importance of non-HDL-C as a predictor of atherosclerotic diseases in the general population, as well as its importance in patients with coronary disease, our report confirmed and extended previous studies in terms of using non-HDL-C as a significant predictor of MACE. Further studies with a greater sample size are needed to address this question with ultimate goal to identify high-risk patients in daily clinical practice.

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Sažetak

NE-HDL-KOLESTEROL MOŽE PREDVIDJETI POJAVU VEĆIH KARDIOVASKULARNIH INCIDENATA U BOLESNIKA BEZ PRETHODNE TERAPIJE STATINIMA NAKON PRVOG INFARKTA MIOKARDA – PRELIMINARNO IZVJEŠĆE

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Cilj ovog istraživanja je bio ispitati utjecaj lipidnog parametra lipoproteina ne visoke gustoće (ne-HDL-C) na pojavu velikih neželjenih kardiovaskularnih događaja (*major cardiovascular event*, MACE) kod bolesnika nakon prvog infarkta miokarda s ST elevacijom (STEMI) koji su liječeni primarnom perkutanom intervencijom (*primary percutaneous intervention*, pPCI) i implantacijom stenta koji izlučuje lijek (*drug-eluting stent*, DES). U studiju je uključeno 78 bolesnika (54 muškarca i 24 žene srednje dobi 58,62±11,14 godina) s dijagnozom prvog STEMI koji su liječeni pomoću pPCI i implantacijom DES u razdoblju od siječnja 2018. do siječnja 2020. godine Tijekom dvije godine od indeksnog događaja je praćena pojava MACE, kao i povezanost MACE s početnim vrijednostima ne-HDL-C, ukupnog kolesterola, LDL-C, HDL-C i triglicerida. Tijekom dvogodišnjeg praćenja 20 (25,6%) bolesnika je imalo MACE. Nije bilo značajne razlike u osnovnim parametrima kao što su dob, hipertenzija, prisutnost dijabetes melitusa te postintervencijska primjena statinske terapije između bolesnika s MACE i onih bez MACE. Ukupni kolesterol (p=0,009), LDL-C (p=0,028) i ne-HDL-C (p=0,007) su bili značajno viši kod bolesnika koji su imali MACE. Pearsonov χ^2-test je pokazao da su i ne-HDL-C i LDL-C bili značajni prediktori pojave MACE tijekom dvogodišnjeg praćenja, ali je ne-HDL-C imao značajniju korelaciju od LDL-C (p=0,007 naspram p=0,028). Naši prvi rezultati pokazuju da su početne vrijednosti ne-HDL-C bile značajniji prediktor pojave MACE nakon prvog STEMI u odnosu na LDL-C, što odražava važnost rezidualnog rizika u nastanku MACE i omogućava identifikaciju i praćenje visoko rizičnih bolesnika.

Ključne riječi*: Akutni infarkt miokarda; Veliki neželjeni kardiovaskularni događaji; Kolesterol lipoproteina ne visoke gustoće; Kolesterol lipoproteina niske gustoće*