

ORIGINAL PAPER

doi: 10.5455/medarh.2016.70.419-424

Med Arch. 2016 Dec; 70(6): 419-424

Received: OCT 25, 2016 | Accepted: DEC 18, 2016

© 2016 Alen Dzibur, Mevludin Mekic,
Senad Pesto, Naser Nabil

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Echocardiographic Parameters as Life Quality Predictors in Patients After Myocardial Infarction Treated with Different Methods

Alen Dzibur¹, Mevludin Mekic¹, Senad Pesto², Naser Nabil³

¹Clinic for Heart Diseases, Blood Vessels and Rheumatism, University Clinical Center of Sarajevo University, Sarajevo, Bosnia and Herzegovina

²Clinic for Emergency Medicine, Clinical Center of Sarajevo University, Sarajevo, Bosnia and Herzegovina

³Polyclinic "Dr Nabil" Sarajevo, Bosnia and Herzegovina

Corresponding author: Alen Dzibur, PhD, MD. Clinic for Cardiology, University Clinical Center Sarajevo, Bolnicka 25, 71 000 Sarajevo, Bosnia and Herzegovina. Phone: +38761483259. E-mail:alendzibur@gmail.com.

ABSTRACT

Introduction: Cardiovascular diseases are the leading cause of death in most countries. The aim was to examine the quality of life and to determine the differences in the quality of life in patients one year after myocardial infarction and the relationship between quality of life and echocardiographic parameters in these patients. **Material and Methods:** The research was a prospective, clinical, epidemiological study and was conducted at the Clinic of Cardiology, University Clinical Center Sarajevo (UCCS). The research was conducted on a sample of 160 patients who had acute myocardial infarction, which are based on the therapeutic procedures divided into four groups. The average age in the total sample was 54.9±8.8 years (range 37-76 years). The research was conducted one year after myocardial infarction (I group of subjects) or 12 months after PCI therapeutic procedures (II and III group of respondents) or coronary artery bypass surgery (IV group of respondents). **Results:** Comparison of the mean scores of scales in SF-36 questionnaire showed that the highest total score had patients in the group II 67.3±15.2, and the lowest in the group I 57.8±21.4. The increase in ejection fraction leads to a statistically significant increase in quality of life scores at all subscales, in all groups, so that EF has the greatest impact on the quality of life in all respondents. Statistically significant differences in the effects of mitral regurgitation in particular groups have been recorded only in the case of the mental health scale. **Conclusions:** Ejection fraction has the greatest impact on the quality of life in all patients, regardless of the type of medical treatment.

Keywords: acute myocardial infarction, echocardiography, quality of life.

1. INTRODUCTION

Cardiovascular diseases (CVD) are the leading cause of death in most countries (1, 2). According to the data of the Bosnian Federal Bureau of Statistics, myocardial infarction was the fourth cause of death in 2011 (3).

In order to save as many patients with infarction, thrombolytic therapy should be applied as early as possible. After the realization that the patient is a candidate for the reperfusion therapy, it is necessary to decide whether it will be a fibrinolytic

therapy or PCI (percutaneous coronary intervention). If coronary angiography and PCI are possible within the first 90-120 minutes after onset of symptoms, it is then the method of choice (4). The American College of Cardiology and the American Heart Association (ACC/AHA) recommend that pPCI (primary percutaneous coronary intervention) should be used as an alternative to thrombolytic therapy only if it can be done in a short time, by the intervention cardiologist with experience in these procedures and with the support of

an experienced staff and in centers with history of large number of interventions. Today primary PCI (pPCI) generally means the treatment of coronary blood vessel by stenting. Stenting results in a lower incidence of restenosis in the affected blood vessel (5). The role of cardiac surgery in the treatment of acute coronary syndrome (ACS) has evolved during the last 35 years. Cardiac surgery takes today an active role in the treatment of the ACS, which is recognized and defined in the most recent recommendations of the European Society of Cardiology and Cardiac Surgeons on myocardial revascularization. Results of the SHOCK study (Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock) are the basis for diagnostic and therapeutic effects in ACS (6).

The quality of human life depends not only on the economic situation, but also on many other factors, including physical and mental health, social security, social institutions, political stability and the environment (7). The quality of life is defined as the individual's perception of their own position in life in the context of culture and value system in which they live, as well as to their goals, expectations, standards and interests (World Health Organization - WHO). In the broadest sense, the quality of life is everything that makes life worth living. Quality of life can be defined as a personal perception of the individual about its own position in life, in comparison with its goals and within the value system that is accepted and incorporated in the decision-making (8). Quality of life is an indicator for observation of disease outcome and treatment outcome in patients. Very few studies have examined the quality of life of people who had a myocardial infarction.

The aim of this study was to examine the quality of life of patients one year after acute myocardial infarction, who were treated with different methods and to determine the relationship between quality of life and echocardiographic parameters in these patients.

2. MATERIAL AND METHODS

The research was a prospective, clinical, epidemiological study and was conducted at the Clinic of Cardiology, University Clinical Center Sarajevo (UCCS). Study included 160 patients who had acute myocardial infarction (confirmed by electrocardiographic changes, laboratory findings, which include an increase in enzyme activity in serum and non-hematological changes caused by necrosis and inflammation and echocardiographic abnormalities in left ventricular wall segmental kinetics). The study was approved by the Ethics Committee of UCCS and was conducted in accordance with the principles of the Helsinki Declaration on Human Rights. All participants signed a written consent for the participation.

All patients were randomly selected, based on inclusion criteria, as they got in the emergency unit of Clinic for Cardiology. The inclusion criteria were patients of all age groups who have had only one myocardial infarction, patients who until the day of the survey were not hospitalized for other illnesses, did not have any other systemic disease, neurological disease, cardiac valvular

defect and polyvascular arteriosclerotic disease and did not have diagnosed mental illness. From the study were excluded patients with lethal outcome, patients who for any reason did not want to participate in the study, and patients who have had more than one myocardial infarction. Patients included in the research signed informed consent to participate in the study. After release from the hospital patients were followed up through regular controls in the cardiac counseling center of Clinic for Cardiology.

Patients were divided into four groups based on the therapy treatment they got. First group consisted of 40 patients who had myocardial infarction and were treated with medications. In the second and in the third group were patients who were treated with PCI (who immediately after incident underwent pPCI or delayed percutaneous coronary intervention), in each 40 patients. The fourth group consisted of 40 patients who underwent surgical revascularization (coronary artery bypass surgery). All patients were treated either with medicaments, primary PCI, delayed PCI or surgically. After the treatments have finished, an echo cardiogram was performed on every patient. The measurements included interventricular septum thickness, the thickness of the back wall of the left ventricle (LV), diameter of the left ventricle at the end of diastole (LVIDd) and systole (LVIDs), ejection fraction (EF) and an overview of valvular apparatus of the heart. One year after the treatment the echo cardiogram was repeated to all patients and observed were same parameters. Echocardiographic examinations were performed on two ultrasonic devices, Philips iE33 and Toshiba Powervision 7000. These examinations have been made by two physicians who were not familiar with the criteria for inclusion or exclusion and they did not know for each other in order to reduce the inter and intra observer error. Acute coronary syndrome (ACS) is the most common indication for echocardiography, which has multiple roles in the diagnosis and risk stratification, as well as in making treatment decisions.

Basic and medical data, including gender, age, smoking habits, occupation and comorbid conditions were taken from medical records or through interviews. Laboratory results (blood count, cholesterol, HDL-high density lipoprotein, LDL-low density lipoprotein, triglycerides and glucose) were performed at the Institute for Clinical Chemistry and Biochemistry of UCCS with standard laboratory procedures. Body mass index (BMI) was calculated after measurement of body weight and body height during regular controls in the cardiac counseling center. All laboratory test results and BMI were redone one year after the treatment.

The study used the Short Form-36 (SF-36) questionnaire for testing the quality of life and clinical data obtained from the patient's history (9). Patients were asked to complete the SF-36 questionnaire at the cardiac counseling center during regular controls two times. The first time immediately after completion of medical treatment (medicamentous, PCI or surgical) and the second one year after the treatment. Questionnaires were coded and personal data were known only to researchers. Su-

pervision over filling out the questionnaire was in the competence of principal researchers. The Short Form-36 Health Survey is a multi-purpose, short-form health survey with only 36 questions. The SF-36 is a measure of health status. It yields an 8-scale profile of functional health and well-being scores as well as psychometrically-based physical and mental health summary measures and a preference-based health utility index. Therefore, the SF-36 has 8 scaled scores. Scores range from 0-100 (lower scores-more disability, higher scores-less disability). Sections are: vitality, physical functioning, bodily pain, general health perceptions, physical role functioning, emotional role functioning, social role functioning and mental health (9).

Statistical analysis

All data obtained from the research were analyzed in the statistical program SPSS. Research results were analyzed using the descriptive statistics, which includes the determination of the mean, standard deviation (SD) and standard error of mean (SEM), or the median and interquartile ranking. The following methods of analytical statistics have been used: methods of empirical distribution identification, methods for assessing the statistical significance (Chi-square test, Student's t-test, one-way analysis of variance, Mann-Whitney test and Kruskal-Wallis analysis of variance. Methods for assessing the significance of relations which were used are Pearson's linear correlation coefficient and Spearman's rank correlation coefficient. To assess the impact of these factors on the quality of life we used the Cox model of univariate and multivariate analysis. The statistical significance was on the level of $p < 0.05$.

3. RESULTS

The study included 160 patients with a history of myocardial infarction, of which 130 (81.3%) were men, and 30 (18.8%) women. The analysis of gender distribution shows that in all groups men were more represented than women, as well as in the total sample. Thus, the representation of men is most pronounced in the group IV with 40 (100%) male respondents, than in the group III, 34 (85%) male respondents, followed by the second group with 31 (80%) and the lowest in the first group, 24 (60%) male respondents. The average age in the total sample was 54.9 ± 8.8 years (range 37-76 years). Patients in the group II were the youngest, 51.7 ± 7.8 years (range 37-66 years), while patients in group IV were the oldest with 55.8 ± 8.4 years (range 38-66 years). Respondents under age 45 years were represented with 20 (12.5%) subjects in the total sample, those aged between 45-54 years with 54 (33.8%), while respondents aged between 55-65 years were represented with 72 (45.0%) subjects. Respondents over 65 years were represented with 14 (8.8%) subjects in the total sample. Analysis of those age groups showed that the largest number of respondents of group I, III and IV were in the age of 55-65 years, and the respondents of the second group in the age of 45-54 years ($X^2=21,13$; $p=0,01$). The highest representation of respondents older than 65 years was in the group I (20%).

Quality of life parameters	N	X±SD	F	p	
Physical functioning	I group	40	60.2±21.3	1.255	0.292
	II group	40	70.5±22.5		
	III group	40	62.8±26.9		
	IV group	40	66.7±29.5		
	Total	160	65.0±25.3		
Physical role	I group	40	46.5±28.0	3.497	0.017
	II group	40	65.6±24.3		
	III group	40	54.8±28.0		
	IV group	40	61.2±31.2		
	Total	160	57.0±28.6		
Emotional role	I group	40	61.6±30.4	0.846	0.471
	II group	40	67.5±25.5		
	III group	40	56.6±31.6		
	IV group	40	63.3±34.8		
	Total	160	62.2±30.7		
Vitality	I group	40	56.2±23.4	1.668	0.176
	II group	40	64.3±16.8		
	III group	40	54.6±16.2		
	IV group	40	60.0±26.2		
	Total	160	58.8±21.2		
Mental health	I group	40	63.7±21.0	1.010	0.390
	II group	40	67.2±20.6		
	III group	40	60.8±18.0		
	IV group	40	68.0±22.9		
	Total	160	64.9±20.7		
Social functioning	I group	40	63.1±27.8	3.558	0.016
	II group	40	70.6±19.7		
	III group	40	60.0±22.3		
	IV group	40	75.6±24.5		
	Total	160	67.3±24.3		
Pain	I group	40	65.1±25.4	1.684	0.173
	II group	40	75.3±26.0		
	III group	40	68.7±27.6		
	IV group	40	76.2±24.9		
	Total	160	71.3±26.2		
General health	I group	40	46.0±21.0	2.147	0.097
	II group	40	56.7±16.9		
	III group	40	53.6±20.7		
	IV group	40	50.0±21.0		
	Total	160	51.5±20.2		
SF-36 total	I group	40	57.8±21.4	2.152	0.096
	II group	40	67.2±15.2		
	III group	40	59.0±18.6		
	IV group	40	65.1±22.8		
	Total	160	62.3±19.9		

Table 1. Quality of life of patients in the observed groups assessed with the SF-36 questionnaire. Notes: N-total number of respondents, X-mean, SD-standard deviation.

Percutaneous coronary intervention was applied slightly more often among men (85%) in group III compared to group II (80%), but without statistically significant differences in the application of PCI by gender in the observed groups. Analysis of the number of stents by groups and gender showed that in group II was slightly more patients with two stents and in the III group with

	Before treatment X±SD				One year after treatment X±SD			
	Group I	Group II	Group III	Group IV	Group I	Group II	Group III	Group IV
LVIDs	52.2±4.4	52.6±3.3	54.4±4.1	53.0±4.1	55.1±3.9	54.5±4.4	55.5±4.9	55.5±4.2
LVDs	35.3±4.6	34.1±4.1	39.7±6.2	36.8±4.8	36.3±4.9	33.6±4.8	36.0±6.9	37.2±4.6
EF	49.3±4.3	47.7±4.6	44.2±6.7	45.5±5.3	47.4±5.2	49.6±5.9	45.5±8.2	46.4±4.9
MR	1.10±0.4	1.10±0.2	1.16±0.6	1.35±0.4	1.17±0.4	0.90±0.3	0.93±0.6	1.12±0.4

Table 2. Echocardiographic parameters of the observed groups. Notes: Data are presented as mean values and standard deviation. LVIDs-Left ventricular internal dimension in end-systole, LVDs-Left ventricular end-systolic diameter, EF-Ejection fraction, MR-Mitral regurgitation, X-mean, SD-standard deviation. LVIDs: F=2.40; p=0.07, LVDs: F=7.17; p=0.00, EF: F=6.13; p=0.00, MR: F=3.93; p=0.01.

one stent. Analysis by gender within the groups as well as in the total sample showed that there is no statistically significant difference in the number of stents by gender.

Comparison of the average values of SF-36 questionnaire scales showed that the highest total score had patients in the group II, 67.2±15.2, and the lowest patients of group I, 57.8±21.4, with no statistically significant differences between groups (p=0.096). Statistically significant differences between groups were recorded in the case of the subscale physical role were participants in the group II showed an average score of 65.6±24.4, and participants in the I group 46.6±28.1 (p=0.017). Statistically significant difference between groups was also recorded in the social functioning subscale (p=0.016) (Table 1).

Comparison of mean values of echocardiographic parameters before and after the procedure/therapy showed that in the case of LVIDs (left ventricular internal dimension in end-systole) the largest increase was recorded in the group I (2.9±2.6), and the lowest in group III (1.1±3.6) without statistically significant difference between groups (p=0.07). In the case of LVDs (left ventricular end-systolic diameter) the highest increase was recorded in the group I (0.99±3.4) and the largest decrease in the group III (-3.7±8.9), with statistically significant difference between groups (p=0.00). Ejection fraction (EF) increased mostly in group II (1.9±4.4), whereas in the group I there was a decrease in EF (-1.9±2.9), with

LVIDd		I group II group III group IV group				χ ²	p
		I group	II group	III group	IV group		
Physical functioning	R	-0.13	-0.31*	-0.14	-0.21	0.89	0.82
	p	0.41	0.04	0.36	0.17		
Physical role	R	-0.30	0.06	-0.11	0.15	4.86	0.18
	p	0.05	0.71	0.49	0.33		
Emotional role	R	-0.30	-0.04	-0.06	-0.00	2.15	0.54
	p	0.05	0.78	0.69	0.97		
Vitality	R	-0.11	-0.10	0.03	0.06	0.96	0.80
	p	0.49	0.50	0.84	0.68		
Mental health	R	-0.12	-0.09	0.08	-0.15	1.31	0.72
	p	0.45	0.55	0.59	0.33		
Social functioning	R	0.07	0.20	-0.03	0.00	1.19	0.75
	p	0.62	0.21	0.84	0.97		
Pain	R	-0.21	0.01	0.35*	-0.09	6.95	0.07
	p	0.19	0.91	0.02	0.57		
General health	R	-0.05	-0.35*	0.12	-0.11	4.63	0.20
	p	0.74	0.02	0.45	0.48		

** Correlation significant at level p<0.01, * Correlation significant at level p<0.05

Table 3. The correlation of life quality and left ventricle dimensions changes in end-diastole in the observed groups of patients. Notes: Data are presented as Spaermans correlation. LVIDd-Left ventricular internal dimension in end-diastole.

EF		I group II group III group IV group				χ ²	p
		I group	II group	III group	IV group		
Physical functioning	R	0.71**	0.23	0.36*	0.17	12.03	0.00
	p	0.00	0.13	0.02	0.26		
Physical role	R	0.73**	-0.05	0.18	-0.22	29.51	0.00
	p	0.00	0.75	0.26	0.16		
Emotional role	R	0.71**	0.10	0.44**	-0.11	21.58	0.00
	p	0.00	0.52	0.00	0.48		
Vitality	R	0.73**	0.35*	0.04	-0.25	29.56	0.00
	p	0.00	0.02	0.78	0.10		
Mental health	R	0.65**	0.45**	0.06	-0.12	18.29	0.00
	p	0.00	0.00	0.71	0.46		
Social functioning	R	0.63**	0.17	0.28	-0.24	18.87	0.00
	p	0.00	0.26	0.07	0.12		
Pain	R	0.73**	0.41**	0.18	-0.26	28.29	0.00
	p	0.00	0.00	0.26	0.10		
General health	R	0.61**	0.34*	0.10	0.05	10.14	0.01
	p	0.00	0.02	0.51	0.75		

** Correlation significant at level p<0.01, * Correlation significant at level p<0.05

Table 4. The correlation of life quality and changes in left ventricular ejection fraction in the observed groups of patients. Notes: Data are presented as Spaermans correlation. EF-ejection fraction.

MITRAL REGURGITATION		I group II group III group IV group				χ ²	p
		I group	II group	III group	IV group		
Physical functioning	R	-0.11	-0.18	-0.46**	-0.26	3.17	0.36
	p	0.46	0.24	0.00	0.09		
Physical role	R	-0.14	-0.05	-0.41**	-0.28	3.06	0.38
	p	0.36	0.71	0.00	0.07		
Emotional role	R	-0.00	-0.05	-0.26	-0.33	3.10	0.37
	p	0.98	0.73	0.10	0.03*		
Vitality	R	0.00	0.32*	0.00	-0.14	4.51	0.21
	p	1.00	0.04	1.00	0.38		
Mental health	R	-0.28	0.25	-0.22	-0.36*	9.15	0.02*
	p	0.07	0.11	0.16	0.02		
Social functioning	R	-0.16	0.10	-0.37*	-0.29	5.40	0.14
	p	0.32	0.51	0.01	0.06		
Pain	R	-0.05	-0.13	0.12	-0.26	3.01	0.38
	p	0.76	0.39	0.45	0.10		
General health	R	-0.25	0.28	-0.12	-0.14	6.64	0.08
	p	0.11	0.07	0.44	0.36		

** Correlation significant at level p<0.01, * Correlation significant at level p<0.05

Table 4. The correlation of life quality and changes in left ventricular ejection fraction in the observed groups of patients statistically significant difference between groups. In case of the left atrium the largest increase of 1.97±5.4 was recorded in the group II, and at lowest increase of 0.8±2.6 in the group IV, without statistically significant difference between groups (p=0.00). The degree of mitral regurgitation increased in group I (0.08±0.5), and de-

MITRAL REGURGITATION							
		I group	II group	III group	IV group	χ^2	p
Physical functioning	R	-0.11	-0.18	-0.46**	-0.26	3.17	0.36
	p	0.46	0.24	0.00	0.09		
Physical role	R	-0.14	-0.05	-0.41**	-0.28	3.06	0.38
	p	0.36	0.71	0.00	0.07		
Emotional role	R	-0.00	-0.05	-0.26	-0.33	3.10	0.37
	p	0.98	0.73	0.10	0.03*		
Vitality	R	0.00	0.32*	0.00	-0.14	4.51	0.21
	p	1.00	0.04	1.00	0.38		
Mental health	R	-0.28	0.25	-0.22	-0.36*	9.15	0.02*
	p	0.07	0.11	0.16	0.02		
Social functioning	R	-0.16	0.10	-0.37*	-0.29	5.40	0.14
	p	0.32	0.51	0.01	0.06		
Pain	R	-0.05	-0.13	0.12	-0.26	3.01	0.38
	p	0.76	0.39	0.45	0.10		
General health	R	-0.25	0.28	-0.12	-0.14	6.64	0.08
	p	0.11	0.07	0.44	0.36		

** Correlation significant at level $p < 0.01$, * Correlation significant at level $p < 0.05$

Table 5. Correlation of the life quality and changes in the degree of mitral regurgitation in the observed groups of patients. Notes: Data are presented as Spaermans correlation.

creased mostly in the group IV, (-0.23 ± 0.4), with a statistically significant difference between the groups ($p = 0.01$) (Table 2).

Within group II, values of LVIDd (left ventricular internal dimension in end-diastole) showed a negative correlation toward the scales of physical functioning ($p = 0.045$) and general health ($p = 0.025$) (higher LVIDd lower score), and within the group III positive correlation towards the scale of pain ($p = 0.026$). Statistical analysis of the differences impact on the SF-36 scales between the groups suggests that there were no statistically significant difference on any scale (Table 3).

The correlation of the life quality of observed patients and changes in the dimensions of the left ventricle in systole (LVIDs) indicated no statistically significant differences.

Ejection fraction demonstrated a statistically significant correlation in the positive sense. There was an increase in ejection fraction leading to increased scores on different scales. So, in the group I statistically significant effect exists according to the results on all scales ($p = 0.00$), in the case of group II to the scale of vitality ($p = 0.02$), mental health ($p = 0.00$), pain ($p = 0.00$) and general health ($p = 0.02$), and in the group III according to the scale of emotional role ($p = 0.00$). Statistically significant difference between groups existed for all scales of the SF-36 (Table 4).

Within group II, mitral regurgitation (MR) showed a statistically significant positive correlation to the vitality (higher MR = higher score on a vitality scale) ($p = 0.04$). In the group III the negative correlation was found according to the physical functioning ($p = 0.00$), physical role ($p = 0.00$) and social functioning ($p = 0.01$), and in group IV to the emotional role ($p = 0.03$) and mental health ($p = 0.02$). Statistically significant differences were only found in the case of the mental health scale when observed between different groups ($p = 0.02$) (Table 5).

4. DISCUSSION

In Europe, CVD remains a major cause of premature death. Cardiovascular diseases are responsible for 42% of all deaths among European women under 75 years and for 38% of all deaths in men up to age of 75 years. The assessment of quality of life related to health or disease is important as for health workers and also for the patients.

Today, the assessment of life quality is also made to compare different medical treatments, what we have been done in our study. We measured basic echocardiography parameters (LVIDd, LVIDs, EF, left atrial dimension and degree of mitral regurgitation) in patients immediately after myocardial infarction and one year after the medical treatment. Correlation between echocardiographic parameters and quality of life in our study showed significant changes in followed groups. For example, with the increase of LVIDd it comes to decline in physical function and general health, and reduction of pain in the third group (delayed PCI). Ejection fraction proved to be a very important predictor of quality of life in patients of all four groups and the increase in its value leads to a statistically significant increase in scores of all subscales of life quality. Study conducted in Australia in 2000, on 123 patients with acute myocardial infarction with average age of 64 years showed that the EF is closely linked to the quality of life of patients and is significant in terms of its relationship with the dimensions of pain, social and emotional functioning. It has been shown that the presence of pain and insomnia reduces quality of life of patients (10). Size of left atrium shows a negative and statistically significant effect on the subscales of physical role and general health in the first group and in the third group on the scale of general health. It was noted that with the increase in mitral regurgitation there is a significant reduction in physical function subscale scores, social functioning in the third and emotional role and mental health in the fourth group. For mitral regurgitation statistically significant difference was observed between the groups for subscale of mental health.

A study conducted in the United States in 2011 on a sample of 903 patients, who were treated with PCI stent and 897 patients who have undergone revascularization or coronary artery bypass graft intervention (CABG) were examined for life quality one, six and 12 months after myocardial infarction. The authors emphasize the importance of this type of research because it shows less improvement in quality of life for patients who underwent revascularization compared to patients who have implanted stent (11). Study conducted in Sweden, in 2005, examined the quality of life of patients one week, 5 months and one year after the onset of myocardial infarction, showed that five months after the incident, women have higher scores than men, but there is a strong possibility that after one year a significant decline in the quality of life can appear in all patients. The authors point out the great importance of direct measurements and more frequent control of physical and mental health after myocardial infarction, especially in males (12).

Similar study was conducted by Szygula-Jurkiewicz B et al in 2005, where they measured the quality of life in

patients after myocardial infarction treated by PCI and stent revascularization, and the outcome was measured 12 months after the intervention. This study shows a statistically significant difference in the quality of life of patients who underwent revascularization compared to PCI treatment in terms of an increase in the dimensions of physical components, while the mental component shows no statistically significant differences in both groups. The authors did not include changes of echocardiographic parameters 12 months after the intervention in the study, as we did in our study (13). Norris and colleagues, in 2004, conducted a study similar to our own, where they measured the quality of life of patients with myocardial infarction who were medically treated either with a stent or PCI revascularization. The authors determined that a better quality of life had those who have undergone PCI (with or without stent) (14). In our study, unlike previous studies, we included patients with the placed stent and have confirmed similar results.

5. CONCLUSION

The highest total score of average values of all tested subscales had patients of group II (pPCI). Ejection fraction increased mostly in group II also.

The increase of ejection fraction led to a significant increase of quality of life scores in all subscales in all groups so that EF had the greatest impact on the quality of life in all respondents.

- Conflict of interest: The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper. All authors have read manuscript and agreed with contents.

REFERENCES

1. Mirzaei M, Truswell AS, Taylor R, Leeder SR. Coronary heart disease epidemics: not all the same. *Heart*. 2009; 95: 740-6.
2. European Heart Network. European Cardiovascular Disease Statistics, 2008.
3. Zavod za javno zdravstvo FBiH. Izvještaj o zdravstvenom stanju stanovništva Federacije BiH u 2011 godini. Zavod za javno zdravstvo Federacije BiH, 2012.
4. Kushner FG, Hand M, Smith SC, et al. Focused Updates: ACC/AHA Guidelines for the management of Patients With ST-elevation Myocardial Infarction (Updating the 2004 Guideline and 2007 Focused Update) and ACC/AHA/SCAI Guidelines on Percutaneous Coronary Intervention (Updating the 2005 Guideline and 2007 Focused Update): A report of the American College of Cardiology Foundation/ American Heart Association Task Force on Practice Guidelines. *Circulation*. 2009; 120: 2271-2306.
5. Ellis SG, Armstrong P, Betriu A. et al. Facilitated percutaneous coronary intervention versus primary percutaneous coronary intervention: design and rationale of the facilitated intervention with enhanced reperfusion speed to stop events (FINESSE trial). *Am Heart J*. 2004; 147: 16.
6. Hochman JS, Sleeper LA, Webb JG; Sanborn TA, White HD, Talley JD. et al. Early revascularization in acute myocardial infarction complicated by cardiogenic shock. *N Engl J Med*. 1999; 341: 625-34.
7. Merton RK. Social Structure and Anomie. *Am Soc Rev*. 1938; 3: 672-82. Reprinted in *On Social Structure and Science*, 2008.
8. Higginson IJ, Carr AJ. Using quality of life measures in the clinical setting. *BMJ*. 2001; 322(7297): 1297-1300.
9. User's Manual for the SF-36v2™ Health Survey Part technical manual and part historical text. www.sf-36.com
10. Hunt JO, Hendrata MV, Myles PS. Quality of life 12 months after coronary artery bypass graft surgery. *Heart Lung*. 2000; 29(6): 401-11.
11. Cohen DJ, Van Hout B, Serruys PW, Mohr FW, Macaya C, den Heijer P et al. Quality of life after PCI with drug-eluting stents or coronary-artery bypass surgery. *N Engl J Med*. 2011; 17; 364(11): 1016-26.
12. Brink E, Grankvist G, Karlson BW, Hallberg LR. Health-related quality of life in women and men one year after acute myocardial infarction. *Qual Life Res*. 2005; 14(3): 749-57.
13. Szygula-Jurkiewicz B. et al. Health-related quality of life after percutaneous coronary intervention versus coronary artery bypass graft surgery in patients with acute coronary syndromes without ST - segment elevation 12-month follow up. *Eur J Cardiothorac Surg*. 2005; 27(5): 882-6.
14. Norris CM et al. Health-related quality of life outcomes of patients with coronary artery disease treated with cardiac surgery, percutaneous coronary intervention or medical management. *Can J Cardiol*. 2004; 20(12): 1259-66.