Predictors of Quality of Life Change after an Acute Coronary Event

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Summary

Background: The assessment of quality of life (QOL), identifying functional capacity and frequency of angina and other cardiac symptoms, are key issues in the treatment of chronic patients or in those with disease instability.

Objective: To identify predictors of quality of life (QOL) improvement in patients with non-ST segment elevation acute coronary syndrome (NSTEACS).

Methods: Patients hospitalized in a cardiology reference hospital were assessed with the Seattle Angina Questionnaire (SAQ) at the time of admission and after 6 months. The analyzed outcome was the variation of the QOL score, resulting from the difference between the score after six months and the score at the time of admission. Differences between patients with or without 6-month QOL improvements regarding the demographic, clinical and therapeutic characteristics were assessed by univariate and multivariate analysis.

Results: Hypertensive patients presented lower improvement in QOL scores when compared to non-hypertensive ones [8,3(0-25) vs. 16,6(0-33,3); P=0,05], as well as patients with dyslipidemia, when compared to non-dyslipidemic ones [8,3(0-25) vs. 16,6(0-33,3); P=0,02]. Patients with unstable angina presented greater improvements in QOL in relation to those with NSTE myocardial infarction [16.6(0-33.3) vs. 8.3(-8,3-25); P=0,03]. By multivariate analysis, myocardial revascularization in the first 30-days was associated with the greater improvement in the QOL score (8.47 points; P=0,005). On the other side, the presence of dyslipidemia at the baseline evaluation was an independent predictor of worse QOL scores (-7.2 points; P=0.01).

Conclusion: Myocardial revascularization was associated with improvement in the 6-month QOL scores, while dyslipidemia was associated with worse scores. (Arq Bras Cardiol 2008;91(4):229-235)

Key words: Coronary arteriosclerosis; quality of life; myocardial revascularization.

Introduction

With the increased survival and aging of the population, the treatment of patients with coronary artery disease (CAD) must include improvement in the physical functionality and delay the disease progression, in addition to symptom relief, aiming at the patients' return to their daily routine[1]. The tendency to focus the disease management solely on the clinical findings may not correspond to the patients' expectations, who worry about the limitations that the disease imposes to their activities of daily living.

Thus, the verification of complementary outcomes in patients with CAD becomes relevant for the patients and for society[2]. The evaluation of the patient's health status through the Seattle Angina Questionnaire (SAQ)[3] is a frequently employed assessment tool, encompassing the health-related quality of life (HRQL), physical limitations, satisfaction with the treatment, frequency and stability of symptoms.

These measurements help to monitor the responses to treatment, identification of changes in the clinical picture as well as potential problems and comprise information that are complementary to decision-making in the clinical practice.

Studies carried out in patients with CAD have demonstrated that the SAQ is useful in the assessment of strategies that improve the functional capacity, the frequency and instability of symptoms[4,5]. The use of the SAQ is valid to verify outcomes as well as for the identification of risk factors for cardiovascular events[6,7], being considered more sensitive to changes in quality of life of patients with CAD than generic tools such as the Short Form 36[8].

However, the SAQ has been scarcely used in daily clinical practice. Most of the studies that evaluated HRQL in patients with unstable CAD originated from randomized clinical assays and the patients treated at daily clinical practice present different characteristics. Recently, the ICTUS[9] study demonstrated that the early interventionist strategy might not improve survival, further emphasizing the importance of the assessment of these outcomes within the context of treatment.

Therefore, the objective of the present study is to identify quality of life improvement predictors in acute coronary syndrome (ACS) without ST segment (STS) elevation, in a cohort representative of the patients treated at daily clinical

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practice, after 6 months of hospital admission.

Methods

Patients

The patients treated at the Emergency Unit (EU) of our Institution and admitted with a clinical diagnosis of Non-ST Segment Elevation Acute Coronary Syndrome (NSTEACS) from January to June 2004 were eligible for this study. The exclusion criteria were severe valvular disease, dilated myocardiopathy of non-ischemic origin, previous heart transplantation, hypertrophic myocardiopathy, neurological alterations such as dementia, Alzheimer's disease, Parkinson's disease, encephalic vascular accident (EVA) sequelae, psychiatric disorders, neoplasia, pregnancy or hemodynamic instability compatible with cardiogenic shock, physical impairment, participation in randomized multicentric clinical studies, as well as refusal in participating or impossibility to continue participating in the study.

The patients were evaluated prospectively and the demographic and clinical characteristics as well as the therapy instituted at the hospital discharge were verified. The SAQ[3] was applied up to 48 hours of hospital admission. The study was approved by the Ethics Committee in Research of our institution and all individuals included in the study signed the free and informed consent form.

Definitions

The NSTEACS was characterized as unstable angina and acute myocardial infarction (AMI) with no ST segment elevation. Unstable angina was defined as typical angina pain or anginous equivalent, with a minimum duration of 5 minutes and symptom onset in up to 96 hours before hospital admission, with or without chest pain at rest. Acute myocardial infarction with no STS elevation was defined by a normal electrocardiogram (ECG) or T-wave inversion or ST segment depression associated to chest pain or serum elevation of myocardial injury biomarkers[10,11]. The patients were stratified according to the TIMI[12] risk score and the patients with scores 0 to 2 were considered low-risk; from 3 to 5, medium-risk; and 6 or 7, high risk. These data and the other clinical characteristics were obtained from the patients' medical files and through interviews with the patients.

Outcomes and follow-up

The measurement of health-related quality of life was carried out through the Seattle Angina Questionnaire (SAQ), a disease-specific questionnaire that consists of five domains. The variation of the quality of life score between the sixth month and the patients' initial interviews was the main outcome of the study (Δ SAQ5 = SAQ5 6 months – SAQ5 admission). The domains 1 (physical limitation) and 3 (frequency of angina) were also analyzed and recorded. The questionnaires were applied by one of the investigators and the following clinical outcomes were also evaluated: recurrent angina, AMI and new revascularization (surgical or percutaneous). The SAQ scores are formed for each domain, by attributing an ordinal number to each response, starting with number 1 for the response that implies the lowest level of functionality. After that, the other domain responses are added to it. The score is transformed to 0 to 100, through the subtraction by the lowest possible number of the domain responses, dividing it by the variation and multiplying by 100. The higher the score, the better the functional capacity is, the fewer the symptoms and the better the quality of life is.

The physical limitation domain (D1) uses questions that concern the performance of activities of daily living. The questions that analyze the frequency of angina (D3) verify the periodicity of the symptoms. The questions that deal with HRQL (D5) verify, together with the patient, his or her satisfaction in living as a CAD patient and the fear of sudden death or of having a heart attack. The HRQL is defined as the variation of the impact that the disease causes in the patient's life, manifested by the patient him or herself[2].

Statistical analysis

The data were analyzed with the program SPSS version 12.0. The categorical variables were expressed as absolute and relative frequencies and the continuous variables were expressed as medians and 25 and 75 percentiles. To analyze the difference between the groups, the Chi-square test was used for the categorical variables and ANOVA, Mann-Whitney and Kruskal-Wallis tests were used for the continuous variables, according to the presupposed parametric relationship.

For the comparison of the SAQ-D5, at admission and after six months, Wilcoxon's test was used. For the correlations between the continuous variables, Spearman's correlation coefficient was used (r_s). Diagrams of dispersion were used to graphically demonstrate these correlations. The clinical and therapeutic variables were submitted to the univariate analysis and later, to the multiple linear regression in order to identify associations with the HRQL variation. The data adopt similar or close values because they originate from a tool with a minimum and maximum score per domain, in which there is no freedom for the score to take up any value.

The independently associated variables or those that suggested an association with improvement at 6 months were included in the model. The multivariate analysis was carried out to identify predictors of health-related quality of life improvement. For all tests, a $P \leq 0.05$ was considered statistically significant.

Results

Of the 350 initially eligible patients, 62 were excluded from the study. The causes for exclusion were: randomization to multicentric clinical studies (30), dementia or some type of physical disability (8), refusal to participate (3), impossibility to continue participating in the study (4). Of a total number of 305 patients, 08 (2.6%) died and 16 (5.1%) were lost to follow-up. The latter were excluded from the comparative analysis, totaling 281 patients in the sample.

Therefore, a group of 281 patients were studied and the data related to their clinical characteristics are shown in Table 1. There was no difference regarding the score variation in relation to gender, age, ethnicity or level of schooling. Patients with unstable angina presented a higher variation in the score

Table 1 - Variation in the SAQ-health-related quality of life score at the admission and after 6 months, according to the demographic and clinical characteristics of the studied sample (n=281).

Characteristics	Admission n (%)	SAQ-Quality of Life median (25-75 percentile)			P
		Admission	6 months	Variation	
Demographic					
Age					
<65 yrs	161(52.3)	33.3(16.6-50)	50(33.3-66.7)	16.6(0-33.3)	0.52
≥65 yrs		33.3(25-50)	54.1(33.3-66.7)	16.6(0-25)	
Gender					
Male	163(58)	41.6(25-50)	50(33.3-66.6)	16.6(0-33.3)	0.45
Female		33.3(16.6-41.6)	50(33.3-66.6)	16.6(0-33.3)	
Ethnicity					
Caucasian	244(86.8)	33.3(25-50)	50(33.3-66.6)	16.6(0-31.2)	0.39
Others		25(8.3-41.6)	50(25-66.6)	16.6(0-33.3)	
Schooling					
<8 yrs	161(52.3)	33.3(25-50)	50(33.3-66.6)	16.6(0-33.3)	0.98
> 8 yrs		33.3(25-50)	58.3(33.3-66.6)	16.6(0-29.1)	
Clinical					
Unstable angina	222(79.0)	33.3(22.9-50)	50(33.3-66.6)	16.6(0-33.3)	0.03
AMI w/t supra ST		41.6(33.3-58.3)	50(41.6-66.6)	8.3(-8.3-25)	
SAH*					
Yes	221(78.6)	33.3(20.8-50)	50(33.3-66.6)	8.3(0-25)	0.05
No		41.6(33.3-50)	58.3(35.4-66.6)	16.6(0-33.3)	
Dyslipidemia					
Yes	147(52.3)	33.3(25-50)	50(33.3-66.6)	8.3(0-25)	0.02
No		33.3(25-50)	58.3(41.6-66.6)	16.6(0-33.3)	
Previous AMI					
Yes	119(42.3)	33.3(16.6-50)	50(33.3-66.6)	8.3(0-25)	0.29
No		33.3(25-50)	58.3(39.5-66.6)	16.6(0-33.3)	
Previous MR					
Yes	108(38.4)	33.3(16.6-41.6)	50(33.3-66.6)	16.6(0-33.3)	0.66
No		33.3(25-50)	58.3(37.5-66.6)	16.6(0-25)	
DM					
Yes	66(23.5)	33.3(16.6-41.6)	50(33.3-66.6)	16.6(0-33.3)	0.12
No		33.3(25-50)	50(33.3-66.6)	16.6(0-33.3)	
Smoker					
Yes	65(23.1)	33.3(16.6-50)	58.3(33.3-66.6)	16.6(0-37.5)	0.11
No		33.3(25-50)	50(33.3-66.6)	16.6(0-25)	
HF					
Yes	15(5.3)	33.3(33.3-58.3)	50(33.3-58.3)	16.6(0-33.3)	0.68
No		33.3(25-50)	50(33.3-66.6)	8.3(-8.3-33.3)	
MR 0-30 days					
Yes	118 (42)	33.3(16.6-50)	54.1(33.3-66.6)	16.6(0-33.3)	0.01
No		33.3(25-50)	50(33.3-66.6)	8.3 (0-25)	
Severity of disease†					
1 vessel	47 (16.8)	33.3(16.6-58.3)	50(33.3-66.6)	8.33 (0-33.3)	0.23
2 vessels	41 (14.9)	33.3(20.8-45.8)	50(37.5-75)	25 (0-41.7)	
3 vessels	29 (10.3)	16.6(33.3-45.8)	58.3(33.3-70.8)	25 (16.7-33.3)	

†In revascularized patients. PTCA – Percutaneous Transluminal Coronary Angioplasty; MRS – Myocardial Revascularization Surgery; DM – Diabetes Mellitus, SAH – Systemic Arterial Hypertension, AMI – Acute Myocardial Infarction; HF – Heart Failure, MR – Myocardial Revascularization; SAQ – Seattle Angina Questionnaire.

when compared to those with AMI and STS [16.6(0-33.3) vs. 8.3(-8.3-25); P=0.03]. As for the risk factors for CAD, the hypertensive individuals presented a lower score variation, when compared to the non-hypertensive ones [8.3(0-25) vs. 16.6(0-33.3); P=0.05] and likewise, in patients with dyslipidemia, when compared to non-dyslipidemic ones [8.3(0-25) vs. 16.6(0-33.3); P=0.02]. Patients submitted to percutaneous coronary angioplasty (PCA) or myocardial revascularization surgery (MRS) up to 30 days after the acute event (PCA n=77 and MRS n=41), presented a higher score variation when compared to the group of patients that did not undergo revascularization [16.6(0-33.3) vs. 8.3(0-25); P=0.01]. The disease severity, described by the number of affected vessels, was verified only in patients that were revascularized up to 30 days of admission (n=118). When disease severity and myocardial revascularization within 30 days were compared, no significant difference was observed in the quality of life score variation between the two variables. Most of the patients [209 (74.4%)] presented moderate risk for the development of cardiovascular events within 30 days, followed by 47 patients (16.7%) that presented low risk.

This and the other clinical characteristics did not present any association with the outcome.

During the follow-up period, major cardiovascular events (MCVE) that resulted in re-hospitalization were evaluated: recurrent angina [40(14.2%)], AMI [7(2.5%)] and new revascularization [2(0.7)].

As for the other domains of the SAQ, Figure 1 shows the correlation between the score variations of the SAQ-Physical limitation (D1) and SAQ-Quality of life (r_s=0.26; P<0.01). Figure 2 shows the correlation between the score variations of the SAQ-Frequency of angina (D3) and SAQ-Quality of life (r_s=0.41; P<0.01).

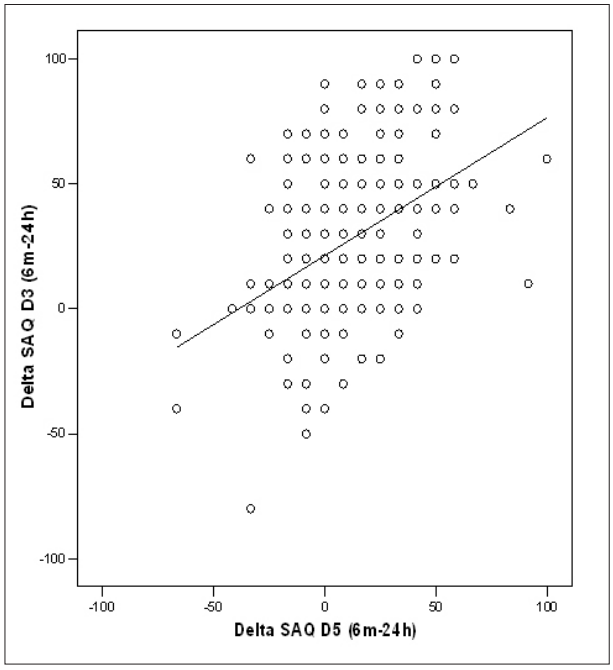

Figure 2 - Correlation between the variation of the SAQ-Frequency of angina (D30) and SAQ-Quality of Life (D5).

Figure 3 shows the medians and the score variation of the SAQ – Quality of life at hospital admission and after 6 months. At admission, the median was 33.3 (25-50) and after six months, the score changed to 50 (33.3-66.6), P<0.01.

The characteristics included in the multiple linear regression model are shown in Table 2: male gender, age ≥ 65 years,

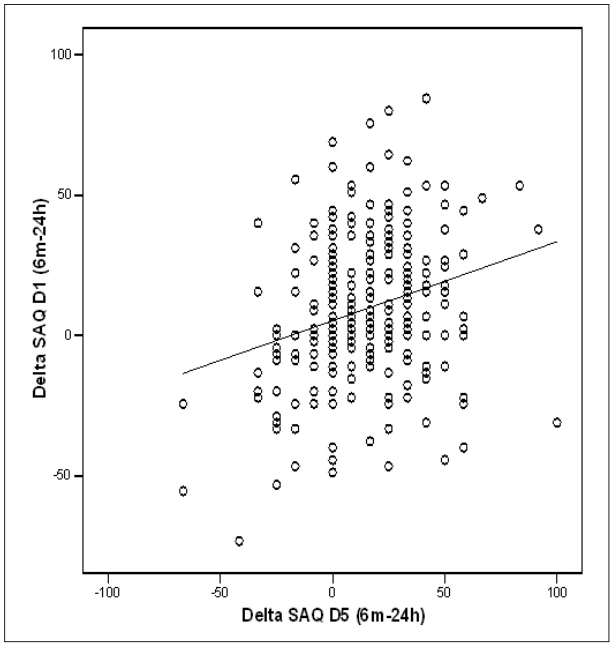

Figure 1 - Correlation between the SAQ-Physical Limitation (D1) and SAQ-Quality of Life (D5).

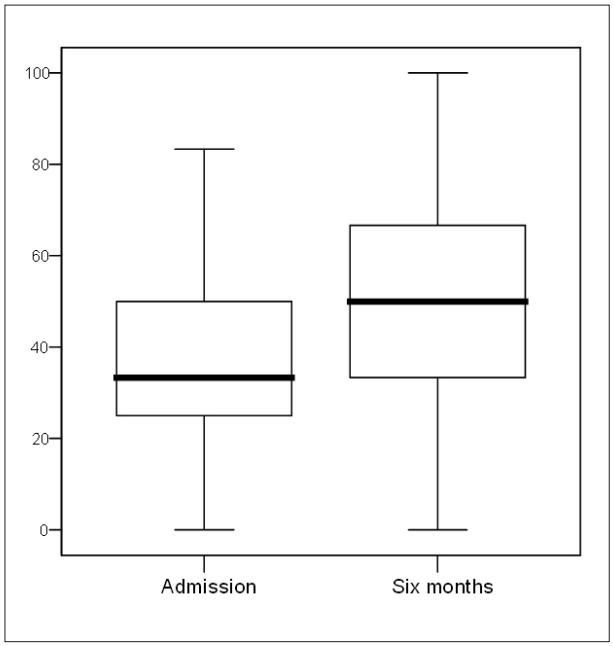

Figure 3 - SAQ score - Quality of life at admission and after 6 months (median, 25 and 75 percentiles, maximum and minimum).

systemic arterial hypertension (SAH), diabetes mellitus, dyslipidemia, medications prescribed at the hospital discharge such as acetylsalicylic acid (ASA), betablockers, angiotensin-converting enzyme inhibitor (ACEI) and myocardial revascularization up to 30 days of discharge.

In this analysis, the presence of dyslipidemia associated with a decrease in the quality of life score (-7.2 points; P=0.01). On the other hand, patients submitted to myocardial revascularization showed an increase in the score (+8.47 points; P<0.01).

At the multivariate analysis, the independent quality of life predictors were dyslipidemia and myocardial revascularization (MR). The improvement in the HRQL varied with the type of MR, with patients that were submitted to surgery presenting a more marked improvement (+1.77 points; P=0.07), as described in Table 3.

Table 2 – Predictors of variation of the SAQ-quality of life score at the multivariate analysis (n=281)

Characteristics	B (SE)	P
Male gender	-5.14(3.0)	0.09
Age ≥ 65 yrs	-4.60(2.9)	0.11
SAH	1.74(3.6)	0.63
DM	3.73(3.4)	0.28
Dyslipidemia	-7.20(2.9)	0.01
ASA*	2.08(4.6)	0.65
B-blocker*	4.84(4.0)	0.23
Statins*	-4.90(3.0)	0.11
ACE inhibitor*	1.13(2.9)	0.70
MR 0-30 days	8.47(3.0)	0.005

**Prescribed at hospital release; DM – Diabetes Mellitus, ACE – Angiotensin-converting enzyme; SAH – Systemic Arterial Hypertension, MR – myocardial revascularization.*

Table 3 – Predictors of variation of the SAQ-quality of life score in revascularized patients (n=118)

Characteristics	B (SE)	P
Male gender	-4.69(5.2)	0.37
Age ≥ 65 yrs	-3.56(4.8)	0.45
SAH	6.25(5.7)	0.27
DM	8.09(5.1)	0.12
Dyslipidemia	-15.40(8.5)	0.002
ASA*	1.33(11.7)	0.91
B-blocker*	15.26(8.5)	0.07
Statins*	-5.85(5.0)	0.25
ACE Inhibitor*	-0.66(4.8)	0.89
MR X PTCA	1.77(4.7)	0.07

**Prescribed at hospital release; DM: Diabetes Mellitus, ACE: Angiotensin-converting enzyme; SAH – Systemic Arterial Hypertension, MR – myocardial revascularization.*

Of the total of patients that presented some type of cardiovascular event [49 (17.4%)], only 12 were revascularized in up to 30 days (PCA n=9 and MRS n=3). The patients that needed a new revascularization (n=2) had been submitted to PCA and among the patients that were re-admitted due to recurrent angina, 8 had been revascularized (PCA n=6 and MRS n=2). When compared to non-revascularized patients, these presented a 2.8-fold higher risk of re-hospitalization within the period than the revascularized ones (95% CI: 1.47 – 5.55; P=0.003).

Discussion

The patients included in the present study represent part of a population treated at a tertiary reference center in Cardiology and the data show, through the use of a disease-specific tool, the quality of life predictors 6 months after an acute coronary event, adjusted for the clinical characteristics and the established therapy.

Health-related quality of life predictors

In the present study, the variable associated with the highest variation in the quality of life score was the myocardial revascularization up to 30 days after the hospital admission, either by PCA or MRS. Similar to our results, a study performed by Kim et al[4], showed that patients with NSTEACS, treated by intervention, presented better scores when compared to those treated conservatively. As for the myocardial revascularization strategies, Zhang et al[13] carried out a study comparing patients with multiarterial CAD, submitted to percutaneous or surgical revascularization, evaluating the physical limitation, frequency of angina and quality of life, and observed improvement in the scores for both revascularization strategies within 6 months (variation of 13.6 to 34.7 points; P<0.001). However, patients that were surgically revascularized presented higher scores than those submitted to PCA. Regarding the percutaneous revascularization, studies carried out comparing the early interventionist strategy with the conservative strategy[14,15] demonstrated a significant improvement in the physical limitation, anginous symptoms and HRQL. .

Spertus et al[16] compared patients submitted to PCA or MRS stratified by the risk of re-stenosis regarding the SAQ-angina frequency score and quality of life. In patients with low risk for re-stenosis, there was no difference regarding the SAQ scores, whereas in those with intermediate risk, an improvement in the frequency of angina score was observed in patients with MRS compared to PCA (96.5±1.1 vs. 90.3±0.8, p<0.001) within a year and likewise, in the quality of life score (90.7±1.1 vs. 84.9±0.8). In the group with high risk for re-stenosis, it was also observed that MRS is a determinant factor for angina frequency and quality of life improvement. Considering these results, a better functional capacity, symptom improvement and, consequently, better adaptation to living with a chronic disease that requires efforts aiming at delaying its evolution, are observed in revascularized patients, mainly by MRS.

On the other hand, dyslipidemia showed to be a score worsening predictor. As possible explanations for this finding, one must consider the changes in eating habits, necessary for the control of this risk factor of coronariopathy. The prescription

of strict diets, the use of medications and their side effects, as well as the regular control of serum cholesterol levels alter the patients' perception of health and quality of life. The dietary efforts to control the hypercholesterolemia, many times ineffective, can result in a certain frustration. A study by Lalonde et al[17], comparing patients with and without dyslipidemia in the absence of CAD, corroborates these inferences regarding the quality of life scores, by showing that patients with dyslipidemia had lower scores (-3.3 points; P=0.02). Our results were similar to those of the aforementioned studies, given that the multivariate analysis shows that revascularization up to 30 days is a predictor of quality of life improvement and the patients treated by MRS tend to present a lower score variation than those treated by PCA.

Variation of the SAQ-Quality of life scores in relation to the demographic and clinical characteristics and other SAQ domains

Regarding the demographic characteristics, no significant differences were observed in the quality of life score variation, after six months. Although age was considered a mortality predictor in patients with CAD in one year[7] and a determinant of quality of life alterations[18], the patients in the present study who were 65 years or older presented a variation that was similar to the ones younger than 65. Conaway et al[19], taking into account the aging of the North-American population and the prevalence of CAD, carried out a study showing that patients older than 75 submitted to MRS, despite the slow physical recovery, did not present differences regarding the frequency of angina and quality of life, when compared to the younger patients. The quality of life score variation was the same for men and women in this study. However, a study carried out by Norris et al[20], showed that women with CAD reported worse HRQL scores than men, one year after the coronary angiography. Although the Caucasian patients constitute the majority of the study populations, it is known that Black patients are receptors of fewer revascularization procedures when compared to Caucasians (52.5% vs. 66%; P<0.01) and, even with no difference in mortality between Caucasian and Black patients, the latter present a worsening in the functional health status[21].

Regarding the comorbidities associated to CAD, arterial hypertension and dyslipidemia were the most prevalent ones, with higher rates than the ones reported by other studies. This finding can possibly be explained by the more advanced CAD stage of the studied patients, which resulted in an acute event. The established therapy showed to be a determinant for the outcome. Regarding the other SAQ domains, the variation in physical limitation, stability and frequency of angina in the follow-up period are directly associated with the quality of life.

As the score variation increases, characterizing improvement in the physical capacity and anginous symptoms, the quality of life score variation also improves.

Cardiovascular Events

The rate of MCVE in the present study was 17.4%. The assessed events were those that presented higher clinical significance, in addition to death, which excluded patients due to the use of the score variation such as outcome, recurrent angina that can develop into AMI or necessity of emergency revascularization, AMI and necessity of a new revascularization. The results showed that, among the revascularized patients up to 30 days after the NSTEACS, the necessity of a new revascularization was observed in those submitted to PCA. These data are in agreement with the literature[22], which demonstrates a higher need for a new revascularization in patients treated by the percutaneous strategy when compared to those treated by MRS, within a one-year period.

However, it is important to consider the adherence to the pharmacological therapy that is necessary after the percutaneous revascularization, which can represent a high cost for the patient, impairing the treatment optimization. Spertus et al[23] carried out a study with the objective of verifying the impact of the difficulty presented by the patient in maintaining health care measures after coronary revascularization, through the functional health status. Worsening in the SAQ scores was observed in patients that reported such difficulty, regardless of the revascularization strategies.

Another aspect to be considered is the use of pharmacological stents, which, when compared to conventional stents, decrease the rates of re-stenosis in the revascularization by PCA[24,25]. In the present study, the patients treated with PCA received conventional stents.

Clinical implications

It is vital to have mechanisms to identify patients whose interventions, such as revascularization or more aggressive pharmacological therapy, are indicated.

Although all patients must modify habits, aiming at the control of risk factors, some need a more intensive clinical management. Even if the results showed benefits for the quality of life with the surgical revascularization in patients with ST segment (STS) elevation, one must consider the disease severity, the surgical risk and the patient's consent. The findings of this study are useful as they can help the clinical management of patients, the identification of potential problems, mainly regarding the destabilization of the disease, the monitoring of clinical changes and treatment responses, due to the chronic pharmacological management[2].

Study limitations

The studied patients were at distinct phases of CAD evolution, as some of them had already presented previous AMI and MRS, with a clear indication for the interventionist approach whereas, for others, it was the first manifestation of the disease. It is also worth mentioning that the SAQ presents a considerable degree of subjectivity, which sometimes impairs its understanding by the patient. The quality of life can also be influenced by socioeconomic and/or ethnic and racial factors, which were not analyzed in the present study. Regarding the cardiovascular events, these were verified through the reports made by the patient or his/her family, at the end of the follow-up period. The corroboration of this variable might have undergone a bias due to the omission or lack of knowledge of the diagnosis by the informer and the lack of evidence to confirm the event, when

the patient sought assistance at another hospital.

Our data allow us to conclude that the revascularization up to 30 days after the hospital admission is associated with improvement in the quality of life and that dyslipidemia is associated to a worsening in this outcome within 6 months. It was also demonstrated that there is a correlation between physical limitation, stability and frequency of angina with quality of life.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Study Association

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