

Quality of Life in Patients with Severe and Stable Coronary Atherosclerotic Disease

Gisele Moriel¹, Meliza Goi Roscani², Luiz Shiguero Matsubara², Ana Teresa de A. Ramos Cerqueira², Beatriz Bojikian Matsubara²

Hospital Santa Marcelina¹; Faculdade de Medicina de Botucatu - UNESP², São Paulo, SP - Brazil

Abstract

Background: There are few data on the factors decreasing quality of life (QoL) in patients with coronary artery disease (CAD) before a percutaneous coronary intervention (PCI).

Objective: To associate clinical variables with QoL scores in patients with stable CAD before the PCI and with unfavorable outcomes, 12 months after the procedure.

Methods: The present is a longitudinal study of 78 patients (43 men and 35 women), before an elective PCI. The associations between the QoL scores (SF-36 questionnaire) and age, sex, weight, body mass index, diabetes mellitus (DM), arterial hypertension, dyslipidemia, current smoking, previous cardiovascular event or PCI, glycemia control and blood pressure (BP) were analyzed by multivariate logistic regression. We also analyzed the associations between the clinical features and the unfavorable outcomes (death due to any cause, heart failure or nonfatal infarction). The level of significance was set at $p < 0.05$.

Results: The medians of the QoL scores were < 70 percentage in all domains. Female sex, age < 60 years, previous cardiovascular event or PCI, $BMI \geq 25$ kg/m², DM and high BP were associated with a higher degree of impairment of at least one QoL score. Female sex (OR: 7.19; 95%CI: 1.55 - 33.36; $p = 0.012$), previous cardiovascular event (OR: 3.97; 95%CI: 1.01 - 15.66; $p = 0.049$) and PCI failure (OR: 10.60; 95%CI: 1.83 - 61.46; $p = 0.008$) were associated with increased risk of combined outcome.

Conclusion: In the presence of CAD, women and patients with comorbidities present a higher degree of QoL impairment. The unfavorable outcomes 12 months after the PCI are associated with the female sex, previous event or procedure failure. (Arq Bras Cardiol 2010;95(6):691-697)

Keywords: Quality of life; depression; coronary artery disease; women.

Introduction

Lifestyle and emotional stress are risk factors for cardiovascular diseases that have been emphasized in the literature. Studies have shown a higher incidence of cardiovascular events among the population with depressive symptoms or low scores of quality of life (QoL) indicators. Additionally, patients with established coronary artery disease (CAD) present QoL impairment and high levels of stress, caused by the disease itself, physical limitation and risk of death, closing a vicious circle that intensifies the disease progression¹⁻⁴. It is believed that, in addition to disease severity, the association of comorbidities, such as diabetes mellitus (DM), arterial hypertension (AH) and obesity, frequently

observed in these patients, could represent an aggravating factor for the decline in QoL⁵.

The global definition of quality of life takes into account the individual's external life conditions and subjective experiences⁶. It is not an easy task to quantify quality of life. Several tools have been proposed for that purpose, which have been validated by several studies. The assessment of the health status by the Seattle Angina Questionnaire (SAQ)⁷ is one of these methods used to evaluate QoL related to the limitations in activities of daily living caused by the intensity of angina, as well as the satisfaction with the performed treatment. A more comprehensive questionnaire and better applied to patients with chronic diseases, including CAD, is the Medical Outcomes Study 36-item Short-form Health Survey (SF-36)⁸⁻¹⁰, which has been translated to Brazilian Portuguese and validated in Brazil¹¹.

Norris et al¹² evaluated 3,392 patients with CAD, one year after the hemodynamic study, using the SAQ and observed that women, when compared to men, presented QoL impairment regarding several indices, such as lower level of satisfaction with the performed treatment higher frequency of angina episodes and lower physical exercise capacity.

Mailing address: Meliza Goi Roscani •

Departamento de Clínica Médica da Faculdade de Medicina de Botucatu - UNESP - Distrito de Rubião Júnior, s/nº - 18618- 970 - Botucatu, SP - Brazil
E-mail: meliza10@hotmail.com

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Another study¹³ showed that women older than 65 years with symptoms of depression presented an unfavorable clinical evolution, with worse prognosis, six months after a cardiovascular event.

In our country, Favorato et al¹⁴ described a higher degree of QoL impairment in women with CAD after clinical or surgical treatment or percutaneous coronary intervention (PCI), when compared to men. These results were consistent with the Rita-2 study¹⁵, which included a large sample and also identified the female sex as a factor associated with QoL impairment in patients with CAD.

As the national literature has scarce data on this aspect, the objective of the present study was to associate clinical variables and QoL scores in patients with severe and stable CAD, before the PCI and evaluate unfavorable outcomes, 12 months after the procedure.

Methods

All procedures were submitted to appreciation and were approved by the Ethics Committee in Research of *Faculdade de Medicina de Botucatu* - UNESP (OF.78/2005-CEP). There were no sources of funding for this research.

A longitudinal, prospective study was carried out in a population of patients referred to undergo PCI. A total of 78 patients of both sexes, older than 18 years and no other age limitations, with a diagnosis of CAD, regardless of a previous diagnosis of acute myocardial infarction (AMI) and submitted to angioplasty of one or more coronary arteries, during an elective procedure that was scheduled in advance, were included in the study. All agreed to participate and signed the Free and Informed Consent Form. These patients were referred by the regional Cardiology Outpatient Clinics, from August 2004 to June 2006. All patients were submitted to a thorough clinical-cardiological evaluation.

The following exclusion criteria were adopted: 1) hemodynamic instability, characterized by a systolic pressure < 100 mmHg and/or dyspnea at rest, precordial pain at the assessment, severe arrhythmia; 2) patients with a diagnosis of acute ischemic syndrome.

Clinical evaluation

The demographic and clinical variables were: origin, marital status, sex, degree of schooling, occupational status, age, previous history of AMI or other cardiovascular event (acute ischemic syndrome, peripheral artery disease or cerebrovascular accident), diabetes mellitus, arterial hypertension or smoking, number of coronary arteries with severe lesions (> 70% of lumen obstruction), weight, height, body mass index, blood pressure. After the angioplasty, the following variables were considered: coronary artery submitted to the procedure and the result of angioplasty (the success of the procedure was defined as TIMI 3 flow in the artery submitted to PCI).

The laboratory variables were: fasting glycemia, total cholesterol and fractions, triglycerides, urea, serum creatinine, hematocrit and hemoglobin.

The following values were adopted to define the control of risk factors: systolic blood pressure < 140 mmHg and diastolic

blood pressure < 90 mmHg (in diabetic patients, these values were decreased to 130 and 80 mmHg, respectively); fasting glycemia \leq 126 mg/dl; LDL-cholesterol \leq 100 mg/dl; BMI < 25 kg/m²; and triglycerides \leq 150 mg/dl^{13, 16, 17}.

Quality of life assessment

The standard SF-36 questionnaire was applied, always by the same interviewer, at the hospital facility, in a room specially prepared for this purpose, in a calm, silent and private environment. This tool contains 36 items that encompass 8 domains: functional capacity (10 items); physical performance (4 items); pain (2 items); general health status (5 items); vitality (4 items); social aspects (2 items); emotional aspects (3 items) and mental health (5 items). Based on the answers obtained, the QoL scores were calculated, following the literature recommendations^{6, 7, 18}.

The medians of the score values were considered as reference to categorize the "highest" and "lowest" scores in each aspect.

Clinical outcomes

Twelve months after the angioplasty, contacts by telephone were carried out and the medical files were checked for outcome. Death due to any cause, hospitalization due to heart failure (HF) or nonfatal AMI were considered "unfavorable clinical outcomes".

Statistical analysis

Mean values, with their respective standard deviations, were calculated for continuous variables with normal distribution. The QoL scores were expressed as medians and interquartile ranges. The univariate exploratory analysis was carried out by Student's *t* test or Mann-Whitney test. The differences between proportions were analyzed by Chi-square test. The associations with a probability of being due to chance < 0.20 were introduced in the multivariate logistic regression model.

The multivariate logistic regression analysis was applied to identify which clinical features were associated with the categorized QoL score impairment. In this analysis, the "highest" or "lowest" category was considered as the dependent variable in each of the 8 studied items. The following independent variables were categorized and included in the model: sex (male and female), age (\geq 60 years or < 60 years), BMI (< 25 kg/m² or \geq 25 kg/m²), diabetes mellitus (yes/no), increased fasting glycemia (yes/no), previous cardiovascular event (yes/no), previous angioplasty (yes/no), current smoker (yes/no). The following continuous variables were also included: systolic blood pressure (SBP) and diastolic blood pressure (DBP).

The same analysis was carried out to identify which clinical features were associated with a combined clinical outcome.

In all cases, the level of significance was set at $p < 0.05$.

Results

Thirty-five patients from the study sample were females and 43 were males. Table 1 shows the means and standard

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deviations of age, weight, height, blood pressure and biochemical variables. The distribution of QoL scores is

Table 1 - Clinical variables in the studied sample

Variable	Women (n = 35)	Men (n = 43)	p value
Age (yrs)	64 ± 8.6	59 ± 8.7	0.031
SAH (s/n)	29/6	35/8	0.867
DM (s/n)	19/16	16/27	0.132
Smoking (s/n)	6/29	11/32	0.369
Previous event (s/n)	17/18	19/24	0.699
Previous PCI (s/n)	15/20	21/22	0.598
BMI(kg/m ²)	27.6 ± 5.8	26.8 ± 3.59	0.496
SBP (mmHg)	138 ± 24	139 ± 18	0.818
DBP (mmHg)	77 ± 18	84 ± 14	0.038
Glycemia (mg/dl)	135 ± 77.8	135 ± 65	0.997
LDL-C (mg/dl)	110 ± 34.8	118 ± 34.6	0.311
HDL-C (mg/dl)	45.0 ± 13.4	36.4 ± 10.8	0.003
Triglycerides (mg/dl)	142 ± 53.0	220 ± 156.5	0.006
Creatinine (mg/dl)	1.04 ± 0.76	1.16 ± 0.30	0.330
Hemoglobin (mg/dl)	13.2 ± 1.30	15.1 ± 1.36	<0.001
Outcomes (s/n)	13/21	5/35	0.010

BMI - body mass index; SBP - systolic blood pressure; DBP - diastolic blood pressure.

shown in Figure 1. The medians and interquartile ranges of the scores in the eight domains were: 65; 40-85 (functional capacity); 25, 0-50 (physical aspects); 52, 30-72 (pain); 62, 47-77 (general health status); 62, 45-75 (vitality); 50, 37-100 (social aspects); 67, 33-100 (emotional aspects); and 66, 40-80 (mental health).

Table 2 shows the medians and 25th and 75th percentiles of the scores in the eight domains of the SF-36 questionnaire, in men and women.

The significant associations between the several aspects of the QoL scores and the clinical variables were:

Table 2 - Medians (25th and 75th percentiles) of the quality of life scores in men and women with severe and stable CAD

Domains	Women (n = 35)	Men (n = 43)	p value
Functional capacity	55.0 (26.3-75.0)	70.0 (45.0-85.0)	0.101
Physical aspects	0.0 (0.0-50.0)	25.0 (0.0-68.8)	0.023
Pain	42.0 (24.0-78.3)	62.0 (34.0-96.0)	0.016
General health status	55.0 (40.5-74.3)	70.0 (52.0-82.0)	0.046
Vitality	60.0 (40.0-75.0)	65.0 (45.0-87.5)	0.390
Social aspects	50.0 (37.5-100)	62.5 (40.6-100)	1.00
Emotional aspects	33.3 (33.3-100)	100 (33.3-100)	0.355
Mental health	56.0 (41.0-76.0)	72.0 (40.0-87.0)	0.216

Mann-Whitney Test.

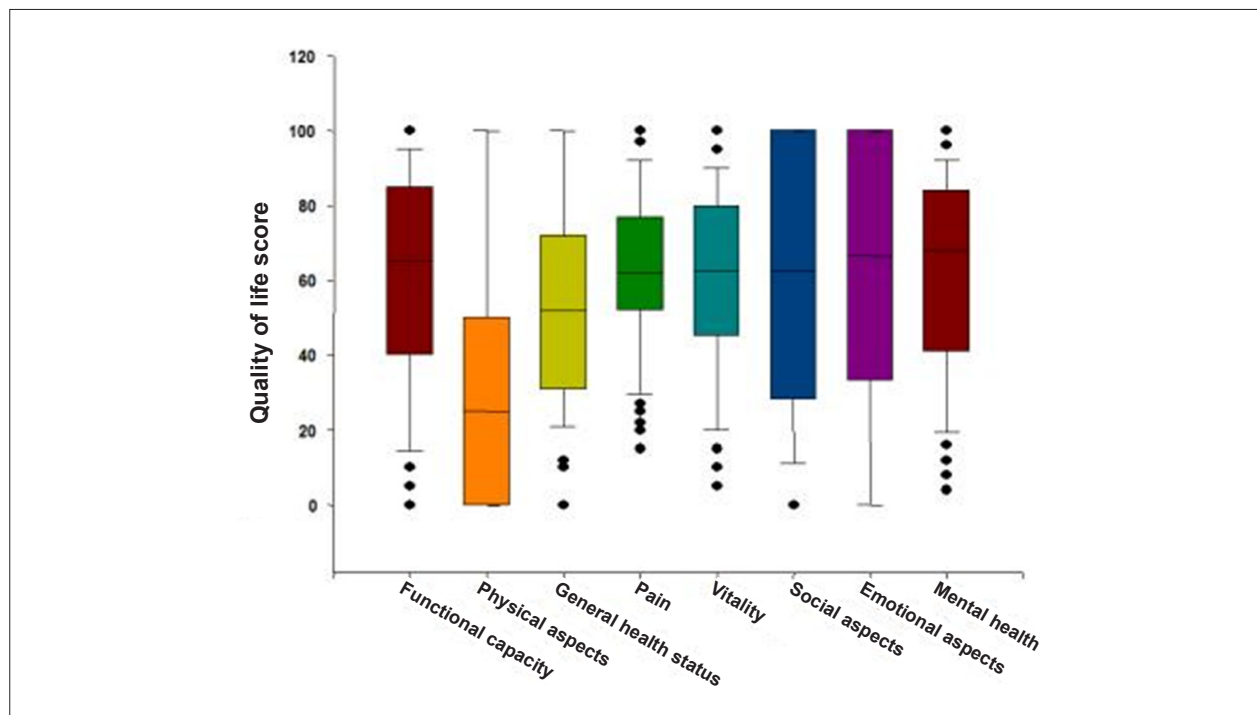


Fig. 1 - Box plot presenting the eight domains evaluated by the SF-36 questionnaire: functional capacity, physical aspects, general health status, vitality, social aspects, emotional aspects and mental health. The horizontal line inside the box represents the median of the values. The upper and lower lines represent the 25th and 75th percentiles, respectively. The vertical bars upward or downward represent the 90th and 10th percentiles, respectively. The circles represent values that extrapolated these limits.

1. *Functional capacity* - age ≥ 60 years (OR: 0.18; 95%CI: 0.05 to 0.72; $p = 0.04$) and male sex (OR: 0.18; 95%CI: -3.0 to -0.44; $p = 0.009$) were protective factors, decreasing the risk of QoL score impairment. Higher SBP (143 ± 23 mmHg vs 133 ± 16 mmHg; $p = 0.032$) and BMI > 25 kg/m² were associated with lower scores (OR: 1.05; 95%CI: 0.01-0.09; $p = 0.01$ and OR: 3.8; 95%CI: 1.06-13.8; $p = 0.04$, respectively).

2. *Physical aspects* - the only variable independently associated to a lower QoL score was the presence of previous cardiovascular event (OR: 3.7; 95%CI: 1.2-11.4; $p = 0.02$).

3. *Pain* - only the male sex showed to be a protective factor and was associated with higher scores in this item (OR: 0.26; 95%CI: 0.08-0.78; $p = 0.017$).

4. *General health status* - the presence of DM and previous cardiovascular event were significantly associated with additional QoL impairment (OR: 11.2; 95%CI: 1.29-97.8; $p = 0.028$ and OR: 5.6; 95%CI: 1.4-22.7; $p = 0.015$, respectively).

5. *Vitality* - none of the variables included in the logistic regression model was independently associated with additional QoL score impairment in the studied sample.

6. *Social aspects* - previous PCI was associated with lower scores (OR: 103; 95%CI: 3.9-33.1; $p = 0.001$).

7. *Emotional aspects* - no clinical variable was shown to significantly contribute to the modification of the score.

8. *Mental health* - the male sex was associated with a lower risk of decrease in this domain (OR: 0.21; 95%CI: 0.06-0.71; $p = 0.01$). Previous PCI and overweight/obesity contributed to the impairment of this variable (OR: 3.3; 95%CI: 1.08-10.07; $p = 0.035$ and OR: 4.3; 95%CI: 1.19-15.85; $p = 0.02$, respectively).

Twelve months after the procedure, complete data were obtained regarding 74 individuals. Four cases were excluded due to lack of data in the medical files and failure to establish telephone contact. During this period, 13 of the 74 stents presented re-stenoses identified at a new coronary angiography. New interventions were carried out in 11 vessels.

Seventeen patients presented at least one of the unfavorable clinical outcomes. Five patients died; 7 needed hospitalization due to HF and 10 presented nonfatal AMI.

The female sex (OR: 7.19; 95%CI: 1.55-33.36; $p = 0.012$), previous cardiovascular event (OR: 3.97; 95%CI 1.01-15.66; $p = 0.049$) and PCI failure (OR: 10.60; 95%CI: 1.83-61.46; $p = 0.008$) were associated with increased risk of combined outcome.

Discussion

The present study aimed at evaluating the factors associated with QoL impairment in patients with severe and stable CAD. The associations between clinical features and unfavorable outcomes after the angioplasty were also analyzed.

The study population was characteristically elderly, overweight and without ideal control of modifiable cardiovascular risk factors. This finding is relevant, considering that such patients already presented target-organ lesions. Lack

of ideal BP control was identified in 51.0% of the patients; of glycemia, in 44.0% and of the lipid profile, in 68.0% of the patients. Additionally, 36 cases presented overweight and 14 cases presented obesity.

The difficulty to control all cardiovascular risk factors is often described in the literature¹⁹. A survey carried out by Ministry of Health and Pan-American Health Organization, called "Evaluation of the Reorganization Plan for Arterial Hypertension and Diabetes Mellitus Care in Brazil" showed that 36.0% of the surveyed individuals presented BP levels $\geq 140 \times 90$ mmHg; 16.4% of the individuals presented altered glycemia levels. The nutritional status, evaluated through the BMI, showed that 30.8% of them were overweight (BMI > 25 and < 30 kg/m²) and that 19.4% were obese (BMI > 30.0 kg/m²)²⁰.

In the present study sample, the QoL scores were decreased in all items, taking into account the values obtained in normal individuals and described in the literature²¹⁻²³. The values observed in the present study are similar to those observed by other national authors that evaluated patients with CAD¹. The item physical aspects showed to be especially impaired, with 50.0% of the patients presenting a score < 50 . Our data do not allow us to conclude on all the causes for this alteration, but they would be in accordance with the study by Spertus et al⁴, who described disease-related functional status impairment in patients with DAC and symptoms of depression.

The women presented lower functional capacity, in addition to reporting more pain and presenting a higher degree of mental health impairment. There have been reports in the literature showing that women present a higher degree of mental health impairment during the disease²⁴⁻²⁶. This characteristic might be associated to women's higher capacity of verbalization during the assessment²⁷. It might also be associated with social-cultural factors, which implicate in longer working hours, prejudice and other factors.

It is noteworthy the observation that individuals aged ≥ 60 reported better functional capacity. A possible explanation for this result might be the highest impact of the disease on younger individuals, that is, patients who were previously more active, when compared to already retired and less active patients, can experience more difficulty with the imposed rest or work incapacity.

The other variables associated with QoL score impairment, in fact, reflect the presence of comorbidities or older or more severe CAD. The presence of DM, uncontrolled arterial hypertension, overweight/obesity and repeated cardiovascular events are conditions that contribute to aggravate the health status and affect the individuals' daily activities²⁸.

Therefore, although the results obtained were expected, it is noteworthy the small number of references in the literature that addressed this aspect in the specific case of patients with coronary atherosclerotic disease. Miralda et al²⁶ evaluated patients after myocardial revascularization surgery and observed that the presence of multiple risk factors and the female sex were associated with QoL impairment. In a subsequent study, these authors identified preserved QoL in the patients after angioplasty²⁷.

Differently, the present study did not evaluate the association between QoL scores and outcomes after the

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angioplasty, as its objective was to assess the QoL score impairment in patients with CAD before the procedure.

One aspect that deserves to be discussed is the possible implication of QoL impairment and depression symptoms on these patients' prognosis. Three physiopathological mechanisms can be involved²⁹. First, the depression might be accompanied by hypercortisolemia, a well-known pro-atherosclerotic component³⁰. Second, depressive individuals might present higher platelet aggregation and pro-inflammatory component release³¹. Finally, they can also present lower HR variability and decreased vagal tonus, favoring a higher incidence of arrhythmogenic events^{32,33}. There is an increase in blood pressure, vasoconstriction and endothelial dysfunction, thus accelerating atherosclerotic phenomena^{34,35}.

It is noteworthy the observation of a higher risk of combined outcome in women, patients with previous cardiovascular event or PCI failure, even in a relatively small sample, such as this one. Previous events and procedure failure are easy-to-understand factors, considering the fact that they represent a more severe disease. On the other hand, the question of a higher risk for the female sex must be better analyzed, as it is less understood.

Several factors can explain the association between the female sex and a higher risk of unfavorable cardiovascular outcome. In general, women with CAD are older and present a higher number of comorbidities³⁶. Several mechanisms have been implicated, such as the post-menopausal decrease in estrogen secretion. Estrogen is the factor responsible for the delay in the atherosclerotic activity during the fertile age in women, with the increase in HDL levels and cardiovascular protection. An interesting aspect is that women also present a higher risk of QoL impairment.

This observation might suggest that the two phenomena are related. That is, the higher risk of events in women might be associated, in part, to the fact that they present more depressive symptoms and a poorer psychosocial adjustment

in the presence of a cardiovascular event¹¹. However, the association between QoL impairment and unfavorable outcomes was not assessed in the present study. That was due to the fact that the PCI was performed after the definition of the scores, which might constitute an interpretation bias. In spite of that, it is noteworthy the evidence that women presenting depressive symptoms and a lower degree of social integration also present a higher risk of unfavorable clinical outcomes in the presence of CAD^{37,38}. Moreover, poor QoL and emotional stress would cause ovarian dysfunction, lower estrogen secretion, neuroendocrine activation and hypercortisolemia, accelerating the atherosclerotic process^{39,40}, closing the vicious circle.

Conclusion

Quality of life is impaired in patients with severe and stable CAD. This impairment is aggravated in women and patients with other comorbidities, such as DM, overweight, obesity, uncontrolled hypertension and previous cardiovascular event or PCI. Twelve months after the PCI, there was a higher risk of unfavorable outcomes in women and patients with previous cardiovascular event or PCI procedure failure.

Potential Conflict of Interest

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

Sources of Funding

There were no external funding sources for this study.

Study Association

This study is not associated with any post-graduation program.

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