

EVALUATION BETWEEN ANGINA SYMPTOMS AND DEGREES OF CORONARY OBSTRUCTION IN PATIENTS INDICATED FOR CORONARY ANGIOGRAPHY

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ABSTRACT

Introduction: Patients with coronary artery disease (CAD) have angina as the main clinical manifestation. Angina limits the quality of life and can be evaluated by several methods being one of the main cardiac catheterization (CCTA).

Objective: This study aims to compare the symptoms of pre-intervention angina with the findings in CC.

Methods: Cross-sectional study with 50 patients referred to the hemodynamics service to undergo CCTA for CAD between August and October 2020. The Seattle Angina Questionnaire (SAQ) was used to assess the most relevant clinical manifestations of CAD before intervention. After CCTA, the images were analyzed by two experienced interventional cardiologists to determine the lesions. A sequential analysis of the right and left coronary arteries, as well as their main branches, and eventual surgical grafts previously implanted was performed. Patients were divided into two groups: those with coronary lesions $\geq 70\%$ and those with normal ("white") CCTA (lesions $< 70\%$ or no lesions). Subsequently, they were compared according to their baseline characteristics and scores obtained from the SAQ. Statistical analysis used unpaired t and chi-square tests. Non-parametric measures were tested by Fisher's test, with significance at 5%.

Results: Patients with lesions $\geq 70\%$ had worse health perceptions when compared to patients with normal CCTA (Lesions $\geq 70\%$: 68.0 ± 17.3 points versus white CCTA: 81.3 ± 14.1 points, $p: 0.01$). Other QAS domains did not show significant differences.

Conclusion: It was observed that patients with coronary lesions $\geq 70\%$ had a worse perception of health than those with "white" CCTA. The SAQ is an important instrument in the clinical assessment of patients with CAD and may be an option for evaluating symptoms in this population.

KEYWORDS: CARDIAC CATHETERIZATION; ANGINA PECTORIS; ACUTE CORONARY SYNDROME; HEALTH LEVEL

INTRODUCTION

Cardiovascular diseases are the main causes of mortality in the world. In Brazil, according to the Ministry of Health (MS), it is estimated that about 147,000 people died in 2019 from this group of diseases.¹ CAD has been standing out among these cardiovascular diseases, as it is among the main causes of mortality and morbidity. In the Midwest region, it is estimated 37% of the national mortality from CAD.²

Characterized by remodeling and narrowing of the coronary arteries, CAD has a wide spectrum of clinical manifestations, which can present as stable angina or acute coronary syndrome (ACS). The increasing morbidity and mortality in Brazil is driven by population aging combined with risk factors such as smoking, high blood pressure, diabetes, dyslipidemia, sedentary lifestyle, atherogenic diets and personal history.² In Brazil, it is estimated that there are 30 cases of stable angina for each case of acute infarction. Therefore, the importance of a careful and careful investigation to diagnose it is noted, also due to its clinical severity and potential risk.³

Aiming to assess the health status of patients with CAD, a sensitive and specific tool, the Seattle Angina Questionnaire (SAQ) was developed.⁴ The SAQ is used to assess changes in angina frequency, stability and quality of life related to health after myocardial revascularization or clinical drug treatment in patients with ACS.

SCAs share the same anatomical substrate, atherosclerotic plaque rupture or erosion, with different degrees of thrombosis, which will result in different clinical consequences. Therefore, unstable angina is a milder form of this spectrum, and it is obvious to see that, according to the SAQ indices, patients with unstable angina have the best health status indices compared to patients with infarction.⁵

Angiography or cardiac catheterization (CCTA) emerged as an exam to identify the presence of arterial obstructions, measuring the severity of pathological variants and evaluating the need for interventions.⁶ CCTA is indicated for diagnostic purposes in patients with non-specific chest pain, angina stable, acute ischemic syndromes,

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myocardial infarction and some special clinical situations⁷, being considered the gold standard method for the diagnosis of CAD.⁸ In addition, this procedure for diagnostic purposes is of low risk, as the American College of Cardiology points out that the complication rate is less than 1:1000.⁶ Therefore, angiography or CAE are preferable for stable patients with a high probability of CAD.⁹

In the present study, the hypothesis that CC findings in patients with CAD may present significant differences in relation to their health status and angina manifestation was tested, with the possibility, for example, of symptomatic patients having "white" CCTA (without no significant change) and the degree of angina does not correspond to the degree of coronary obstruction. Therefore, carrying out an investigation with the SAQ can help to better understand each of these clinical conditions.

METHODS

This is an observational cross-sectional study carried out at Hospital Encore, in the city of Aparecida de Goiânia, in Goiás. The patients included were those referred to the hospital's hemodynamics service for CCTA during the period between August and October 2020. Patients with disabling neurological or psychiatric disease and those with previously diagnosed CAD and/or who had already undergone CC/angioplasty were excluded. A total of 50 patients were evaluated, 25 men and 25 women.

The present study was approved by the Research Ethics Committee of the Hospital de Urgências de Goiânia (CAAE: 32730920.60000.0033) and all participants signed an Informed Consent Form.

The SAQ was used as an instrument to assess the most relevant clinical manifestations of CAD in the pre-intervention setting, being applied to patients 60 minutes before the procedure. The five domains of the SAQ were analyzed: physical limitation (D1), stability (D2), frequency of anginal symptoms (D3), satisfaction with the treatment (D4) and illness perception (D5).

The first domain of the questionnaire uses questions to assess the ability to perform activities of daily living, the questions in D2 analyze the severity of symptoms and those in D3 analyze the frequency and periodicity with which symptoms occur. The questions for D4 and D5 verify, with the patient, their satisfaction of living despite the disease and the fear of dying suddenly, respectively. According to the patients' responses, each domain receives indices ranging from 0 to 100. The designated points are related to the functionality status of each domain. The higher the score, the better the quality of life.

After the application of the SAQ and the performance of the CCTA, the angiographic film was analyzed by two interventional cardiologists in a sequential analysis of the right and left coronary arteries as well as their main branches and finally any previously implanted surgical grafts (saphenous and/or mammary bypass). These vessels were evaluated and described in terms of 5 characteristics: 1- the identification of the

vessel, 2- its angiographic importance and the irrigated territory, 3- the presence or absence of obstructive lesions and/or other relevant alterations, 4- visual angiographic quantification the degree of stenosis in percentage terms (ranging from parietal irregularities when up to 20%, and from 10% to 100%, when fully occluded) and 5- the location of this lesion/alteration in the vessel in question (origin, proximal thirds, medium or distal, their combination or diffusely in the vessel). Thereafter, the clinical and angiographic characteristics of the patients were determined and analyzed.

Finally, patients were divided into two groups: those with coronary lesions above 70% and those with normal or "white" CCTA (lesions < 70% or no lesions). The two groups were compared according to their baseline characteristics and scores obtained from the SAQ. Thus, the symptoms of angina, present in the pre-intervention scenario, were compared with the findings in the diagnostic CCTA.

Considering the presentation of data in the results, categorical variables were expressed as absolute numbers and percentages. Continuous variables were expressed as mean \pm standard deviation. The Microsoft Excel 365[®] version 2016 software was used for data tabulation. Variables were tested for normality distribution using the Shapiro-Wilk test. Anthropometric data were examined using unpaired t-tests and chi-square analyses. Nonparametric measures were tested using Fisher's test. A P value < 0.05 was considered statistically significant for all tests. Statistical analyzes were performed using Statistica 10.0 software (Statsoft Inc., Tulsa, Oklahoma, USA).

RESULTS

Fifty patients were included in the present study, half female and half male. Of the patients who make up the sample, 35 (70%) had a coronary lesion greater than or equal to 70% and 15 (30%) had a normal CCTA. The anthropometric and clinical characteristics of the two groups are presented and compared in Table 1. The great difference between the groups regarding gender, smoking and the presence of symptoms of acute coronary syndrome is highlighted.

Analyzed Variables	Lesion \geq 70% (n=35)	Normal CC (n=15)	P value
Age (years)	64 \pm 8.8	58 \pm 11.1	0.05
BMI (kg/m ²)	28 \pm 5.2	27 \pm 5.3	0.93
Males, n (%)	22 (63)	3 (20)	<0.01
Hypertension, n (%)	31 (89)	10 (67)	0.07
Dyslipidemia, n (%)	25 (71)	7 (47)	0.10
Smoking, n (%)	19 (54)	2 (13)	0.02
Family history, n (%)	28 (80)	10 (67)	0.32
Sedentary lifestyle, n (%)	25 (71)	10 (67)	0.74
Diabetes Mellitus, n (%)	20 (57)	5 (33)	0.13
SCA, n (%)	19 (54)	0	<0.01
Time of symptoms (months)	11.4 \pm 31.9	4.0 \pm 9.0	0.39

CCTA: coronary angiography; BMI: body mass index; ACS: acute coronary syndrome.

Table 1 - Comparison between the anthropometric and clinical characteristics of the participants (n=50)

Clogged Vessels	n (%)	Percentage of obstruction per vessel
RCA	24 (18%)	73 ± 26
PD	6 (5%)	76 ± 22
RPV	4 (3%)	65 ± 21
LMCA	4 (3%)	35 ± 6
AD	27 (21%)	78 ± 19
DB1	17 (13%)	71 ± 22
DB2	5 (4%)	84 ± 19
CX	15 (11%)	56 ± 22
DB	7 (6%)	73 ± 26
MB1	14 (11%)	78 ± 23
MB2	3 (2%)	63 ± 21
LPV	3 (2%)	60 ± 26
PDCA	1 (1%)	90
Total of vessels	130 (100%)	

RCA: right coronary artery; PD: posterior descending; RPV: right posterior ventricular; LMCA: left main coronary artery; AD: anterior descendant; AD: anterior descendant; DB1: first diagonal branch; DB2: second diagonal branch; CX: circumflex; DB: diagonal branch; MB1: first marginal branch; MB2: second diagonal branch; LPV: left posterior ventricular; PDCA: posterior descending circumflex artery; Values indicated in absolute numbers and/or percentage or mean ± standard deviation.

Table 2 - Angiographic data of volunteers who presented obstruction greater than 70% in one of the coronary arteries.

Domains	Lesão ≥ 70%	CATE branco	Valor de P
Limitation of physical activity	81 ± 16,8	78 ± 16,0	0,50
Angina severity	45 ± 30,8	43 ± 22,1	0,85
Angina frequency	72 ± 25,3	78 ± 19,0	0,41
Satisfaction with treatment	90 ± 16,1	91 ± 14,5	0,86
Disease perception	67 ± 21,0	62 ± 27,6	0,45
Perception of one's health	68 ± 17,3	81 ± 14,1	0,01

CCTA: coronary angiography. Values indicated in mean and standard deviation.

Table 3 - Comparison of Seattle Angina Questionnaire scores between groups.

DISCUSSION

The present study found that patients with obstructive lesions greater than 70% had worse health perceptions when compared to patients with normal or "white" CCTA. Other SAQ domains did not show significant differences. These data coincide with the results found in the studies by Marino et al., Lima et al., and Reich et al.¹⁰⁻¹²

The analysis of the results showed a higher prevalence of severe coronary lesions (≥70%) in male patients aged over 60 years. This finding was in agreement with three other important studies found in the literature, which highlighted the same profile of patients as having more severe injuries. Conti et al., with a sample of 236 patients, observed more serious injuries in 78% of the male population. Costa et al. analyzed 200 patients and found that 64% of patients with severe injuries were men and older than 60 years. And Monfroi et al. also confirmed that men aged > 60 years have a higher incidence of serious injuries.¹³⁻¹⁵

In the analysis of the SAQ, significance was observed in the score attributed to the patients' perception of their own health. The group of patients with coronary lesions equal to or greater than 70% gave lower marks for their own health

(Lesions ≥ 70%: 68.0 ± 17.3 points versus normal CCTA: 81.3 ± 14.1 points, p: 0.01). In the same sense, in the Brazilian studies by Santos et al. and Quadros et al. the patients' manifested symptoms correlated with the anatomical findings in the examination.^{5, 16-17} Thus, in view of the chronicity of CAD and the tendency of patients to have bad lifestyle habits, it is justifiable that patients with larger lesions feel sicker, especially if questioned right before performing an invasive procedure.

In view of this finding, it is essential that, in face of any patient indicated for CCTA and investigation of CAD or potential ischemia, the professional responsible for the care of this patient reinforces the importance of adopting healthy lifestyle habits. According to the ISCHEMIA study, routine invasive therapy does not promote a significant reduction in major adverse ischemic events compared to optimal clinical therapy among stable patients with moderate ischemia in lesions that do not involve the left main coronary artery.¹⁸ Thus, it is up to the health professional to create strategies (nutritional guidance, encouragement of exercise, maintenance of regular use of medications, anti-stress measures) to improve the quality of life and reduce the poor perception of their own health by this patient, in addition to avoiding that it relapses in some acute coronary event.

In the other domains, the differences between the groups were not significant. In this sense, it is important to remember that the SAQ is a measurement instrument considered clinically important according to the study by Spetus et al., being one among other options for the assessment of anginal symptoms, such as: the Rose questionnaire, SF36, Minnesota, WHOQOL and MacNew.^{4, 18-20} However, like all of these other questionnaires, the SAQ is subject to significant collection bias.

An important bias to be considered when filling out the SAQ is the recall bias, since angina is an episodic symptom. According to the Food and Drug Administration's Labeling and Endpoints Development Group, patients are unable to accurately remember their health status over time, which could make the questionnaire inaccurate as a recall period of four weeks is required.¹⁸ Furthermore, according to the International Association for the Study of Pain, the symptom of pain is an unpleasant sensory and emotional experience. Therefore, the fact that pain is a subjective and multifactorial symptom may justify the inability to observe differences in other domains of the questionnaire.^{7, 21-23}

Furthermore, use of the SAQ was questioned against daily records of angina frequency and use of sublingual nitroglycerin. To perform this comparison, the TERISA study was used, which analyzed the patients' angina through an electronic diary and the SAQ. This work showed that the SAQ may have a reduced accuracy compared to the daily reports, as it only portrays an angina average over the last four weeks, which represents a potential limitation of this questionnaire.²¹ The study by Chan et al. also suggests that the SAQ has limited use in clinical practice due to its size, as an alternative, the author validated a reduced SAQ with only 7 items which increased the feasibility of the daily use of the questionnaire.²²

The study had limitations that deserve to be considered. Due to its performance in a hemodynamics service in which the sample did not come exclusively from the institution, it was impossible to catalog the complementary exams used to justify the indication of coronary angiography. Furthermore, the patients had a heterogeneous angina profile, with different classifications, frequency and duration. However, the CCTA performed in the service were conducted by a medical team of qualified hemodynamicists and homogeneous training, which minimizes the operator-dependent bias in the analysis of angiographic films. Furthermore, it is noteworthy that the study through questionnaires is a subjective method of assessment. The questionnaire was applied up to 60 minutes before the coronary angiography, which can lead to inaccurate data due to the emotional and memory bias of each patient, which can influence the perception of symptoms. Thus, it is possible that the application of the questionnaire outside the pre-intervention environment could bring different results due to the change in the psychological and subjective factor that has an important influence on the questionnaire.

CONCLUSION

It was observed that patients with coronary lesions $\geq 70\%$ had a worse perception of health than those with normal or "white" CCTA. The SAQ is an important instrument in the clinical assessment of patients with CAD and may be an option for evaluating symptoms in this population.

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