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Is the Treatment of Coronary Artery Disease Following the Recommendations Set Out in the Proposed Guidelines and in the SYNTAX Study?

Helmgton José Brito de Souza[1,2], MD, PhD; Beatriz Estrella Souza[3]; Thiago Amaral Cavalcante[3], MD; Eduardo Ferreira Sales[3], MD; Natália Lopes Kairala[3], MD; Rafaela Salviolo[3], MD; Leonardo Jadyr Silva Alves[3], MD; Diogo Assis Souza[3], MD; Rafael Ramos Amaral[3], MD; Maria Paula Meireles Fenelon[3], MD; Henrique Louzan Machado[3], MD; Leopoldo Nucci[4], MD

[1]Faculdade de Medicina, Eixo de Habilidades e Atitudes e Humanidades Médicas, Centro Universitário Euro-Americano, Brasília, Distrito Federal, Brazil.
[2]Academia Simulamed, Brasília, Distrito Federal, Brazil.
[3]Department of Skills and Attitudes, Centro Universitário de Brasília, Brasília, Distrito Federal, Brazil.
[4]Department of Medicine, Centro Universitário Euro-Americano, Brasília, Distrito Federal, Brazil.

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ABSTRACT

Introduction: Coronary artery disease (CAD) is the main cause of death among cardiovascular diseases. Current guidelines aim to guide clinical practice in choosing the best treatment, based on the best scientific evidence. The SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery (SYNTAX) score uses anatomical and clinical factors, helping to assess the complexity of coronary lesions.
Objective: To verify whether the treatment used in CAD complied with the recommendations set out in the guidelines and in the SYNTAX study.
Methods: Single-center, cross-sectional, observational, descriptive, and retrospective study, which analyzed medical records over a three-year period. Patients diagnosed with CAD who had obstructive disease in at least two vessels were selected. The exams were evaluated by a specialist who was unaware of the report and the treatment used for each patient. SYNTAX 1 and 2 scores were calculated, and the recommended treatment was compared to the established treatment.
Results: Two hundred and ten patients were distributed, according to SYNTAX Score 1, into the groups low (Group A), intermediate (Group B), and high risk (Group C). Of 155 patients in Groups B and C, 105 (67.7%) were treated with percutaneous coronary intervention (PCI), *vs.* 24 (15.5%) with CABG. When calculating the SYNTAX Score 2 of the 101 patients with recommended treatment for CABG, 71 (70.3%) received PCI, compared to 18 (17.8%) treated with CABG. All patients recommended for preferential treatment for PCI had the recommendation respected.
Conclusion: The treatment offered was not supported by current guidelines and recommendations. Expanding the sample size may determine the current situation of the treatment of CAD in Brazil.
Keywords: Coronary Artery Disease. Myocardial Revascularization. Angioplasty. Cardiovascular Diseases. Drug-Eluting Stents.

Abbreviations, Acronyms & Symbols

CABG	= Coronary artery bypass grafting	LMCA	= Left main coronary artery
CAD	= Coronary artery disease	MACCE	= Major cardiac and cerebrovascular events
CKF	= Chronic kidney failure	MI	= Myocardial infarction
COPD	= Chronic obstructive pulmonary disease	PCI	= Percutaneous coronary intervention
CVD	= Cardiovascular diseases	PE	= Pulmonary embolism
DLP	= Dyslipidaemia	PVD	= Peripheral vascular disease
DM	= Diabetes mellitus	SYNTAX	= SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery
DVT	= Deep vein thrombosis		
HBP	= High blood pressure	SS1	= SYNTAX score 1
HR	= Hazard ratio	SS2	= SYNTAX score 2

Correspondence Address:
Helmgton José Brito De Souza
https://orcid.org/0009-0001-4251-2157
Eixo de Habilidades e Atitudes e Humanidades Médicas, Centro Universitário Euro-Americano
St. de Clubes Esportivos Sul Núcleo de Prática Jurídica Assistência à Comunidade – Asa Sul, Brasília, DF, Brazil
Zip Code: 70200-001
E-mail: helmgton@icloud.com, hjbsouza@gmail.com

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INTRODUCTION

Cardiovascular diseases (CVD) represent the leading cause of death in Brazil and worldwide[1]. Among CVDs, coronary artery disease (CAD) stands out as the primary cause of this mortality[2].
The guidelines for the treatment of CAD aim to guide the choice of the most appropriate treatment, among clinical, percutaneous, or surgical therapy[3], to determine whether the benefits outweigh the risks associated with each of these therapeutic modalities[4].
The SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery (SYNTAX) study[5-7], conducted in 62 European centers and 23 American centers, intended to demonstrate the hypothesis that percutaneous coronary intervention (PCI)-Taxus would not be inferior to coronary artery bypass grafting (CABG) in patients with three-vessel disease and/or left main coronary artery (LMCA) lesion. It was the first prospective study to compare clinical outcomes between PCI and CABG in patients with these characteristics. The result confirmed that CABG is superior to PCI with drug-eluting stents in this high-risk patient group. From this, the SYNTAX score was developed as a way to stratify patients for the selection of the best procedure. The SYNTAX score is based on coronary anatomy regarding the number of lesions and their functional repercussions, location, and complexity[8].
The SYNTAX 2 study, conducted in 22 European centers, analyzed the impact of contemporary PCI techniques on the clinical outcomes of patients with three-vessel disease[9], incorporating clinical variables such as age, sex, creatinine clearance, chronic obstructive pulmonary disease (COPD), and peripheral artery disease, making an individualized estimate of the mortality risk associated with each therapeutic option[5,10].
It is recommended that the treatment indication be made by the Heart Team (interventional cardiologist, cardiac surgeon, and clinical cardiologist)[11]. Studies show that the choice of treatment, when performed in accordance with current guidelines, determines better outcomes[12].
In this study, we intend to verify whether the treatment employed for patients with CAD adhered to the recommendations provided in the guidelines and by the SYNTAX study.

METHODS

This is a cross-sectional, observational, descriptive, and retrospective study with masking, conducted in a private tertiary hospital in the Distrito Federal (Brazil), using records contained in the medical charts of patients diagnosed with CAD. The study was authorized by the Research Ethics Committee under number 2.436.269. Since it involved the evaluation of chart data, there was no need to obtain signatures for the informed consent form.
All patients diagnosed with CAD over a period of 39 consecutive months were pre-selected based on reports issued by an interventional cardiologist confirming obstructive coronary disease (> 50% of vessel lumen) in at least two vessels. Patients who underwent primary angioplasty (percutaneous treatment in the acute phase of myocardial infarction [MI]) or those whose chart information was insufficient to characterize them were excluded. These patients were duly characterized epidemiologically (sex, age, comorbidities). The angiographic exams (coronary cineangiography) that supported the therapeutic choice at the time of diagnosis were recorded on hard drives and identified with sequential numbering, without identifying their identities.
The exams were evaluated by a specialist who was unaware of both the treatment each patient underwent and the clinical outcomes (masking). From this analysis, the SYNTAX Score I (SS1) was calculated. This calculation was performed using the online calculator available at: http://www.syntaxscore.com. Following the guidelines of the SYNTAX I study, patients were allocated into three groups according to the recommended risk tertiles for SYNTAX and evaluated regarding the treatment performed — Group A, low risk (SS1 ≤ 22); Group B, intermediate risk (SS1 23 - 32); and Group C, high risk (SS1 > 33).
From this initial analysis, considering the clinical variables predicted in that study, from a prognostic point of view such as age, sex, creatinine clearance, COPD, and peripheral arterial disease, the SYNTAX Score II (SS2) was calculated using the same previously mentioned online calculator. The patients were then allocated, according to the treatment recommendations proposed by the SS2, into three subgroups:

- **Subgroup PCI:** Indication for PCI — patients with an exclusive indication for percutaneous treatment;
- **Subgroup PCI/CABG:** Indication for PCI or CABG — patients who could undergo percutaneous or surgical treatment;
- **Subgroup CABG:** Indication for CABG — patients with an exclusive indication for surgical treatment.

Analyzing the medical records, we compared the recommended treatment based on the calculation of the SS2 to the treatment that each patient actually underwent, *i.e.*, whether percutaneous treatment (PCI, using a drug-eluting stent), surgical treatment (CABG), or clinical treatment.
To compare the demographic data of the studied groups, we used the Kruskal-Wallis test. To compare the therapeutic option, we used the Kappa test. We considered the significance level at 5%. Numerical data were expressed as mean, standard deviation, and minimum value-maximum value.

RESULTS

Three hundred and fifteen medical records from a private tertiary hospital in the Distrito Federal (Brazil) were pre-selected over a period of 39 consecutive months, whose diagnosis recorded at admission was CAD. Of these, 105 medical records were excluded. The reasons for exclusion were: 1) patients diagnosed with acute MI and, therefore, underwent primary angioplasty; 2) the information contained in the medical record was incomplete, which would result in analytical bias. This lack of information did not allow the maintenance of some of these patients in the study. Therefore, 210 patients remained, distributed as follows: 64.8% of the sample (136 patients) were male, and 35.2% (74 patients) were female. The age ranged from 29 to 93 years (mean: 64.15 ± 12.93). Among the risk factors for CAD, hypertension was the most prevalent (84.7%), followed by dyslipidemia (62.3%), diabetes mellitus (47.1%), and family history of CAD (25.7%). The clinical and epidemiological characteristics of the sample are described in Table 1.
From the anatomical evaluation recommended in the SYNTAX score, out of the 210 patients, 55 (26.2%) were classified with a SYNTAX score < 22, composing Group A (low risk); 69 (30%) were classified with a SYNTAX score between 23 and 32, composing Group B (intermediate risk); and 86 patients (43.8%) were classified with a SYNTAX score > 33, composing Group C (high risk).

Table 1. Clinical and epidemiological characteristics of selected patients*.

Characteristics	PCI (N = 3)	CABG/PCI (N = 106)	CABG (N = 101)	*P*-value
Age	73-91 (82 ± 15.6)	29-93 (71.5 ± 11.7)	31-77 (60 ± 10.2)	0.038
Male sex	2 (66.7%)	93 (87.7%)	40 (39.6%)	0.003
Female sex	1 (33.3%)	12 (11.3%)	61 (60.4%)	0.003
HBP	3 (100%)	90 (84.9%)	85 (84.2%)	0.028
DM	1 (33.3%)	39 (36.8%)	52 (51.5%)	0.042
DLP	3 (100%)	59 (55.7%)	65 (64.4%)	0.004
Family history	0 (0.0%)	25 (23.6%)	28 (27.7%)	0.001
Previous MI	1 (33.3%)	33 (31.1%)	27 (26.7%)	0.043
Previous stroke	1 (33.3%)	4 (32.8%)	5 (5.0%)	0.001
CKF	1 (33.3%)	18 (17.0%)	4 (4.0%)	0.001
Smoking	0 (0.0%)	27 (25.5%)	31(30.7%)	0.001
Alcoholism	0 (0.0%)	3 (2.8%)	3 (3.0%)	0.001
PE/DVT	0 (0.0%)	0 (0.0%)	1 (1.0%)	0.001
PVD	0 (0.0%)	2 (1.9%)	0 (0.0%)	0.001
COPD	0 (0.0%)	2 (1.9%)	1(1.0%)	0.001

*Data are expressed as n (%), except for age = mean ± standard deviation (minimum value-maximum value). Demographic data – Kruskal-Wallis test

CABG=coronary artery bypass grafting; CKF=chronic kidney failure; COPD=chronic obstructive pulmonary disease; DLP=dyslipidaemia; DM=diabetes mellitus; DVT=deep vein thrombosis; HBP=high blood pressure; MI=myocardial infarction; PCI=percutaneous coronary intervention; PE=pulmonary embolism; PVD=peripheral vascular disease

According to the guidelines in force, patients in Group A would have PCI as the preferred indication (69 patients). Of these, 48 (87.3%) actually underwent PCI, seven patients (12.7%) underwent clinical treatment, and no patient underwent CABG. In Group B (intermediate risk), the therapeutic indication recommended by the SYNTAX study would be surgical. However, 56 (81.2%) of the 69 patients in this group underwent PCI. Two patients (2.9%) underwent CABG, and 11 patients (15.9%) underwent clinical treatment. In Group C (high risk), whose recommendation, according to the SYNTAX study, would also be the performance of CABG, the majority, 49 patients (57%), underwent PCI, 22 patients (25.86%) underwent CABG, and 33 patients (15.7%) received clinical treatment. Table 2 shows the distribution of patients according to their treatment, in relation to the risk groups.

Eighty-six patients (43.8%) were classified as high risk by SS1, and 69 patients (30%) as intermediate risk. Therefore, considering the SYNTAX I study, they would have an indication for surgical treatment. Of these 155 patients, 67.7% (105 patients) underwent PCI, and only 15.5% (24 patients) underwent CABG. In the intermediate and high-risk groups, 26 patients (16.7%) underwent clinical treatment. Of the 153 patients who underwent percutaneous treatment, only 31.4% (48 patients) were grouped in the low-risk group. In this sample, 72.9% (153 patients) underwent percutaneous treatment, compared to 11.4% (24 patients) who underwent surgical treatment.

When comparing the treatment performed in relation to the recommended treatment based on the SS2 calculation, we found that in only three patients (1.4%) the SS2 calculation recommended PCI and these patients underwent this therapy. In 106 patients (50.5%), according to the SS2 calculation, the recommendation could be for either PCI or CABG. Of these, 79 patients (74.5%) underwent PCI, another 21 patients received clinical treatment (19.8%), and only six (5.7%) underwent CABG. In the remaining 101 patients in the sample (48.1%), the SS2 calculation recommended CABG as the most appropriate therapy. Of these, 71 patients (70.3%) underwent PCI, 12 (11.9%) received clinical treatment, and only 18 (17.8%) underwent surgical treatment (CABG) (*P*=0.178). Of the 153 patients who underwent percutaneous treatment, 71 (66%) were eligible exclusively for surgery. Table 3 shows the data from this comparison.

If we analyze the subgroup of patients whose indication does not statistically distinguish the option for PCI or CABG, we observe that their results favor one or the other therapeutic modality. That is, one of the therapeutic modalities presents a lower four-year mortality rate according to SS2. This merely numerical differentiation was only not verified in one sample case. Therefore, of the 106 cases whose recommended therapy could be percutaneous or surgical (CABG/PCI subgroup), in 20 of them (18.9%) there was a relative advantage to percutaneous treatment. In 85 patients (80.2%), surgical treatment could be considered as preferable.

In the specific analysis of this subgroup, of the 20 patients with a relative advantage to percutaneous treatment, 14 (70%) underwent this treatment, five (25%) received clinical treatment, and only one (5%) was operated on. On the other hand, of the 85 patients whose

Table 2. Recommended treatment vs. performed treatment*.

SYNTAX I		Performed treatment			*P*-value
	N (210)	PCI	CABG	Clinical	
SYNTAX I (< 23)	55	48/55	0/55	7/55	0.875
Low risk	(26.2%)	(87.3%)	0%	(12.7%)	
SYNTAX I (23 – 32)	69	56/69	2/69	11/69	0.841
Intermediate risk	-30%	(81.2%)	(2.9%)	(15.9%)	
SYNTAX I (> 33)	86	49/86	22/86	15/86	0.256
High risk	(43.8%)	-57%	(25.86%)	(17.4%)	
Total	210	153/210 (72.9%)	24/210	33/210 (15.7%)	0.842
			(11.4%)		

*Data are expressed as n (%). Demographic data – Kruskal-Wallis test
CABG=coronary artery bypass grafting; PCI=percutaneous coronary intervention; SYNTAX=SYnergy between percutaneous coronary intervention with TAXus and cardiac surgery

Table 3. Recommended treatment *vs.* performed treatment*.

Recommended treatment		Performed treatment			*P*-value
	N (210)	PCI	CABG	Clinical	
PCI subgroup	3	3/3	0/3	0/3	1.0
	(1.4%)	-100%	0%	0%	
CABG/PCI subgroup	106	79/106	6/106	21/106	0.802
	(50.5%)	(74.5%)	(5.7%)	(19.8%)	
CABG subgroup	101	71/101	18/101	12/101	0.178
	(48.1%)	(70.3%)	(17.8%)	(11.9%)	
Total	210	153/210	24/210	33/210	0.840
	-100%	(72.6%)	(11.4%)	(15.7%)	

*Data expressed as n (%), Kappa test
CABG=coronary artery bypass grafting; PCI=percutaneous coronary intervention

relative advantage tended towards surgical treatment, 64 (75.3%) underwent percutaneous treatment (PCI), and only five (5.9%) underwent surgery (CABG) ($P<0.05$). The remaining 16 patients (18.8%) were treated clinically. Table 4 shows the data from this subgroup analysis.

Among the patients who received clinical treatment, we found records indicating that some of these patients refused invasive treatment (percutaneous or surgical), despite its indication.

DISCUSSION

There is still much discussion among interventional cardiologists and surgeons about the best revascularization approach to be implemented. The primary goal of revascularization is to improve symptoms, exercise capacity, patient quality of life, and better prognosis. There is scientific evidence for both complete revascularization techniques, either by PCI or CABG[13].

In the SYNTAX study, PCI with first-generation paclitaxel-eluting stents was shown to be inferior to CABG in the outcome of major adverse cardiac and cerebrovascular events (MACCE) (death, MI, stroke, or need for new myocardial revascularization) in patients with three-vessel or LMCA disease. However, for patients with LMCA lesions with low or intermediate SYNTAX scores (≤ 32), all-cause mortality at five years was lower after PCI than CABG (7.9% *vs.* 15.1%, $P=0.02$). Mortality tended to increase in cases treated with PCI compared to CABG in patients with high SYNTAX scores (≥ 33) (20.9% *vs.* 14.1%, $P=0.11$). Consistent results were observed, however, in the PRECOMBAT study (randomized with 600 patients), in which the composite rate of major adverse cardiac events at five years (death, MI, or stroke) was not significantly different between first-generation sirolimus-eluting stents and myocardial revascularization. It is noteworthy that the mean SYNTAX score of patients enrolled in PRECOMBAT was only 25, consistent with the fact that most patients had low to moderate complexity. These studies suggest that PCI may be an effective and durable treatment option in patients with LMCA lesions and low to intermediate anatomical complexity, perhaps even preferred to myocardial revascularization, given the lower risk of stroke[14].

Table 4. PCI or CABG subgroup analysis.

CABG or PCI subgroup		Performed treatment			*P*-value
	N (106)	PCI	CABG	Clinical	
PCI > CABG	20	14/20	1/20	5/20	0.700
	(18.9%)	-70%	-5%	-25%	
CABG > PCI	85	64/85	5/85	16/85	0.005
	(80.2%)	(75.3%)	(5.9%)	(18.8%)	
CABG = PCI	1	1/1	0/1	0/1	1.0
	(0.9%)	-100%	0%	0%	
Total	106	79/106	6/106	21/106	0.854
	-100%	(74.5%)	(10.9%)	(43.8%)	

*Data expressed as n (%), Kappa test
CABG=coronary artery bypass grafting; PCI=percutaneous coronary intervention

Evidence supporting the use of the SYNTAX score for risk stratification is controversial. In a systematic review involving six clinical trials, totaling 4,134 patients undergoing PCI and 4,135 undergoing myocardial revascularizations, with a mean follow-up of 6.2 years (3.8 - 10 years), overall, PCI was associated with a significant increase in MACCE and a non-significant increase in all-cause mortality. The authors concluded that no significant association was found between the SYNTAX score and the comparative effectiveness of PCI and myocardial revascularization surgery[15].

In an offshoot of the original study, the SYNTAX Score was divided into SS1 and SS2. The former aims to anatomically characterize the severity of CAD, stratifying its carriers into the following risk tertiles: low (SS1 < 22), intermediate (SS1: 23 to 32), and high (SS1 > 33). SS2, on the other hand, incorporates important clinical variables from a prognostic point of view and makes an individualized estimate of the risk of mortality associated with each revascularization strategy[5]. Our study focused on reproducing these two stages of evaluation — the anatomical SS1 and the correlation with these clinical variables of SS2.

The SYNTAX study followed patients for five years, and in this scenario, the SYNTAX score, stratified into tertiles, did not significantly impact the outcomes of patients undergoing CABG. On the other hand, in patients undergoing PCI, the rate of MACCE was 32.1% in the low-risk group (SS1: 0 to 22), 36% in the intermediate group (SS1: 23 to 32), and 44% in the high-risk group (SS1 > 33), with a statistically non-significant interaction observed between treatment groups by the SYNTAX score (P=0.07)[5,16]. Unlike the SYNTAX study, the present study did not perform late follow-up of included patients to assess clinical outcomes according to the treatment employed.

Chew et al.[17] (2022), in a meta-analysis that gathered 1,496 studies and six randomized clinical trials, totaling 7,181 patients, evaluated 10-year mortality, comparing CABG and PCI with stent implantation in patients with multivessel disease without LMCA involvement. It was found that in patients with low SYNTAX scores, all-cause mortality at 10 years after PCI was comparable to CABG (hazard ratio [HR]: 1.102, 0.822–1.479, P=0.516). However, in patients with moderate to high SYNTAX scores, all-cause mortality at 10 years was significantly higher in the PCI group compared to the CABG group (HR: 1.444, 1.122–1.858, P<0.001; HR: 1.856, 1.380–2.497, P<0.001, respectively).

Considering the results obtained in the late follow-up by Chew et al.[17] (2022) and analyzing the results of the present study, although a statistically significant difference in the therapeutic options adopted (PCI × CABG) has not been demonstrated, we can believe that, perhaps, this numerical difference, when comparing cases submitted to PCI in intermediate and high-risk patients to cases submitted to CABG, may imply higher mortality rates for the group of patients whose therapeutic indication confronted the recommendations of the SYNTAX study.

We also observed that 135 (64%) of the 210 patients studied did not have their treatment performed according to the recommendations advocated in the SYNTAX study. The late outcome of this therapeutic option should be evaluated in a future study that will verify the long-term clinical evolution of these apparently mistaken choices, which may bring even more worrying results.

The SYNTAX study also showed that in the group of patients with three-vessel and/or LMCA disease, treatment by PCI with drug-eluting stent placement was associated with equivalent mortality to treatment with CABG, despite having a higher risk of requiring new revascularization, but with a reduction in the risk of stroke. This occurs because the success of complete revascularization by PCI is often hindered by the presentation of other diseases in the patient, as well as complex coronary anatomy, chronic occlusions, and additional risk factors such as age, heart failure, renal failure, COPD, or extra-cardiac arteriopathy. These patients are classified as high risk in the SYNTAX score, but a large part of them also do not have the status for CABG[13]. This condition would justify, for example, the option of non-interventional clinical treatment. In our study, it was not possible to collect information, in most cases, that would allow us to analyze the justifications for the clinical treatment option in those patients eligible for CABG or PCI.

Since SYNTAX was conducted, new-generation stents have been introduced, which have a substantially improved safety and efficacy profile compared to those eluting paclitaxel. The fluoropolymer-coated and cobalt-chromium everolimus-eluting stent has shown lower rates of stent thrombosis, MI, target lesion revascularization, and possibly mortality compared to paclitaxel-eluting stents[18,19].

Our study demonstrated that 86 patients (43.8%) were classified as high risk by SS1, and 69 patients (30%) as intermediate risk. Of these, 67.7% (105 patients) underwent percutaneous

treatment and only 15.5% (24 patients) underwent surgery. In this intermediate and high-risk group, 26 patients (16.7%) underwent clinical treatment. Among these patients are those who refused the proposed treatment, whether percutaneous or surgical. Despite the numerical difference, there was no statistical significance in the analysis of this sample.

We found in our study that, regardless of the risk group, the treatment performed in practice is predominantly percutaneous. This data is consistent with what is seen in the literature, which shows that it is the preferred method of revascularization. According to Lima et al.[20] in a 2012 publication, PCI is the preferred method of myocardial revascularization in the United States of America, estimating about 1,000,000 procedures annually, which exceeds the number of CABG by almost three times.

Although SS1 is a tool with limitations, due to the absence of clinical variables and the lack of a personalized approach for decision making, in addition to the lack of predictive capacity for the subgroup of patients undergoing CABG[10], the present study demonstrates results that, when added to these variables, become impactful from a numerical point of view, but do not demonstrate statistical significance. Perhaps this significance can be demonstrated by expanding the sample and the number of centers involved in the study.

Between 2005 and 2020, we listed 379 publications in PubMed® with the term "SYNTAX score" in their titles[21]. Another 48 manuscripts were published between 2020 and 2024. It is therefore verified that the SYNTAX study represents an important milestone in the search for evidence of the best approach for the treatment of CAD.

It is expected that, in the current decade, the score will undergo new mutations, but it has a reasonable chance of survival because it is inherently related to the complexity and extent of CAD, which is at the center of therapies: pharmacological, percutaneous, or surgical. Recently, with the advent of non-invasive three-dimensional imaging with computed tomography angiography, fractional flow reserve computed tomography has been incorporated into the SYNTAX III score[21].

The current American College of Cardiology and American Heart Association guidelines contain the appropriate indications for the treatment of CAD by PCI or CABG. These guidelines are intended to assist specialists in choosing the most appropriate procedure to be implemented, considering which approach brings the greatest benefits and lowest risks, evaluating a series of factors such as: type of angina, ventricular function, coronary involvement, results of non-invasive ischemia tests, and others[3,22-24]. The present study, given the natural limitations of its application, found that these guidelines are not being followed adequately.

Scientific evidence indicates that patients undergoing procedures consistent with guideline recommendations achieve better outcomes. However, contrary to the recommendations, it is not uncommon for cardiologists who perform diagnostic coronary angiography, and who also perform PCI, to opt for PCI without prior multidisciplinary discussion. Thus, the final result is not always the most indicated for patients[22,25]. Our results corroborate the conclusions of these authors.

In this context, it is recommended that the indication of the revascularization modality be made by a team composed of an interventional cardiologist, a cardiac surgeon, and a clinical cardiologist — the Heart Team. It is extremely important that this concept is disseminated so that the final therapeutic decision is made jointly, given that the quality of treatment and the late results employed should be the best possible for the well-being of patients. In the present study, we did not find evidence that the decision for the instituted treatment was made by a multidisciplinary team — a Heart Team. Perhaps for this reason, we found so many distortions between the recommended treatment and the one performed.

This work highlights a situation of disagreement and an alert to the multidisciplinary teams of private hospitals in the Distrito Federal. We suspect that this reality goes far beyond this single private and tertiary hospital. We seek to alert to the need for organization of these multidisciplinary teams (Heart Team) for the discussion and selection of the ideal treatment for CAD. The possible late consequences arising from what we could observe in the present study justify the expansion of this survey to other health institutions, whether public or private, as well as the incentive to attempt long-term follow-up of these patients.

Limitations

As this is a single-center study, the present research has results that limit a more consistent conclusion. Another point to be considered is the fact that, although the exams were pre-selected based on the technical report of an interventional cardiologist, the calculation of SS1 and SS2 was performed by a single evaluator, also a specialist. Thus, it would be convenient to continue the study, including other hospitals in the Distrito Federal and other states, in addition to including a second or even a third evaluator in the review of the collected data and the verification of new exams. In this way, it is expected that this sample will be expanded in order to represent a robust sample for the Brazilian reality.

CONCLUSION

In the sample studied, the treatment offered to patients with CAD did not follow the guidelines and recommendations widely consolidated in the universal literature. This numerical expressiveness, however, was not statistically proven. Nevertheless, the distortions and misinterpretations of therapeutic indication found could be minimized if there was a real and concrete performance of the Heart Team. Increasing the sample size, with the inclusion of other centers, may provide a more reliable assessment of the current situation of CAD treatment in Brazil.

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Authors' Roles & Responsibilities

HJBS	Substantial contributions to the conception and design of the work; and the interpretation of data for the work; revising the work
BES	Revising the work
TAC	Substantial contributions to the acquisition and interpretation of data for the work; revising the work
EFS	Substantial contributions to the acquisition and interpretation of data for the work; revising the work
NLK	Substantial contributions to the acquisition e interpretation of data for the work; revising the work
RS	Substantial contributions to the acquisition e interpretation of data for the work; revising the work
LJSA	Substantial contributions to the acquisition and interpretation of data for the work; revising the work
DAS	Substantial contributions to the acquisition and interpretation of data for the work; revising the work
RRA	Substantial contributions to the acquisition and interpretation of data for the work; revising the work
MPMF	Substantial contributions to the acquisition and interpretation of data for the work; revising the work
HLM	Substantial contributions to the acquisition and interpretation of data for the work; revising the work
LN	Substantial contributions to the analysis of data for the work

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