Journal of
Transcatheter Interventions
e-ISSN e-2595-4350

Correlation between race and percutaneous coronary intervention

Correlação entre raça e intervenção coronária percutânea

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DOI: 10.31160/JOTCI201927A201821

ABSTRACT – **Background:** Race is a risk factor for coronary events that shows conflicting data and still has been scarcely studied in the Brazilian population. The present study aimed to assess the influence of race on the development of coronary artery disease, therapeutic outcomes, and major adverse events. **Methods:** Data from the *Central Nacional de Intervenções Cardiovasculares* (CENIC) were retrospectively analyzed from June 2006 to March 2016, comparing profiles and results of interventions according to race. **Results:** Mixed ethnic ancestry individuals presented a higher incidence of angina and more angioplasty procedures with drug-eluting and bare-metal stents. They showed lower prevalence of dyslipidemia and left ventricular dysfunction, as well as a lower percentage of adverse cardiac events (death, periprocedural infarction and revascularization), albeit with no statistical difference. Simple and multiple logistic regression models did not establish race as a significant isolated variable for cardiovascular events. **Conclusion:** Mixed ethnic ancestry individuals presented fewer cardiovascular events. However, there was no race-related statistical significance as to the number of deaths or periprocedural infarctions.

Keywords: Coronary diseases; Ethnicity and health; Percutaneous coronary intervention

RESUMO – **Introdução:** A raça constitui fator de risco para eventos coronarianos com dados conflitantes e ainda pouco estudados na população brasileira. Este trabalho teve como objetivo avaliar a influência dessa característica no surgimento de coronariopatia, bem como nos resultados terapêuticos e eventos adversos maiores. **Métodos:** Foram analisados, de forma retrospectiva, os dados da Central Nacional de Intervenções Cardiovasculares (CENIC), no período de junho de 2006 a março de 2016, comparando-se os perfis e os resultados de intervenções de acordo com a raça. **Resultados:** Os mestiços apresentaram maior incidência de angina e precisaram ser sujeitados a mais procedimentos de angioplastia com stents farmacológicos e não farmacológicos. Demonstraram menor prevalência de dislipidemia e menor incidência de disfunção ventricular, bem como menor porcentual de eventos cardíacos adversos (óbito, infarto periprocedimento e nova revascularização), sem diferença estatística. Os modelos de regressão logística simples ou múltipla não demonstraram a raça como variável isolada significativa para eventos cardiovasculares. **Conclusão:** Raça mestiça apresentou menor número de eventos cardiovasculares. Porém, não houve significância estatística quanto ao número de óbitos ou infartos periprocedimento relacionados à raça.

Descritores: Doença das coronárias; Origem étnica e saúde; Intervenção coronária percutânea

How to cite this article:
Albuquerque MG, Castro Filho A, Portela AL, Sousa JF, Nunes PM, Bastos Filho R, et al. Correlation between race and percutaneous coronary intervention. J Transcat Interven. 2019;27:eA0021. https://doi.org/10.31160/JOTCI201927A201821

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Submitted on:
Jun 18, 2018

Accepted on:
Jan 28, 2019

BACKGROUND

Coronary diseases encompass a wide range of stable and unstable clinical syndromes with a high prevalence in the population. A number of risk factors, such as hypertension, hypercholesterolemia, diabetes mellitus, obesity, genetics, sedentary lifestyle and smoking, have been adequately reported,[1] while other factors, such as race, still present limited correlation in the medical literature.[2,3]

Race has been analyzed as a risk factor for cardiovascular disease and coronary disease for decades,[4,5] having been associated with differences in time of diagnosis, treatments established and clinical outcomes.[5]

The objective of the present study was to describe the clinical, angiographic and procedural characteristics according to the race of patients submitted to percutaneous

coronary intervention (PCI) in Brazil, as well as to assess results and outcomes of the procedures during hospitalization.

METHODS

The present study was evaluated by the Research Ethics Committee of *Hospital Leforte*, and was registered on *Plataforma Brasil*, receiving its approval by CAAE: 07801119.0.0000.5485.

Population

Patients included in the database of the *Central Nacional de Intervenções Cardiovasculares* (CENIC; http://www.corehemo.net/), of the *Sociedade Brasileira de Hemodinâmica e Cardiologia Intervencionista* (SBHCI), submitted to PCI from June 2006 to March 2016 were analyzed retrospectively. The Brazilian population, according to the demographic census of the *Instituto Brasileiro de Geografia e Estatística* (IBGE) 2010,[6] is divided into five races or colors: White, East Asian, Black, Mixed Ethnic Ancestry or Amerindian (using the race declared by the interviewee as parameter). In the CENIC registry, the terms White, East Asian, Black, Mixed Ethnic Ancestry were used, according to criteria defined by the examiner, in that Mixed Ethnic Ancestry encompasses Brown and Amerindian. The number of patients in each group was 13,583, 6,164, 331 and 1,360, respectively.

Study procedures

PCIs performed were either by femoral or radial access, according to the characteristics of the patient and the preference of the operator. Unfractionated heparin doses of 70 to 100U/kg or 50 to 70U/kg for those receiving glycoprotein IIb/IIIa inhibitors were used, except in cases in which previous low molecular weight heparin had been administered less than 8 hours of the procedure, given the increased risk of bleeding.[7,8] All patients received dual antiplatelet therapy.

Angiography assessment and definitions

Analyses were performed in at least two orthogonal projections, using quantitative angiography by experienced operators. The Thrombolysis in Myocardial Infarction (TIMI) classification was used to determine pre- and post-procedure flow.[9] Procedural success was defined as the achievement of angiographic success (residual stenosis <30%, with TIMI 3 flow) and the absence of major adverse cardiac events (MACE), encompassing death, periprocedural myocardial infarction (MI), stent thrombosis or emergency coronary artery bypass graft (CABG), during the in-hospital period.

Periprocedural MI, or associated with PCI, was defined according to the third and fourth universal definitions of MI,[10,11] consisting of a five-fold increase in the value of the 99th percentile of troponin up to 48 hours after the procedure in patients with previous normal values, or a 20% increase from baseline when it was initially changed. In addition to the laboratory finding, suggestive symptoms or new ischemic changes to the electrocardiogram, loss of angiographic patency of a coronary or branch, or imaging demonstrating new viable myocardial loss or segment alteration were required.

Stent thrombosis was defined according to Academic Research Consortium (ARC) criteria,[12] and the complexity of lesions was established according to the American College of Cardiology/American Heart Association (ACC/AHA) classification.[13] Emergency myocardial revascularization was defined as recanalization of the obstructed vessel by chemical, surgical or percutaneous means.[14]

Statistical analysis

Analysis of variance (ANOVA) was used to compare continuous variables. The Bonferroni correction was used for the multiple comparisons. The Chi-square test and, when required, the likelihood ratio test were used to compare categorical variables. The simple logistic regression model was used to assess the influence of variables of interest in relation to mortality. Incomplete data in the tables were due to failure to complete all the information contained in the electronic registration form by participating CENIC centers. For all analyses, a 5% significance level ($p<0.05$) was considered. Statistical calculations were performed with Statistical Package for Social Science (SPSS) software, version 22.

RESULTS

Between June 2006 and March 2016, a total of 23,542 procedures were performed in 21,438 patients, with a mean of 1.01 procedures/patient. Stents were used in 27,474 cases (92.1%), adding up 30,353 prostheses. The mean age was 63.1±11.2 years, in that black patients were younger in comparison to white and east Asians. The male gender prevailed in all races, with black women having the lowest percentage difference between sexes. Smoking was more frequent among black and white individuals. Hypertension was less prevalent in the white race, while dyslipidemia affected more east Asians. The latter were also the group that had most frequently been submitted to previous revascularization surgery. Previous PCI was more frequent among white individuals (Table 1). Stable angina was the most frequent clinical presentation, accounting for 40% of cases. PCIs in patients with silent ischemia were more common among white and east Asian individuals, with 27.8% and 26.3%, respectively. Non-ST-elevation myocardial infarction (NSTEMI) affected blacks and mixed ethnic ancestry individuals more frequently, whereas ST-elevation myocardial infarction (STEMI) prevailed in the black race. Most of the patients presented as Killip 1.

Angiographic characteristics are shown in table 2. There was a higher prevalence of single-vessel patients (52.8%), with white, black and east Asian races having the highest single-, two- and three-vessel involvement, respectively. The most frequently treated vessel in all groups was the left anterior descending (LAD) artery (39.1%), and affected up to 42.6% of mixed ethnic ancestry group. Lesions involving the left main coronary artery (LMCA) and venous grafts were infrequent. Less complex lesions (type A and B_1) were more common among black, while east Asian and mixed ethnic ancestry individuals had a higher percentage of B_2/C lesions. East Asians showed a higher prevalence of calcified and long lesions, and thrombotic lesions were more frequent among black individuals. The number of bifurcations was also observed to be higher among mixed ethnic ancestry individuals (10.4%) than in the other ethnic groups.

In the analysis of the characteristics of procedures (Table 3), we observed a higher number of interventions for

Table 1. Clinical characteristics of patients

Characteristic	Race				p-value
	East Asian (n=331)	Mixed ethnic ancestry (n=6,164)	Black (n=1,360)	White (n=13,583)	
Age, years	63.7±10.3	62.6±10.9	61.0±11.3	63.6±11.3	<0.0001
Male sex	211 (63.7)	4,032 (65.4)	818 (60.1)	9,074 (66.8)	<0.0001
Smoking	30 (9.1)	756 (12.3)	216 (15.9)	2,129 (15.7)	<0.0001
Hypertension	279 (84.8)	5,247 (86.5)	1,163 (86.1)	11,216 (83.5)	<0.0001
Dyslipidemia	197 (59.5)	2,459 (39.9)	728 (53.5)	7,378 (54.3)	<0.0001
Diabetes mellitus	105 (31.8)	2,138 (34.7)	494 (36.3)	4,536 (33.4)	0.54
Prior MI	31 (9.4)	615 (9.9)	136 (10.0)	1,435 (10.6)	0.27
Prior PCI	44 (13.3)	838 (13.6)	155 (11.4)	2,094 (15.4)	<0.0001
Prior CABG	35 (10.7)	426 (7.0)	71 (5.3)	1,340 (10.0)	<0.0001
Clinical presentation					<0.0001
Stable angina	125 (37.8)	2,891 (46.9)	497 (36.5)	5,055 (37.2)	
Silent ischemia	87 (26.3)	728 (11.8)	244 (17.9)	3,776 (27.8)	
STEMI	47 (14.2)	791 (12.8)	244 (17.9)	1,719 (12.7)	
NSTEMI	72 (21.8)	1,750 (28.4)	375 (27.6)	3,025 (22.3)	

Results expressed as mean ± standard deviation or n (%). MI: myocardial infarction; PCI: percutaneous coronary intervention; CABG: coronary artery bypass surgery; STEMI: ST-elevation myocardial infarction; NSTEMI: non-ST elevation myocardial infarction.

Table 2. Angiographic characteristics

Characteristic	Race				p-value
	East Asian (n=352 procedures/n=437 vessels)	Mixed ethnic ancestry (n=6,836 procedures/ n=8,520 vessels)	Black (n=1,440 procedures/ n=1,789 vessels)	White (n=14,914 procedures/ n=19,086 vessels)	
Coronary disease extension					0.0007
Single vessel	128 (48.5)	2,505 (52.6)	594 (52.2)	5,713 (53.0)	
Two-vessel	78 (29.5)	1,438 (30.2)	368 (32.4)	3,143 (29.2)	
Three-vessel	56 (21.2)	753 (15.8)	168 (14.8)	1,743 (16.2)	
LMCA	2 (0.8)	42 (0.9)	3 (0.3)	143 (1.3)	
Multi-vessel + LMCA	0 (0)	23 (0.5)	4 (0.4)	30 (0.3)	
Treated vessels					<0.0001
Right coronary artery	112 (25.6)	2,409 (28.3)	529 (29.6)	5,342 (28.0)	
Circumflex artery	126 (28.8)	2,147 (25.2)	492 (27.5)	5,362 (28.1)	
Left anterior descending artery	169 (38.7)	3,629 (42.6)	679 (38.0)	7,198 (37.7)	
Surgical bypass	22 (5.0)	194 (2.3)	63 (3.5)	904 (4.7)	
LMCA	8 (1.8)	141 (1.7)	26 (1.5)	280 (1.5)	
Type B_2/C lesions	82 (86.3)	443 (85.2)	221 (77.8)	2,565 (82.1)	0.04
Calcified lesions	92 (21.7)	714 (8.4)	265 (14.8)	3,006 (16.3)	<0.0001
Thrombotic lesions	26 (5.9)	540 (6.3)	150 (8.4)	1,052 (5.5)	<0.0001
Lesions >20mm	17 (3.9)	112 (1.3)	37 (2.1)	503 (2.6)	<0.0001
Bifurcations	28 (6.4)	890 (10.4)	144 (8.0)	1,393 (7.3)	<0.0001
Occlusions	58 (13.6)	1,118 (13.4)	240 (13.9)	2,371 (12.7)	0.33
TIMI flow pre					0.006
0/1	70 (16.1)	1,347 (15.8)	278 (15.6)	2,719 (14.3)	
2/3	366 (83.9)	7,163 (84.2)	1,506 (84.4)	16,305 (85.7)	

Results expressed as n (%). LMCA: Left main coronary artery; TIMI: Thrombolysis in Myocardial Infarction.

white, and lower for black individuals, while more stents and of greater extension were used for the mixed ancestry ethnic group. Primary PCI occurred in a lower number in whites (4.5%), prevailing in the east Asian race (6.8%). Rescue PCI, in turn, was more common for east Asian and black individuals, as was the use of glycoprotein IIb/IIIa inhibitors. Postprocedural TIMI flow 2 and 3 was achieved in 99.5% of procedures, with no difference among groups.

Procedural success was, on average, 97%, reaching a higher percentage for the mixed ethnic ancestry group (98.3%) and lower for whites (96.4%) (Figure 1). There was a higher occurrence of MACE among whites, and lower in the mixed ethnic ancestry group (Figure 2). The mortality rate was 2.5% and the periprocedural MI was 4.1%, with no significant difference among races (Table 4). There was no report of stent thrombosis or urgent myocardial revascularization. Simple (Table 5) and multiple (Table 6) logistic regression analysis revealed that the race variable was not a determinant of clinical in-hospital death.

Table 3. Characteristics of procedures

Characteristic	Race				p-value
	East Asian (n=352 procedures/n=424 stents)	Mixed ethnic ancestry (n=6,836 procedures/ n=9,282 stents)	Black (n=1,440 procedures/ n=1,835 stents)	White (n=14,914 procedures/ n=18,812 stents)	
Treated vessels/patient	1.3±0.7	1.4±0.7	1.3±0.6	1.4±0.8	<0.0001
Use of stent	295 (89.1)	5,933 (96.3)	1,261 (92.7)	11,931 (87.8)	<0.0001
Stent/patient ratio	1.4±0.8	1.6±0.9	1.5±0.7	1.6±0.9	<0.0001
Drug-eluting stents	131 (30.9)	3,388 (36.5)	561 (30.6)	6,713 (35.7)	<0.0001
Stent diameter, mm	3.03±0.45	3.05±0.44	3.03±0.47	3.02±0.45	0.23
Stent length, mm	22.0±10.1	24.1±12.1	23.0±11.8	22.9±11.4	<0.0001
Types of intervention					<0.0001
Primary PCI	24 (6.8)	443 (6.5)	96 (6.7)	676 (4.5)	
Rescue PCI	3 (0.9)	31 (0.5)	13 (0.9)	68 (0.5)	
GP IIb/IIIa inhibitors	18 (5.1)	101 (1.5)	59 (4.1)	417 (2.8)	<0.0001
Thromboaspiration	0 (0)	2 (0.02)	0 (0)	2 (0.01)	0.77
TIMI flow post					
0/1	3 (0.7)	44 (0.5)	4 (0.2)	87 (0.5)	0.39
2/3	417 (99.3)	9,213 (99.5)	1,831 (99.8)	18,651 (99.5)	
Stenosis grade					
Pre	85.8±11.3	86.1±12.3	85.4±12.6	84.7±12.6	<0.0001
Post	0.6±2.0	1.2±5.7	1.0±4.8	1.2±6.6	0.14

Results expressed as mean±standard deviation or n (%). PCI: percutaneous coronary intervention. GP: glycoprotein; TIMI: Thrombolysis in Myocardial Infarction.

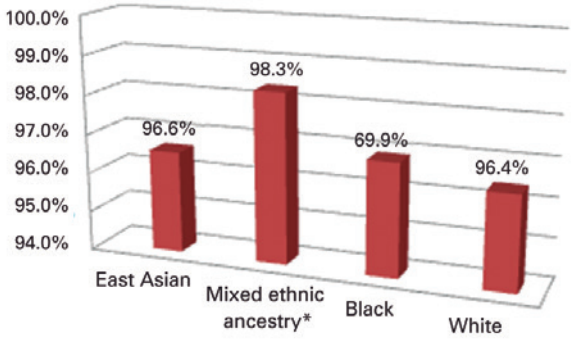

Figure 1. Percutaneous coronary intervention success as per ethnicity (p<0.001). *Greater percentage of statistically significant procedural success.

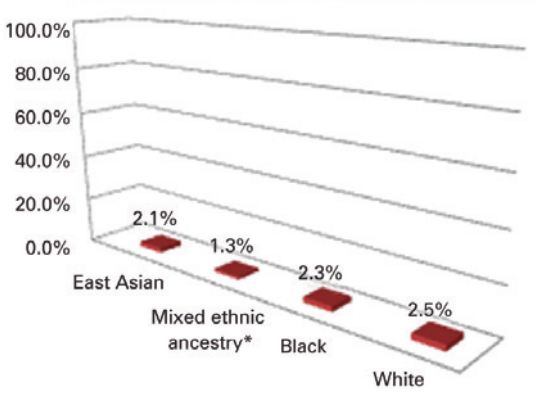

Figure 2. Major adverse cardiac events, as per ethnicity (p<0.001). *Smaller percentage of statistically significant major adverse cardiac events.

Table 4. In-hospital clinical outcomes

Outcome	Race				p-value
	East Asian (n=331)	Mixed ethnic ancestry (n=6,164)	Black (n=1,360)	White (n=13,583)	
Periprocedural MI	5 (3,8)	24 (3,2)	10 (2,3)	213 (4,4)	0,08
Death	2 (1,3)	54 (3,3)	21 (2,8)	140 (2,3)	0,10

Results expressed as n (%). MI: myocardial infarction.

Table 5. Factors related to occurrence of death by simple logistic regression

	Estimate	p-value	OR	95%CI
Mixed ethnic ancestry vs. east Asian	0.99	0.17	2.69	0.65-11.12
Black vs. east Asian	0.82	0.27	2.27	0.53-9.78
White vs. east Asian	0.63	0.37	1.88	0.46-7.68
Age, years	0.07	<0.0001	1.08	1.06-1.09
Sex, female vs. male	0.53	0.0001	1.70	1.29-2.22
Smoking, no vs. yes	0.71	0.0017	2.03	1.3-3.17
Hypertension, yes vs. no	0.14	0.47	1.15	0.78-1.68
Dyslipidemia, no vs. yes	0.63	<0.0001	1.88	1.43-2.49
Diabetes mellitus, yes vs. no	0.20	0.25	1.23	0.86-1.75
Prior MI, no vs. yes	0.38	0.07	1.46	0.97-2.2
Previous PCI, yes vs. no	0.27	0.28	1.31	0.8-2.15
Previous CABG, no vs. yes	0.08	0.76	1.08	0.66-1.76
Stable angina vs. STEMI	-2.29	<0.0001	0.10	0.06-0.16
Silent ischemia vs. STEMI	-1.99	<0.0001	0.14	0.08-0.22
NSTEMI vs. STEMI	-0.74	<0.0001	0.48	0.35-0.65
Two-vessel vs. single-vessel	0.77	0.0001	2.16	1.45-3.21
Three-vessel vs. single-vessel	1.46	<0.0001	4.29	2.92-6.31
Multivessel + LMCA vs. single-vessel	1.31	0.20	3.71	0.48-28.59
LMCA vs. single-vessel	2.30	<0.0001	10.01	5.16-19.41
Primary PCI vs. others	1.91	<0.0001	6.75	5.04-9.05
Rescue PCI vs. others	1.48	0.0017	4.40	1.74-11.09
GP IIb/IIIa inhibitors, yes vs. no	1.63	<0.0001	5.13	3.66-7.19

MI: myocardial infarction; PCI: percutaneous coronary intervention; CABG: coronary artery bypass surgery; STEMI: ST-elevation myocardial infarction; NSTEMI: non-ST- elevation myocardial infarction; LMCA: left main coronary artery; GP: glycoprotein.

Table 6. Factors related to occurrence of death by multiple logistic regression

	Estimate	p-value	OR	95%CI
Age, years	0.07	<0.0001	1.07	1.06-1.09
Sex, female vs. male	0.33	0.02	1.39	1.04-1.85
GP IIb/IIIa inhibitors, yes vs. no	1.32	<0.0001	3.75	2.57-5.49
Stable angina vs. STEMI	-1.47	<0.0001	0.23	0.13-0.42
Silent ischemia vs. STEMI	-1.14	0.0002	0.32	0.18-0.58
NSTEMI vs. STEMI	-0.08	0.73	0.92	0.57-1.49
Primary PCI vs. others	1.03	<0.0001	2.80	1.73-4.54
Rescue PCI vs. others	1.26	0.01	3.54	1.27-9.88

GP: glycoprotein; STEMI: ST-elevation myocardial infarction; NSTEMI: non-ST-elevation myocardial infarction; PCI: percutaneous coronary intervention.

DISCUSSION

Cardiovascular disease is one of the leading causes of disability and death in Brazil and worldwide. Much of the epidemiological data on cardiovascular disease came from the Framingham study, which did not consistently represent the diversity of races in a large number of other populations.[15] The cardiovascular impact of race has been analyzed particularly in the United States, and this is the first study to address the topic in the Brazilian population. The present study analyzed the clinical and angiographic profiles related to the race of patients submitted to PCI in Brazil, evaluating the results and the outcomes associated with the procedure during inpatient stay.

Comorbidities such as smoking, hypertension and preprocedural infarction were more common among blacks, although it was the race with the lowest percentage of prior surgical or percutaneous revascularization. In the literature, higher prevalence, severity and mortality associated with hypertension in American afro descendants, as well as higher prevalence and mortality associated with coronary disease and stroke have been reported.[16,17] There is also an association with a greater number of modifiable risk factors for coronary artery disease (CAD).[3,4] Dyslipidemia and previous CABG were more common among east Asians. It has been previously shown that the prevalence of CAD among Asians is 3.7% lower than that of the general population. However, the risk of mortality is variable, with Indo-Asian men and women, and Filipino men presenting higher proportional ratios of cardiovascular mortality.[18]

The mixed ethnic ancestry group presented more hypertension and less dyslipidemia, whereas whites had lower blood pressure levels and a higher percentage of previous PCI. Black and Hispanic patients have a significantly higher prevalence of traditional cardiovascular risk factors and perform PCI at a younger age. However, there is no significant difference in outcomes after the procedure between these racial groups.[5,19] Despite the significant effect of CAD on the Hispanic population, data point towards a health advantage in such population. That is, in spite of the greater burden of risk factors for CAD and greater socioeconomic disadvantage, there is no greater propensity to CAD or death of cardiovascular origin. Thus, the term "Hispanic paradox" was suggested for coronary artery disease in this population.[5]

Studies in Malaysia have shown a significant difference in risk factors, reperfusion therapy, and mortality among the various local ethnicities.[1] There are also reports of differences in the use of myocardial revascularization for American ethnic minorities since 1989.[2] In these minorities, there are lower invasive stratification indices, less PCI and myocardial revascularization surgery in black patients,[2,20] as well as longer door-to-needle and door-to-balloon times for blacks and Hispanics, compared to American whites.[21-23] Door-to-balloon time was also reported as 7.5% longer for the black race, but with no statistical significance, and reperfusion means over 90 minutes in time were similar among races.[23]

Blacks were observed to present a higher percentage of lesions with low complexity (A/B_1) and more lesions with thrombi. Mixed ethnic ancestry individuals presented lower rates of calcified, extensive lesions and ventricular dysfunction, although they presented greater involvement of bifurcations. East Asians had more complex (B_2/C), calcified, and long lesions. The black race was related to lower use of drug-eluting stents, traditional antiplatelet agents,[24] new antiplatelet agents,[4] statins,[3,24] and beta-blockers.[25] Nevertheless, there are reports of a lower rate of vascular complications and a lower probability of progression to heart failure after MI among blacks.[4]

In the present study, black individuals had a lower number of vessels treated per patient, fewer stents per patient, and a lower percentage of drug-eluting stents. On the other hand, the mixed ethnic ancestry group presented a higher use of stents, stent/patient ratio (along with the white race) and percentage of use of larger stents. East Asians had higher rates of primary and rescue PCI (the latter along with blacks).

Several studies have attributed worse cardiovascular outcomes after revascularization, poorer control of risk factors and socioeconomic status,[4,21,24] as well as an increased risk of thrombosis of drug-eluting stents among blacks.[25] The analysis of the BARI 2D study demonstrated that the risk of death and MACE was 20% higher in blacks but not statistically significant.[26] Similarly, after a health insurance reform in Massachusetts, lower rates of revascularization were observed in the black, Asian and Hispanic races[27] - a fact closely related to the difference in level of education for these races, with consequences on clinical outcomes.[25]

Regarding mortality, data in the literature are conflicting. Some authors cite mortality in 30 days as being lower among black individuals, with similar late and overall mortality among races.[20,25] Others report higher cardiovascular[22,25] and post-MI[3] mortality in afrodescendants, as well as a higher rate of re-hospitalization and worse quality of life. However, there are still reports of worse outcomes after revascularization among white women compared to black women,[28,29] despite the description of similar quality therapy among races.[22] Some of the explanations proposed consist of the difference in access to health services, an explanation partially ruled out by the BARI 2D protocol, which did not succeed in eliminating all disparities.[27]

A lower percentage of MACE in mixed ethnic ancestry individuals was found when compared to the other races, which may be associated with less calcified and long lesions, a lower rate of ventricular dysfunction, and possibly a higher percentage of stents and pharmacological endografts. There was no statistical difference regarding death and periprocedural MI, with race as a non-statistically significant variable for death as a clinical outcome. A similar result was found in some studies,[4,22] but there were cases in which mortality was higher among blacks and Hispanics[2,3].

Recently, the trend of reduced differences in treatment time, hospitalization time and clinical outcomes after procedures among races has been observed. Such facts may corroborate the hypothesis that there is greater miscegenation between races or greater homogenization of the quality of health service delivery. In the current literature, decreased hospitalization time, morbidity and mortality have also been observed, along with increased revascularization rate, mostly PCI.[24]

As the present study was performed through database analysis, we point out a number of limitations, such as lack of data recording, loss of records, discontinuation of follow-up after hospital discharge, as well as heterogeneity among participating centers.

CONCLUSION

There was no correlation between the races and severe hospital clinical outcomes related to percutaneous coronary intervention. Although lower rates of combined major adverse clinical events were found in the mixed ethnic ancestry group, there was no single difference in mortality or periprocedural infarction. Further studies and analyses are needed to corroborate the present study, which was the first study on the influence of race on coronary disease in the Brazilian population.

SOURCE OF FINANCING

None.

CONFLICTS OF INTEREST

The authors declare there are no conflicts of interest.

REFERENCES

1. Lu HT, Nordin RB. Ethnic differences in the occurrence of acute coronary syndrome: results of the Malasyan National Cardiovascular Disease (NCVD) Database Registry (March 2006 – February 2010). BMC Cardiovasc Disord. 2013;13:97.
2. Kumar RS, Douglas PS, Peterson ED, Anstrom KJ, Dai D, Brennan M, et al. Effect of race and ethnicity on outcomes with drug-eluting and bare metal stents. Circulation. 2013;127(13):1395-403.
3. Li S, Fonarrow GC, Mukamal KJ, Lang L, Schulle PJ, Smith EE, et al. Sex and race/ethnicity – related disparities in care and outcomes after hospitalization for coronary artery disease among older adults. Circ Cardiovasc Qual Outcomes. 2016;9(2 Suppl): S36-44.
4. Khambatta S, Seth M, Rosman HS, Share D, Aronow HD, Moscucci M, et al. The association between patient race, treatment, and outcomes of patients undergoing contemporary percutaneous coronary intervention: Insights from the blue shield of Michingan cardiovascular consortium (BMC2). Am Heart J. 2013;165(6): 893-901.
5. Leigh JA, Alvarez M, Rodriguez CJ. Ethnic minorities and coronary heart disease: an update and future directions. Curr Atheroscler Rep. 2016;18(2):9.
6. Instituto Brasileiro de Geografia e Estatística (IBGE). Censo demográfico 2010: Características gerais da população, religião e pessoas com deficiência. Rio de Janeiro: IBGE; 2010.
7. Abizaid A, Costa Jr JR. Manual de cardiologia intervencionista do Instituto Dante Pazzanese. Rio de Janeiro: Elsevier; 2013.
8. Feres F, Costa RA, Siqueira D, Costa Jr JR, Chamié D, Staico R, et al. Diretriz da Sociedade Brasileira de Cardiologia e da Sociedade Brasileira de Hemodinâmica e Cardiologia Intervencionista sobre Intervenção Coronária Percutânea. Arq Bras Cardiol. 2017;109 (1 Supl 1):1-81.
9. TIMI Study Group. The Thrombolysis in Myocardial Infarction (TIMI) trial. Phase I findings. N Engl J Med. 1985;312(14):932-6.
10. Thygessen K, Alpert JS, Jaffe AS, Simoons ML, Chaitman BR, White HD; the Writing Group on Behalf of Joint ESC/ACCF/AHA/WHF Task Force for Universal Definition of Myocardial Infarction. The third universal definition of myocardial infarction. Circulation. 2012;126(16):2020-35.
11. Thygessen K, Alpert JS, Jaffe AS, Chaitman BR, Bax JJ, Morrow DA, White HD; ESC Scientific Document Group. The fourth universal definition of myocardial infarction. Eur Heart J. 2019; 40(3):237-69.
12. Food and Drug Administration (FDA). Circulatory System Devices Panel Meeting 2006 [Internet]. Washington: FDA; 2006. [cited 2019 Feb 25]. Available from: http://www.fda.gov/ohrms/dockets/ac/06/briefing/2006-4253b1_01.pdf
13. Block PB, Peterson EC, Krone R, Kesler K, Hannan E, O'Connor GT, et al. Identification of variables needed to risk adjust outcomes of coronary interventions: Evidence-based guidelines for efficient data collection. J Am Coll Cardiol. 1998;32(1):275-82. Erratum in: J Am Coll Cardiol 1999;34(2):613. Peterson EC [corrected to Peterson ED].
14. Piegas LS, Timerman A, Feitosa GS, Nicolau JS, Mattos LA, Andrade MD, et al. V Diretriz da Sociedade Brasileira de Cardiologia sobre Tratamento do Infarto Agudo do Miocárdio com Supradesnível do Segmento ST. Arq Bras Cardiol. 2015;105(2):1-105.
15. Cesar LA, Ferreira JF, Armaganijan D, Gowdak LH, Mansur AP, Bodanese LC, et al. Diretriz de Doença Coronária Estável. Arq Bras Cardiol. 2014;103(2Supl 2):1-59.
16. Yancy CW. Doenças cardiovasculares em populações diversificadas. In: Libby P, Bonnow RO, Mann DL, Zipes DP. Braunwald: Tratado de doenças cardiovasculares. 8a ed. Rio de Janeiro: Elsevier; 2010. p. 23-34.
17. Sociedade Brasileira de Cardiologia/Sociedade Brasileira de Hipertensão/Sociedade Brasileira de Nefrologia. VI Diretrizes Brasileiras de Hipertensão. Arq Bras Cardiol. 2010;95(1Supl 1):1-51.
18. Jose PO, Frank AT, Kapphahn KI, Goldstein BA, Karen E, Hesting KG, et al. Cardiovascular disease mortality in Asian Americans. J Am Coll Cardiol. 2014;64(23):2486-94.
19. Minutello RM, Chou ET, Hong MK, Wong C. Impact of race and ethnicity on in hospital outcomes after percutaneous coronary intervention (report from the 2000-2001 New York State Angioplasty Registry). Am Heart J. 2006;151(1):164-7.
20. Mathews R, Chen AY, Thomas L, Wang TY, Chin CT, Thomas KL, et al. Differences in short-term versus long-term outcomes of older black versus white patients with myocardial infarction: findings from the Can Rapid risk stratification of Unstable angina patients Suppress ADvErse outcomes with early implementation of American College of Cardiology/American Heart Association guidelines (CRUSADE). Circulation. 2014;130(8):659-67.
21. Bradley EH, Herrin J, Wang Y, McNamara RL, Webster TR, Magrid DJ, et al. Racial and ethnic differences in time to acute reperfusion therapy for patients hospitalized with myocardial infarction. JAMA. 2004;292(13):1563-72.
22. Cohen MG, Fonarrow GC, Peterson ED, Moscucci M, Dai D, Hernandez AF, et al. Racial and ethnic differences in the treatment of acute myocardial infarction: findings from the get with the guidelines – coronary artery disease program. Circulation. 2010; 121(21):2294-301.
23. Cavender MA, Rassi AN, Fonarrow GC, Cannon CP, Peacock WF, Laskey WK, et al. Relationship of race/ethnicity with door-to-balloon time and mortality in patients undergoing primary percutaneous coronary intervention for ST-elevation myocardial infarction: Findings from get with the guidelines-coronary artery disease. Clin Cardiol. 2013;36(12):749-56.
24. Johansen ME, Hefner JL, Foraker RE. Antiplatelet an statin use in US patients with coronary artery disease categorized by race/ethnicity and gender, 2003 to 2012. Am J Cardiol. 2015;115(11): 1507-12.
25. Collins SD, Torguson R, Gaglia Jr MA, Lemesle G, Syed AI, Ben-Dor I, et al. Does black ethinicity influence the development of

stent thrombosis in the drug-eluting stent era? Circulation. 2010; 122(11):1085-90.

26. Behoar N, Sansing VV, Davis AM, Srinivas VS, Helmy T, Althouse AD, Thomas SB, Brooks MM; BARI 2D Study Group. Race/ethinic disparities in risk factor control and survival in the By-pass Angioplasty Revascularization Investigation 2 Diabetes (BARI 2D) trial. Am J Cardiol. 2013;112(9):1298-305.
27. Albert MA, Ayanian JZ, Silbaugh TS, Lovett A, Resnic F, Jacobs A, et al. Early results of Massachusetts healthcare reform on racial, ethnic, and socioeconomic disparities in cardiovascular care. Circulation. 2014;129(24):2528-38.
28. Shaw LJ, Shaw RE, Merz CN, Brindis RG, Klein LW, Nallamothu B, Douglas PS, Krone RJ, McKay CR, Block PC, Hewitt K, Weintraub WS, Peterson ED; American College of Cardiology-National Cardiovascular Data Registry Investigators. Impact of ethnicity and gender differences on angiographic coronary artery disease prevalence and in-hospital mortality in the American College of Cardiology-National Cardiovascular Data Registry. Circulation. 2008;117(14):1787-801.
29. Singh JA, Lu X, Ibrahim S, Cram P. Trends in and disparities for acute myocardial infarction: an analysis of Medicare claims data 1992 to 2010. BMC Med. 2014;12:190.