

# Race and Patient Refusal of Invasive Cardiac Procedures

Howard S. Gordon, MD, Debora A. Paterniti, PhD, Nelda P. Wray, MD, MPH

**OBJECTIVE:** To determine whether patients' decisions are an important determinant of nonuse of invasive cardiac procedures and whether decisions vary by race.

**DESIGN:** Observational prospective cohort.

**PARTICIPANTS:** Patients ( $N = 681$ ) enrolled at the exercise treadmill or the cardiac catheterization laboratories at a large Veterans Affairs hospital.

**MEASURES:** Doctors' recommendations and patients' decisions were determined by both direct observation of doctor and patient verbal behavior and by review of medical charts. Performance of coronary angiography, angioplasty, and bypass surgery were determined by chart review for a minimum of 3 months follow-up.

**RESULTS:** Coronary angiography was recommended after treadmill testing for 83 of 375 patients and 72 patients underwent angiography. Among 306 patients undergoing angiography, recommendations for coronary angioplasty or bypass surgery were given to 113 and 45 patients and were completed for 98 and 33 patients, respectively. Recommendations were not significantly different by race. However, 4 of 83 (4.8%) patients declined or did not return for recommended angiograms and this was somewhat more likely among black and Hispanic patients, compared with white patients (13% and 33% vs 2%;  $P = .05$ ). No patients declined angioplasty and 2 of 45 (4.4%) patients declined or did not return for recommended bypass surgery. Other recommended procedures were not completed after further medical evaluation ( $n = 32$ ). There was no difference ( $P > .05$ ) by race/ethnicity in doctor-level reasons for nonreceipt of recommended invasive cardiac procedures.

**CONCLUSIONS:** Patient decisions to decline recommended invasive cardiac procedures were infrequent and may explain only a small fraction of racial disparities in the use of invasive cardiac procedures.

**KEY WORDS:** patient acceptance of health care; treatment refusal; ethnic groups; racial variation; coronary artery disease.

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Received from the Houston Center for Quality of Care and Utilization Studies, Veterans Affairs Medical Center (HSG); Section of Health Service Research (HSG, DAP, NPW), Department of Internal Medicine, Baylor College of Medicine, Houston, Tex; Center for Health Services Research in Primary Care (DAP), Department of Internal Medicine and Sociology, University of California, Davis, Sacramento, Calif.

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Address correspondence and requests for reprints to Dr. Gordon: Houston VAMC (152), 2002 Holcombe Boulevard, Houston, TX 77030 (e-mail: hgordon@bcm.tmc.edu).

Racial and ethnic variations in the use of invasive cardiac procedures are well described in the medical literature.<sup>1</sup> For example, studies have reported that black patients are substantially less likely to undergo coronary bypass surgery than white patients.<sup>2,3</sup> These racial and ethnic disparities in the use of invasive cardiac procedures persist even after controlling for differences in the incidence or severity of disease,<sup>4-6</sup> for differences in access to doctors, specialists, or hospitals offering procedures,<sup>7-9</sup> for differences in health insurance or financial incentives for doctors to perform procedures,<sup>10,11</sup> and for differences in clinical indications or appropriateness of procedures.<sup>2</sup> Other explanations of racial and ethnic differences in procedure use include nonclinical and nonbiological differences in care. For example, racial bias in doctors' treatment recommendations<sup>12</sup> and racial variation in patients' willingness<sup>13</sup> to accept doctors' recommendations for invasive cardiac procedures have been suggested to explain racial/ethnic disparities.

Although differences by race in patients' willingness to accept a recommended invasive cardiac procedure may contribute to racial differences in care, patient preferences such as these are poorly studied. Previous studies provide conflicting estimates of patients' willingness to accept doctors' recommendations with estimates of refusal rates that vary several fold, from 20% to less than 3% for black patients and from 10% to 2% in white patients.<sup>14-16</sup> Also, studies used hypothetical scenarios,<sup>17</sup> retrospective chart reviews, and other indirect methods of assessing patients' refusals.<sup>3,14-16,18-22</sup> Because of possible missing documentation in medical records, several studies supplemented chart data with surveys asking about patients' willingness to accept doctors' recommendations for invasive cardiac procedures.<sup>3,21,23</sup> These studies relied on indirect methods and may have misclassified doctors' recommendations and patients' decisions to undergo invasive cardiac procedures. Therefore, we undertook a study to directly observe two important points in the evaluation of suspected coronary disease. We observed the medical interactions after an exercise treadmill stress test or after a coronary angiogram. We sought to determine the extent to which doctors recommended additional procedures after a stress test or angiogram and whether patients indicated they would follow or not follow the recommendation and whether this patient preference varied by race and ethnicity.

## METHODS

We prospectively enrolled patients at two sites in a large Veterans Affairs medical center. The sample consisted of patients presenting for an exercise treadmill test or for coronary angiography. Patients were enrolled during regular daytime hours, Monday through Friday from

September 1999 to May 2000. The study was reviewed and approved by the institutional review board, and all patients enrolled gave written informed consent to participate in the study.

Data to determine doctors' recommendations and patients' refusals were collected by direct observation of doctor and patient verbal behavior, by review of medical charts, or both. Research assistants were trained by a board-certified internist and a sociologist to directly observe doctors' recommendations for invasive cardiac procedures and to directly observe patients' verbal indication that they intended or did not intend to follow their doctor's recommendation. After treadmill testing, doctors' recommendations for angiography were noted when the research assistant directly observed the doctor recommending an angiogram or referring the patient to a pre-angiogram clinic. Recommendations for medication or lifestyle changes were considered as medical management. After angiography, doctors' recommendations were noted when the doctor recommended coronary angioplasty or bypass surgery or stated they would consult the doctor performing those procedures. If a patient received a recommendation for both angioplasty and bypass surgery and the patient chose one of the two, we did not classify the other as a refusal. Patient demographic data including age and race (self-identified as white, black, or Hispanic) were collected at enrollment.

Data to determine doctors' recommendations and patients' decisions were also collected from medical records for all patients. When an observed recommendation differed from a charted recommendation, the charted recommendation took precedence. Charters recommendations that reversed a previous recommendation were considered a doctor-level decision. Patients who did not have procedures because they missed appointments were classified as "no-shows."

Follow-up was completed for a minimum of 3 months to determine whether patients received a recommended procedure. For patients who did not receive a recommended procedure in 3 months, we performed an additional 3 months of follow-up to determine whether the procedure was received within 6 months of recommendation. In addition, we telephoned patients who did not receive a recommended procedure and asked whether the patient received health care outside the study hospital and whether the patient had received angiography, angioplasty, or bypass surgery since enrollment in the study.

In our analysis, we compared participants with non-participants in both (treadmill and angiography) study cohorts by age and race/ethnicity to examine for possible selection bias. In addition, we compared the distribution of procedures that were recommended but not received at the doctor level and patient level (declined or no-show) by race/ethnicity. We used the  $\chi^2$  or Fisher's exact test to examine differences for categorical variables and the *t* test for continuous variables, and we considered a *P* value of .05 or smaller as statistically significant.

## RESULTS

We enrolled 681 patients (23.5% black, 7.1% Hispanic, and 69.5% white) at the treadmill test or coronary angiography laboratories, combined. Patients who did not participate were similar to participating patients by age (57.6 vs 55.2 years; *P* = .10, treadmill patients; 63.4 vs 61.3 years; *P* = .11, angiogram patients). Nonparticipating patients were similar to participating patients by race/ethnicity at treadmill (*P* = .61; Table 1), but at angiogram white patients were more likely to participate compared with black and Hispanic patients (*P* = .04; Table 1).

We directly observed 94.9% (356/375) of doctor-patient interactions in the treadmill laboratory. Recommendations for angiogram were identified for 83 patients and we directly observed the interaction for 82 (99%) of these recommendations. In the catheterization laboratory we directly observed 95.1% (291/306) of doctor-patient interactions. A recommendation for coronary angioplasty or bypass surgery was identified for 113 and 45 patients, and we directly observed the interaction for 99 (88%) and 41 (91%) of these recommendations, respectively. Proportions of patients recommended for angiogram, angioplasty, and surgery did not differ significantly by race (Table 2).

Among the 83 treadmill patients who received a recommendation for angiogram, 72 subsequently completed the recommended procedure (Table 3). We classified the 11 procedures that were recommended but not received as doctor-level or patient-level decisions. Seven patients did not receive angiography because of doctor-level decisions. The most common (5/7) doctor-level reason for noncompletion was a cardiologist's judgment that angiography was not appropriate. There was no difference by race/ethnicity in doctor-level decisions against angiogram (13% [*N* = 2] black or 0% Hispanic vs 8% [*N* = 5] white; *P* = .67) compared with recommended and received angiograms. Compared with angiograms recommended and received, angiograms

**Table 1. Patient Demographics According to Study Recruitment at the Treadmill Test and Catheterization Laboratories**

Characteristic	Participants (n)	Nonparticipants (n)	<i>P</i> Value
Treadmill test, %	79.8 (375)	20.2 (95)	
Race/ethnicity, %			
Black	76.9 (103)	23.1 (31)	.61
Hispanic	81.1 (30)	18.9 (7)	
White	80.9 (242)	19.1 (57)	
Mean age, y	55.2	57.6	.10
Coronary Angiography	78.1 (306)	21.9 (86)	
Race/ethnicity, %			
Black	69.5 (57)	30.5 (25)	.04
Hispanic	69.2 (18)	30.8 (8)	
White	81.3 (231)	18.7 (53)	
Mean age, y	61.3	63.4	.11

**Table 2. Proportion of Patients Who Received a Recommendation for an Angiogram, Angioplasty, or Coronary Bypass Surgery by Race**

	All Patients (n)	Black (n)	Hispanic (n)	White (n)	P Value
Treadmill test	(375)	(103)	(30)	(242)	
Recommended angiogram, %	22 (83)	18 (19)	10 (3)	25 (61)	.10
Coronary angiogram	(306)	(57)	(18)	(231)	
Recommended angioplasty, %	37 (113)	25 (14)	44 (8)	39 (91)	.09
Recommended surgery, %	15 (45)	11 (6)	17 (3)	16 (36)	.61

not received because of patient-level decisions were more likely among black and Hispanic patients than white patients (13% [ $N = 2$ ] black or 33% [ $N = 1$ ] Hispanic vs 2% [ $N = 1$ ] white;  $P = .05$ ). Two patients missed scheduled appointments (and did not reschedule), and two patients declined their doctor's recommendation. There was no statistically significant difference by race among patients who explicitly declined the recommended angiogram (8% black [ $N = 1$ ] or 33% Hispanic [ $N = 1$ ] vs 0% white [ $N = 0$ ];  $P = .06$ ).

In the cohort enrolled at the catheterization laboratory, recommendations for revascularization with angioplasty and bypass surgery were given to 113 and 45 patients and were completed for 98 and 33 patients, respectively (Table 3). We found no instance where a patient refused a recommended angioplasty. In addition, 3 patients received a recommendation for both angioplasty and bypass surgery, but chose angioplasty. Further, 38 patients agreed to proceed to angioplasty immediately after angiogram. However, a cardiologist determined that angioplasty was not appropriate for the 15 recommended angioplasty procedures that were not completed. Reasons for not completing angioplasty included high risk of restenosis and no ischemia on a noninvasive test. There was no statistical difference by race/ethnicity in these doctor-level decisions to change a previous recommendation for angioplasty (0% black or 38% [ $N = 3$ ] Hispanic vs 13% [ $N = 12$ ] white;  $P = .96$ ).

Bypass surgery was not offered to 10 of the 12 patients who received an initial recommendation and did not receive

surgery. For these 10 patients, a surgeon decided surgery was not an option for several reasons including poor targets for bypass and severe comorbid disease. The other 2 patients did not receive surgery for patient-level reasons; 1 patient did not return for preoperative visits and 1 patient refused surgery (Table 3). There were no statistically significant differences by race/ethnicity in doctors' decisions to change a prior recommendation for surgery (50% [ $N = 3$ ] black or 33% [ $N = 1$ ] Hispanic vs 18% [ $N = 6$ ] white;  $P = .18$ ) or in patient-level reasons that surgery was not completed (0% [ $N = 0$ ] black or Hispanic vs 8% [ $N = 2$ ] white;  $P = .79$ ).

Patients declined or failed to return for 4.8% (4/83), 0% (0/113), and 4.4% (2/45) of doctor-recommended angiograms, angioplasties, and bypass surgeries, respectively. To determine whether these patients may have received procedures elsewhere, we conducted telephone interviews with patients who explicitly declined a recommended procedure ( $N = 3$ ) or did not return for preprocedure visits ( $N = 3$ ). Two patients could not be reached or did not return our calls. The other 4 had not received the recommended procedure at another facility.

## DISCUSSION

We directly observed doctor-patient interactions to examine patients' willingness to follow doctors' recommendations. We found that it was rare for a patient to explicitly decline a doctor's recommendation for an invasive cardiac

**Table 3. Numbers of Received and Not Received Invasive Cardiac Procedures by Race**

Invasive Cardiac Procedure	Totals (N)	Black (N)	Hispanic (N)	White (N)	P Value
Angiogram	(83)	(19)	(3)	(61)	
Recommended and received, %	(72)	79 (15)	67% (2)	90 (55)	.15
Not received, doctor-level	(7)	13 (2)	0 (0)	8 (5)	.67
Not received, patient-level	(4)	13 (2)	33 (1)	2 (1)	.05
Angioplasty	(113)	(14)	(8)	(91)	
Recommended and received, %	(98)	100 (14)	63 (5)	87 (79)	.96
Not received, doctor-level	(15)	0 (0)	38 (3)	13 (12)	.96
Not received, patient-level	(0)	0 (0)	0 (0)	0 (0)	—
Surgery	(45)	(6)	(3)	(36)	
Recommended and received, %	(33)	50 (3)	67 (2)	78 (28)	.22
Not received, doctor-level	(10)	50 (3)	33 (1)	18 (6)	.18
Not received, patient-level	(2)	0 (0)	0 (0)	8 (2)	.79

procedure, but even with the small number of refusals, we found that black and Hispanic patients were more likely than white patients to decline or not show for a recommended angiogram. These results are consistent with results of prior studies that used indirect methods to assess patients' preferences and that have reported that rates of refusal are low and explain only a fraction of racial differences in care.

In our study, we found a trend toward fewer recommended procedures for black patients. However, our assessment of these recommendations was limited because we did not evaluate clinical indications for the recommendation and because we evaluated whether, but not how, the recommendations were communicated. We believe the quality of the doctor-patient interaction may influence both doctors' recommendations and patients' refusals. For example, when communication is successful, patients may negotiate and indicate their preferences for diagnostic or therapeutic procedures. Patients indicating preferences for noninvasive management may be less likely to receive recommendations for invasive procedures, an appropriate response by the doctor, if the patient is making an informed decision. Additionally, recommendations may be less strong when treatment is discretionary, is primarily for relief of symptoms, or is offered to improve physical functioning as compared to when treatment improves survival. Further, communication may be best when doctor and patient are the same race.<sup>24-26</sup> Thus, patient willingness to accept a doctor's recommendation may be influenced by the effectiveness of the doctor-patient communication.

Our findings support prior studies that used hypothetical scenarios and reported that black patients were less likely than white patients to accept a recommended cardiac catheterization,<sup>17</sup> angioplasty, bypass surgery,<sup>13</sup> or carotid endarterectomy.<sup>27</sup> Other studies using indirect methods reported that bypass surgery was recommended but not received for 20% of black and 9% to 10% of white patients.<sup>14,18</sup> However, refusal of angioplasty was infrequent with a rate of 1.8% in black and 2.1% in white patients,<sup>18</sup> a result close to our own. Studies examining chart-documented patient refusal of invasive cardiac procedures in patients discharged after acute myocardial infarction reported that coronary angiography was refused by 5% of both black and white patients, but in the subgroup with left main or three-vessel coronary disease, chart-documented refusal of coronary bypass surgery was higher in black than white patients, 12.2% versus 4.6%, respectively.<sup>19</sup> In two other studies, chart-documented refusal of angiogram was significantly higher in black compared with white patients but overall refusal rates were low at 2% to 3%.<sup>15,16</sup>

Studies attempting to improve the classification of doctors' recommendations and patients' refusals have combined chart review with surveys of doctors and patients.<sup>3,21,23</sup> In one such study, refusal was higher (10% vs 5%) in hospitals that did not offer revascularization compared with hospitals that did offer revascularization onsite, but refusal rates did not differ by race.<sup>23</sup> In another study,

Hannan et al.<sup>3</sup> attempted to determine why patients did not undergo bypass surgery when it was "appropriate" by the RAND criteria. Doctors responded to a survey and indicated they did not recommend surgery for 90% of these patients; the remaining 10% were classified as refusals and did not differ by race. Within the 90% of patients not receiving a recommendation, 9% did not get the recommendation because the patient communicated a preference for less invasive care with angioplasty or medical therapy.

It is a strength of this study that we used prospective, direct observation of doctor-patient interactions and that we examined decisions at the treadmill test and coronary angiography laboratories, two points in the work-up of coronary disease that may lead to recommendations for additional cardiac procedures. However, our estimates of refusal might be low because we could only investigate patients who at least agreed to participate in this study. We did not have consent from patients who refused to be in this study; thus, we were unable to review their medical records to ascertain procedure recommendation and refusal, if any, in these patients. Participation in this study was not significantly lower in black compared with white patients at treadmill; however, black and Hispanic patients awaiting angiogram were more likely to refuse to participate in this study ( $P = .04$ ; Table 1). This nonparticipation at angiogram lessened our ability to examine treatment refusal after angiogram. If nonparticipants were more likely to refuse doctors' recommendations, then results that included these patients might have indicated either a higher occurrence of refusal, a racial disparity in refusal, or both. Thus, our study highlights the need for efforts to encourage and ensure enrollment and retention of black and Hispanic patients in prospective research studies and for efforts to obtain approval for medical record review of nonparticipants to ascertain procedure use and to develop the best estimates of factors that may predict racial disparity.

The referral process for these procedures has several steps where refusal may occur.<sup>28</sup> The low refusal rates we found may be associated with refusal at earlier steps in this process; however, other studies that examined patient refusal were limited by similar factors. Also, refusal rates may be higher in facilities without onsite capability to perform invasive cardiac procedures,<sup>23</sup> and patient transfer to facilities with onsite capability to perform invasive cardiac procedures may be less likely for black patients.<sup>29,30</sup> Finally, it is possible our study was limited by the Hawthorne effect—the insertion of an observer into clinical encounters might have changed patients' decision-making behavior, leading to fewer refusals.

Our results reinforce the finding of several other studies that patient refusal of recommended procedures is infrequent. The low number of refusals suggests that rather than focusing on patient preferences, other possible influences on decision making in doctor-patient interactions (e.g., doctor-patient communication<sup>31</sup>) should be examined to further our understanding of racial/ethnic disparities in

health care and to work toward our goal to eliminate these disparities.

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