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Achievement of Optimal Medical Therapy Goals for U.S. Adults With Coronary Artery Disease

Results From the REGARDS Study (REasons for Geographic And Racial Differences in Stroke)

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Objectives In a nonclinical trial setting, we sought to determine the proportion of individuals with coronary artery disease (CAD) with optimal risk factor levels based on the COURAGE (Clinical Outcomes Utilizing Revascularization and Aggressive DruG Evaluation) trial.

Background In the COURAGE trial, the addition of percutaneous coronary intervention (PCI) to optimal medical therapy did not reduce the risk of death or myocardial infarction in stable CAD patients but resulted in more revascularization procedures.

Methods The REGARDS (REasons for Geographic And Racial Differences in Stroke) study is a national prospective cohort study of 30,239 African-American and white community-dwelling individuals older than 45 years of age who enrolled in 2003 through 2007. We calculated the proportion of 3,167 participants with self-reported CAD meeting 7 risk factor goals based on the COURAGE trial: 1) aspirin use; 2) systolic blood pressure <130 mm Hg and diastolic blood pressure <85 mm Hg (<80 mm Hg if diabetic); 3) low-density lipoprotein cholesterol <85 mg/dl, high-density lipoprotein cholesterol >40 mg/dl, and triglycerides <150 mg/dl; 4) fasting glucose <126 mg/dl; 5) nonsmoking status; 6) body mass index <25 kg/m^2; and 7) exercise ≥4 days per week.

Results The mean age of participants was 69 ± 9 years; 33% were African American and 35% were female. Overall, the median number of goals met was 4. Less than one-fourth met ≥5 of the 7 goals, and 16% met all 3 goals for aspirin, blood pressure, and low-density lipoprotein cholesterol. Older age, white race, higher income, more education, and higher physical functioning were independently associated with meeting more goals.

Conclusions There is substantial room for improvement in risk factor reduction among U.S. individuals with CAD.
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Coronary artery disease (CAD) is highly prevalent in the United States (1). The American Heart Association (AHA) estimates that 15,400,000 Americans have CAD and that CAD accounted for 1 in 6 deaths in the United States in 2009. The total estimated annual direct and indirect cost of CAD in the United States is $195.2 billion (1).

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Current guideline recommendations for the management of patients with stable CAD involve intensive risk factor management and anti-ischemic therapies, with revascularization reserved for individuals whose symptoms persist or progress despite intensive medical therapy (2). Despite these recommendations, many patients undergo revascularization, often because of emotional or psychological factors on the part of both patients and physicians (3,4). More than 1 million percutaneous coronary interventions (PCIs) are performed annually in the United States (1). Although estimates vary, it appears that at least one-half of all PCIs in the United States are performed electively (5).

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The COURAGE (Clinical Outcomes Utilizing Revascularization and Aggressive Drug Evaluation) trial recently demonstrated that, compared with a strategy of PCI plus optimal medical therapy, an initial strategy of optimal medical therapy alone, with PCI reserved for those with refractory angina, had similar rates of death or nonfatal myocardial infarction in individuals with stable CAD who had undergone coronary angiography before randomization (6). Also, over a median follow-up of 4.6 years, only 33% of individuals randomized to the optimal medical therapy group required revascularization (6), suggesting that two-thirds of individuals with stable CAD could potentially avoid PCI during this time period if treated initially with optimal medical therapy alone (7).

Because clinical trial populations tend to be more adherent and health conscious, it is not clear to what extent individuals with stable CAD in the United States achieve the risk factor goals used in the COURAGE trial. Therefore, using data on participants who reported a history of CAD at baseline in the national REGARDS (REasons for Geographic and Racial Differences in Stroke) study, we sought to examine the proportion of individuals with risk factor levels similar to the goals used in the COURAGE trial. Additionally, we examined sociodemographic factors associated with being at these risk factor goals.

Methods

The REGARDS study was described in detail previously (8). Briefly, the REGARDS study is a cohort of 30,239 community-dwelling individuals recruited between 2003 and 2007. Although the cohort is currently being followed longitudinally, this analysis uses data that were collected during the baseline examination. The cohort was designed to be balanced on race (white and African American) and sex; the final sample was 42% African Americans and 55% female. Because the primary goal of the REGARDS study is to elucidate regional and racial differences in stroke, residents of the Stroke Belt, located in the southeastern United States, were oversampled such that 20% of the overall cohort was selected from the "buckle" of the Stroke Belt (the coastal plain region of North Carolina, South Carolina, and Georgia), 30% from the rest of the Stroke Belt (the remaining parts of North Carolina, South Carolina, and Georgia plus Alabama, Mississippi, Louisiana, Arkansas, and Tennessee), and 50% from the remaining 40 contiguous states. Individuals were identified by commercially available lists and contacted by mail and telephone. Of those determined to be eligible, 49% agreed to paricipate. Upon enrollment, participants underwent a computer-assisted telephone interview followed by an in-home examination. During the telephone interview, demographic and self-reported medical information was obtained. During the in-home examination, the participant's blood pressure, height, and weight were measured, and blood and urine samples were collected.

Abbreviations and Acronyms

ACC = American College of Cardiology
AHA = American Heart Association
CAD = coronary artery disease
HDL-C = high-density lipoprotein cholesterol
LDL-C = low-density lipoprotein cholesterol
PCI = percutaneous coronary intervention

At enrollment, there were a total of 4,245 participants who reported a history of CAD, defined as a self-reported history of myocardial infarction, PCI, or coronary artery bypass graft surgery. Of these participants, 454 with missing data on blood pressure, glucose or lipid values, smoking status, height, weight, or physical activity were excluded. Additionally, 624 individuals who had not fasted for their blood draw were excluded from the primary analysis. This resulted in a final sample size for our primary analyses of 3,167 participants with a self-reported history of prevalent CAD. Individuals excluded from our primary analyses were more likely to be African American (39% vs. 33%, $p < 0.001$) and less likely to live in the Stroke Buckle (17% vs. 23%, $p < 0.001$) than those included. Female sex did not differ significantly between those excluded (38%) and those included (35%) ($p = 0.16$). We conducted additional secondary analyses as described in the following without excluding the 624 individuals who had not fasted for their blood draw ($n = 3,791$ for these analyses).

Risk factor treatment goals. The risk factor goals used for this analysis were based on those used at the beginning of the COURAGE trial (9,10) and are listed in Table 1. These goals were based on the American College of Cardiology (ACC) and AHA guidelines at the time that the COURAGE trial was designed (9,10) and do not vary significantly from current guideline recommendations (2,11) or the AHA 2020 goals for ideal cardiovascular health (12), as shown in Table 1. Because our intent was to estimate the degree to which optimal risk factor levels are achieved in the general U.S. population in individuals with stable CAD, for our primary analyses, we defined the blood pressure goal as achieving both the systolic and diastolic blood pressure goals, the lipid goal as achieving all 3 lipid goals, and an optimal body mass index as <25 kg/m^2. Exercise was defined as