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Editorial commentary: Ethnic and racial disparities and differences in sudden cardiac death burden and survival: How do we close the gap?[☆]

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Racial, ethnic and socioeconomic factors have been implicated in various cardiac and arrhythmic diseases. The incidence of hypertension, diabetes, obesity has been noted to be higher among black patients [1]. Prior studies have shown that racial and gender disparities exist in the implantation of implantable cardioverter-defibrillators [2,3]. Other studies have shown that the care of patients with atrial fibrillation was associated with gender/racial and ethnic factors [4,5].

The terminology of differences versus disparities and biases require clarification [6]. The term disparities in health care applies after demonstrating that differences in health care use/outcome was not due to treatment eligibility, contraindications, patients preferences or other confounding factors [6]. Yancy and Peterson [7] define health care disparities as differences that persist after accounting for patient preference, underlying medical condition and/or appropriateness of care. They point out that socioeconomic barriers, cultural or language issues, and intrinsic bias/racism may be the cause of health care disparities.

In an analysis of racial and ethnic disparities in cardiac care [7], Yancy and Peterson propose the following:

- There may be certain genotypes and phenotypes associated with race and ethnicity and future therapies may offer more targeted therapies.
- Treatment of patients with cardiac disease should be equitable regardless of socioeconomic status.
- Preventive strategies such as aggressive treatment of hypertension, and education regarding diet and exercise may help reduce the staggering racial differences noted among young patients with heart failure
- Effective treatment strategies need to account for educational, cultural and other barriers

In the review in this issue of the Journal, by Reinier and Chugh [8], the association of race and ethnicity on sudden cardiac death (SCD) and sudden cardiac arrest (SCA) burden was examined. In addition to population burden, factors related to resuscitation outcomes and primary prevention of SCD were evaluated. The definition of SCD, adjudication methods, and underlying pathophysiology have varied in different studies, making distinctions between population and individual risk difficult [9]. For that reason, the absolute rates of SCD varied considerably between 20 and 200 /100,000 person-years.

Despite these variations, the following observations were made:

- Blacks had consistently higher rates of SCD than whites. This has been shown across multiple epidemiological studies. Moreover, blacks had higher rates of SCD even at younger ages. Meaningful survival post-SCA was lower in blacks than whites.
- The data for Hispanics were inconsistent. Some studies showed higher rates and other studies showed lower rates.
- Asians tended to have lower rates of SCD.

It is difficult to ascertain the reason for these differences in SCD due to multiple confounding factors. The presence of risk factors for coronary artery disease seems to be more prevalent among blacks, particularly hypertension and diabetes. Moreover, blacks tend to develop more left ventricular hypertrophy which has been linked with SCD.

Incident heart failure (HF) before the age of 50 has been shown to be up to 20 times more prevalent among black men and women compared with white men and women [10]. Baseline elevations in diastolic BP, body mass-index, and kidney disease were predictors for development of HF, during a mean follow-up of 10 years. Therefore, a targeted strategy of aggressive hypertension treatment in young black patients, education regarding diet and exercise, and close follow-up may have a meaningful impact on development of HF among black patients. Clearly, HF is one of the risk factors for SCD, so the downstream effects of early intervention may also reduce subsequent SCD events.

Lower socioeconomic status has been associated with increased incidence of SCD, and this may in part explain the racial and ethnic differences in SCD. Moreover, the application of bystander CPR has been associated with racial, ethnic and socioeconomic factors [8]. Early bystander CPR, and application of defibrillation therapy in pa-

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tients with ventricular tachycardia/fibrillation is crucial to the resuscitative efforts and improving meaningful survival. Sasson et al. [11] have shown that rates of bystander-initiated CPR were lower in low-income neighborhoods. However, even when comparing neighborhoods of similar income levels, rates of bystander-initiated CPR were lower in predominantly black neighborhoods compared with white neighborhoods. Therefore, a targeted endeavor to overcome educational and/or cultural barriers to CPR may help equalize the rates of bystander-initiated CPR. Making AEDs widely available should be part of that strategy.

Finally, Reinier and Chugh [8] examined genetic factors among different racial and ethnic groups. As with many other medical and cardiac conditions, there were meaningful genetic differences among different ethnic and racial groups that may predispose to SCD.

Thus, there are many factors that may explain racial and ethnic differences in the burden of SCD as well as the treatment (CPR, ICD) and survival. One reason to do these epidemiological studies is to identify causative factors and to try to correct them.

We performed a study examining patients with ICD shocks, based on their insurance status and whether they presented with appropriate or inappropriate shocks [12]. In this study, we found that uninsured patients were more likely to present with inappropriate shocks, when they had ICD shocks compared with insured patients. Moreover, we identified lack of appropriate follow-up prior to their shock as a causative factor. Once we enrolled uninsured patients into the appropriate device clinic, the rates of recurrent shocks (appropriate or inappropriate) no longer differed based on insurance status.

Reduction in the differences and/or disparities of the rates and treatment of SCD will require a sustained effort to address multiple causes. Improved training of clinicians to be more culturally sensitive may help reduce disparities. Aggressive treatment of primary conditions such as hypertension/diabetes/obesity may help reduce the development of coronary artery disease (CAD), cardiomyopathy, and HF with reduced ejection fraction (HFrEF), conditions that increase the risk for SCD. Patients at risk for SCD, and otherwise meet criteria for an implantable defibrillator (ICD), should be offered an ICD regardless of ethnicity or race. There is also increasing recognition of the importance of HF with preserved ejection fraction in SCD risk, with recent emphasis on type 2 diabetics with preserved EF and CAD [13].

Current guidelines from CMS suggest that patients share in the decision to implant an ICD [14]. Given that most patients who receive primary prevention ICDs never have an appropriate therapy, there could be underlying educational/cultural biases in the patients themselves, regarding acceptance or rejection of ICD therapy. In areas of uncertainty or concern about the limits of potential benefits, shared decision-making with patients and families is taking on an increasingly prominent role.

In summary, the risk of sudden cardiac arrest and SCD is largely a downstream result of development of CAD, the presence of risk factors, or HF from any etiology. The differences in SCD burden and outcomes among patients of different races and ethnicities provide targets for both clinicians and patients to address to hopefully reduce the rates of SCD among those groups with the highest rates.

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