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EDITORIAL

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Editorial to "Sickle-Cell Disease-associated Arrhythmias and In-hospital Outcomes: Insights from the National Inpatient Sample"

Sickle cell disease affects approximately 1 of 500 African Americans and 1 of 1200 Hispanic Americans.[1] The clinical manifestations of the sickle-cell disease result from hemolysis and vascular occlusions, leading to a myriad of clinical presentations such as pain crisis, acute chest syndrome, and acute stroke. The sickle-cell disease also has cardiovascular manifestations, including left ventricular diastolic dysfunction, pulmonary hypertension, myocardial infarction, and arrhythmias.

In this issue of the *Journal of Arrhythmia*, Patel et al analyzed and reported the frequency of arrhythmia and its trends over time from a national database in patients hospitalized with sickle-cell disease.[2] The authors used the National Inpatient Sample, which is a nationally representative survey of hospitalizations conducted by the Healthcare Cost and Utilization Project.

The hospitalization data of 891 450 sickle-cell disease patients between 2010 and 2014 were studied. Among these patients, the overall frequency of arrhythmia was 6.2%. Among patients with arrhythmias, the type of arrhythmias was not specified in 65.9% of patients. Among arrhythmias that were specified, the most common was atrial fibrillation occurring at a frequency of 1622 per 100 000 sickle-cell disease-related admissions. The frequency of ventricular arrhythmias was 362 per 100 000 sickle-cell disease-related admissions. The overall frequency of arrhythmias increased from 5.4% in 2010 to 7.0% in 2014. The frequency of atrial fibrillation increased from 1.3% in 2010 to 1.8% in 2014. Patients with arrhythmia were associated with higher all-cause mortality and prolonged hospital stays.

The study draws our attention to the increasing trend of arrhythmias in hospitalized sickle-cell disease patients. Reviewing hospitalizations for sickle cell disease from 2000 to 2016, Fingar et al showed that the primary reasons for hospitalization include respiratory system-related illnesses and pain crises.[3] The possible factors triggering arrhythmias in these hospitalized patients could be the underlying respiratory illness, which led to hypoxemia, myocardial ischemia, metabolic disturbances, and systemic inflammation. In a general cohort of patients admitted to the intensive care unit, 12% had sustained arrhythmias.[4] Acute pain crises in sickle-cell disease patients also can lead to elevated sympathetic tone, and significant autonomic dysregulation leading to triggering arrhythmias.

Furthermore, sickle-cell disease patients may also have underlying arrhythmias even outside of the hospital. In a cohort of adult sickle-cell disease patients, atrial fibrillation was present in 2% of patients.[5] The increasing trend of arrhythmias in patients with the sickle-cell disease could be because of the increased in-hospital monitoring for arrhythmias, such as telemetry systems, or increasing chronic comorbid conditions among an aging sickle-cell disease population.

The other important finding is the significant association between arrhythmias and in-hospital mortality. It is essential to keep in mind that association is not the same as causation. Arrhythmias may be a "bystander" or marker of the severity of the underlying illness that eventually led to mortality. However, arrhythmias can also contribute toward hemodynamic instability and complicate the hospital course of these patients, and indirectly leading to the death of the patient. In order to better delineate the relationship of arrhythmias and mortality in these patients, further studies that enable a precise evaluation of the sequence of events prior to death are required.

One of the limitations of this study is the lack of granularity of the arrhythmia diagnosis code within this cohort of sickle-cell disease patients in the National Inpatient Sample. The majority of the arrhythmias were not specified, and so the actual frequency and trend of atrial fibrillation or ventricular arrhythmias are not clear. It is also uncertain if some of the patients who were diagnosed with "unspecified arrhythmias" only had rare episodes of premature atrial complexes or premature ventricular complexes. The second limitation is that the database is an inpatient database, and thus, sickle-cell disease patients who were seen and treated in the emergency department or under observation status were excluded. These may be patients with acute pain crisis who were treated in the emergency department or under observation status. Therefore, the overall frequency of arrhythmias reflects patients who require inpatient hospitalization and may reflect a sicker population of sickle-cell disease patients. Besides, it is relatively common for rehospitalizations in sickle cell patients, hence was there a same or different arrhythmia during each hospitalization remains unclear.

Patel et al should be congratulated for this important work that adds to our understanding of arrhythmias in sickle-cell disease

patients. Importantly, the results of this study demonstrate the increasing trend of arrhythmias in this patient population and its association with mortality. Further studies highlighting the mechanistic insights into arrhythmia genesis and impact on overall morbidity and mortality beyond the contemporary risk stratification tools will help identify the "at-risk" patients.

KEYWORDS

arrhythmia, atrial fibrillation, mortality, sickle cell disease

CONFLICT OF INTEREST

Authors declare no conflict of interests for this article.

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