Prevalence of atrial fibrillation in patients with atrial septal defect and its impact on in-hospital outcomes

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Background: Atrial septal defect (ASD) is one of the most common congenital heart diseases in adulthood. ASDs have left-to-right shunt and primarily right-sided volume overload. This leads to electrical remodeling that may predispose patients to atrial fibrillation (AF). There is limited data on the impact of AF on clinical outcomes in patients with ASD.

Purpose: To study the prevalence of AF and its impact on in-hospital outcomes in adult patients with ASD.

Methods: This is a retrospective cohort analysis of all ASD related hospitalizations between January 1, 2016, and December 31, 2020, from the National Inpatient Sample, the largest publicly available all-payer inpatient care database in the United States. Our study population included adult patients (≥18 years) with ASD using ICD-10 diagnostic codes. Patients with a diagnosis of acquired ASD were excluded. ASD patients were divided into two groups: with and without AF. We used Chi square test for categorical variables and t-test for continuous variables to compare group differences between ASD with AF and ASD without AF. Univariate and multivariate logistic regression were used to analyze the clinical outcomes between the two groups.

Results: From 2016 to 2020, we identified 82,574 hospitalizations with primary diagnosis of ASD, of which 23,907 (29%) had coexisting AF. The mean age was 71 years. Among them, 48% were female. Racial distributions were: 81% Whites, 8.8% Blacks, 5.9% Hispanics and 2.1% Asians. Compared to ASD without AF, ASD with AF hospitalizations were older in age (mean age: 71 vs 59, \(p<0.001\)), had higher prevalence of chronic heart failure (56% vs 25%, \(p<0.001\)), hypertension (71% vs 61%, \(p<0.001\)), obstructive sleep apnea (16% vs 9%, \(p<0.001\)), and higher Charlson comorbidity index (CCI) of ≥3 (52% vs 46%, \(p<0.001\)). ASD patients with AF had higher in-hospital mortality (aOR: 1.25, 95% CI: 1.14, 1.37, \(p<0.001\)), longer length of stay (beta coefficient: 0.15, 95% CI 0.13, 0.17, \(p<0.001\)), higher odds of acute heart failure (aOR: 3.0, 95% CI: 2.86, 3.15, \(p<0.001\)), cardiogenic shock (aOR: 2.68, 95% CI: 2.42, 2.97, \(p<0.001\)), acute kidney injury (aOR: 1.4, 95% CI: 1.35, 1.46, \(p<0.001\)) and requirement of permanent pacemaker (PPM) (aOR: 2.51, 95% CI: 2.16, 2.92, \(p<0.001\)) compared to ASD without AF after controlling for age, race, CCI, obesity, COPD and pulmonary hypertension.

Conclusions: Our study showed that a significant percentage of hospitalized patients with ASD had concomitant AF. AF can contribute to higher in-hospital mortality and worse clinical outcomes in patients with ASD. This highlights the importance of optimal management of AF in patients with ASD.