Detecting Aortic Stenosis Using Point-of-Care Ultrasound (POCUS) in the Emergency Department

Aortic Stenosis (AS), characterized by calcific narrowing of the aortic valve, is a major cause of morbidity and mortality in older adults. Symptom severity correlates with the degree of valvular narrowing and the resulting aortic flow gradient. With 4-year mortality rates reaching 44.9% in severe AS and 30% in moderate AS, timely identification is critical. Although formal echocardiography is the diagnostic standard, it is often not available until after admission. Limited research exists on the utility of point-of-care ultrasound (POCUS) in detecting AS. This study aims to determine whether emergency physicians can reliably identify AS using Peak Aortic (JET) Velocity measured via POCUS in patients presenting with syncope, enabling earlier risk assessment and potentially reducing morbidity, mortality, and unnecessary hospital admissions.

Enrollment criteria include patients aged ≥60 presenting with syncope or symptoms suggestive of AS who are planned for admission and formal echocardiography. Using the apical 5-chamber (A5C) view, continuous-wave Doppler will be used to measure the peak aortic jet velocity. Values >3 m/s will indicate moderate AS, and ≥4 m/s severe AS. These measurements are compared to formal echocardiographic parameters, including peak velocity, aortic valve area, mean gradient, ejection fraction (EF), and final severity classification.

This study is currently ongoing. Data collection includes both POCUS-derived peak jet velocity and corresponding formal echocardiographic findings. The primary analysis will compare the single POCUS-derived velocity measurement to the diagnostic standard obtained from formal echocardiography to assess diagnostic accuracy and clinical utility.

We hypothesize that POCUS-derived peak jet velocity will demonstrate sufficient negative predictive value to rule out severe AS in this population. Early identification of AS in the emergency department may facilitate more appropriate clinical management, given the substantially different treatment pathways for patients with and without AS.