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Title: Utility of Postextrasystolic Potentiation in Assessing Severity of Low-Flow Low-Gradient Aortic Stenosis: A Case Series

Background:

Abnormalities of aortic valve morphology and function comprise the most common cardiac valvular lesions. Of these, severe aortic stenosis (SAS) poses a particularly eminent burden, especially in the elderly population. Though SAS classically presents with echocardiographic findings of a valve area ≤ 1.0 cm² and a transvalvular pressure gradient ≥ 40 mmHg, variants exist. One example of this is low-flow low-gradient (LF-LG) SAS; in which a reduced transvalvular gradient presents as a result of myocardial remodeling-related restrictive physiology and a subsequent reduced left ventricular ejection fraction. Treatment of patients with LF-LG SAS depends greatly on findings of dobutamine stress echocardiography – both to differentiate true, SAS from pseudo-AS, and to gather prognostic information in determining candidacy for valve replacement. Dobutamine echocardiography is a time and labor intensive test with risks and side effects to the patient. Postextrasystolic potentiation (PesP), the phenomenon of contractility augmentation following a premature ventricular contraction, can provide hemodynamic information to arrive at appropriate diagnoses of SAS. These post-systolic beats tend to match those seen with dobutamine. Therefore, they may provide similar prognostic information as has been validated in ischemic cardiomyopathy - a matter that this case series aims to study.

Methods:

A population of 2000 patients' echocardiograms captured within the last 7 months were evaluated - 401 of which displayed SAS. These were then further assessed in order to isolate LF-LG SAS. Finally, 7 echocardiograms displaying LF-LG SAS, with premature ventricular contractions during the time in which images were captured, were isolated. Using M-mode tracings, the echocardiograms of these 7 patients were scrutinized for the presence of PesP.

Results:

A correlation between PesP in the setting of LF-LG SAS and Aortic Valve stenosis severity was established - however, this series was of a small number of cases.

Conclusion:

We are presenting a series of seven patients, which provides experiential evidence of feasibility in this testing modality. Further investigation is needed to validate the hypothesis that PesP can be utilized in place of dobutamine stress testing in assessing severity of aortic stenosis in LF-LG scenarios.