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CLINICAL VIGNETTE

Severe Aortic Valve Stenosis in an Elderly Patient, Is it Routine?

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Introduction

Aortic valve stenosis is the most common cause of left ventricular outflow tract (LVOT) obstruction, especially in older patients.¹ Echocardiogram is the test of choice to evaluate the aortic valve, and severe stenosis can be identified by measuring peak velocity, mean gradient, and calculated aortic valve area using the continuity equation. Visualization of the aortic valve leaflets can sometimes be difficult using transthoracic echocardiography but is important to help differentiate aortic valve stenosis from other possible causes, such as subvalvular or supra-valvular aortic stenosis. The following is a case where visualization of the aortic valve and recognition of other clinical clues helped identify a rarer cause of LVOT obstruction.

Case

A 71-year-old woman with hypertension and hyperlipidemia presented with leg swelling, dyspnea on exertion, and fatigue. Progressive symptoms had been present for a year. She was aware of a longstanding heart murmur since she was a young adult. Vital signs included elevated blood pressure of 149/77 mmHg, heart rate 65 bpm, and O₂ sat 95% on room air. Her physical exam was notable for a 3/6 systolic murmur, loudest at right upper sternal border with normal S2. Lungs were clear to auscultation bilaterally and lower extremities had no pitting edema. No evidence of elevated jugular venous distention.

Transthoracic echocardiogram showed normal left ventricular size, moderate septal hypertrophy, and normal systolic function with estimated left ventricular ejection fraction of 65-70%. Doppler measurements of the aortic valve were consistent with severe stenosis (peak velocity 4.2 m/s, mean gradient 41 mmHg, calculated area by continuity equation 0.92 cm²). Continuous wave Doppler signal was early peaking, unlike in dynamic LVOT obstruction in hypertrophic cardiomyopathy. Aortic valve was not clearly visualized, but valve leaflets appeared to be mobile and only mildly sclerotic. Color Doppler images showed flow acceleration in the LVOT, well before the aortic valve. She had mild aortic valve regurgitation.

Appearance is not consistent with degree of valve stenosis suggested by Doppler measurements, suspicious for subaortic stenosis.

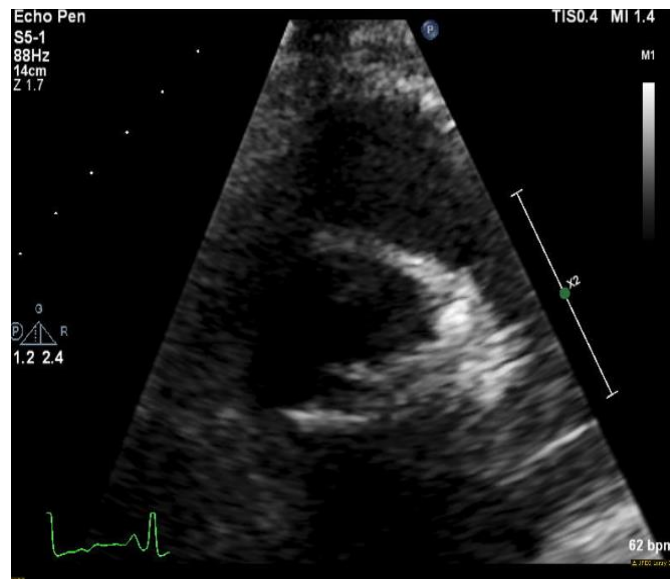


Figure 1. Technically difficult imaging of aortic valve in basal short axis view on transthoracic echocardiogram. Aortic valve leaflets appear mildly thickened but open well in mid systole.

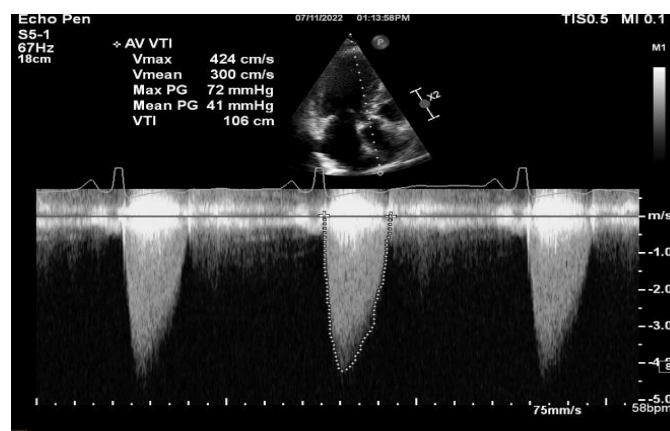


Figure 2. Continuous wave Doppler across LVOT on apical 3-chamber view on transthoracic echocardiogram. Doppler measurements are consistent with severe aortic valve stenosis, with early-peaking morphology. Dynamic LVOT obstruction in hypertrophic cardiomyopathy would have a late-peaking (“dagger shape”) morphology.

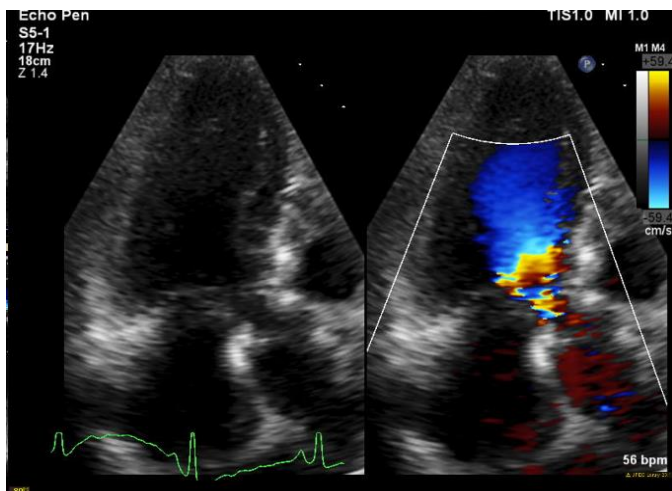


Figure 3. Color Doppler comparison images in apical 3-chamber view on transthoracic echocardiogram. Flow acceleration with aliasing is visible in the left ventricular outflow tract, well before the aortic valve, suggesting pathology in the subaortic valve region.

She was referred for transesophageal echocardiogram, which showed a subaortic membrane/secondary mitral chord with peak LVOT velocity 5.1 m/s, mean gradient 56 mmHg, and peak gradient 105 mmHg. Aortic valve was thickened with some restricted mobility but appeared consistent with only mild aortic valve stenosis.

Given these findings, she was referred to Adult Congenital Cardiology and Cardiac Surgery. Invasive coronary angiogram showed severe three-vessel coronary artery disease. She underwent surgical resection of subaortic membrane, septal myectomy, aortic valve replacement, and three-vessel coronary artery bypass grafting. Post-operative course was uncomplicated and her symptoms were significantly improved after surgery. Follow-up echocardiogram showed resolution of the LVOT obstruction, preserved left ventricular function, and normal functioning prosthetic aortic valve.

Discussion

Subaortic stenosis is a rare but significant cause of obstructive cardiac pathology in adults.² Timely diagnosis is important for appropriate management. Differentiating subaortic stenosis from aortic valve stenosis can be challenging, especially with poor visualization of the aortic valve on transthoracic echocardiogram. In this patient, clinical clues such as longstanding heart murmur³ and normal S2 on cardiac exam raised suspicion for subaortic stenosis and led to evaluation by transthoracic and transesophageal echocardiogram, which confirmed the diagnosis. Notable findings on echocardiogram include flow acceleration in the LVOT and early peaking continuous wave Doppler signal across the LVOT. Cardiac MRI can also be used to help diagnosis with detailed anatomical imaging.

Surgical intervention is the mainstay of treatment for symptomatic subaortic stenosis.⁴ The decision for surgery is influenced

by the severity of symptoms, the presence of left ventricular hypertrophy, and the degree of obstruction. In cases where the membrane is thin, balloon dilation may be considered as an alternative to surgery. However, the long-term outcomes of balloon dilation compared to surgical resection warrant further investigation. Long-term follow-up is essential to monitor for potential recurrence and assess overall cardiac function post-operatively.

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