Left Ventricular Outflow Tract Obstruction: Is It the Valve or Something Else?

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CASE HISTORY

A 67-YEAR-OLD FEMALE presented to the authors’ institution for an elective aortic valve replacement (AVR) in the setting of known aortic stenosis and progressive congestive heart failure symptoms. The patient had been followed as an outpatient with serial transthoracic echocardiograms (TTE) but suffered an acute episode of hemodynamic decompensation with respiratory failure requiring intubation and ventilation prior to this admission. At that time, it was determined that the patient would undergo elective aortic valve replacement (AVR). On the day of the surgery after uneventful induction of general anesthesia, an intraoperative transesophageal echocardiography (TEE) examination was performed with an iE-33 ultrasound system and an X7-2t probe (Philips Medical Systems, Andover, MA) capable of real-time three-dimensional (RT-3D) imaging. This evaluation revealed a discreet echo density in the left ventricular outflow tract (LVOT) (Fig 1) with associated turbulence on color-flow Doppler interrogation. There was also a significant gradient across the LVOT (Peak Gradient 48 mmHg) (Fig 2). There was mild-to-moderate aortic regurgitation (AR). The aortic valve leaflets were thickened with slightly limited excursion but did not appear to be significantly stenotic (Fig 3).

ECHOCARDIOGRAPHIC CHALLENGE

(1) What was the diagnosis of the echo density in the LVOT? (2) Was this subaortic LVOT obstruction responsible for the patient’s symptoms? (3) Was there significant aortic stenosis? How should it be diagnosed accurately in the presence of subaortic obstruction?

CLINICAL CHALLENGE

(1) Since the aortic valve was not entirely normal, does it need to be replaced? (2) What is the extent of the subaortic obstruction?
membrane to guide an accurate surgical resection to relieve the symptoms?

CLINICAL COURSE

In this case, the authors chose to interrogate the LVOT with RT-3D imaging. The acquired data were further analyzed in the on-cart geometric analysis software Q-Lab Version 9.0 (Philips Medical Systems, Andover, MA). The multiplanar reformatting of the 3D data was performed to analyze the LVOT in 3 orthogonal planes (sagittal, transverse, and coronal) (Video clip 1). It was found that there was a localized annular membrane extending to around 270 degrees of the LVOT (Video clip 2). The planimetry of the aortic valve demonstrated no evidence of stenosis, and the regurgitation was felt not to be worthy of a replacement procedure. The patient underwent resection of the membrane and was weaned off cardiopulmonary bypass uneventfully. There was no evidence of turbulence on color-flow Doppler or any significant gradient across the LVOT after the procedure. The patient was discharged uneventfully a few days after the surgery.

In conclusion, this case presented the authors with numerous echocardiographic and clinical challenges. They encountered an unanticipated finding that could have been the source of the patient’s symptoms rather than the established diagnosis.

APPENDIX A. SUPPLEMENTARY DATA

Supplementary material cited in this article is available online at doi:10.1053/j.jvca.2014.02.011.