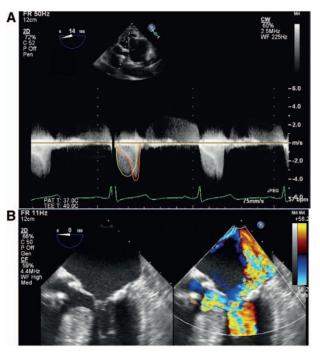
Charles D. Collard, M.D., Editor Alan Jay Schwartz, M.D., M.S. Ed., Associate Editor

## Images in Anesthesiology: Coexisting Aortic Stenosis and Left Ventricular Outflow Tract Obstruction

Steven M. Haddy, M.D.



HE distinctive physiologies of aortic stenosis and dynamic left ventricular outflow tract obstruction (DLVOTO) manifest as characteristic Doppler tracings. Either condition may be occult, presenting first as unexpected profound hypotension.<sup>1</sup>

The orifice area of aortic stenosis changes little during systole leading to a parabolic continuous-wave Doppler tracing that peaks in mid-systole<sup>2</sup> (fig. A, which is a transesophageal deep transgastric long-axis view, yellow outline). The diminishing orifice in DLVOTO leads to a late-peaking "dagger"-shaped envelope (fig. A, red outline). This obstruction is exacerbated by conditions causing a small left ventricular cavity: decreased preload, increased contractility, and tachycardia. Figure B is a mid-esophageal five-chamber view showing the pathologies responsible for the continuous-wave tracings. The dynamic nature of the obstruction is demonstrated in Supplemental Digital Content 1, http://links.lww.com/ALN/B82, which is the video from which the figure was taken.

Because of differences in the underlying physiology of these conditions, their managements are similar but not identical. Both require maintenance of preload and afterload while avoiding tachycardia and arrhythmias. Both phenylephrine and norepinephrine will increase blood pressure, but norepinephrine

may be preferable in aortic stenosis where support of contractility is helpful rather than detrimental as it is in DLVOTO. $^3$   $\beta$ -Blockade may control tachycardia and arrhythmias but decrease contractility, beneficial in dynamic obstruction but not in fixed obstruction. Because the degree of DLVOTO depends on preload and contractility, it may go unrecognized during the preoperative evaluation. The first indication of DLVOTO may be an exaggerated hypotensive response that is unresponsive to inotropes and exacerbated by tachycardia. $^1$ 

## Competing Interests

The author declares no competing interests.

## Correspondence

Address correspondence to Dr. Haddy: haddy@med.usc.edu

## References

- 1. Luckner G, Margreiter J, Jochberger S, Mayr V, Luger T, Voelckel W, Mayr AJ, Dünser MW: Systolic anterior motion of the mitral valve with left ventricular outflow tract obstruction: Three cases of acute perioperative hypotension in noncardiac surgery. Anesth Analg 2005; 100:1594–8
- 2. Reeves ST, Perrino AC Jr: A Practical Approach to Transesophageal Echocardiography, 3rd edition. Philadelphia, Lippincott Williams and Williams, 2014, pp 218
- 3. Thiele RH, Nemergut EC, Lynch C III: The clinical implications of isolated α1 adrenergic stimulation. Anesth Analg 2011; 113:297–304

From the Department of Anesthesiology, Keck School of Medicine, University of Southern California, Los Angeles, California. Copyright © 2014, the American Society of Anesthesiologists, Inc. Wolters Kluwer Health, Inc. All Rights Reserved. Anesthesiology 2015; 123:213

Supplemental Digital Content is available for this article. Direct URL citations appear in the printed text and are available in both the HTML and PDF versions of this article. Links to the digital files are provided in the HTML text of this article on the Journal's Web site (www. anesthesiology.org).