

IMAGES IN INTERVENTION

Avulsion of an Aortic Cusp During Aortic Balloon Valvuloplasty



Stavros Hadjimiltiades, MD,* Antonis Ziakas, MD,* George Kazinakis, MD,* Chrysovalantou Nikolaidou, MD,* Kyriakos Anastasiadis, MD,† Haralambos Karvounis, MD*

An 87-year-old man presented to another hospital with angina at rest and on minimal exertion, and the diagnosis of critical aortic stenosis was made. The patient was transferred for evaluation for transcatheter aortic valve implantation. The transthoracic echocardiogram revealed a severely calcified aortic valve with preserved ejection fraction but with significant left ventricular hypertrophy, with diastolic septal thickness of 1.90 cm and lateral wall thickness of 1.62 cm, and with no significant valvular regurgitations. A coronary angiogram did not demonstrate any significant coronary artery disease, and the decision was made to proceed with balloon valvuloplasty (BAV) as a bridge to transcatheter aortic valve implantation. The aortic annulus diameter obtained with transthoracic echocardiogram was 21 mm, and with angiography, using a marker pigtail catheter for magnification correction, it was 24.5 mm. The sinotubular junction diameter obtained with angiography was 32.7 mm.

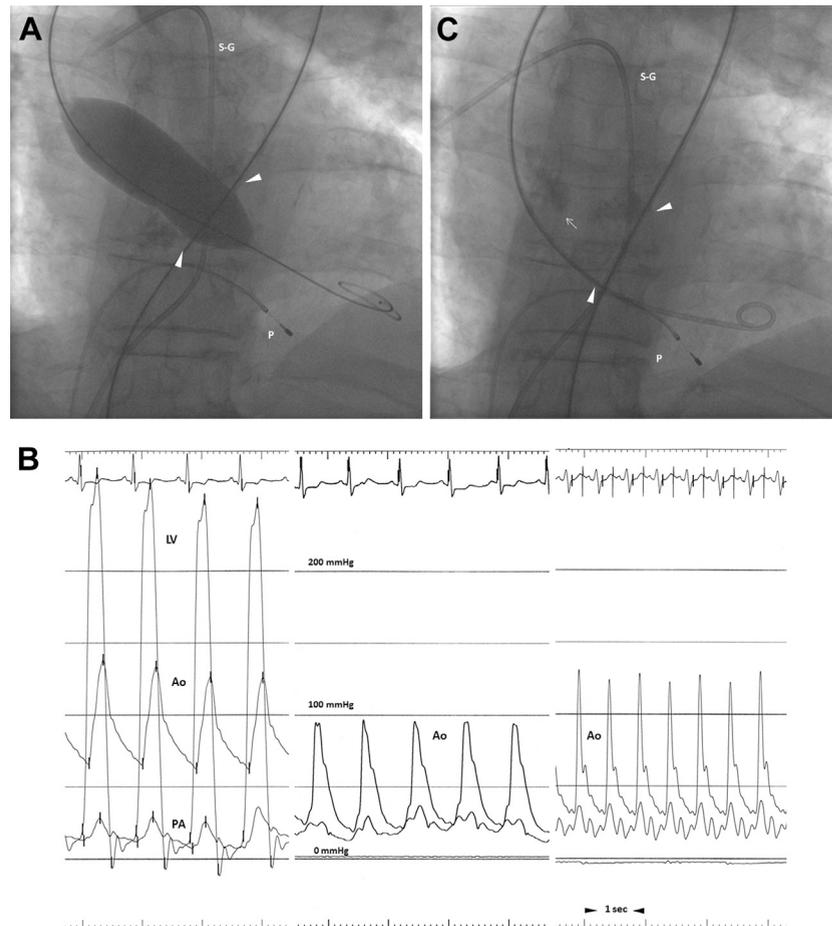
The BAV was performed through the femoral artery with full expansion of a 25-mm Z-Med II-X balloon (NuMED, Hopkinton, New York) at a pacing rate of

180 beats/min (Figure 1A, Online Video 1). Immediately after the balloon deflation, the characteristic aortic pressure waveform of acute severe aortic regurgitation was recorded (Figure 1B). The calcified mass of the posterior leaflet of the aortic valve was seen flying back and forth in the ascending aorta (Figure 1C, Online Video 2) and was soon detected by fluoroscopy in the abdominal aorta. Percutaneous retrieval through the femoral artery proved impossible due to the size of the mass. The patient did not survive an open heart operation.

A similar case of complete aortic cusp avulsion post-BAV and embolization to the abdominal aorta has been reported (1). Catastrophic aortic regurgitation after BAV is an infrequent complication occurring in <2% of cases (2). It is attributed to the use of relatively large balloons or balloons matched in size to the valve annulus but in heavily calcified valves.

REPRINT REQUESTS AND CORRESPONDENCE: Dr. Stavros Hadjimiltiades, Aristotle University, AHEPA Hospital, Stilponos Kyriakidi 1, Thessaloniki 54636, Greece. E-mail: stavros@otenet.gr.

FIGURE 1 The Aortic Valve During Balloon Inflation and After Balloon Withdrawal, With Hemodynamic Measurements Before and After the Balloon Inflation



(A) The fully inflated valvuloplasty balloon pushes the large calcium nodules into the sinuses ([Online Video 1](#)); the **arrowheads** point to the annulus. (B) Post-BAV, the aortic diastolic pressure is very low but increases with right atrial pacing at a high rate. (C) The free floating aortic cusp is seen in the ascending aorta (**arrow**) ([Online Video 2](#)). Ao = abdominal aorta; LV = left ventricle; P = temporary pacemaker lead; PA = pulmonary artery; S-G = Swan-Ganz catheter.

REFERENCES

- Hamm CW, Langes K, Vogel M, Schroder S, Bleifield W. Avulsion of a calcified leaflet as a complication of aortic valvuloplasty. *Z Kardiol* 1988;10:674-7.
- Ben-Dor I, Pichard AD, Satler LF, et al. Complications and outcome of balloon aortic valvuloplasty in high-risk or inoperable patients. *J Am Coll Cardiol Intv* 2010;3:1150-6.

KEY WORDS aortic regurgitation, aortic stenosis, balloon valvuloplasty, complications

APPENDIX For supplemental videos and their legends, please see the online version of this article.