Resolution of Shock-Induced Aortic Regurgitation With an Intraaortic Balloon Pump

Jordi Bañeras Rius, MD; Axel Sarrias Merce, MD; Bruno García del Blanco, MD; Gerard Martí Aguasca, MD; Pilar Tornos Mas, MD, PhD, FESC; David García-Dorado García, MD, PhD, FESC, FACC

An 80-year-old man was admitted to our hospital with a diagnosis of non-ST-elevation acute coronary syndrome. His past history included severe aortic stenosis and coronary artery disease, for which he had undergone aortic valve replacement with a Björk-Shiley mechanical prosthesis and triple coronary artery bypass with the use of saphenous vein grafts 30 years before. He had been well until 1 year before admission, when he developed progressive angina. The venous graft to the left anterior descending artery was found to be occluded, and percutaneous angioplasty and stenting of his native left main and left anterior descending arteries were performed. At that time, the left ventricular ejection fraction was preserved and normal prosthetic valve function was reported.

At the current admission, a repeat coronary angiography revealed severe native coronary artery disease without in-stent restenosis. The venous grafts to the right coronary artery and the left circumflex artery were degenerated, with multiple stenoses. Balloon dilatation and stenting of the grafts was done with the use of a distal protection device. During the dilatation of the venous graft to the right coronary artery (which supplied a large territory of myocardium), the patient developed progressive hypotension and severe bradycardia; intravenous dobutamine was started, followed by increasing doses of noradrenaline because of refractory hypotension. Echocardiography revealed a depressed left ventricular function with preserved right ventricular function. A restricted motion of the prosthetic disc of the mechanical aortic valve was noted on the fluoroscopy screen, and an aortogram showed severe aortic regurgitation (Movie I in the online-only Data Supplement). Direct catheter maneuvers crossing the prosthesis did not change the disc motion. An intraaortic balloon pump (IABP) was inserted. After placement of the IABP in the descending aorta, blood pressure increased, and the disc recovered full opening and closing motion (Movie II in the online-only Data Supplement). Transesophageal echocardiography confirmed normal valve motion with minimal physiological regurgitation (Movie III in the online-only Data Supplement), with a slightly depressed left ventricular ejection fraction. The patient’s hemodynamics improved, and he could rapidly be weaned from the inotropic drugs and from the IABP.

Significant aortic regurgitation is considered a contraindication for the usage of an IABP, because inflation of the balloon during diastole increases the amount of blood regurgitating into the left ventricle. In our case, regurgitation was probably caused by an incomplete closure of the prosthetic disc because of low diastolic aortic pressure. Severe ventricular function impairment, probably due to transient ischemia with the release of atherosclerotic debris into the microcirculation during graft angioplasty, resulted in cardiogenic shock with a decrease in arterial pressure and an increase in left ventricular end-diastolic pressure, so not enough gradient was present in diastole to ensure full prosthesis closure. The IABP was beneficial by increasing diastolic arterial pressure and coronary blood flow while decreasing ventricular afterload. This led to an increase in left ventricular output and higher blood pressure, so the prosthesis recovered normal motion with resolution of the regurgitation.

Disclosures

None.

From the Hospital Universitari Vall d’Hebron, Barcelona, Spain.
The online-only Data Supplement is available with this article at http://circ.ahajournals.org/cgi/content/full/124/4/e131/DC1.
Correspondence to Jordi Bañeras Rius, MD, Hospital Universitari Vall d’Hebron, Servei de Cardiologia, ACORVH, Passeig de la Vall d’Hebron 119-129, 08035 Barcelona, Spain. E-mail j_o_r_d_i_b@hotmail.com
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