Revista Argentina de Cardiología
ISSN: 0034-7000
revista@sac.org.ar
Sociedad Argentina de Cardiología
Argentina

Ferrero Guadagnoli, Adolfo; López, Jonathan Miara; Contreras, Alejandro E.; Peirone, Alejandro R.

Simultaneous Percutaneous Closure of Paravalvular Aortic Leak and Aorto-Atrial Fistula Guided by Two-Dimensional Transesophageal Echocardiography

Revista Argentina de Cardiología, vol. 84, núm. 2, 2016, pp. 156-157
Sociedad Argentina de Cardiología
Buenos Aires, Argentina

2. Lebeau R, Serri K, Morice M-C, Hovasse T, Unterseeh T, Piéchaud J-F, et al. Assessment of left ventricular ejection fraction using the wall motion score index in cardiac magnetic resonance imaging. Arch Cardiovasc Dis 2012;105:91-8. http://doi.org/bcwj
3. Licka M, Zimmermann R, Zehelein J, Dengler TJ, Katus H a, Kübler W. Troponin T concentrations 72 hours after myocardial infarction as a serological estimate of infarct size. Heart 2002;87:520-4. http://doi.org/dwp6br
4. Steg PG, James SK, Atar D, Badano LP, Lundqvist CB, Borger MA, et al. ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: The Task Force on the management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology (ESC). Eur Heart J 2012;33:2569-619. http://doi.org/zkn
5. Chia S, Senatore F, Raffel OC, Lee H, Wackers FJT, Jang IK. Utility of cardiac biomarkers in predicting infarct size, left ventricular function, and clinical outcome after primary percutaneous coronary intervention for ST-segment elevation myocardial infarction. JACC Cardiovasc Interv 2008;1:415-23. http://doi.org/d3bz3w
6. Steen H, Giannitsis E, Futterer S, Merten C, Juenger C, Katus H. Cardiac troponin T at 96 hours after acute myocardial infarction correlates with infarct size and cardiac function. J Am Coll Cardiol 2006;48:2192-4. http://doi.org/djbkhs

Rev Argent Cardiol 2016;84:154-156. http://dx.doi.org/10.7775/rac.v84.i2.7907

Simultaneous Percutaneous Closure of Paravalvular Aortic Leak and Aorto-Atrial Fistula Guided by Two-Dimensional Transesophageal Echocardiography

Paravalvular prosthetic leak is a complication of valve surgery caused by degeneration of annular tissue, affecting about 6% to 15% of surgically implanted prosthetic valves and annuloplasty rings. (1)

We report the case of a 75-year-old male patient, who underwent aortic valve replacement with a bioprosthesis (Biocor 27; St Jude®) and myocardial revascularization surgery (mammary artery bypass graft to the anterior descending artery and venous bypass graft to the first diagonal artery). The patient was discharged on the sixth day after uneventful postoperative course. Two months after the procedure, a control transthoracic echocardiography revealed a moderate anterior paravalvular leak (PVL), 5-6 hour of surgical view, and a fistula between the aorta and the right atrium (AO-RA), 8-9 hour of surgical view (Figure 1). There was no clinical, analytic, or echocardiographic evidence of endocarditis. During the 2-year follow-up, the patient had chronic hemolytic anemia and progressive heart failure despite optimal medical treatment; therefore, percutaneous leak closure was suggested.

Under two-dimensional transesophageal echocardiography (TEE) and angiographic guidance, simultaneous paravalvular leak closure was performed via retrograde aorta with 8 mm Amplatzer Vascular Plug II (St Jude®) device, with immediate minimal residual shunt, and AO-RA fistula was closed with 6 mm Amplatzer Vascular Plug III (St Jude®) (Figure 2).

Today, three years after the percutaneous treatment, the patient is asymptomatic, with no evidence of hemolysis. Control echocardiography showed mild paravalvular leak, with mild increase in transvalvular aortic gradient (mean gradient 24 mm Hg) and preserved left ventricular ejection fraction.

Paravalvular leak after cardiac valve replacement involves abnormal flow through the native tissue and prosthetic valve, due to incomplete apposition of the sewing ring to the native tissue. This is generally a consequence of suture dehiscence. It may develop more commonly in patients with heavy annular calcification, localized infection, or due to technical considerations. (2)

Paravalvular leaks are usually small and asymptomatic, and have a benign course. Larger PVLs -with greater clinical involvement occur in about 1-5% of the patients with prosthetic valves. (3) Biological valves are more commonly involved than mechanical valves.

Patients with significant PVLs present symptoms because blood flow through the valve and subsequent volume overload are associated with reduction of effective cardiac output and congestive heart failure, resulting in decreased exercise tolerance and dyspnea. Symptoms can also be associated with hemolytic anemia, which is caused by red cell fragmentation in the elevated shear stress of the regurgitant jet. Infectious endocarditis can be cause or consequence of PVLs.

Diagnosis is made based on clinical and echocardiographic findings, the latter being very difficult at times. Three-dimensional TEE allows for the visualization of the entire prosthetic valve, increasing the definition and characterization of PVLs. (4)

Reoperation is the treatment of choice in PVLs, either repairing the defect or, most commonly, replacing the valve. It is generally performed in very symptomatic patients due to severe anemia or progressive heart failure, and is associated with elevated morbidity and mortality. It also has the risk of recurrent paravalvular failure. (5)

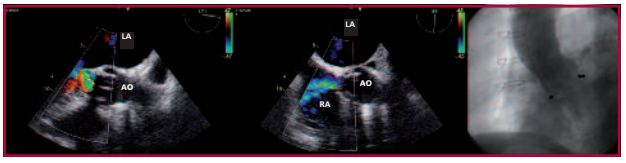

Fig. 1. Aortic (AO) paravalvular leak (left) and fistula to the right atrium (RA) (middle) in transesophageal echocardiography. Paravalvular leak (**) and fistula (*) in angiography (right).

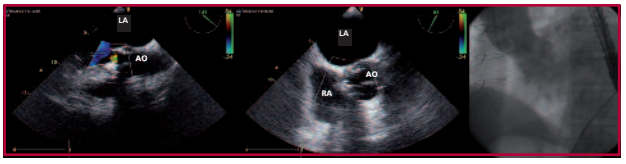

Fig. 2. Post-procedural transesophageal echocardiography and angiography. Paravalvular residual shunt (left).

In this scenario, the use of percutaneous closure as a less invasive technique is a valid therapeutic option for the treatment of these patients, with good results in terms of morbidity and mortality during follow-up. (6) It should be noted that the oval or half-moon morphology in most PVLs hampers finding a specific device for each defect. For this reason, a variety of devices not specifically designed for the treatment of PVLs have been used.

Finally, we would like to point out that three-dimensional TEE is the ideal monitoring during the procedure, particularly of posterior structures such as the mitral valve, because it provides improved spatial resolution to channel the regurgitation, choosing the approach, deciding on the device to use, and assessing complications after the occlusion (interference with prosthetic valve motion, residual regurgitation, etc.). (4) However, a strategy based on two-dimensional TEE and angiography, as in our case, can be used even in complex cases.

Adolfo Ferrero Guadagnoli, Jonathan Miara López, Alejandro E. Contreras[MTSAC], Alejandro R. Peirone[MTSAC]
Department of Interventional Cardiology.
Hospital Privado Centro Médico de Córdoba.
Instituto Universitario de Ciencias Biomédicas de Córdoba. Córdoba, Argentina
Tel. 543514688220 - Fax 543514688818
E-mail: alepeirone@yahoo.com

REFERENCES

1. Eleid MF, Cabalka AK, Malouf JF, Sanon S, Hagler DJ, Rihal CS. Techniques and outcomes for the treatment of paravalvular leak. Circ Cardiovasc Interv 2015;8:e001945. http://doi.org/bcwk
2. Pate GE, Al Zubaidi A, Chandavimol M, Thompson CR, Munt BI, Webb JG. Percutaneous closure of prosthetic paravalvular leaks: case series and review. Catheter Cardiovasc Interv 2006;68:528-33. http://doi.org/d3sqvb
3. Rallidis LS, Moyssakis IE, Ikonomidis I, Nihoyannopoulos P. Natural history of early aortic paraprosthetic regurgitation: A five-year follow-up. Am Heart J 1999;138:351-7. http://doi.org/d4kp6h
4. Tsang W, Weinert L, Kronzon I, Lang RM. Ecocardiografía tridimensional en la evaluación de las válvulas protésicas. Rev Esp Cardiol 2011;64:1-7. http://doi.org/fmz2kq
5. Jones JM, O'Kane H, Gladstone DJ, Sarsam MA, Campalani G, MacGowan SW, et al. Repeat heart valve surgery: risk factors for operative mortality. J Thorac Cardiovasc Surg 2001;122:913-8. http://doi.org/b7xg3d
6. Millan X, Skaf S, Joseph L, Ruiz C, Garcia E, Smolka G, et al. Transcatheter reduction of paravalvular leaks: A systematic review and meta-analysis. Can J Cardiol 2015;31:260-9. http://doi.org/bcwm

Rev Argent Cardiol 2016;84:156-157. http://dx.doi.org/10.7775/rac.v84.i2.7554