

Rupture of an aortic dissection into the right atrium in a patient with a previous aortic valve replacement: a case report

Gaetano Panzarella, Gabriella Carlino, Kahlil Fattouch, Giovanni Ruvolo, Luigi Messina, Enrico Hoffmann, Egle Incalcaterra, Salvatore Novo

Division of Cardiology, University of Palermo, "P. Giaccone" University Hospital, Italy

Key words:

Aortic aneurysm; Aortic dissection; Ascending aorta; Cardiac surgery; Fistula; Shunts.

We report the case of a 73-year-old man with a history of previous aortic valve replacement in 1990 and rupture of an aortic dissection into the right atrium. The patient was admitted to the emergency room because of chest pain, stopped not long after. The electrocardiogram did not show any signs of ischemia and myocardial enzymes were not increased. Transthoracic echocardiography revealed aortic root dilation (maximum diameter 60 mm) extended to the aortic arch, and the presence of a flow from the ascending aorta to the right atrium (evocative of a fistula between the two chambers). The aortic valvular prosthesis function was good. Transesophageal echocardiography confirmed an aorta-right atrium fistula. Cardiac catheterization did not show any luminal obstructions in the coronary arteries; there was a small shunt from the aorta to the right atrium.

The ascending aorta and the aortic root were replaced with a Dacron graft. Right and left sinuses were reimplemented to the graft. The fistula was repaired with 4-0 pledgeted Prolene sutures. The surgeon's diagnosis was "type A aortic dissection in a patient with an ascending aorta aneurysm and an old ascending aorta-right atrium fistula".

(Ital Heart J 2005; 6 (8): 658-660)

© 2005 CEPI Srl

Received January 10, 2005; revision received April 15, 2005; accepted April 18, 2005.

Address:

Prof. Salvatore Novo
Cattedra di Malattie dell'Apparato Cardiovascolare
Policlinico Universitario "P. Giaccone"
Via del Vespro, 141
90127 Palermo
E-mail: novosav@unipa.it

Introduction

Aorta-right atrium fistula is an extremely rare complication of acute aortic dissection. This condition, frequently quickly lethal, often occurs in patients who underwent cardiac surgery¹. Only few cases were reported in the literature¹⁻⁷: in most of these, the acute dissection was associated with signs and symptoms of heart failure. In our case, unlike previous descriptions, the aortic dissection is not associated with signs and/or symptoms of acute heart failure.

Case report

We report the case of a 73-year-old man who underwent aortic valve replacement with implant of a mechanical prosthesis, and who was admitted to the emergency room of our hospital because of a sudden substernal, constrictive, strong, chest pain, risen 2 hours before and spontaneously stopped at the emergency room. The physical examination was good and there was in the mesocardium a holosystolic 3-4/6L murmur: the blood pressure was normal

and the peripheral pulses were normo-sphygmic. The electrocardiogram showed a left bundle branch block and atrial fibrillation with a moderate ventricular rate; there were not signs of ischemia. Myocardial enzymes were normal.

In the suspicion of an aortic dissection the patient underwent transthoracic echocardiography (Fig. 1) and then transesophageal echocardiography (Figs. 2 and 3), performed by a multiplane sound that revealed a moderately dilated ascending aorta (60 mm) and an empty, not movable formation into the aorta, above the aortic valvular level (2 cm), with a bidirectional flow to the aorta; there was also a flow from the aorta to the right atrium, just above the valvular level, due to an old fistula between the two chambers. The hypothesis that this fistula was old (in the last years the patient did not undergo any echocardiogram), confirmed by the absence of signs and symptoms of heart failure at the beginning, was subsequently validated by the surgeon who signaled, in the operative report, the presence of adhesions between the aorta and the right atrium. The global and regional contractile function of the left ventricle was normal as well as the aortic valve function.



Figure 1. The aorta (Ao)-right atrium fistula revealed by transthoracic echocardiography. Long-axis parasternal view. F = flow between the aorta and the right chambers.



Figure 2. The aorta (Ao)-right atrium (RA) fistula revealed by transesophageal echocardiography. Short-axis view. D = aortic root dissection.



Figure 3. The aorta (Ao)-right atrium (RA) fistula revealed by transesophageal echocardiography: the pulsed Doppler study shows the continuous flow through the fistula. F = flow from the aorta to the RA.

The diagnosis of aortic aneurysm was afterwards confirmed by multislice computed tomography with contrast medium, that did not provide any further information.

In expectation of the surgical intervention and being the clinical status stable, the patient underwent cardiac catheterization (Fig. 4) that showed a coronary artery ectasia. There were not any significant luminal obstructions and there was a non-coronary sinus aneurysm, with a probable fistula into the right atrium. The patient underwent the surgical intervention that consisted of the closure of the aorta-right atrium fistula with 4-0 pledgeted Prolene sutures and the insertion of a Bard no. 26 vascular prosthesis (at the level of the coronary sinus and, directly, on the valvular prosthesis implanted previously, with a new suture of the valvular prosthesis). The surgeon's intraoperative diagnosis was "acute ascending aortic dissection". The patient's post-operative course was characterized by non-cardiac complications, such as renal insufficiency, severe anemia, and anuria.

Discussion

Aorta-right atrium fistulization, as a complication of acute aortic dissection, is a rare clinical occurrence, but is worthy of note. There are only few cases described in the international literature. In all of these, patients were admitted to the hospital with signs and symptoms of severe heart failure. Caruso et al.¹ describe a case of a female with a 6-year history of heart transplantation who presented with subacute chest pain and severe cardiac decompensation accompanied by a continuous murmur in the precordium. The diagnosis of aortic dissection complicated by right atrial fistula was made by the combination of transthoracic and transesophageal echocardiographic examination.

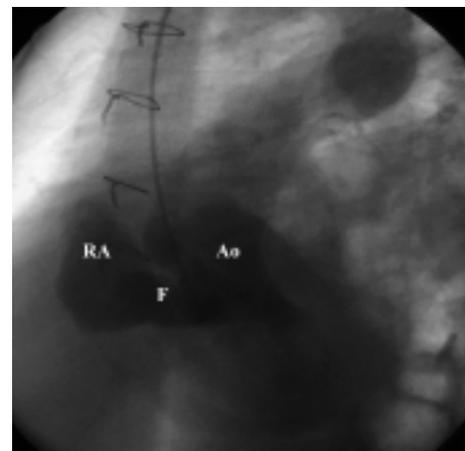


Figure 4. Cardiac catheterization showing the flow between the aorta (Ao) and the right atrium (RA). F = fistula.

Tayama² describes a case of an aortic dissection complicated by aorta-right atrium fistula after aortic valve replacement. Japanese authors³ describe another case report that occurred 15 years after an aortic valve replacement: the patient presented with chest pain and dyspnea. Finally, Turkish authors⁵ report the case of a 49-year-old man with a history of aortic and mitral valve replacement, who developed an aorta-right atrium fistula. In their case, there was no evidence of aortic dissection or infective endocarditis during the postoperative period; thus the authors speculated that the origin of this fistula might be a traumatic tear or damage due to aggressive decalcification near the suture line.

In the majority of these cases, however, the acute dissection is characterized by a condition of acute severe heart failure. In our case, the localized ascending aorta dissection, that was limited to a short line over the previously implanted prosthesis and was associated with fistulization into the right atrium, was also associated with a sudden chest pain, moreover spontaneously stopped not long after the admission to the emergency room. A possible reason of the patient's hemodynamic steadiness might be found in the fact that the fistula, slowly derived from the adhesions of the previous surgical intervention and characterized by a non-significant hemodynamic shunt, could be run into the localized ascending aorta dissection (from which sudden pain).

In conclusion, we may consider the presence of a dissection and aorta-right atrium fistulization in a patient with a previous history of cardiac surgery (particularly valve replacement and cardiac transplantation), who presented with heart failure or chest pain. In these cases, the transthoracic and eventually transesophageal

echocardiography or computed tomography, performed in the emergency area, could confirm the diagnostic suspicion. We could state that echocardiography should be preferred to computed tomography because it gives the possibility of assessing also ventricular function. Actually, both transesophageal echocardiography and computed tomography, if performed with last-generation equipment, have a good diagnostic accuracy; the choice, in fact, is due to the accessibility and availability, in the emergency area, of one of these techniques.

References

1. Caruso A, Iarussi D, Materazzi C, et al. Aortic dissection with fistula to right atrium after heart transplantation: diagnosis by transthoracic and transesophageal echocardiography. *Echocardiography* 2000; 17: 337-40.
2. Tayama K. Aortic dissection complicated with aorta-right atrium fistula after valve replacement. *Jpn J Thorac Cardiovasc Surg* 2001; 49: 638-9.
3. Nakano H, Takahara Y, Sudou Y, Shioiri M, Nakajima N. Aortic dissection complicated with aorta-right atrium fistula. *Jpn J Thorac Cardiovasc Surg* 2000; 48: 531-3.
4. Ten Morro F, Miro Palau V, Osa Saez AM, Osca Asensi J, Quesada Carmona A, Morillas Blasco P. A right aorto-atrial fistula as a complication of early prosthetic endocarditis. *Rev Esp Cardiol* 1999; 52: 1022-4.
5. Badak O, Akdeniz B, Aslan O, Kirimli O, Goldeli O, Guneri S. Rare complication of aortic valve replacement: aorto-right atrial fistula. *Anadolu Kardiyol Derg* 2003; 3: 373.
6. Hsu RB, Chien CY, Wang SS, Chu SH. Aorto-right atrial fistula: a rare complication of aortic dissection. *Tex Heart Inst J* 2000; 27: 64-6.
7. Frank MW, Stout MJ. Acute aortic dissection with an aorta right-atrium fistula. *Tex Heart Inst J* 2003; 30: 335-6.