Fistulas between the aorta and left atrium are a rare manifestation of aortic dissection and are infrequently diagnosed premortem. We report the case of a 70-year-old man who exhibited this condition soon after aortic valve replacement and eventually died from rapidly developing refractory congestive heart failure. The diagnosis was indicated by transthoracic echocardiography and was ultimately made with transesophageal echocardiography and color flow Doppler imaging. Transesophageal echocardiography is the procedure of choice for establishing the correct diagnosis and leading to prompt surgical repair of this lethal condition. (J Am Soc Echocardiogr 2002;15:1409-11.)

CASE REPORT

A 70-year-old man was referred to our institution from another hospital where he was admitted with a diagnosis of refractory congestive heart failure. Seven years ago he had undergone aortic valve replacement with a no. 19 Medtronic-Hall prosthesis (Medtronic Inc, Minneapolis, Minn) because of stenosis of a bicuspid native valve. Four months ago he had progressively worsening dyspnea on exertion with episodes of paroxysmal nocturnal dyspnea. The diagnostic evaluation, which included TEE and transesophageal echocardiography and was ultimately made with transesophageal echocardiography and color flow Doppler imaging, revealed the presence of severe paraprosthetic regurgitation. One month before admission he had undergone replacement of the prosthetic valve with a no. 21 St Jude prosthesis (St Jude Medical, St Paul, Minn). At the time of the operation, the surgeon’s impression was that the prosthetic valve was not infected, and results of cultures of the material retrieved during surgery were negative for infecting micro-organisms. The postoperative follow-up had been carried out elsewhere and was significant for the development of acute pulmonary edema on the third postoperative day. An echocardiogram was not performed at the time. He had also acquired a large embolic stroke that resulted in sensory aphasia. Because of insufficient communication with the patient, his family gave the history, and they reported that after the operation he was continuously in respiratory distress.

On arrival the patient appeared acutely ill. He was dyspneic with large bilateral pitting leg edema. His temperature was 36.2°C. Blood pressure was 145/90 mm Hg in both arms, and his heart rate was 89 bpm. The internal jugular veins were distended. An examination of the chest revealed the presence of bilateral rales and rhonchi at the lower two thirds of lung fields. Prosthetic valve sounds were crisp. A grade 3/6 systolic murmur was audible throughout the anterior thorax and was more intense at the lower left and right sternal border. There was a soft grade 2/6 diastolic murmur heard at the apex, and it was interpreted as indicating a regurgitant lesion. Transthoracic echocardiography revealed a dilated left ventricle (LV) with hypercontractile systolic function. In the parasternal long-axis and in the 5-chamber apical view, the color flow Doppler study indicated the presence of continuous flow from the aorta to the LA. During diastole the
color jet was directed through the mitral valve into the LV, whereas in systole it was confined to the left atrial inner wall (Figure 1). There was moderate mitral regurgitation but no aortic regurgitation was detected. There was also mild-to-moderate tricuspid regurgitation with a right ventricular/right atrial systolic pressure gradient of 40 mm Hg. During the examination the patient became severely dyspneic and agitated, and it had to be discontinued. Because of a suspected aortic left-atrial fistula, surgical consultation was requested. Results of laboratory tests on admission included a white blood cell count of 9600/mm³ with 81% neutrophils and 17% lymphocytes, a platelet count of 257,000/mm³, an erythrocyte sedimentation rate of 37 mm/h, and a C-reactive protein level of 37 mg/L.
Blood cultures were taken immediately to exclude the possibility of infective endocarditis.

Two hours after the TTE, the patient had a cardiac arrest. Cardiopulmonary resuscitation was applied successfully, and he was intubated. A TEE was performed while he was intubated. The aortic prosthesis was functioning normally, with a small paraprosthetic leak. A small dissection flap was detected at the noncoronary sinus, right above the prosthetic annulus (Figure 2, A). The false lumen did not extend to the ascending aorta but it communicated with the LA at its posterior wall (Figure 2, B). Color flow mapping confirmed the findings of the TTE study (Figure 3). The mitral valve was structurally normal with annular dilatation and moderate regurgitation.

Surgical consultation excluded the possibility of surgical repair because of poor patient prognosis. His condition progressively worsened, despite maximal pharmacologic support, and he died 7 days after admission. His family did not consent to an autopsy.

**DISCUSSION**

The current patient had refractory heart failure, caused by aortic dissection penetrating into the LA, which ultimately led to death.

All previously reported aortocameral fistulas involving communications between the aorta and LA have been associated with bacterial endocarditis, paravalvular abscess, ruptured sinus of Valsalva aneurysm, Behçet’s syndrome, or aortic dissection.1-9 Aortocameral fistula is rare, but when it occurs the frequency of previous aortic valve replacement, particularly for aortic regurgitation, is high.8 In comparison with previous reports, the current case is unique in the appearance of the complication at the immediate postoperative period.8,9 The presence of cardiac decomposition on the third postoperative day demonstrates that the complication developed soon after the operation, although the patient did not undergo an echocardiographic examination at the time. The possibility of infective endocarditis cannot be definitely excluded because no autopsy was available. Three sets of blood cultures taken at our institution were negative, although he had not received antibiotics at any time after the operation. The clinically presumed early appearance of the complication on the third postoperative day and the absence of clinical and laboratory findings consistent with the presence of infection make the diagnosis of infective endocarditis unlikely.

It has been reported that postoperative adhesions prevent free rupture of the dissection into the pericardial space and favor penetration into a cardiac chamber adjacent to the aorta. In this case the early appearance of the complication is against this mechanism. Our patient had a No. 19 prosthesis and on reoperation a No. 21 was inserted. Trying to force in a valve that is larger than the annulus can tear the aortic wall and lead to dissection.10 Intrinsic weakness of the aortic wall in this patient with a history of a bicuspid valve is another predisposing factor.11

In concordance with previous reports,8,9 a continuous murmur, the hallmark of aortocameral fistula, was not present, and the clinical picture was compatible with prosthetic malfunction. The TTE was able to visualize the flow through the communication, but TEE, with its superior resolution, combined with color flow mapping, provided the ultimate diagnosis and topographic features of the dissection and the fistula.

To the best of our knowledge, this case represents the first reported aorto-left atrial fistula complicating aortic dissection soon after surgery for aortic valve replacement. This complication is rare and lethal. Its diagnosis cannot be made by clinical examination. Although TTE is valuable in this setting, TEE with color flow mapping is the procedure of choice for establishing the correct diagnosis and leading to prompt surgical repair.

**REFERENCES**