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CASE REPORT

Heart failure due to aorto-right atrial fistula and successful treatment with percutaneous closure

Aorto-sağ atriyum fistülü nedenli kalp yetersizliği ve perkütan kapatma ile başarılı tedavisi

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Summary– Aorto-atrial fistula is a rare anomaly of the heart that may be the result of congenital or acquired conditions, such as bacterial endocarditis, paravalvular abscess, aortic dissection, or a complication of cardiac surgery. A 50-year-old female patient presented at the clinic with the complaint of dyspnea and abdominal distention due to ascites. On admission, her functional capacity was New York Heart Association (NYHA) class III. A physical examination revealed a systolic murmur, which was best audible in the right parasternal side, ascites, and hepatomegaly. An aorto-right atrial fistula was detected using transthoracic echocardiography and confirmed with transesophageal echocardiography and aortography. The patient had a history of previous cardiac surgery, anticoagulant use, and heart failure; therefore, percutaneous intervention was preferred to surgery as a result of the high surgical risk. A successful closure of the fistula was performed with an Amplatzer Duct Occluder II device. The patient demonstrated a dramatic response to the treatment, resulting in a decrease in the ascites and halving of her diuretic dose within 1 week. Her functional capacity improved to NYHA class II, and right atrial pressure decreased to 8 mmHg after a month.

Özet– Aorto-atriyal fistül doğumsal olabildiği gibi bakteriyel endokardit, paravalvüler apse, aort diseksiyonu ve kalp cerrahisinin komplikasyonu gibi kazanılmış nedenlere bağlı olarak gelişen kalbin nadir bir anomalisidir. Elli yaşında kadın hasta kliniğimize nefes darlığı ve karın şişliği şikayetleri ile başvurdu. Başvurusunda fonksiyonel kapasitesi NYHA (New York Heart Association) sınıf III idi. Fizik muayenesinde en iyi sağ parasternal alanda duyulan sistolik üfürüm, asit ve hepatomegali saptandı. Transtorasik ekokardiyografi ile aorto-sağ atriyum arasında fistül saptadık ve transözofajiyal ekokardiyografi ve aortografi ile doğruladık. Hastanın geçirilmiş kalp cerrahisi, antikoagülasyon kullanımı ve kalp yetersizliği öyküsü olduğundan, yüksek cerrahi riski nedeniyle perkütan girişimi tercih ettik. Fistülü Amplatzer Duct Occluder II cihazı ile başarılı şekilde kapadık. Hasta tedaviye olumlu cevap verdi, bir hafta sonra hastanın asitinde belirgin azalma oldu ve diüretik dozu yarıya düşürüldü. Bir ay sonra hastanın foknsiyonel kapasitesi NYHA sınıf II oldu ve sağ atriyum basıncı 8 mm Hg'ya düştü.

Aorto-atrial fistula (AAF) is a rare anomaly of the heart that generally results from congenital or acquired conditions, such as bacterial endocarditis, paravalvular abscess, aortic dissection, or a complication of cardiac surgery or transcatheter intervention. Presently described is a case of refractory heart failure due to AAF and successful treatment with percutaneous transcatheter closure.

Abbreviations:

AAF	*Aorto-atrial fistula*
NYHA	*New York Heart Association*
SOVA	*Sinus of Valsalva aneurysm*

CASE REPORT

A 50-year-old female patient presented at the clinic with the complaints of dyspnea and abdominal distention due to ascites. Three years earlier, the patient had undergone mitral valve replacement and tricuspid valve annuloplasty surgery for severe mitral and tricuspid regurgitation. Preoperative coronary angiography had indicated normal coronary arteries. After the valve surgery, the patient experienced recurring

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dyspnea and developed mild abdominal distention. Despite treating her with increasing doses of diuretics over the years, her functional capacity continued to decrease.

On admission, her functional capacity was New York Heart Association (NYHA) class III, with daily therapy of 100 mg of torasemide. The physical examination revealed a systolic murmur, which was best audible on the right parasternal side, ascites, and hepatomegaly. A transthoracic echocardiogram (TTE) showed a flow from the aorta to the right atrium. A transesophageal echocardiographic (TEE) examination was performed for additional detail, and a shunt from the noncoronary sinus of Valsalva to the right atrium with a diameter of 9 millimeters was observed (Fig. 1a). Right heart catheterization demonstrated an elevated right atrial pressure of 25 mm Hg.

The patient had a history of previous cardiac surgery, anticoagulant use, and heart failure; therefore, percutaneous intervention was preferred to surgery due to the high surgical risk. The procedure was performed in the catheterization laboratory under intravenous sedation with TEE guidance. The right femoral artery was cannulated using a 6-F sheath, and intravenous heparin and cefazolin was administered. Aortography was performed using a 5-F pigtail catheter prior to the procedure and provided detailed imaging of the defect (Fig. 1b). The fistula was engaged using a 6-F Judkins right coronary catheter and a 0.035-in. guidewire advanced through the fistula to the right atrium. The Judkinss right coronary catheter then was exchanged for the delivery sheath over the guidewire. An Amplatzer Duct Occluder II (St. Jude Medical, Inc., St. Paul, MN, USA) device was advanced through the sheath to the right atrium and the retention disc was deployed in the right atrium. The retention disc was placed to the right atrial site of fistula, occlusion was observed using immediate aortic root angiography, and the catheter was then withdrawn. TEE was used to check the position of the device, and then the proximal skirt of the device in the aorta was released. After the release, aortography was performed and complete occlusion was visible (Fig. 1c). There were no complications related to the procedure.

The patient demonstrated a dramatic response to the treatment, resulting in a decrease in her ascites and halving of her diuretic dose within 1 week. Her functional capacity improved to NYHA class II, and right atrial pressure decreased to 8 mm Hg after a month.

DISCUSSION

In this case, we presented an iatrogenic aorto-right atrial fistula as a complication of previous valve surgery. In the literature, the majority of acquired AAF reports are related to infective endocarditis, specifically prosthetic valve endocarditis.[1] Acquired AAF may also occur following acute aortic dissection,[2,3] ruptured sinus of Valsalva aneurysm (SOVA),[4–6] or cardiovascular surgical[7,8] and percutaneous procedures.[9] Said et al.[10] reviewed 38 reported aortocameral fistula cases, of which 29 were aorto-right atrial fistula. Noncoronary sinus, right coronary sinus, left coronary sinus, and thoracic aorta was the origin of the fistula in 21, 10, 4, and another 4 cases, respectively.

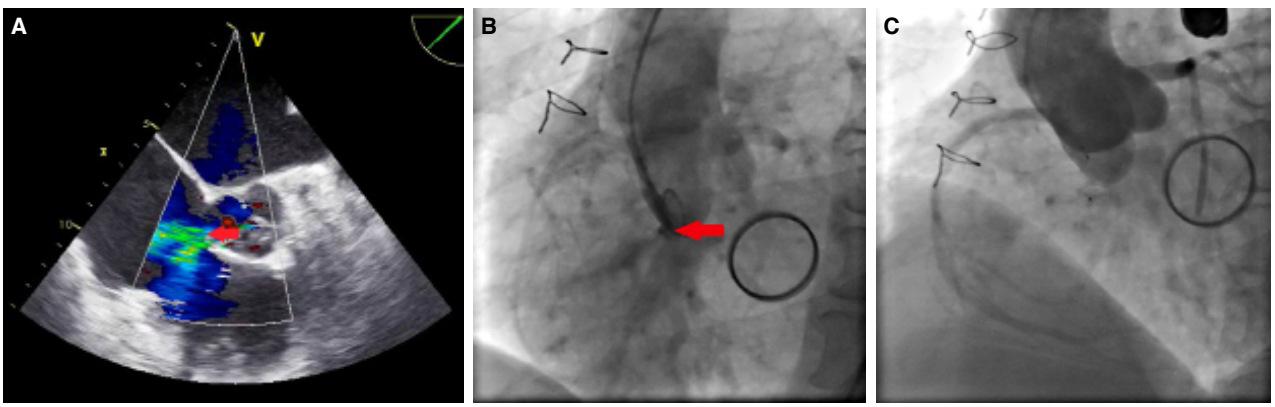

Figure 1. **(A)** Transesophageal echocardiography image shows the jet flow from the aorta to the right atrium (arrow). **(B)** Aortography illustrates the contrast pass from the aorta to the right atrium (arrow). **(C)** After implantation of the device, no contrast passed through the fistula.

Aorto-atrial fistula can present as acute or chronic heart failure due to a combination of hemodynamic compromise of a shunt and underlying etiology.[11] Exertional dyspnea is the most common symptom, and chest pain, palpitations, and syncope may also be present. Recurrent respiratory tract infections are common in children with congenital aorto-right atrial tunnel.[12]

Surgical repair has been successfully performed for decades. Lillehei et al.[13] published the first report of successful surgical repair of 3 cases of ruptured SOVA. In 2 of these cases, the shunt was between the aorta and the right ventricle, and in 1 case, it was observed between the aorta and the right atrium. Transcatheter closure is an attractive alternative to surgical repair in cases with a high risk of perioperative complications.[11] Different types of devices, such as an Amplatzer septal occluder, Amplatzer duct occluder, and a Gianturco coil, have been successfully used in reported cases.[4,5] In 2010, Kerkar et al.[6] published immediate and mid-term follow-up results of 20 cases of transcatheter closure of a ruptured SOVA using an Amplatzer duct occluder. In 14 of these patients, the SOVA was ruptured into the right atrium. The procedure was successful in 18 of 20 patients. Of the 18, 13 had complete closure at discharge. At a median follow-up of 24 months, the residual shunt had been eliminated in 3 of 5 patients.

Conclusion

Percutaneous closure is a novel method of AAF treatment; however, it appears to be a safe and effective method.

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Anahtar sözcükler: Aorto-atrial fistül; kalp yetersizliği; perkütan kapatma.