

Successful closure of coronary artery fistula with an Amplatzer Duct Occluder II device

Koroner arter fistülünün Amplatzer Duct Occluder II cihazı ile başarılı kapatılması

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ABSTRACT

Coronary artery fistulas localized between the coronary arteries and heart chambers are rare congenital abnormalities of the heart. Although surgery is the conventional treatment of these fistulas, transcatheter closure is feasible in selected cases. Herein, we present a case in whom the fistula was localized between the coronary artery and right atrium and successfully closed with an Amplatzer Duct Occluder II. An 11-month-old patient was admitted to our clinic with a continuous murmur. His physical examination revealed no other pathology. Transthoracic echocardiography showed a fistula localized between the coronary artery and right atrium. The fistula was closed antegradely with an Amplatzer Duct Occluder II device. Post-procedural echocardiography revealed no continuous flow across the fistulous tract.

Keywords: Coronary artery fistula; duct occluder; transcatheter closure.

The most distal malformations of the coronary arterial tree originate from the communication between the branches of the coronary arteries and another large vessel or cardiac chamber.^[1] Surgical repair is the conventional treatment in coronary artery fistulas (CAFs). However, several recent reports have demonstrated the feasibility of transcatheter closure of CAFs with device or coil in selected cases.^[2-6] Herein, we report an 11-month-old boy whose CAF was successfully closed by transcatheter embolization using an Amplatzer Duct Occluder (ADO) II device (AGA Medical Corporation, Plymouth, MN, USA).

ÖZ

Koroner arterler ile kalp boşlukları arasında koroner arter fistülleri nadir görülen doğuştan kalp anomalileridir. Bu fistüllerin geleneksel tedavisi cerrahi olmasına rağmen, seçilmiş olgularda transkateter olarak da kapatılması uygundur. Bu makalede, sağ koroner arter ve sağ atriyum arasında yerleşimli fistülün Amplatzer Duct Occluder II cihazı ile başarılı bir şekilde kapatıldığı bir olgu sunuldu. On bir aylık hasta devamlı üfürüm nedeni ile kliniğimize getirildi. Fizik muayenesinde başka bir patoloji saptanmadı. Transtorasik ekokardiyografide koroner arter ve sağ atriyum arasında yerleşimli bir fistül izlendi. Fistül Amplatzer Duct Occluder II cihazı ile antegrad olarak kapatıldı. İşlem sonrası ekokardiyografisinde fistül yolunda devam eden akım görülmedi.

Anahtar sözcükler: Koroner arter fistülü; ductal occluder; transkateter kapatma.

CASE REPORT

An 11-month-old asymptomatic boy was admitted to our clinic with a continuous murmur. Physical examination revealed a continuous murmur which could be best heard at the right upper sternal border. Other physical examination findings were normal. The electrocardiogram and chest X-ray findings were also normal. Transthoracic echocardiography (ECHO) revealed a dilated right coronary artery (RCA) with a fistulous tract arising from the RCA and opening into the right atrium (RA) with continuous flow into the RA. The largest diameter of the RCA was



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measured as 7.5 mm (Figure 1a-c). The right femoral artery and vein were reached using the 5-Fr sheaths under general anesthesia. Patients were heparinized (100 U/kg). Selective 5-Fr Judkin's catheter (Cook Medical Inc. Bloomington, IN, USA) was used for the RCA. Angiography showed a dilated RCA with a fistula draining into the RA. The narrowest diameter of fistula was measured as 2.7 mm. The pulmonary to systemic blood flow (Qp/Qs) was 2.0:1. A Floppy guide wire was snared and, then, exteriorized through the right femoral vein to form an arteriovenous wire loop. Through this arteriovenous loop, a 5-F long sheath was passed into the right atrial end of the fistula. A 6 mm in waist diameter and 4 mm in length ADO II device was loaded and, then, was advanced into the catheter. The distal skirt of the device was deployed in the aneurysmal part of the fistula. The catheter was, then, withdrawn up to the right atrial aspect of the fistula and the proximal retention skirt was released in the right atrial end of the fistula. Repeated selective coronary angiography showed that the device was well-suited without any residual shunt. The distal RCA flow was seen to be open, following the procedure. After release of the occluder, the contrast agent demonstrated complete occlusion of the fistula (Figures 2a, b). There were no procedural complications. The continuous murmur disappeared

following the procedure. Repeated ECHO revealed no fistula flow. The device was observed in stable position at the mouth of the fistula. Acetylsalicylic acid was started at a dose of 5 mg/kg daily dose. The patient was discharged two days later and remained well at six months of follow-up.

DISCUSSION

Coronary artery fistulas are very rare entities, and more than 90% are localized in the right side of the heart.^[7] Patients are usually asymptomatic, as in our case, or present with palpitations, shortness of breath, and recurrent lung infections.^[8] Surgical treatment is the standard treatment of CAFs.^[9] However, myocardial infarction, arrhythmia, transient ischemic changes, and stroke may develop during surgery.^[9] In the literature, excellent results of transcatheter closure with different devices and coils, lesser morbidity and mortality, lower cost, shorter recovery time, and avoidance of thoracotomy and cardiopulmonary bypass have been reported.^[10] Therefore, transcatheter method should be used in the first-line setting. However, coil embolization, transient electrocardiographic changes and arrhythmias, contrast load and fistula dissection are the potential complications with these devices.^[2-5] In our case, the ADO II was used, due to the narrow opening with sharp angulation at the

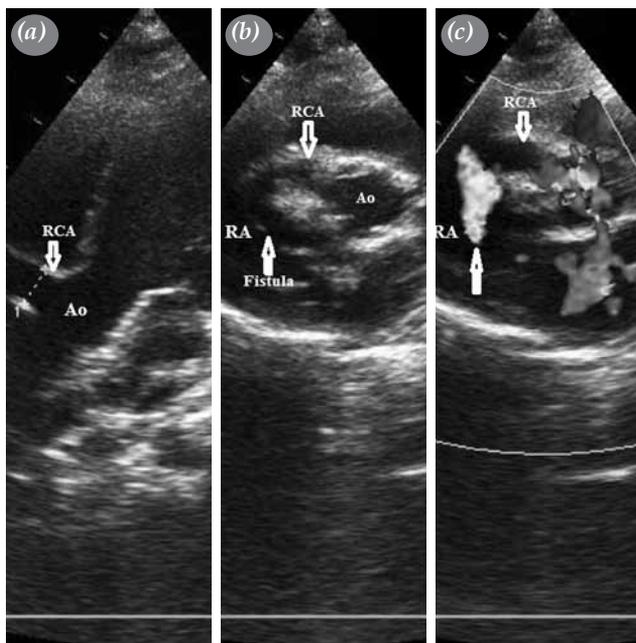


Figure 1. (a-c) The right coronary artery was dilated with a fistulous tract arising from the right coronary artery and opening into the right atrium with continuous flow into the right atrium (arrow).

Ao: Aorta; RA: Right atrium; RCA: Right coronary artery.

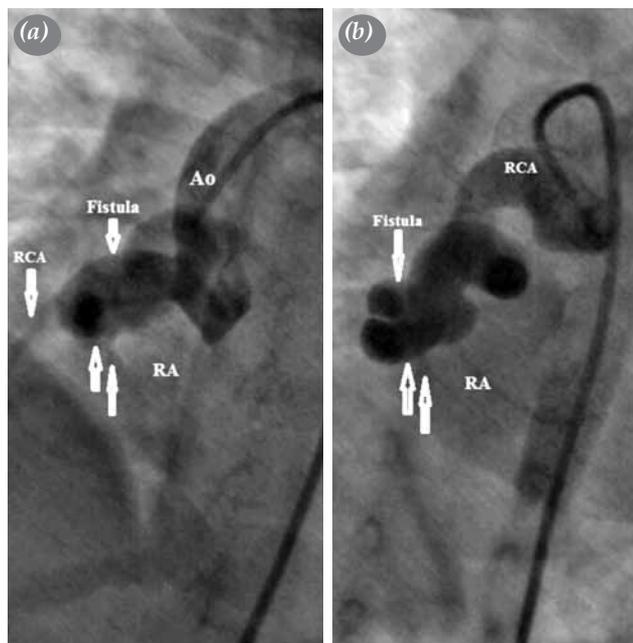


Figure 2. (a) Repeated angiography before detachment shows no residual shunt, **(b)** no residual shunt and no obstruction of the RCA after detachment (arrow). Arrow indicates the position of the Amplatzer ductal occlude.

Ao: Aorta; RCA: Right coronary artery.

right atrial end. Compared to several devices used to close such fistulas, the ADO II device has several advantages, including the use of a single device, a high rate of complete occlusion, improved control over the placement and release of the device, and the use of low-profile delivery catheters (4 and 5 Fr).^[2] Although ADO II is a very soft device, it may contact the aneurysmal wall, thereby, leading to perforation later.^[11] Hence, patients should be monitored for the tissue ulceration. The Amplatzer vascular plug appears the most suitable alternatives to the ADO device, as it can be delivered to the targeted site using a small-caliber guiding catheter.

In conclusion, coronary artery fistulas are very rare entities. According to the anatomic characteristics of the fistula, transcatheter procedure can be performed. It can be quickly and safely placed. Therefore, we recommend fistula closure with the Amplatzer Duct Occluder II device in selected cases as an effective and reliable method.

Declaration of conflicting interests

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