

Transcatheter closure of congenital coronary arteriovenous fistula using detachable balloon technique

Konjenital koroner arteriyovenöz fistülün ayrılabilir balon tekniği ile transkateterizasyon yoldan kapatılması

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Introduction

Congenital coronary arteriovenous fistula (CAF) is a direct communication between coronary artery and lumen of any cardiac chamber, coronary sinus, the pulmonary artery, or the superior vena cava. Its incidence is 0.2-0.4% of all congenital cardiac defects (1). Surgical closure of CAF was initially reported in 1983 with low morbidity and mortality rates (2). Since then, successful transcatheter closure of congenital CAF in children have been reported, using coils, detachable balloons, umbrellas, polyvinyl alcohol foam, and other occluding devices (3, 4). Complications after transcatheter occlusion are rare, and avoids the need of surgery. Here we describe a case of CAF treated with a detachable balloon embolisation.

Case Report

A 2-year old boy was referred for evaluation of murmur. Physical examination revealed normal 1st-2nd heart sounds, and a continuous murmur, heard maximally at the left lower sternal border. The electrocardiogram was normal. The echocardiogram showed a dilated circumflex coronary artery with a fistula draining into the right ventricle. Cardiac catheterization and selective left coronary angiography revealed dilated left main and circumflex coronary arteries (6.7 mm). The circumflex artery made a 180° curve in the atrioventricular groove and entered into the right ventricle (Fig. 1). The patient was decided to be treated by endovascular route (Qp/Qs=1.5/1.0). Heparin was administered before the procedure (50 U/kg).

A 7-F Judkins left coronary catheter was placed in the proximal left coronary artery. A 8.5 mm detachable balloon (GVB 17, Minvays, Gennevillles, France) was introduced and placed at the fistulous site just proximal to the vascular curve. Angiogram showed successful occlusion of the fistula (Fig. 2), therefore the balloon was detached. Final coronary angiography confirmed successful closure (video). Post-

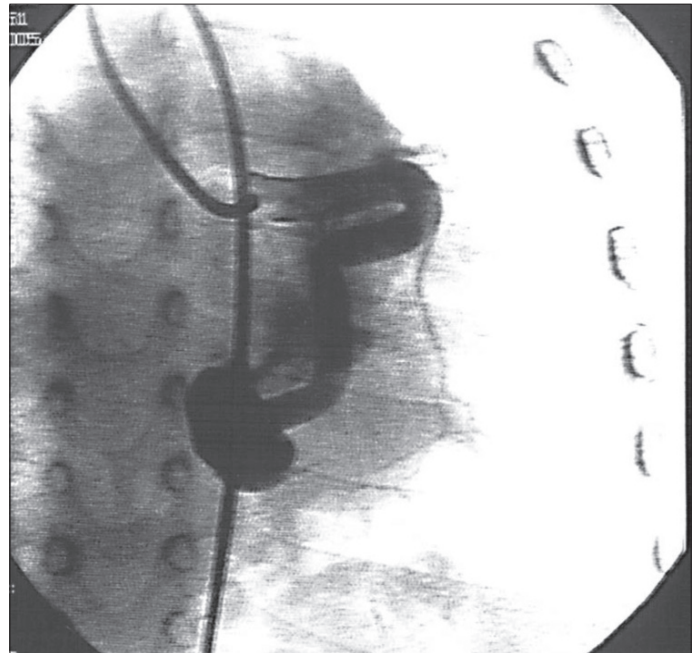


Figure 1. The angiocardiology view of coronary fistula before detachable balloon occlusion

catheterization cardiovascular examination and echocardiography were normal. Warfarin therapy was administered for seven days and low-dose aspirin (5 mg/kg/d) therapy was begun after the procedure.

Discussion

Coronary artery anomalies occur in 1-2% of people. Coronary arteriovenous fistulas considered to be termination anomalies (5). First description of CAF was given by Krause (6). In the majority of the cases,

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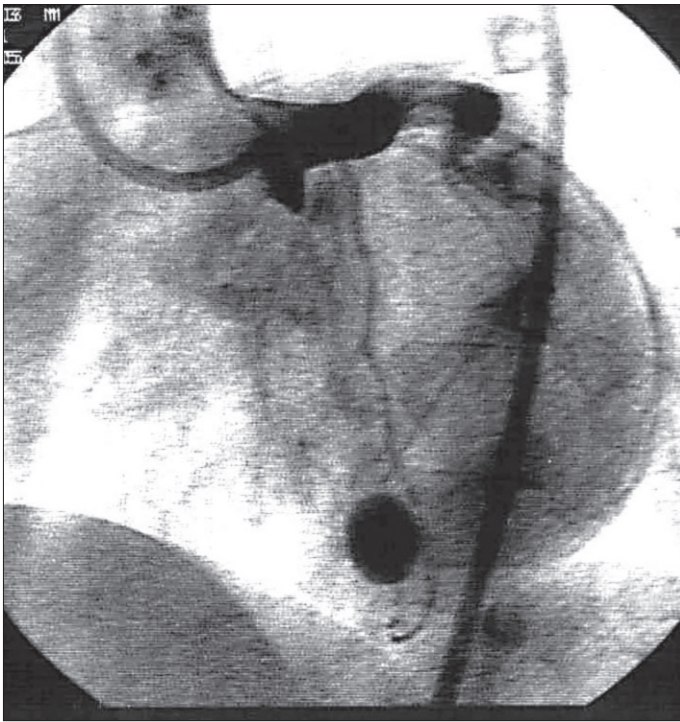


Figure 2. The angiocardiography view after detachable balloon occlusion

it was found to be originated from the right coronary artery. Fistulae originating from the circumflex artery are seen less (5).

Fistulas can cause heart failure, infective endocarditis, they may be totally asymptomatic, an incidental finding of a continuous murmur. Two-dimensional echocardiography is important in the diagnosis, but definitive diagnosis can be done with cardiac catheterization (6).

Although it is a rare anomaly, because of the risks of the heart failure, endocarditis, thrombosis, and arrhythmia, patients should undergo closure of the fistulae as soon as the diagnosis is made.

There are three management options. Hemodynamically stable CAF may be managed conservatively because of the probability of spontaneous closure. Surgical closure and transcatheter closure are the other options.

The first successful occlusion was reported by Reidy (2). Until now, several largest series of transcatheter closure of CAF have been published. Transarterial device delivery was performed in 33 patients in Armsby series of 35 procedures which included coils in 28, umbrella devices in 6 and Grifka vascular occlusion device in 1 (7). Riviera et al. reported a successful transcatheter detachable balloon occlusion of a right CAF in a neonate (8). Trehan et al. reported that coils were used to

close smaller fistulas (<4 mm at site of drainage), while devices and detachable balloons were used to close larger (9). Aydođan (10) performed successfully transcatheter coronary arteriovenous fistula occlusion in 5 children, two with detachable balloon. Our patient had a large fistula of 6.7mm, therefore we used transcatheter detachable balloon occlusion technique (Figure 1-2). The patient remains asymptomatic with no residual shunting at a follow-up of 36 months.

Conclusion

Due to the increased morbidity and mortality associated with delay, the treatment of CAF should be done immediately. The long-term outcome of transcatheter occlusion of CAF remains unknown, but recent results indicate that it may be considered as a safe and effective treatment in children.

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