

Transcatheter occlusion of a large coronary artery fistula using a patent ductus arteriosus occluder

Przecewnikowe zamknięcie szerokiej przetoki wieńcowej za pomocą korka PDA

Jacek Białkowski¹, Małgorzata Szkutnik¹, Roland Fiszer¹, Marian Zembala²

¹Department of Congenital Heart Diseases and Paediatric Cardiology, Silesian Centre for Heart Diseases, Silesian Medical University, Zabrze, Poland

²Department of Cardiac Surgery and Transplantology, Silesian Centre for Heart Diseases, Silesian Medical University, Zabrze, Poland

Abstract

A large fistula from the left coronary artery to the right ventricle was successfully closed percutaneously in a 40 year-old patient using a patent ductus arteriosus occluder. The device was positioned and deployed via the venous system using a guidewire that had been advanced via the aorta, coronary artery and fistula to the venous circulation (arterio-venous loop creation). No complications were reported at follow-up.

Key words: coronary artery fistula, Cardio-O-Fix PDA occluder

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INTRODUCTION

Coronary artery fistulas (CAFs) are abnormal connections between a coronary artery and a cardiac chamber (coronary-cameral) or major intrathoracic vessels. The CAF is a rare entity and usually congenital in nature. On the other hand, CAFs are the commonest congenital abnormality of the coronary arteries. Surgical closure was in the past the standard treatment for haemodynamically significant fistulas and in preventing myocardial ischaemia and aneurysm formation [1]. The American College of Cardiology/American Heart Association 2008 guidelines for the management of adults with congenital heart disease recommend the closure of all large coronary artery fistulae, regardless of symptomology, using transcatheter or surgical techniques [2]. Transcatheter closure of a CAF has been carried out using various devices including coils [1], Amplatzer duct occluder [3], or vascular plug [4]. In this report, we describe the technique of successful CAF closure using a Cardio-O-Fix patent ductus arteriosus (PDA) device.

CASE REPORT

A 40 year-old male (93 kg weight/181 cm height) presented with symptoms of fatigue, with continuous murmur at the left sternal border. A transthoracic echocardiogram showed the presence of a CAF to the right ventricle (RV). ECG was normal. The patient was referred for diagnostic and possible therapeutic catheterisation. Vascular access was obtained via

the right femoral artery (sheath 6 F) and right femoral vein (sheath 8 F). Heparin and antibiotic (cefazolin) were administered. A 6 F Judkins left (JL) catheter was inserted into the ostium of the left coronary artery and angiography was performed showing the presence of a CAF to the RV (Fig. 1). Through a JL 6 F catheter, a Terumo hydrophilic guidewire 0.035 × 260 mm was introduced and smoothly passed from left anterior descending to the ampulla, RV and pulmonary artery. The wire was snared using a 20 mm AndraSnare (Andrademed GmbH, Reutlingen, Germany) and exteriorised in the right femoral vein for the creation of an arterio-venous wire loop. With the wire, an 8 F Mullins transeptal sheath (Cook Europe Corp, Denmark) was introduced from the femoral vein into the distal part of the fistula. A Cardio-O-Fix 8/10 PDA Occluder via an adequate delivery system (Starway Medical Technology Inc, Beijing, China) was inserted through this sheath: the retention disc was opened in the ampulla and the rest of the device in the RV. After confirmation of the proper occluder position by control coronary angiography, the device was released (Fig. 2). No ECG changes were observed during or after the procedure. After the procedure, heparin therapy was continued for three days to prevent thrombosis of the occluded vessel. The patient was discharged home after four days of hospitalisation on aspirin 150 mg per day. At one month follow-up, he was in good condition with no complaints.

Address for correspondence:

prof. Jacek Białkowski, Silesian Centre for Heart Diseases, ul. Szpitalna 2, 41–800 Zabrze, Poland, tel: +48 32 271 34 01, e-mail: jabi_med@poczta.onet.pl
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Figure 1. Left coronarography (PA view). Anterior descending (LAD) dilatated (diameter 6 mm) with a tortuous course and ampulla (12 mm diameter) just before entering the cavity of the right ventricle (white arrow). Coronary branches arising from LAD with a poor contrast perfusion



Figure 2. Coronarography after implantation of an 8/10 mm patent ductus arteriosus Cardio-O-Fix occluder (LAO 30 degree view). White arrow indicates position of the device. Complete closure of coronary artery fistulae with significantly improved perfusion of the peripheral branches

DISCUSSION

Successful percutaneous closure of a large CAF has been reported previously, mainly using an Amplatzer Duct Occluder (ADO). This implant has several advantages over other devices used to close CAFs, including the application of just one device, a high rate of complete occlusion, and relatively easy implantation [3, 5]. In some cases of a large CAF, prolonged post-procedure coumadin therapy is recommended to prevent thrombosis formation. The Cardio-O-Fix PDA occluder is very similar to the ADO. Recently, successful closure of a congenital artery fistula was reported using another Chinese PDA occluder, also similar to the ADO [6]. This data indicates that results obtained with the new PDA devices in the closure of CAFs are similar to those obtained with the original ADO. This supports the published experience regarding the application of Cardio-O-Fix occluders in percutaneous closure of atrial septal defects, patent ductus arteriosus, patent foramen ovale, ruptured aneurysm of the Valsalva sinus, and aorto-pulmonary window [7–9].

On the other hand, sometimes the anatomy of the fistula can limit any interventional technique. In cases with a very short and unrestricted route, e.g. a fistula arising from the left coronary artery with drainage into the left heart chamber, attempted closure with a device could carry the high risk of migration of the device to the systemic circuit, or even to the coronary artery circulation. This risk would be a strong argument against any attempt at transcatheter closure, and a surgical approach would be the safer option [10].

The limitation of this study is the short period of follow-up.

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