

Closure of a Coronary Artery Fistula with an Amplatzer Vascular Plug in a Pediatric Patient

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ABSTRACT

Congenital coronary fistula is an infrequent condition generally asymptomatic, which is mostly diagnosed by an incidental finding. Depending on the presence of hemodynamic compromise, coronary fistulas may be treated with a conservative approach, with surgery or, recently, with transcatheter closure.

We present a case report of a patient with a large coronary-cameral fistula treated with percutaneous embolization with Amplatzer vascular plug. No complications developed during the procedure and follow-up.

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Key words > Cardiac Catheterization - Vascular Fistula - Devices - Pediatrics - Coronary Vessels

Abbreviations >	LCA Left coronary artery	CAF Coronary artery fistula
	AVP Amplatzer vascular plug	PAVM Peripheral arteriovenous malformations

BACKGROUND

Although most pediatric coronary vasculature anomalies are coronary artery fistulas (CAFs), this condition is infrequent. (1)

Management of CAFs is controversial; a conservative approach is feasible due to the possibility of a spontaneous closure, (2) or, once the diagnosis is made, primary occlusion with surgery (3, 4) or transcatheter closure are other options.

We present a case report of a female patient with a large CAF treated with percutaneous closure with an Amplatzer vascular plug (AVP).

CASE REPORT

A 9 year-old asymptomatic patient with a weight of 20.7 kg ($Pc < 3$) was referred to our section after a heart murmur had been detected. The patient presented a continuous grade 2-3/6 murmur located at the mesocardial region that propagated to the xiphoid process, with absence of thrill. The electrocardiogram

was normal; the X-ray showed a cardiothoracic ratio of 0.6 and a slight bulge along the left border of the cardiac silhouette. Color-Doppler echocardiography demonstrated a fistula emerging from the left coronary artery and flowing into the right atrium. An informed consent form was signed previous to the procedure.

Under general anesthesia, a 5 Fr sheath and a 6 Fr sheath were introduced via the femoral artery and femoral vein, respectively. The results of the cardiac catheterization were: patent foramen ovale, normal right coronary artery, oxygen saturation step-up in the right atrium and Qp/Qs 1.5/1. A large and tortuous fistula emerged from the ostium of the left coronary artery (LCA) and flowed into the right atrium. A selective angiography of the CAF was performed with a Judkins left coronary arteriography catheter; the narrowest portion of the CAF, located at the middle segment, had a diameter of 6 mm.

An AVP device with a controlled release system was used. A 0.028" hydrophilic guide-wire was advanced through the Judkins left coronary arteriography

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raphy catheter along the fistula until reaching the right atrium; the wire was then snared by a gooseneck catheter and an arteriovenous loop was created. A 6 Fr-coronary guide-wire was introduced through the femoral vein and advanced to the narrowest segment of the CAF, where an 8 mm device was placed. Due to the presence a severe angiographic residual shunt before the deployment, the device was removed within the controlled release system, and replaced by a 12 mm device that adopted the shape of a "dog bone" after the implant. A selective angiography performed 10 minutes later demonstrated the occlusion of the

CAF with no involvement of the LCA (Figure 1). Fluoroscopic duration: 35 minutes.

The patient left hospital the following day on platelet aggregation inhibitors and aspirin. No adverse events were reported during the procedure. The patient is currently under follow-up (18 months): clinical examination, X-Ray (Figure 2), electrocardiogram and Doppler echocardiography are normal.

DISCUSSION

The diagnosis of a CAF is based on a continuous cardiac murmur with an atypical location in an asymptomatic patient; this murmur may mimic the acoustic quality of a patent ductus arteriosus, a condition that may coexist with a CAF. (5) The first clinical manifestations of this condition may be infectious endocarditis, arrhythmias, heart failure, aneurysmal dilatation and rupture, respiratory failure, sudden death, myocardial ischemia or accelerated atherosclerosis (2, 4); these are the reasons to treat the malformation.

Management of a CAF depends on the experience of each medical center; primary surgical treatment or transcatheter closure are valid options; the latter procedure may be performed with coil embolization, chemical substances or different devices (6, 7), depending on the size of the fistula.

AVP has been originally designed to occlude peripheral arteriovenous malformations (PAVM); nevertheless, its use has been recommended for other conditions. (8) Manufacturers recommend that the device size should be 50-75% greater than the diameter to occlude in cases of PAVM; nevertheless, our

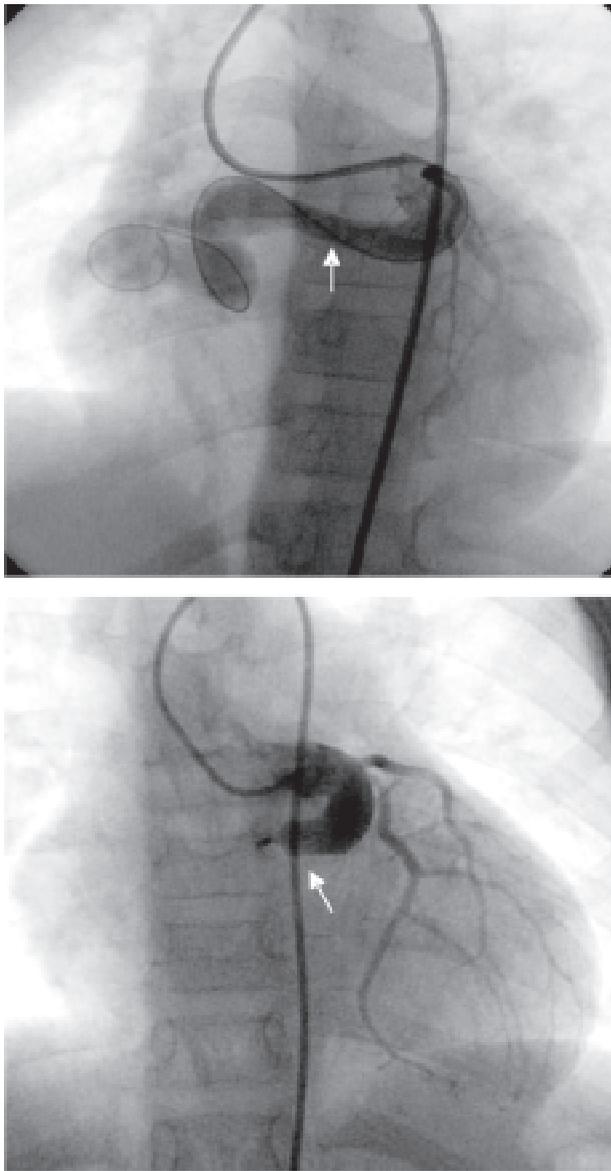


Fig. 1. Embolization of a coronary artery fistula with an AVP. *On top:* Left coronary angiography showing a CAF emerging from the LCA and flowing into the right atrium (*arrow*) *Below:* The same projection demonstrates the occlusion of the CAF with an AVP device (*arrow*).

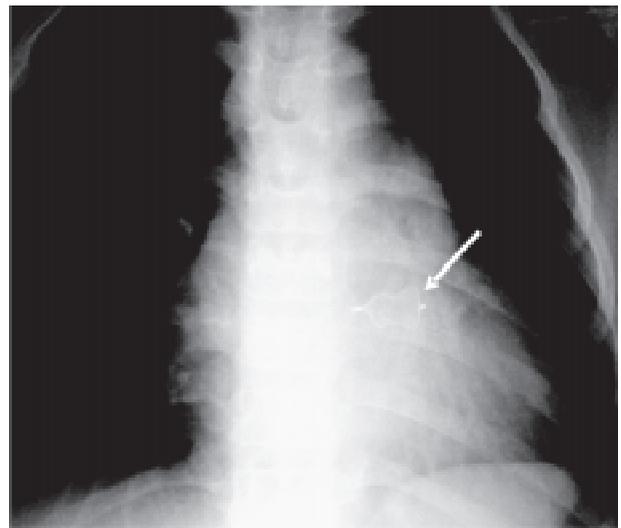


Fig. 2. X-Ray control of the coronary artery fistula subjected to embolization. The device implanted in the CAF keeps the shape of a "dog bone" (*arrow*).

results are similar to those reported by Fisher (9) as we only achieved the occlusion with a device size 100% greater than the diameter of the narrowest segment of the CAF; no additional devices were needed. (10)

The new AVP device should be considered for the treatment of coronary artery fistulas, especially when they are large; however, further experience is needed before recommending this approach for the embolization of a CAF in pediatric patients.

Competing interests

None declared.

RESUMEN

Cierre de fístula coronaria con Amplatzer vascular plug en el paciente pediátrico

La fístula coronaria congénita es una patología poco frecuente y en general asintomática, por lo que muchas veces se diagnostica por un hallazgo incidental. Con dependencia de la repercusión hemodinámica, algunos siguen una conducta conservadora, otros indican tratamiento quirúrgico o, más recientemente, oclusión por cateterismo.

Se presenta el caso de una paciente con una gran fístula coronaria-cameral, que se trató mediante embolización percutánea con dispositivo Amplatzer vascular plug. No se presentaron complicaciones durante el procedimiento ni en el seguimiento.

Palabras clave > Cateterismo cardíaco - Fístula vascular
- Dispositivos - Pediatría - Vasos coronarios

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