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Percutaneous closure of aorto-right atrial fistula after ascending aortic aneurysm surgery using cardiac fusion imaging

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Short title: Percutaneous closure of postsurgical fistula

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Dr. I. Cruz-Gonzalez is proctor for St Jude Medical

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A 75-year-old patient with previous history of heart valve surgery was admitted due to recurrent congestive heart failure.

In 1993 she underwent open-heart surgery where aortic valve was replaced with a mechanical prosthesis. In 2015, it was performed an ascending aortic aneurysm replacement with Dacron graft including the noncoronary sinus.

During a congestive heart failure episode in 2017, an aorto-right atrial shunt was observed in transthoracic echocardiography. Patient was not considered for cardiac surgery because too high-risk.

After a new heart failure episode, patient was referred to our center to evaluate a possible percutaneous closure of the aortoatrial fistula.

Transesophageal echocardiography (TEE) confirmed a 5mm high-flow fistula between noncoronary sinus and right atrium (Figure 1A).

The procedure was performed under general anesthesia guided by fluoroscopy, TEE and computed tomography angiography (CTA)-fluoroscopy fusion imaging.

Vascular access was gained via right femoral vein and left femoral artery.

Initial aortography with a pigtail catheter showed the aortoatrial fistula (Moving image 1). Then, with cardiac fusion imaging guidance and landmarks provided by angiography and tissue calcification, the fistula was easily crossed using a Terumo stiff wire with a Multipurpose catheter (Figure 1B and C).

After that, the wire was advanced and snared into the inferior vena cava (Figure 1D) and externalized via a right femoral vein sheath creating an arteriovenous loop.

Finally, the delivery sheath was advanced from the venous side and the 8/6mm Amplatzer Duct Occluder (St Jude Medical, Minnesota) deployed (Figure 1E, Moving image 2) achieving complete sealing of the fistula (Figure 1F, Moving image 3).

Patient had an uneventful recovery and remains asymptomatic after 1-year follow-up.

Figure 1 legend:

(A) 2D TEE doppler colour image showing the aorto-right atrial shunt (white arrow)

(B) CTA-Fluoro fusion image: cardiac fusion imaging guidance to cross the fistula from aorta (AO) to right atrium (RA)

(C) Fluoro image: stiff wire crossing from aorta into right atrium

(D) CTA-Fluoro fusion image: wire advanced and snared into the inferior vena cava (IVC)

(E) CTA-Fluoro fusion image: device deployment guided by cardiac fusion imaging

(F) Fluoro image: final result showing Amplatzer Duct Occluder (ADO) device (red arrow) sealing the aortoatrial fistula

Supplementary data:

Moving image 1: aortography showing the aortoatrial fistula

Moving image 2: device deployment guided by cardiac fusion imaging

Moving image 3: aortography showing ADO device sealing completely the fistula

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