Pusher modification facilitates placement under anatomically difficult conditions

Flexible pusher cable for percutaneous closure of an atrial septal defect

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Summary

The case report describes a new flexible pusher cable (HyperionFlexPusher) intended for safer percutaneous atrial septal defect device closure.

Key words: atrial septal defect; paediatric interventions; percutaneous closure of ASD

Introduction

Transcatheter closure of an atrial septal defect (ASD) with different occluder systems yields excellent long-term results [1–6]. Embolisation of occluders occurs in about 2% [7]. Transcatheter retrieval of embolised devices has a success rate from 50% to 75% and cardiac surgery may be required [7, 8]. We describe a new delivery system (HyperionFlexPusher, Comed, Bolsward, Holland) with a flexible pusher cable providing the opportunity to assess whether the device is in a safe anatomical position before detachment in order to reduce the risk of occluder embolisation. This position is close to the final one after detachment. Retrieval of the device for repositioning is still possible at that point by retracting the device with the core wire of the pusher cable into the long delivery sheath.

Case report

An 8-mm central secundum atrial septal defect without signs of multifenestration or signs of atrial septal aneurysm was detected in the transthoracic echocardiography (TTE) of a five-year-old girl. There were satisfying rims and mild signs of volume overload of the right ventricle, but no signs of pulmonary arterial hypertension.

Implantation procedure

The procedure was conducted under general anaesthesia and fluoroscopic guidance combined with transoesophageal echocardiography monitoring. After tracheal intubation, venous access was gained through the right femoral vein with a 6 French CheckFlow introducer set and the patient was treated with 1000 units of intravenous unfractionated heparin and 900 mg of intravenous cefuroxime. The atrial defect was passed under fluoroscopic guidance with a 4 French multipurpose catheter. A stiff guidewire was placed in the left superior pulmonary vein. A 14-mm Hyperion Atrial Septal occluder (Comed) was chosen on the basis of the findings of echocardiography and balloon sizing (24-mm Amplatzer sizing balloon, St. Jude Medical, Plymouth, USA). We decided to close the defect with 14-mm Hyperion Atrial Septal Occluder (Comed). The 6 French introducer sheath was exchanged for a 10 French delivery Hyperion sheath (Comed) and advanced into the left atrium. The preassembled Hyperion occluder was loaded and the left atrial disc of the occluder was opened. Afterwards, the delivery sheath and the disc were retracted as a unit until the disc hugged the septum. Subsequently, the right atrial disc was opened in the right atrium. At this stage, the HyperionFlexPusher cable allowed for retraction of its stiff sleeve with the device remaining attached to the screw at the end of the core wire. This relieves the distortion

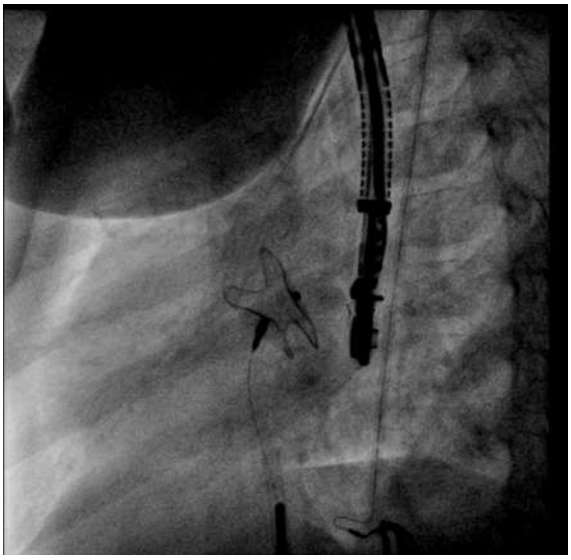

Figure 1: Video 1. HyperionFlexPusher Cable with 14-mm Hyperion Occluder in position before releasing (left anterior oblique 72° / caudal 12° projection).

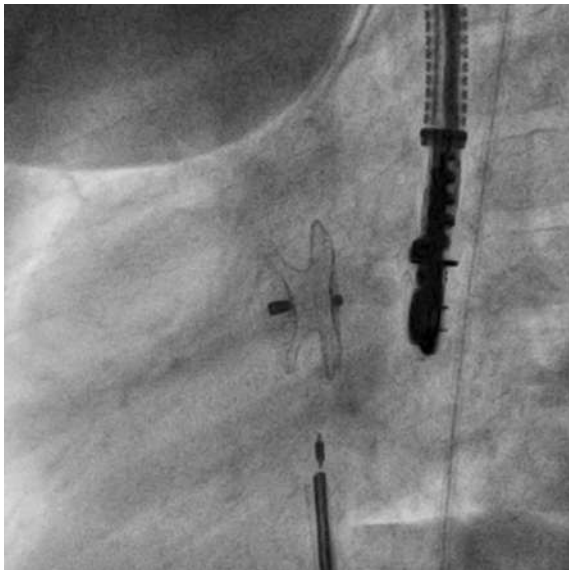

Figure 2: Video 2. After releasing the device (left anterior oblique 72° / caudal 12° projection).

by relaxing the tension of the system. The device position achieved came close to the final position with the precise orientation to the atrial septum (fig. 1, video 1). At this point, the device could still be retrieved and redeployed or replaced. The device was then released by counterclockwise torquing the core wire (fig. 2, video 2). Ideally, the stiff sleeve should be readvanced at least partially before that to avoid entangling of the flexible core wire during torquing. The patient was discharged on the following day after a TTE and chest X-ray had confirmed good device position. Acetylsalicylic acid (100 mg per day) was recommended for 6 months.

Follow up

The subsequent course was uneventful. The TTE at 4 months postimplantation showed a well-seated device without residual shunt and neither interference with atrioventricular valves nor thrombus.

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Discussion

A flurry of ASD closure devices have been developed since the first report approximately 40 years ago [1–3]. The described pusher modification [9, 10] facilitates the placement under anatomically difficult conditions and potentially reduces the risk for device embolisation.

Disclosure statement
Bernhard Meier has received research grants to the institution by St. Jude Medical and speaker fees by Comed and St. Jude Medical.

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