

Closure of extracardiac Fontan fenestration with covered stents

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INTRODUCTION:

In patients after total cavopulmonary connection (TCPC) fenestration allows to improve acute postoperative morbidity. After a stabilized chronic hemodynamic state is achieved, an interventional closure of fenestration can be performed with various devices to increase the systemic arterial saturation and improve the exercise tolerance.

The aim of this paper is to review our experience in the use of covered stents for transcatheter closure of fenestration in patients after TCPC.

METHODS:

We implanted CP covered (6) or Advanta V12 (3) stent in 9 patients after fenestrated TCPC. Median patients age and weight were 8 years and 27.5 kilograms respectively and median interval after the surgery was 22 months. Stenosis of the homograft was additional indication for stent implantation in 2 patients, rhythm disturbances during occlusion test in 2 and unfavorable localization of the fenestration not allowing for proper implantation of Amplatzer Septal Occluder in 1 patient. Femoral approach was used in all but 2 patients having bilateral thrombosis of femoral veins. The Advanta V12 was premounted on a balloon catheter whereas the CP stent was crimped on a BiB balloon.

RESULTS:

Mean oxygen saturation and internal caval vein pressure increased acutely from 81,1% +/- 4.7% to 96.1% +/- 2.6% ($P < 0.001$) and 14 +/- 2 mm Hg to 14.7 +/- 2.4 mm Hg ($P < 0.02$), respectively. In 2 patients control angiography showed trivial leak through the fenestration, in the remaining 7 there was no residual flow. Discharge echocardiography showed no flow at the level of the fenestration in all patients. No procedural or intra-hospital complications occurred. One patient died 8 months after the intervention due to thromboembolic complications after arm fracture. The remainder patients are symptom-free at median follow-up of 8 months, and the mean oxygen saturation is 95.8% +/- 1.3%.

CONCLUSIONS:

The covered stents can be safely and effectively used for closure of TCPC fenestrations. Apart from avoiding protrusion of prosthetic material into the left atrium, this method has additional advantage in patients with stenosis of the homograft, rhythm disturbances or inappropriate anatomy of the atrium or localization of the fenestration to safely deploy other devices.