Use of covered stents for closure of fenestration in extracardiac cavopulmonary connection: technical aspects and mid-term results

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Objective:
Closure of fenestration in total cavopulmonary connection (TCPC) is usually performed with devices used to close intracardiac or vascular connections. This study presents our data regarding the use of covered stents in that context.

Methods:
We retrospectively reviewed data of all the patients receiving a covered stent to close a fenestration of TCPC between 2005 and 2012.

Results:
50 patients met the inclusion criteria. Median age and weight were respectively 7.7 years and 20 kg. Median interval between Fontan completion and fenestration closure was 13 months. Procedures were done through the femoral vein in 42 and jugular vein in 8 patients. 57 stents were used. 7 patients received 2 stents (CP group) because of incomplete sealing of the fenestration. Covered stents were CP stents in 42 patients and Atrium Advanta V12 in 8. For stents insertion we used BIB balloons in 24 patients or simple balloons (TYSHAK or Balt) in 18 patients. In 8 cases 2 different balloons were used: 5 in patients receiving 2 stents, 3 in patients receiving an Atrium stent needing post dilatation. 5 patients had simultaneous occlusion of venous collaterals. Median procedural and fluoroscopy times were respectively 49 +/- 29 and 8 +/- 7 minutes. Mean central venous pressure rose from 10 to 12 mmHg. Mean oxygen saturation increased from 88% to 96%. Full occlusion was confirmed in 47 patients. The remaining had significant residual shunts: two in patients with intracardiac Fontan and one in a patient where stents could not be fully opened. Following the procedure, 5 patients had local bleeding with one needing blood transfusion, and three delayed discharge at day two following the procedure. There was no thrombo-embolic event reported after a mean follow-up of 49 months.

Conclusion:
Covered stent is a good option to close fenestration in extracardiac TCPC. It is safe, easily achievable with low fluoroscopy time, very low risk of thrombo-embolic events or failure. The good results are sustainable when excluding patients with none circular pathway.