Transcatheter Fenestration in Fontan Failure: single center experience?

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Background: Total Cavo-Pulmonary Connection (TCPC) is the final step of the palliative separation of the circulations in children with a univentricular heart. Fenestration between the systemic venous conduit and the common atrium might be a life saving approach in acute or chronic failing Fontan or even necessary for electrophysiological treatment.

Methods: Since 2005, 23 percutaneous catheter-based fenestrations were performed in 20 Fontan patients; 18 patients had an extra cardiac conduit, 2 a lateral tunnel. The perforation of the conduit/lateral tunnel patch was performed with a Brockenbrough technique; one closed surgical fenestration was re-opened by HF-(Byliss), and two with a stiff wire technique. After crossing the conduit or patch, gradual balloon dilatation was performed. Then a 6/8F long sheath was advanced to the atrium during deflation of a 6-8 mm balloon. Hand-crimped or pre-mounted stents (Genesis, Valeo, Formula, Jo-Med) were placed in the newly created fenestration in a diabolo shape in all, but one.

Results: A fenestration of a TCPC tunnel was newly created in 12 patients; re-opening of a surgical or catheter-based closed fenestration was successfully performed in 8 (+3) patients. In 14 patients, catheterizations were performed as a high urgency procedure because of and still during clinical and hemodynamic instability in order to avoid or to treat an already failing Fontan. After stent placement mean arterial oxygen saturation decreased from 92.5 % (n=22; SD 5.5%) to 84.2 % (n=21; SD 5.5%).

Transcatheter fenestration approach was performed with a median fluoroscopy time of 17.3 minutes. Ten of the 14 acute treated patients improved immediately within one week. In all, pleural effusions and ascites diminished corresponding with decreasing central venous and pulmonary artery pressures. In three patients clinical improvement took longer than a week. Serious complications, especially bleedings were not observed. In 6 patients the fenestration closed meanwhile spontaneously.

Conclusion: The percutaneous approach is a low risk procedure even in TCPC with an extra-cardiac conduit. It has a big advantage comparing high risk and complex operation.