Use of covered Cheatham-Platinum stents in congenital heart disease

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Aim: Evaluate possibilities and safety of covered Cheatham-Platinum (CCP) stents in congenital heart disease (CHD).

Methods and results: Single-center retrospective CHD-database study of all CCP stents, 2003-2012. Three study groups: aortic coarctation (CoA), right ventricular outflow tract pre-stenting for percutaneous revalvulation (RVOT), and miscellaneous. Data expressed as median (range).

114 CCP stents in 103 patients, 67% male, age 16.8 years (4.2-71.2).

CoA group: 54 CCP stents in 51 patients: 3/54 for aneurysm exclusion, in 51/54 covering used “prophylactically” because increased risk for vessel tear. CCP stent was dilated to desired dimension at implantation in 39/51 patients, further stent dilation to optimal dimension or following somatic growth in 12/51 patients after 4.5 months (1.6-28). Overall, CCP stenting increased coarctation diameter from 6 (0-15) to 15 (10-20)mm (p<0.001) and decreased PTP gradient from 23 (0-86) to 2 (0-5)mmHg (p<0.001).

RVOT group: 39 CCP stents in 37 patients: the graft lumen had shrunken from nominal 21mm (10-26) down to 13mm (5-22); with the CCP stent the graft was redilated prior to revalvulation up to 22mm (16-26, p<0.001 vs stenosis).

Miscellaneous group: 21 CCP stents in 15 patients: closure of Fontan-circuit fenestration (n=5), expansion of cavopulmonary conduit (n=2), restoration of superior caval vein (n=2) or pulmonary artery (n=2) patency, relief of supra-pulmonary stenosis (n=2), intrapulmonary anastomosis (n=1), exclusion of aberrant pulmonary arteries (n=1). Hybrid procedures in 3/15 patients to make sutureless connections in distal lung vessels. CCP stent as rescue treatment in 2/15 patients to seal iatrogenic bleeding.

Specific techniques were required to optimize the results with CCP stents in selected patients: stent delivery through 10F sheath with a thin low pressure low profile 7F balloon, flaring to seal the expected tear, delayed dilation, double wire delivery, retrograde puncture to reopen a side-vessel subclavian artery.

Conclusion: CCP stents can safely be used in CHD patients, requiring specific techniques in selected targets. The covering allows adequate sealing of existing or expecteded tears, thereby increasing the safety margin with more complete dilation in selected patients, and extending the possibilities of transluminal interventions.