Initial Experience with Valeo Pre-mounted Stents for Treatment of Pulmonary Arterial Stenoses

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Introduction
Pulmonary arterial stenoses are a source of significant morbidity or mortality in post-operative congenital heart disease patients. Stent implantation is effective but challenging in young children owing to the large vascular access required and difficulty tracking long sheaths and stiff stent-balloon assemblies. Stents also need to be ultimately post-dilated to adult size. The Bard Valeo peripheral vascular stent is low-profile, premounted, flexible, open cell and can be dilated to 20mm. Therefore it can potentially overcome these technical difficulties. In this series we assess the performance of this stent in treating pulmonary artery lesions.

Methods
At cardiac catheterisation proximal, minimum and distal pulmonary artery size, and right ventricle:femoral artery (RV:FA) pressure ratio were measured. Pressure gradients were measured across stenoses. Seven stents were implanted in six patients (one required bilateral stent implantation) using standard techniques. All patients were post-operative (3 PA/VSD/MAPCAs, 2 TOF, 1 TGA). Median age was 3 years (3-10 years) and median weight was 22 kg (11.8-30.2 kg). Final measurements included minimum final diameter, RV:FA ratio and residual gradient across stents.

Results
All stents tracked easily and although long sheaths were used, stents were passed bare across the lesions in 71% (5/7) cases. There were good angiographic and haemodynamic results with no procedural complications. Femoral venous access size was median 7.5 French (5-9F). Minimum vessel diameter improved from mean 4.9 mm (3.4-6.8 mm) to 9.4 mm (8.1-10.0 mm). There was no significant stent recoil on balloon deflation. Final stent diameter as a ratio to distal vessel size was mean 1.08 (0.87-1.25). Pressure gradients across stenoses reduced from mean 18.5 mmHg (16-21 mmHg) to 7.5 mmHg (6-9 mmHg). RV:FA ratio reduced from mean 0.73 (0.72-0.75) to 0.54 (0.54-0.55).

Conclusions
Valeo stents require smaller vascular access than other stents that have the potential to be dilated to adult size, do not require placement of a long sheath and have excellent trackability. They have sufficient radial strength to deal with pulmonary artery stenoses. Although the stents can potentially be expanded to 20 mm, long-term follow up will be required to assess whether this is achievable by redilation. Valeo stents provide a good option in treating pulmonary artery stenoses in small children.