Bare-metal stenting in recurrent coarctation of the aorta below 12 kg of weight

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Introduction

Recurrent coarction of the aorta (CoA) occurs relatively often after surgical correction. Surgical and interventional treatment options for recurrent CoA in infants below 12 kg of weight have specific limitations. Stenting is a promising alternative and increasingly accepted in older children, but no stent has been deemed safe and effective in the younger population yet. However, technical stent properties continue to improve. This study investigates bare-metal stenting as a treatment modality in recurrent CoA in young children.

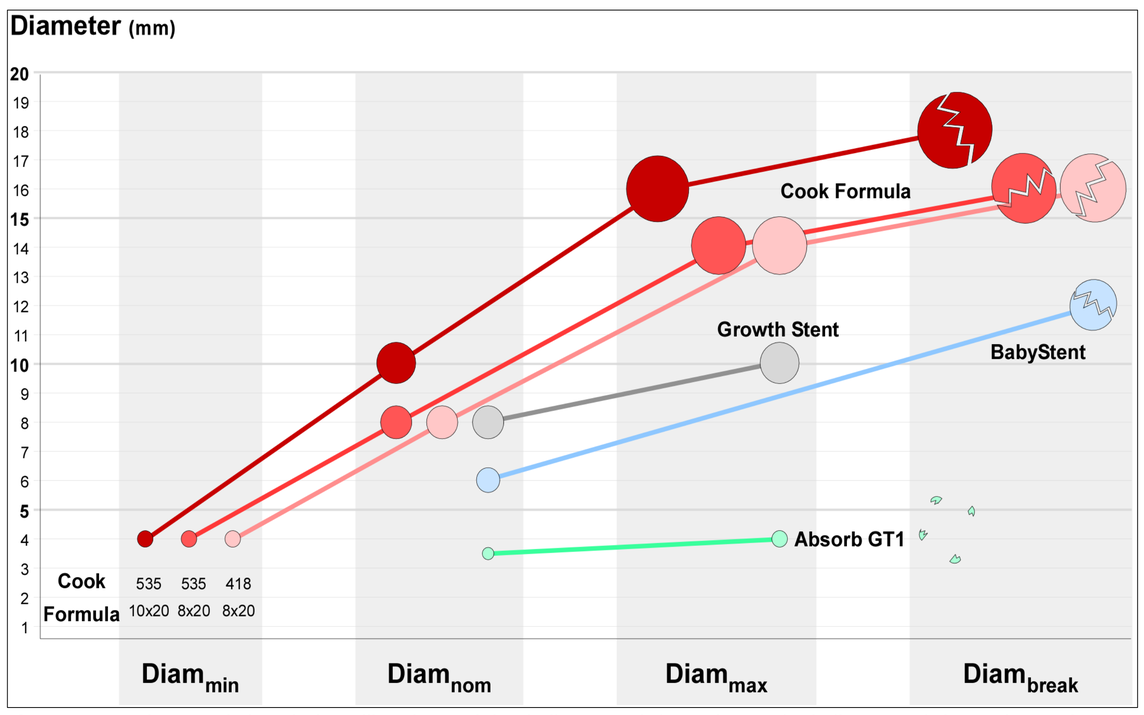

Fig 1. Stent characteristics during dilatation: minimal diameter ($Diam_{min}$), nominal diameter ($Diam_{nom}$), maximum diameter ($Diam_{max}$) and diameter at fracture ($Diam_{break}$). Cross-sectional diameter displayed in proportional size.

Methods

In vitro study of expandability and breakage characteristics of the Cook Formula 418 (8 mm) and 535 (8 and 10 mm) stents was followed by clinical use. All patients below 12 kg undergoing treatment of native or recurrent CoA with a Cook Formula stent between November 2012 and October 2016 were included. Patient and procedural characteristics were obtained as well as procedural success, complications and follow-up.

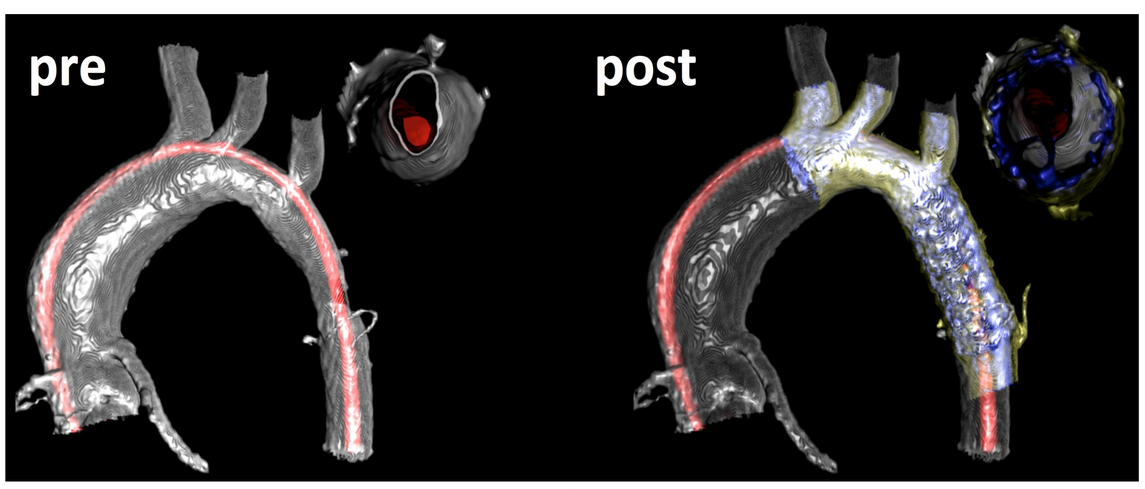

Fig 2. 3DRA-imaging pre-intervention (aorta in silver, pigtail catheter in red) and post-intervention (aorta in yellow, stent and pigtail catheter in blue).

Results

In vitro testing of the 8 and 10 mm diameter Cook Formula stents showed low profile when being down-crimped on smaller balloons in addition to a wide range in diameter with favorable breaking characteristics and limited foreshortening. 14 patients underwent implantation of a Cook Formula stent during the study period. Median time interval between surgery and intervention was 4.2 months. Median age was 0.5 years and median weight 5.6 kg. Arterial sheath size ranged from 5 to 7 French. Stent diameters of 4.4 to 9.1 mm were obtained. A median residual gradient of 0 mm Hg was achieved. Intima stripping in 1 patient was adequately treated with no permanent damage. 2 redilatations due to somatic growth were performed after a median interval of 38 months. An "in stent" breaking procedure as proposed as the next step in this optimized workflow was not indicated yet.

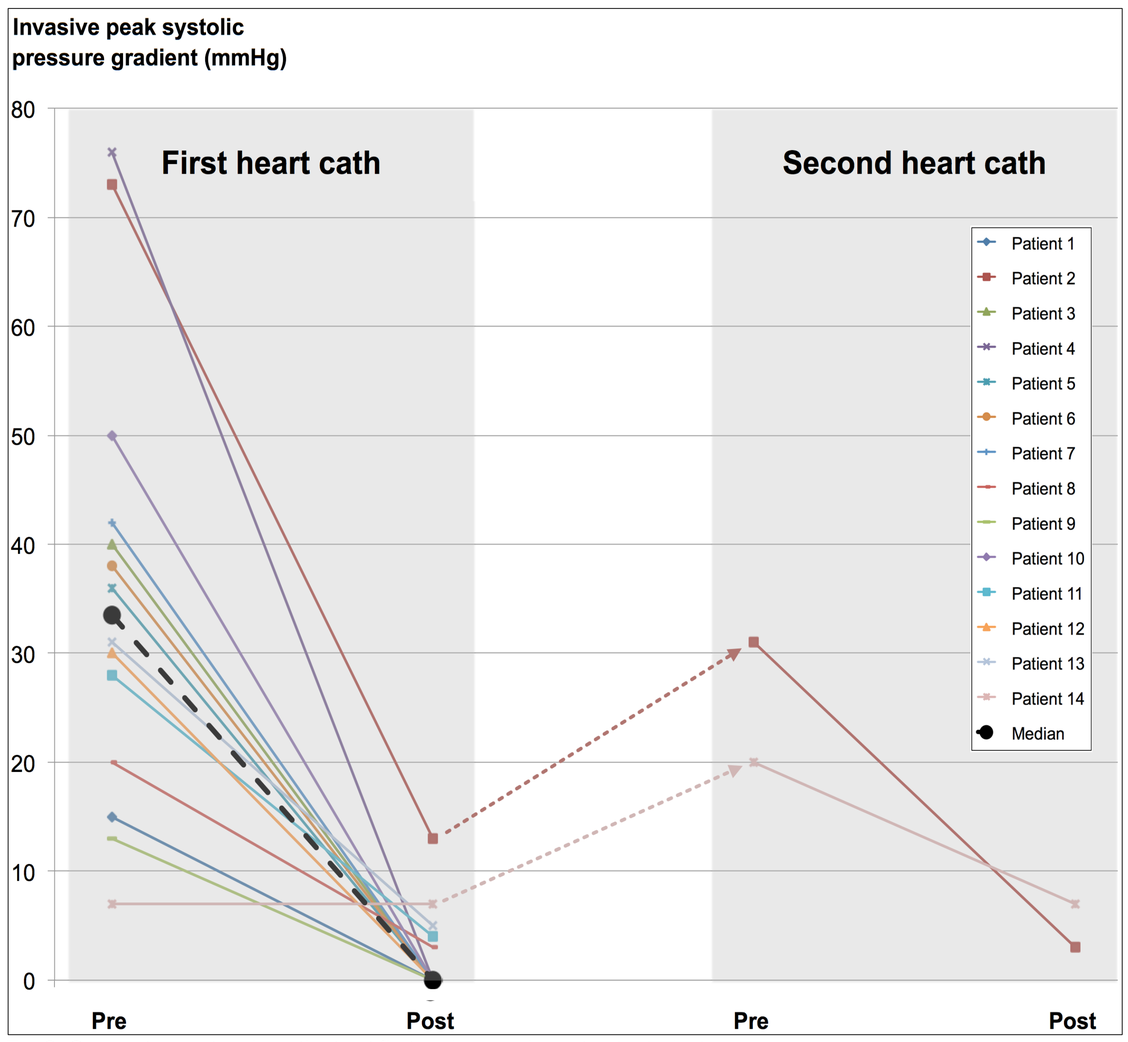

Fig 3. Gradient reduction in patients at first and second heart catheterization.

Conlusion

This study is the first to report mid-term follow-up of stenting therapy in this population. This study is limited by its case study design, but does indicate that bare-metal stenting with Cook Formula stents is effective with minimal complication rates.