

Relief of early post-operative Sano Shunt stenosis in neonates with hypoplastic left heart syndrome

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Introduction: Severe symptomatic shunt stenosis may occur at the proximal and at the distal shunt anastomosis after a Norwood Sano operation for hypoplastic left heart syndrome (HLHS). We report on successful relief of the stenosis by transcatheter stent implantation. Hence, high risk repeated cardiac surgery was avoided.

Methods and Results: Since may 2000, a Norwood operation was performed in 138 newborns with HLHS at our centre at a median age of 8 days (1 – 38d). In the early experience a 5 mm Goretex tube was used for the Sano modification. Three patients developed a severe proximal Sano shunt stenosis 2-7 weeks postoperatively and were successfully treated by transcatheter stent implantation. After this experience a ring enforced 5 mm Goretex tube was used for the subsequent Sano shunts and no further proximal shunt stenosis occurred. However, since then 4 additional patients developed severe (cyanosis SaO₂ < 60%) early postoperative distal Sano shunt stenosis 1,2,5 and 6 days postoperatively. All patients were treated successfully by stent implantation. Five mm x 12 mm premounted balloon expandable stents (EV3, Genesis) were delivered through the femoral veins (5F short sheath). Two early postoperative catheter interventions were emergency procedures (arterial oxygen saturation was 53% and 58% respectively). The arterial oxygen saturation improved significantly (> 75%) and in three patients a partial cavopulmonary shunt was done so far (at the age of 9 weeks, 3 ½ months and 5 ½ months respectively). One patient is still waiting for this operation. There were no periprocedural complications.

Conclusion: Proximal Sano shunt stenosis may be prevented by a ring enforced Goretex tube. Distal Sano shunt stenosis may occur after a modified Norwood operation leading to profound early postoperative cyanosis. Transcatheter stent implantation is a safe and effective alternative to high risk repeated cardiac surgery in these patients.