Interventional closure of muscular VSDs at a young age

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Purpose: The presence of muscular ventricular septal defects (mVSD) may pose a high circulatory burden in young patients. Surgical closure is difficult because of the multilayer structure of these malformations. We present the course of 13 patients (age 10 days – 7.3 years, median 9 months; bodyweight 2.2 and 18 kg (median 8.7 kg) undergoing transcatheter closure of such defects.

Method: All closures were assisted by transesophageal echo guidance. Entrance sites and routes of delivery were chosen according to the anatomic presentation of the defect. For transvascular closure of 5 singular and 8 multiple mVSD 5 Amplatzer PDA II occluder, 6 Amplatzer VSD occluder and 4 Amplatzer vascular plugs IV were used. Follow-up time ranges from 23 days to 2.8 years (mean 1.2 years).

Results: 3 defects were observed closed immediately. 9 mVSD showed a residual shunt immediately after the implantation procedure, which further reduced during follow-up in all patients. In one patient a second defect opened up after closure of one defect and was closed in a second attempt. Two intra-procedural complications occurred. A sudden complete AV-Block led to transcatheter explantation of the device in one patient. This patient with a restrictive cardiomyopathy died during follow-up. In one patient on ECMO a left ventricular perforation with the device already in place had to be over sewn in an emergency operation.

Conclusion: With some of the newer devices available, which pass through smaller delivery sheaths of 4 to 6 F, interventional closure of mVSD has become a feasible option in the treatment of patients of all ages and a bodyweight from 2.2 kg on, who present with elevated right ventricular pressures and high shunt volume. The procedure is challenging in newborns and infants and severe complications may occur.