

TRANSCATHETER CLOSURE OF PERIMEMBRANOUS AND MUSCULAR VSD WITH CARDIOFIX MUSCULAR VSD OCCLUDER

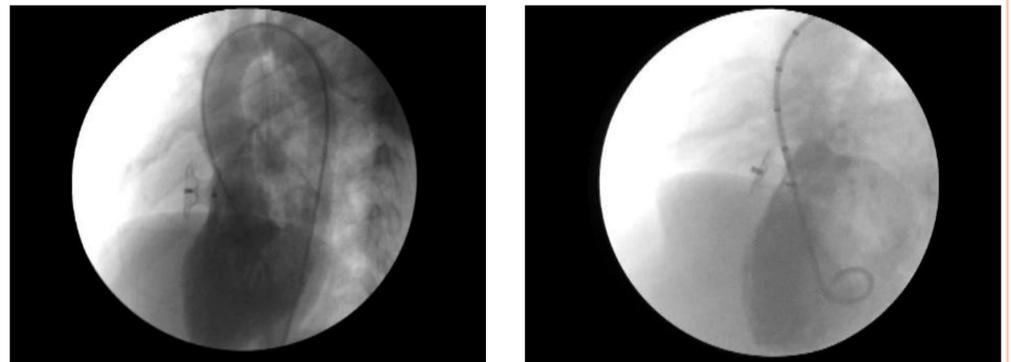
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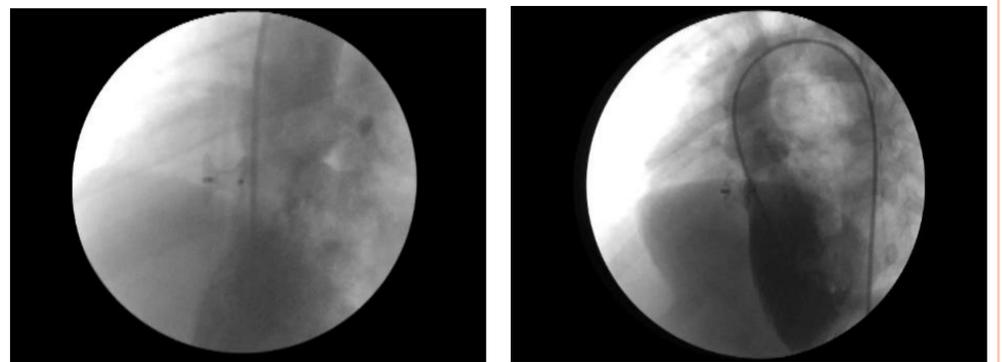
Background: The Cardi-O-Fix muscular ventricular septal defect (VSD) occluder (Starway Med) is a self-expandable, double disc implant device similar to Amplatzer muscular VSD (mVSDO) occluder. The difference from Amplatzer mVSD occluder that central connecting waist have two lengths 5 and 7 mm. However, connecting waist in Amplatzer mVSD occluder is uniformly 7 mm in length. Cardiofix mVSD device with 5 mm connecting waist can be preferred for closure of all muscular VSD and some selected pmVSDs with taking into consideration that the muscular septum is thinner in children and also rims of perimembranous VSD (pmVSD) is slim. In this study, we evaluated the safety and efficacy of Cardiofix mVSD occluder in percutaneous VSD closure.

Material and Method: Between 2007-2014 37 Patients underwent percutaneous transcatheter VSD closure with Cardiofix mVSDO in our clinic were analyzed. During the study period Cardiofix mVSDO was used in all muscular VSDs. In muscular VSDs, percutaneous technique was used if patient's weight more than 6 kg, left side approach was preferred establishing arteriovenous (AV) loop from either jugular or femoral vein. In some selected pmVSDs, if there is associated septal aneurysm, device was deployed preferably into the aneurysm by leaving the left disc of the device into the aneurysm tissue. If there is sufficient (≥ 4 mm) subaortic rim pmVSD was closed by leaving the left disc at the left ventricular (LV) side.

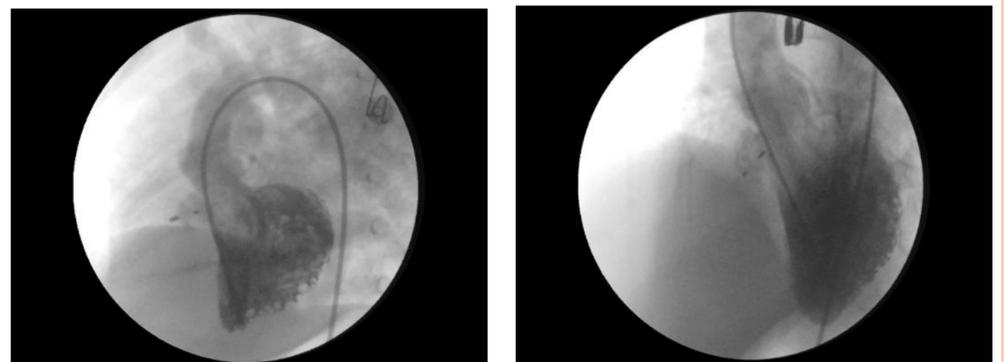
Results: The procedure was successful 35 of 37 (94%) patients. The age of patients ranged from 1 to 34 years (median 7 years) and weights ranged between 7 to 75 kg (median 17 kg). Mean defect diameter was $8,4 \text{ mm} \pm 3,1$ (4,3-18 mm) on LV side and $6,1 \text{ mm} \pm 1,6$ (4,3-11 mm) on right ventricular (hemodynamic diameter) side. Mean Qp/Qs ratio was $1,86 \pm 0,6$. Procedure time median 90 min (range, 42 to 210 min) and fluoroscopy time median was 28 minutes (range, 11 to 74 min). The defect types were perimembranous in 17 and muscular in 18 patients. In muscular defects, AV loop was established via femoral vein in 14 patients and jugular vein in three. In only one patient with muscular VSD, retrograde transarterial approach was used. Twelve patients those pmVSDs with sufficient subaortic rim were closed by left side. The mean distance between defect side and aortic valve (aortic rim) was $5,4 \text{ mm} \pm 1,1$ (4-8 mm). In five patients with insufficient rim device was deployed into the aneurysm. In pmVSDs antegrade transvenous approach was used in 15 patients. Retrograde transarterial closure was performed in only two patients that the left disc leaving in the aneurysm. In 23 patients (%79) procedure was performed under transthoracic echocardiography guidance. In a patient with residual VSD after surgery developed moderate tricuspid regurgitation and significant residual shunt even after device releasing was referred for elective surgery. Full occlusion rate was 94% (33/35) on follow up. There was trivial non-progressive new onset aortic regurgitation in one patient. In a median 42 months (22-73 months) follow up there was no permanent complete AV block.



Muscular VSD devices for high muscular VSDs ,Amplatzer on the left, Cardiofix on the right



Closing pm VSD by leaving the left disc at the left ventricular (LV) side, Amplatzer mVSDO on the left , Cardiofix mVSDO on the right



Pm VSD was closed by a Cardiofix muscular VSD occluder by placing into the aneurysm

Conclusion; Percutaneous VSD closure with Cardiofix mVSDO having a short connecting waist (5 mm) is safe and efficacious. Shorter connecting waist than Amplatzer mVSDO is more convenient for muscular VSDs in children when regarding to septal thickness. On the other hand, it may be preferred in pmVSD closure with sufficient subaortic rim since the larger connecting waist than the eccentric pmVSD occluder may cause lesser pressure to conducting pathway to reduce the risk of AV block. And also with the short connecting waist, the right ventricular disc of the Cardiofix mVSDO may interfere less with tricuspid valve motion in pmVSDs.

