

contacted by phone at 1, 3 and 6 month. The primary study endpoint was cardiovascular death.

**Results:** A total of 248 patients from 10 centers in various geographical areas were randomized: 125 to EHFP and 123 to RC at the time of hospital discharge. The mean age of all patients was  $60.8 \pm 13.8$  years. The patients were predominantly men (73%) with NYHA class II-IV heart failure symptoms who had a mean ejection fraction of  $26.8 \pm 7.3$ %. Demographic characteristics, including age, sex, laboratory evaluations and assessments of cardiac function, and functional capacity were equivalent in both treatment groups. Use of pharmacologic therapy at baseline in the patients demonstrated compliance with guidelines recommended therapy. Six-month cardiovascular mortality was significantly higher in the RC group ( $p < 0.05$ ). At baseline 60% of patients in EHFP and 61% RC were in NYHA Class III and IV; at 6-month follow up only 12% in EHFP and 32% in RC were in NYHA Class III and IV. The mean number of hospitalization was  $0.58 \pm 0.91$  in EHFP and  $0.64 \pm 1.05$  in RC ( $p = \text{NS}$ ) and the mean number of emergency room visits were  $0.84 \pm 1.15$  and  $1.21 \pm 1.47$ , respectively at 6-month follow-up ( $p < 0.05$ ).

**Conclusion:** Our study results showed that an enhanced education lead by a cardiologist and a phone follow up program significantly reduced the cardiovascular deaths and number of emergency room visit within 6 months after discharge in HF patients.

## Interventional Cardiology

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### OP-169

#### Middle-term Results of Percutaneous Closure of Congenital Ventricular Septal Defect Using Different Devices

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**Introduction:** The middle-term results of VSD closure using different devices in our clinic are presented.

**Patients and Methods:** Patients undergoing transcatheter VSD closure in our clinic between April 2007 and June 2013 were reviewed. Defects were closed in cases with a large VSD on echocardiography, left chamber hypertrophy and hemodynamically a  $Qp/Qs > 1.5$  and/or reversible pulmonary hypertension. In perimembranous VSD the left disk of the occluder was placed on the left of the septum in the absence of aneurysm. If an aneurysm was present, the left disk was placed inside it, to reduce the risk of AV block.

**Results:** Median age of the patients was 8 (range, 10 months - 55 years); their average follow-up was  $37 \pm 20$  months and average  $Qp/Qs$   $2.0 \pm 0.63$ . Average VSD diameter was  $91 \pm 3$  mm (3-20). Implantation was successful in 74 (92.5%) of the 80 patients. Of these, 51 had perimembranous and 23 muscular defects. For cases with perimembranous defects, an eccentric Amplatzer perimembranous VSD device was placed in 18, a Cardiofix muscular VSD device in 17, an Amplatzer or Cardiofix duct occluder in 9, an Amplatzer muscular VSD device in 3, a Lifetech muscular VSD device in another 3 and an ADOII device in one patient. The device was placed within the aneurysm tissue in 18 cases. As for muscular VSD, Cardiofix muscular VSD device was used in 18 patients, an Amplatzer muscular VSD device in 2, a Lifetech muscular VSD in another 2 and a Cardiofix ASD occluder in one patient. Complete occlusion immediately post-intervention was achieved in 52% (39/74), 70% (52/74) on the next day and 85% (63/74) at the 6-month follow-up. The residual defect ratio was significantly higher where the device had been placed inside the aneurysm ( $p < 0.05$ ). One patient had a reversible complete AV block and another one experienced hemolysis, no other major complications were observed. One patient underwent open surgery for a significant residual defect. During follow-up, two patient had de novo presentation of non-progressive, minimal aortic insufficiency.

**Conclusion:** VSD occlusion by different devices is safe and efficacious in selected patients. While placement of the device inside the aneurysm increases the proportion of residual shunt, it is believed that it may reduce the risk of AV block, the most feared complication.

### OP-170

#### Percutaneous Closure of Perimembranous Ventricular Septal Defects Associated With Septal Aneurysm

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**Introduction:** Ventricular septal defects (VSD) are the most common congenital heart disease. Of these defects 80% involves the membranous septum. With the

introduction of eccentric perimembranous VSD (PmVSD) occluder devices, percutaneous closure of PmVSDs has become an accepted alternative to surgical closure. However, closure of PmVSDs associated with septal aneurysms is more challenging. We report our experience of device closure of PmVSD associated with septal aneurysm.

**Material-Methods:** Between 2008 and 2012, percutaneous closure of PmVSD associated with a septal aneurysm was attempted in 11 patients in our institution. The indication for VSD closure was the presence of hemodynamically significant PmVSD demonstrated by cardiac catheterisation ( $Qp/Qs > 1.5$ ). We used 2 methods to occlude PmVSD associated with septal aneurysm: 1) to close the defect at the left ventricular opening of the aneurysm by anchoring the left disc of the occluder at the inlet portion of the aneurysm and compressing the aneurysm and the defect between the left and the right discs of the device; 2) to close the defect at the outlet by anchoring the left disc of the device at the left side of the outlet portion of the aneurysm. We preferred to use the first method when the aneurysm was small and there is adequate distance from the aortic valve. The patients were followed up at 1st, 3rd, 6th and 12th months after the closure procedure by TTE and ECG.

**Results:** Mean age of the patients was  $36.2 \pm 1.3$  and 64% were male. The demographic and clinical characteristics of patients are shown in table 1. The average diameter of the VSD was  $5.9 \pm 2.4$  mm by angiography. One patient had 2 defects within the aneurysm and 1 patient had dextrocardia. Large aneurysm (the inlet portion of the aneurysm  $> 10$  mm) was present in 7 patients. The procedure was successful in all patients. We used Amplatzer PmVSD occluder device in 3 patients, Amplatzer Muscular VSD occluder device in 5 patients, Amplatzer Duct occluder-I (ADO-I) in 1 patient and ADO-II device in 2 patients. We preferred to occlude the defect by the first method in 4 patients who had a small aneurysm and PmVSD occluder was used in 3 cases and a muscular VSD occluder device was implanted in 1 patient. Second method was preferred in 7 patients who had larger aneurysms. A trivial residual shunt was detected by ventriculography in 4 patients immediately after the procedure. Complete closure was observed by transthoracic echocardiography in all patients at the time of discharge. The patients were followed-up at mean of  $22 \pm 1.9$  months. There was no device or procedure related complications at the acute setting or mid-term follow-up.

**Conclusion:** Percutaneous closure of PmVSDs associated with aneurysm is more challenging than simple defects. The selection of the device type and size should be made according to the configuration and size of the aneurysm and the defect.

#### Demographic and clinical characteristics of patients

	Gender	Age (years)	Qp/Qs	VSD size (mm)	Aneurysm inlet size (mm)	Device
Patient 1	Male	26	2.2	4	5	PmVSD occluder
Patient 2	Female	18	2	8	18	Muscular VSD occluder
Patient 3	Male	36	1.6	5	19	Muscular VSD occluder
Patient 4	Male	36	1.6	4	19	ADO-II
Patient 5	Male	42	1.7	8	15	Muscular VSD occluder
Patient 6	Male	62	2	8	9	PmVSD occluder
Patient 7	Male	21	1.7	9	13	ADO-I
Patient 8	Female	49	1.6	3	8	PmVSD occluder
Patient 9	Female	49	1.7	3	5	Muscular VSD occluder
Patient 10	Male	23	2.1	5	11	ADO-II
Patient 11	Female	36	1.7	8	15	Muscular VSD occluder

VSD: ventricular septal defect ADO: Amplatzer Duct Occluder