characteristics. Similar success (AV groove: 91.8%, epicardial: 94.3%, septal: 97.6%; p=ns) and procedural complication (AV groove 4.1%, epicardial 4.8%, septal 2.4%; p=ns) rates were achieved in the 3 subgroups.

**CONCLUSIONS** In real world retrograde CTO PCIs, selection of collateral channel guided by a proposed hierarchic decision algorithm achieved high technical success rate and low procedural complication rate. With liberal but rational selection, AV groove, epicardial, or septal collateral channels may all be used with similar technical success and procedural complication rates.

**CATEGORIES CORONARY:** Complex and Higher Risk Procedures for Indicated Patients (CHIP)

**KEYWORDS** Chronic total occlusion, Retrograde, Revascularization strategy

### TCT-25

**Randomized Comparison of Final Kissing Balloon Dilatation Versus No Final Kissing Balloon Dilatation in Patients With Coronary Bifurcation Lesions Treated With Main Vessel Stenting. Five Year Clinical Outcome in The Nordic-Baltic Bifurcation Study III**

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**BACKGROUND** Bifurcation treatment using the provisional strategy with routine final kissing balloon dilatation (FKBD) have resulted in longer and more complex procedures compared to a strategy of no FKBD. FKBD may reduce delayed strut coverage and flow limiting neointimal growth on stent struts jailing the side branch ostium. However, stent distortion after FKBD may negatively affect vessel healing. We present the 5-year clinical follow-up in the Nordic-Baltic Bifurcation Study III (NCT00914199) on routine vs. no FKBD.

**METHODS** 477 patients with a bifurcation lesion were randomized to FKBD (n=238) or no-FKBD (n=239) after main vessel stenting. The 6-month primary end-point was a composite of major adverse cardiac events (MACE); cardiac death, non-procedure related index lesion myocardial infarction, target lesion revascularization or definite stent thrombosis.

**RESULTS** Five-year follow-up was available in 472 (99%) patients. The 5-year MACE rate was 14.5% in the FKBD group compared to 13.1% (p=0.66) in the no-FKBD group. All-cause mortality was observed in 9.8% vs. 3.8% (p=0.01), cardiac death in 4.2% vs. 0.8% (p=0.02), non-procedural myocardial infarction in 4.3% vs. 4.7% (p=0.83), target lesion revascularization in 8.5% vs. 10.1% (p=0.55), and definite stent thrombosis in 0.8% vs. 1.3% (p=0.66) of patients in the FKBD and no-FKBD groups, respectively. In the subgroup of true bifurcation lesions (n=235) 5-year MACE rates were 16.0% in the FKBD group vs. 18.1% (p=0.66) in the no-FKBD group.

**CONCLUSIONS** A strategy of routine FKBD compared to no FKBD, in main vessel-only stenting did not improve 5-year clinical outcome after treatment of coronary bifurcation lesions. Cardiac mortality and all-cause mortality were significantly increased in the routine FKBD group at 5 years.

**CATEGORIES CORONARY:** Complex and Higher Risk Procedures for Indicated Patients (CHIP)

# CONGENITAL HEART DISEASE AND OTHER STRUCTURAL INTERVENTIONS

**Tuesday, October, 13, 2015, 2:00 PM-4:00 PM**

**Abstract nos: 26 - 34**

### TCT-26

**Balloon Pulmonary Angioplasty Driven By Combined Assessment of Intra-Arterial Anatomy And Physiology In Patients With Non Operable Distal Chronic Thromboembolic Pulmonary Hypertension**

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**BACKGROUND** Balloon pulmonary angioplasty (BPA) is an emerging therapeutic method in CTEPH. We aimed to prove the safety and efficacy of refined BPA driven by combined assessment of intra-arterial anatomy (IVUS/OCT) and physiology (pulmonary pressure ratio, PPR) in non-operable distal CTEPH.

**METHODS** 11 pts (mean age 76, 59-84, 7 males) were enrolled in the BPA program according to the following inclusion criteria: 1. Non-operable CTEPH; 2. RHC with mPAP >30mmHg; 3. At least one segmental perfusion defect at lung scintigraphy; 4. WHO class > II. Overall, 9 pts underwent 27 BPA sessions, 50 pulmonary arteries were dilated (mean 6 vessels per patient, range 3-9; 2.03 dilated arteries per session). All the angioplasties were performed according to an algorithm, which incorporated anatomical and functional assessment of targeted lesions.

**RESULTS** We performed BPA of 32 web lesions, 5 ring-like stenosis and 13 complete obstructions. BPA resulted in clinical and hemodynamic improvement. WHO class improved from pre-BPA to post-BPA (p=0.011), and 6 MWD increased from 304m to 384m (p =0.03), NT-proBNP dropped from 1248 pg/ml to 730pg/ml (p=0.007). Mean PAP and PVR decreased (p=0.01), while CO and CI increased (p=0.01). All dilated arteries were patent at angiographic reassessment. No significant complications occurred and all treated patients are still alive. Insignificant transient reperfusion pulmonary edema (RPE) occurred in only 2 patients, who responded well to supplemental oxygen.

**CONCLUSIONS** BPA with assessment of intrapulmonary physiology using a pressure wire and precise evaluation of anatomy with IVUS and OCT provides hemodynamic and functional improvement, with minimal complications in distal non-operable CTEPH. This observation requires further validation in a large prospective study.

**CATEGORIES ENDOVASCULAR:** Peripheral Vascular Disease and Intervention

**KEYWORDS** Balloon Pulmonary Angioplasty, Chronic Thromboembolic Pulmonary Hypertension

### TCT-27

**Impact of Primary Stenting Compared to Balloon Dilatation Alone on Pulmonary Vein Restenosis**

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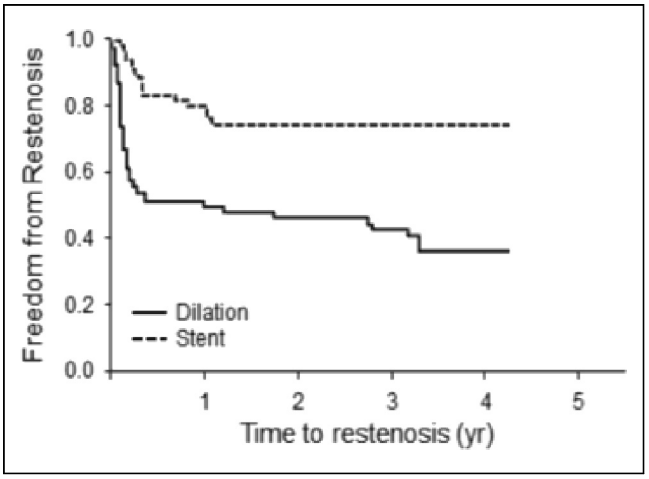
**BACKGROUND** Pulmonary vein stenosis (PVS) is a rare, but serious complication of pulmonary vein isolation resulting in debilitating symptoms including cough, chest pain, dyspnea, hemoptysis, and pulmonary infarction. Despite advances in interventional techniques, re-stenosis after PV dilation and/or stenting is a significant and common complication with no conclusive data regarding recurrence with balloon angioplasty versus stenting. We sought to ascertain the incidence of PVS recurrence after an initially successful intervention, and evaluate procedural characteristics which might have prognostic implications on predicting future restenosis.

**METHODS** We abstracted baseline demographic data, date and method of PVS diagnosis, and presenting symptoms on patients who underwent an incident PVS intervention between November 2000 and November 2014. We charted PVS interventional procedural data

including pre-procedural percent stenosis, PV pressure gradients, method of intervention, complications, and recurrence.

**RESULTS** Of the 112 patients who went to the lab, we analyzed data encompassing 216 veins with 39 veins not intervened upon secondary to complete occlusion or lack of substantial PV-LA pressure gradient. After an initial 94% procedural success rate, there were 76 PVS recurrences (44%) over a median follow up time of 4.6 years. We found those who experienced PVS recurrence had significantly higher post-procedure PV/LA gradients (3.8±4.9 mmHg vs 1.7±1.8 mmHg, p=0.001) compared to those who avoided recurrence. Patients who underwent initial stenting compared to balloon dilatation had a 44% reduction in recurrence compared to those who underwent balloon dilatation only (RR=0.56, 95% CI 0.41 to 0.75, p<0.0001, Figure 1). We also note significantly higher balloon atmosphere inflations among patients who did not recur (9.1±4.0 atm vs 7.3±2.3 atm, p=0.007) with no difference in pre-procedural lesion characteristics or stent/balloon size.




**CONCLUSIONS** These results demonstrate PVS recurrence is common, and is more likely to occur over a lengthy follow up in those who initially underwent balloon dilatation compared to stenting. Furthermore, difficult lesions where higher balloon insufflation cannot be achieved resulting in higher post-procedure PV/LA gradients are more likely to result in recurrence. Thus, PVS should be initially treated with stenting to avoid further sequelae of PVI such as recurrent PVS.

**CATEGORIES CORONARY:** Complex and Higher Risk Procedures for Indicated Patients (CHIP)

**KEYWORDS** Stent, Transseptal puncture, Venous stenting

## TCT-28

### Treat and Repair Strategies for Adult Patients with Atrial Septal Defect and Severe Pulmonary Atrial Hypertension

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**BACKGROUND** Optimal therapeutic strategies for patients with atrial septal defect (ASD) complicated with severe pulmonary arterial hypertension (PAH) is controversial. Combination of recent advanced PAH specific medication and transcatheter ASD closure may contribute the improvement of therapeutic outcome in these difficult patients population. Our purpose was to evaluate the efficacy of PAH-specific medications combined with transcatheter closure.

**METHODS** Between January 2006 and December 2013, 780 patients with ASD were performed transcatheter closure, and 48 of 780 patients (6.2%) complicated with PAH (mean pulmonary artery pressure $\geq$ 25 mm Hg). Following patients were excluded from this study because of pulmonary hypertension related to lung diseases (n=8), left ventricular systolic dysfunction (n=1) and pulmonary embolism (n=1). Among 38 patients with PAH associated with ASD, 3 patients excluded because the defects was too large for device deployment. A total of 35 patients underwent successful procedures and were included in this study. Among of these, 8 patients with severe PAH required of PAH-specific medication (PAH specific group) and compared to 40 patients who did not required of PAH-specific medication (non PAH-specific group) were studied. PAH-specific medications included an endothelin receptor antagonist (bosentan; n = 4), a phosphodiesterase type-5 inhibitor (sildenafil; n = 4), an oral prostanoid (beraprost; n = 1), and an intravenous prostanoid (epoprostenol; n = 2).

**RESULTS** After the induction of PAH specific medication (mean 6.6 months), transcatheter ASD closure was successfully performed in all without hemodynamic intolerances. Mean device size was 26 ± 7 mm and the mean fluoroscopic time was 15 ± 8 min. Multiple devices were required in 2 patients. No hemodynamic compromise occurred in any of the patients during or after the procedure. Improvement of systolic PAP was significantly greater in PAH-specific group compared to non PAH-specific group (median, 49; range, 26 to 105 mm Hg vs. median, 14; range 4 to 77 mm Hg, respectively; p = 0.0014). Among 29 patients with symptomatic heart failure, improved heart failure symptoms was observed in 21 (72%) patients with no exacerbation of heart failure. Compared with the initial evaluation, BNP levels significantly improved at follow-up at follow-up period (p = 0.0017). During the mean observational period of 45 ± 25 months, one patient required hospital admission due to the progression of sick sinus syndrome. No other adverse events including hospitalization of exacerbation of PAH were observed.

**CONCLUSIONS** Even in patients with severe PAH, who initially did not fulfill the indication of transcatheter ASD closure, the recent PAH specific medication can contribute the significant improvement of hemodynamic condition. This treat and repair strategies may expand of therapeutic indication for transcatheter ASD closure in patients with severe PAH.

**CATEGORIES STRUCTURAL:** Congenital and Other Structural Heart Disease

**KEYWORDS** Atrial septal defect, Device closure, Pulmonary hypertension

## TCT-29

### Safety and Efficacy of Percutaneous Device Closure of Large Post Tricuspid Shunts in Pediatric Patients With Severe PAH At Short Term and Midterm Follow Up

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**BACKGROUND** Transcatheter closure of large post-tricuspid shunts in patients with severe pulmonary arterial hypertension (PAH) remains a challenging clinical problem. In neonates and infants it is most often reversible, but in older patients the resolution of PAH is variable depending on the reversibility of pulmonary vascular resistance. The current study was done to assess the safety and efficacy of percutaneous device closure of large post tricuspid shunts in pediatric patients with severe PAH at short and mid term follow up.

**METHODS** A total of 42 pediatric patients underwent transcatheter closure of large post tricuspid shunts with severe PAH. All subjects underwent clinical examination, electrocardiography, chest x-rays and echocardiography before discharge and at 1, 6 and 12 months after the procedure and yearly thereafter for 5 years.

**RESULTS** Type of defect was ventricular septal defect in 8 patients (19%), patent ductus arteriosus in 27 patients (64%), aorto-pulmonary window in 5 patients (12%) and coronary cameral fistula in two patients (5%). Cardi-O-Fix VSD occluder was the most commonly used device (45%), Cardi-O-Fix PDA occluder (21%) and Amplatzer duct occlude in 17% patients. Pre-procedural pulmonary artery systolic pressure decreased significantly from mean 81.12 mmHg to mean 43.17 mmHg post procedure over a mean follow-up of 18.5 months. No residual shunt was found in 38 (90.47%) patients. Only two major complications viz; severe aortic obstruction and symptomatic complete heart block were noticed.