TCT-822

Computed tomography evaluation prior to CoreValve implantation predicts postprocedural aortic regurgitation

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Background: There is growing evidence that paravalvular regurgitation after transcatheter aortic valve implantation impairs long-term survival. We aimed to identify CT-derived parameters associated with postprocedural regurgitation.
Methods: One hundred and forty-three preprocedural computed tomography data sets of patients who had undergone CoreValve (Medtronic, Inc.) implantation with the 26mm (n=58) and the 29mm (n=85) prosthesis between 06/2007 and 09/2010 were analysed retrospectively. The ellipticity of the aortic annulus was defined as the ratio of the maximum and minimum diameter. Annulus size was measured by perimeter and area. The degree of calcifications in the three sinuses was assessed. Prosthesis-annulus oversizing was calculated by the perimeter of the prosthesis in relation to annulus perimeter. The degree of aortic regurgitation and depth of prosthesis implantation was assessed from the intraprocedural angiography.
Results: Thirty-eight patients (26.6%) had an angiographic AI>°I. The t-test revealed a significantly larger perimeter (82.1±8.6mm vs 78.8±6.9mm, p=0.037) and annulus area (5.2±1.1cm^2 vs 4.7±0.8cm^2, p=0.031), a significantly higher degree of calcification of the right, left and non-coronary cusp (total calcium 1222±794 vs 699±493, p<0.001), and significantly less oversizing (6.1±7.4% vs 11.5±7.6%, p=0.001) in patients with an AI>°I, while the ellipticity of the annulus and implantation depth were not associated with AI. Regression analysis revealed calcification of the left coronary cusp (p=0.020) and less oversizing (p=0.014) as significant independent predictors for an AI>°I. Kaplan Meier survival analysis showed an insignificant trend towards a better 1-year survival in patients with an AI≤°I (83.0% vs 77.5%, p=0.118).
Conclusions: Aortic regurgitation after transcatheter valve implantation can be predicted by CT measurements. Our data support the evidence of impaired survival in patients with an AI larger than grade I. As a large annulus anatomy and amount of calcification are unmodifiable variables more valve sizes might be needed to better fit all anatomies. According to our data, an oversizing of at least 10% should be attempted for CoreValve implantation.

TCT-823

In-Vitro Assessment Of The Influence Of Oval Annuli On The Hydrodynamic Function Of Percutaneous Heart Valve Prostheses

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Background: CT- analyses of patient data show that the majority of annuli of patients suffering from severe aortic stenosis are oval in shape. Current percutaneous heart valve prostheses are circular and in-vitro tests for CE-Mark approval are only performed in circular annulus models. In an effort to create a new in-vitro test method closer related to a real world implanted valve setting, a test setting was developed to characterize the hydrodynamic performance of percutaneous heart valves in oval annuli.
Methods: Models of aortic roots with 3 different grades of annulus ovality were created with orifice areas corresponding to circular 23 and 27mm annuli. The dimensions of the aortic roots are based on the Reul model. The molds for the models were 3D-printed and cast from silicone. The prostheses were crimped and expanded into the aortic roots prior to testing. Evaluation of the influence of the oval annuli on valve hydrodynamics were performed in the CVE pulse duplicator by analyzing high speed video recordings of the valve motion and flow and pressure data. The flow rates and frequencies were varied to simulate different physiological situations. The measurements in each annulus model were performed at 3, 5 and 8 l/min cardiac output, 80, 100 and 120 mmHg of mean aortic pressure and 120, 70 and 110 BPM respectively.
Results: This study demonstrates the feasibility of in-vitro evaluation of the influence of an oval annulus on heart valve performance. Tests with commercially available heart valve prostheses (CoreValve, Medtronic CV Luxembourg) showed considerable differences in valve hydrodynamics in circular and oval annuli models. Valve regurgitation and paravalvular leakage are particularly affected by an oval annulus.
Conclusions: The field of percutaneous heart valve testing must develop along with the technology to ensure that these devices are fit to be used in the treated patient group. The regurgitation associated with oval annuli is alarming and calls for further investigation and correlation with clinical data. In-vitro measurement of hydrodynamic valve performance in oval annuli represent a major step forward on the way to more application based testing specifications.

TCT-824

The impact of creation of a transcatheter aortic valve program on surgical aortic valve replacement (sAVR) volume and outcomes: A single center experience

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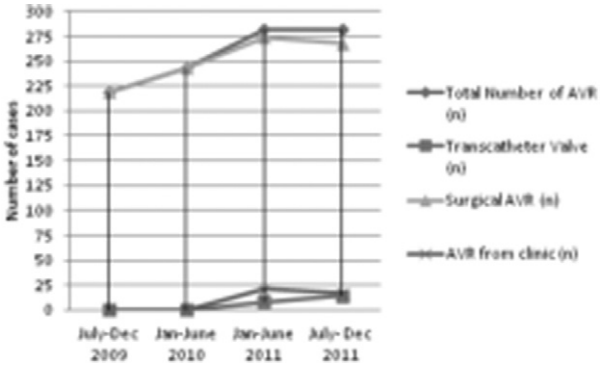
Background: At least 30% of patients with severe asymptomatic aortic stenosis do not undergo sAVR. Transcatheter Aortic Valve Implantation (TAVI) provides a potential option for those patients. Many centers have established a dedicated aortic clinic to evaluate those patients. However, the impact of those clinics on sAVR volume and outcomes remains unclear.
Methods: The University of Pittsburgh started an aortic valve clinic in September 2010 staffed by an interventional cardiologist and a cardiac surgeon to evaluate potential TAVI candidates. Actual implants began in Januaray 2011. We compared the sAVR volume and outcomes in the 12 months prior to opening the clinic (July 2009- June 2010) to the 12 months folllowing that (Jan 2011-Dec2011). We excluded the transition from July-December 2010.
Results: 462 sAVRs were performed between July 2009-June 2010 compared to 564 from Jan 2011-Dec 2011 (22% increase), of those, 41 patients were initially referred for TAVI as they were deemed nonsurgical candidates by their referring cardiologist and underwent sAVR (average STS score 5.3%). The average STS risk score and in hospital surgical mortality for the patients undergoing sAVR prior to establishing valve clinic was 5.0%, and 7.2%, respectively compared to 5.7%, and 6.4% respectively.



Conclusions: Establishing a dedicated aortic valve clinic was associated with increase in sAVR volume. A significant proportion of that increase is from patients whose surgical risk has been overestimated by their treating physician and deemed nonsurgical candidates. This increase in volume was not associated with increase surgical mortality.

TCT-825

Antegrade-transseptal, Retrograde or Trasapical Access to the Ascending Aorta Hemodynamic- a Comparision Study in a Porcine Model

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Background: Thoracic aortic aneurysms are frequently associated with multiple tortuous segments of the aorta that may lead to inability to advance or deploy an endograft and may prohibit precise placement. Antegrade transseptal access (TSA) using through-and-through guidewire technique for endograft introduction into the ascending aorta has previously shown to be feasible in a porcine model. The aim of this study was to compare feasibility and hemodynamic effects of retrograde transfemoral (TFA) and antegrade transapical access (TAA) to the ascending aorta to TSA for endograft introduction in pigs.
Methods: TSA (n=6 pigs, 54±6kgBW) was compared to TFA (n=6, 52±8kgBW) and TAA (n=6, 54±8kgBW). Custom-made endografts (polyester-tube + 2 nitinol-stents, 24x32mm) were advanced and deployed under fluoroscopy into the ascending aorta. Myocardial and cerebral perfusion were assessed by fluorescent-microspheres (FM). Transit-time flow measurement (TTFM) on the carotid artery was performed. Hemodynamic parameters were evaluated during baseline (M1), sheath forwarding (M2), endograft deployment (M3) and after retraction of the sheath (M4).
Results: Endograft deployment was feasible in all animals. All coronary arteries remained patent. Cardiac-output, heart rate and central-venous-pressure were stable throughout the whole study in all animals (p=n.s.). During M2 transient hemodynamic instability due to severe valve insufficiency occurred during TSA and TFA reflected by significantly higher ratio between pulmonary-arterial and

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