the boundary was finally crossed again at patient 51, and the procedure remained under control until the end.

**Conclusions:** The failure of a TAVI procedure may be due to several factors, many of which are not directly related to the operative technique itself. By allowing the early identification of negative trends, the CUSUM charts may prompt internal audits aimed to the identification of the causes of failure, helping to take the procedure back into control.

**TCT-738**

**Changes in Left Ventricular Ejection and Filling Times: Physiological Markers for the Appearance of Left Ventricular Dyssynchrony Following Transcatheter Aortic Valve Implantation (TAVI)**

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**Background:** Aortic stenosis (AS) increases left ventricular (LV) filling pressure. Total isovolumic time (T-IVT): the time when the LV is neither ejecting nor filling: i.e. ‘wasted’ time is a marker of global left ventricular (LV) dyssynchrony. T-IVT is long when LV dyssynchrony is present and is short when LV filling pressure is raised. Relief of AS reduces LV filling pressures and may mask LV dyssynchrony. We hypothesised that prolongation of T-IVT after trans- aortic valve implantation (TAVI) could provide a simple echocardiographic marker for the presence of LV dyssynchrony.

**Methods:** 79 consecutive patients (aged 83±7 years) with severe AS but no flow-limiting coronary artery disease were studied one week before and 6 weeks after TAVI. Using the same echo, total LV ejection (t-ET) and filling times (t-FT) were measured and expressed in seconds/min. T-IVT was then derived as (t-ET minus (t-FT). Incoordination was measured as amplitude of continued inward motion of the lateral wall after aortic valve closure. Patients were compared to 32 normal subjects (aged 66±5 years).

**Results:** In controls, t-ET was 20±3/min, t-FT was 29±3/min, t-IVT was thus 11±2/s/min, and there was no incoordination. In patients pre-TAVI, t-IVT was prolonged compared to controls (24±3/min, p<0.01). T-FT was not different (29±3/min, p=NS), and t-IVT (wasted time) was significantly shorter (7±2/min, p<0.001). Incoordination was present (3±1/mm). After TAVI, mean aortic pressure drop fell (from 49±15 mmHg to 8±2 mmHg, p<0.001) and both t-ET shortened (t-FT to 21±3/min, p<0.001; t-FT to 26±3/min, p<0.05), so that T-IVT (wasted time) increased (to 13±3/min, p<0.001 compared to pre-TAVI). At the same time, incoordination increased (to 5±2/mm, p<0.01).

**Conclusions:** Patients with significant AS have longer ejection time compared to controls. Relief of AS after TAVI is associated with significant shortening of ejection time. The appearance of early diastolic incoordination, presumably due to a reduction in LV filling pressure, concurrently shortens the available time for LV filling. The overall result, significant prolongation of total isovolumic time, may therefore be a marker of LV dyssynchrony after TAVI.

**TCT-739**

**TAVI Karlsruhe (TAVIK) – a comparison of minimal invasive and surgical aortic valve replacement in patients with severe symptomatic aortic stenosis and intermediate risk for conventional surgery**

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**Background:** Aortic stenosis (AS) increases left ventricular (LV) filling pressure. Total isovolumic time (T-IVT): the time when the LV is neither ejecting nor filling: i.e. ‘wasted’ time is a marker of global left ventricular (LV) dyssynchrony. T-IVT is long when LV dyssynchrony is present and is short when LV filling pressure is raised. Relief of AS reduces LV filling pressures and may mask LV dyssynchrony. We hypothesised that prolongation of T-IVT after trans- aortic valve implantation (TAVI) could provide a simple echocardiographic marker for the presence of LV dyssynchrony.

**Methods:** 79 consecutive patients (aged 83±7 years) with severe AS but no flow-limiting coronary artery disease were studied one week before and 6 weeks after TAVI. Using the same echo, total LV ejection (t-ET) and filling times (t-FT) were measured and expressed in seconds/min. T-IVT was then derived as (t-ET minus (t-FT). Incoordination was measured as amplitude of continued inward motion of the lateral wall after aortic valve closure. Patients were compared to 32 normal subjects (aged 66±5 years).

**Results:** In controls, t-ET was 20±3/min, t-FT was 29±3/min, t-IVT was thus 11±2/s/min, and there was no incoordination. In patients pre-TAVI, t-IVT was prolonged compared to controls (24±3/min, p<0.01). T-FT was not different (29±3/min, p=NS), and t-IVT (wasted time) was significantly shorter (7±2/min, p<0.001). Incoordination was present (3±1/mm). After TAVI, mean aortic pressure drop fell (from 49±15 mmHg to 8±2 mmHg, p<0.001) and both t-ET shortened (t-FT to 21±3/min, p<0.001; t-FT to 26±3/min, p<0.05), so that T-IVT (wasted time) increased (to 13±3/min, p<0.001 compared to pre-TAVI). At the same time, incoordination increased (to 5±2/mm, p<0.01).

**Conclusions:** Patients with significant AS have longer ejection time compared to controls. Relief of AS after TAVI is associated with significant shortening of ejection time. The appearance of early diastolic incoordination, presumably due to a reduction in LV filling pressure, concurrently shortens the available time for LV filling. The overall result, significant prolongation of total isovolumic time, may therefore be a marker of LV dyssynchrony after TAVI.
**TCT-741**

**Comparison of long-term clinical outcome between patients with chronic versus acute type B aortic dissection treated by implantation of a stent graft: a single-center report**

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**Background:** Background: Stent grafting for treatment of type B aortic dissection has been extensively used. However, the difference in long-term clinical outcome between patients with chronic versus acute type B aortic dissection remains unknown. This study aimed to analyze the difference in long-term clinical outcome after endovascular repair for patients with chronic (≥2 weeks) versus acute (<2 weeks) type B aortic dissection.

**Methods:** Between May 2000 and June 2011, a total of 174 patients with type B aortic dissection (56 chronic, 118 acute) treated by endovascular repair were studied prospectively. Follow-up three-dimensional computed tomography scanning and aortoangiography were scheduled at 3–6 months after the index procedure. Propensity score matching was used to compare the difference in the endpoint between the two groups.

**Results:** The procedure-related event rate was 16.6% in the acute group and 5.4% in the chronic group (P = 0.021), but this difference became nonsignificant after propensity score matching. At the end of follow-up (mean 2.49 years), overall and aorta-related mortality was 11.0% and 7.6%, respectively, in the acute group, and was not significantly different from that in the chronic group (3.6% and 3.6%, P = 0.148 and P = 0.506, respectively). Both false and true lumina showed significant remodeling over time, with 93% complete false-lumen thrombosis. Untreated tear and type I endoleak were predictors of clinical events during follow-up.

**Conclusions:** Comparable long-term clinical results were achieved in patients with chronic or acute type B aortic dissection after implantation of a stent graft.

**TCT-742**

**Lower Vascular Complications With Percutaneous versus Open Transfemoral Transcatheter Aortic Valve Replacement**

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**Background:** Transcatheter aortic valve replacement (TAVR) via the transfemoral (TF) approach is currently performed by both open surgical and percutaneous access. Vascular complications are associated with morbidity and mortality, but few studies have directly compared access approach.

**Methods:** Data was collected on all patients undergoing TF TAVR with Sapien or Sapien XT aortic bioprostheses (Edwards Inc., Irvine, CA) between November 2007 and April 2013 at our institution. Valve Academic Research Consortium definitions were utilized.

**Results:** TF TAVR was performed in 331 patients via an open surgical (n=120) or percutaneous (n=211) approach. Both groups were similar in age, however the open group had a greater incidence of cardiovascular comorbidities. The average sheath outer diameter (OD) was slightly larger in the open group as compared to the percutaneous group (8.6 ± 0.4 vs. 8.4 ± 0.6 mm, p<0.001). There were fewer major vascular complications in the percutaneous as compared to the open group (11% vs. 20%, p=0.03), and a trend toward fewer overall vascular complications (17% vs. 26%, p=0.06). More patients with vascular complications in the percutaneous cohort had minimal artery diameter (MAD) less than sheath OD (74% versus 55%, p=0.03). The percutaneous group had decreased length of stay (LOS) compared to the open group (7.5 ± 4.7 vs. 9.9 ± 9.9 days, p=0.003). There was no difference in in-hospital mortality between the open and percutaneous groups (2.5 % vs .1 %, p=0.36). The use of second generation TAVR sheaths and valves via a percutaneous approach was associated with an even greater reduction in vascular complications (8% vs. 25%, p=0.01) and LOS (7.0 ± 4.8 versus 10.1 ± 10.0 days, p=0.04) as compared to the open group with first generation devices. Despite an increase in the difference between sheath OD and MAD (>0.21 vs. 0.27 mm, p=0.02) in the first and second half of our percutaneous access experience, the rates of vascular complications did not change over this time.

**Conclusions:** TF TAVR via a percutaneous approach is associated with less vascular morbidity and lower LOS as compared to an open surgical approach. These benefits are even greater with second-generation (Sapien XT) devices.

**TCT-743**

**Stratification of survival after transcatheter aortic valve replacement based on vascular complication by VARC-1 or VARC-2 criteria**

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**Background:** Valve academic research consortium (VARC) guidelines were devised in an effort not only to standardize clinical endpoint definitions but also to select endpoints that best reflect the safety and efficacy of transcatheter aortic valve replacement (TAVR). These guidelines are evolving in an expert led manner. We sought to compare the predictive value for survival of major vascular complications (VC) by VARC-1 and 2 definitions.

**Methods:** A large single center series of patients undergoing TAVR by multiple approaches were studied. We defined VC according to VARC-1 and 2 definitions, and compared the mortality one year after the procedure. Data was analyzed using Kaplan-Meier (KM) and Cox regression multivariable models that included all variables related to 1-year mortality to a significance level≤0.1.

**Results:** Data was analyzed for 388 patients. KM curves showed a numerically lower survival rate at 1-year by major VC with both definitions, but only VARC-2 had statistical significance; 79.2% vs. 60.7% with VARC-2 (p = 0.015), and 78.8% vs. 70.5% with VARC-1 (p = 0.211). Cox regression multivariable model showed VC by VARC-2 definition to be an independent predictor of 1-year mortality (p = 0.004), but not when VC was substituted by the VARC-1 definition (p = 0.08).

**Conclusions:** The VARC-2 definition for vascular complications offers better stratification of survival than the VARC-1 definition, supporting its widespread use. Reasons for this important difference will be discussed.

**TCT-744**

**Quantitative Assessment of Balloon-Expandable Valve Position During Transcatheter Aortic Valve Replacement Using Intraoperative Transesophageal Echocardiography**

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**Background:** Although prior studies describe the fluoroscopic operator-independent motion of the balloon-expandable valve, no studies have described the transesophageal echocardiogram (TEE) appearance of valve deployment. We aimed to describe the fluoroscopic and TEE appearance of valve deployment and to compare the fluoroscopic to TEE images.

**Methods:** Intraoperative TEE from 100 consecutive* patients presenting for TAVR were retrospectively analyzed. Patients with unreliable pacemaker capture or obvious operator-induced device motion during deployment were excluded (n=16). Device position was defined as the percent of total device height below the virtual annulus (hinge points of aortic valve cusps). Device position was measured pre-deployment (during rapid pacing) and post-deployment. Device cranial movement during deployment was defined as the difference between the pre-deployment and post-deployment position (mm) of the valve midpoint.

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*Patient enrollment, device position, and valve height were consistent throughout this study.

**Conclusions:** The fluoroscopic appearance of balloon-expandable valve position was consistent with the TEE appearance and the device position after fluoroscopy was similar to that after deployment. The use of fluoroscopic and TEE images may be helpful in the selection of valve position during deployment to ensure optimal valve apposition and prevent perivalvular regurgitation.