

TAVR AND PACEMAKER IMPLANTATION

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TCT-555

Post-Balloon Dilatation Following TAVR Implantation Increases Pacemaker Dependency



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BACKGROUND Transcatheter aortic valve replacement (TAVR) is increasingly used to treat severe aortic stenosis. A frequent complication of TAVR is atrioventricular (AV) block requiring a permanent pacemaker (PPM). The long-term dependency of pacing after TAVR is unknown. Post-balloon dilatation (PBD) immediately after implantation is frequently done. Its long-term influence on AV block is unknown.

METHODS Of 409 consecutive patients without prior PPM, undergoing TAVR (77% balloon-expandable, 23% self-expandable valve), 48 (11.7%) received a new PPM. Patients receiving a late PPM (>10 days after TAVR, n=5), a biventricular device (n=3), or who died within 30 days (n=1) were excluded. PPM dependency was defined as AV block with a ventricular escape rate ≤ 40 bpm. Patient and procedural characteristics were examined according to PPM dependency status.

RESULTS Nineteen of the 39 patients (48.8%) in the study group who received a PPM following TAVR were dependent at 30-days. There was no significant difference in age (80.1 ± 9.3 vs. 82.8 ± 6.7) or gender (47.4% and 55.0% female) between dependent and non-dependent groups. PPM dependency was more common after a self-expanding valve (47.4% vs. 15.0%, p = 0.03). PBD was performed in 25% of all TAVRs. Among patients without a pre-existing PPM, PBD was associated with a higher rate of new PPM (17.5% vs. 9.8%, p=0.04). Patients who underwent PBD also had a higher rate of PPM dependency (73.7% vs. 20.0%, p < 0.01). PPM dependent patients received the device earlier in the hospitalization (1 ± 1.6 days vs. 4 ± 2.6 days post-TAVR, p < 0.01) (Table 1).

Variable	Non-dependent (N = 20)	Dependent (N = 19)	P value
Median Valve Size (mm)	26	26	
Balloon expandable Valve Type	17 (85.0%)	10 (52.6%)	0.03
Self-expanding Valve Type	3 (15.0%)	9 (47.4%)	0.03
Pre-op PR (msec)	183.7 ± 41.9*	176.9 ± 26.6'	0.55
Pre-op QRS (msec)	111.1 ± 36.5	119.3 ± 25.3	0.42
Days post-TAVR when PPM was placed	4 ± 2.6	1 ± 1.6	< 0.01
Post-balloon dilatation by valve type (%)			
- Balloon expandable	23.5	90.0	< 0.01
- Self-expanding	0	55.6	0.10

CONCLUSION Half of patients who receive a new PPM following TAVR are not clearly pacemaker dependent at follow-up. PBD is associated with a markedly increased risk of PPM dependency.

CATEGORIES STRUCTURAL: Electrophysiology

TCT-556

Exposure to Glucocorticoids Prior to Transcatheter Aortic Valve Replacement is Associated with Reduced Incidence of High-Degree AV block and Pacemaker



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BACKGROUND A significant proportion of patients that receive a permanent pacemaker (PPM) after TAVR is not pacemaker-dependent during follow-up. Tissue edema and inflammation, which occur at the device landing zone during valve deployment, may contribute to the pathophysiology of conduction block. As such, glucocorticoids may have therapeutic effects due to their anti-edema and anti-inflammatory properties.

METHODS We hypothesized that exposure to glucocorticoids prior to TAVR will reduce the incidence of conduction abnormalities requiring PPM implantation after TAVR. We included 167 consecutive patients treated with TAVR at the Minneapolis VA Medical Center and University of Minnesota. Exposure to glucocorticoids was assessed by linking electronic medical and pharmacy records. The primary outcome was a new PPM within 30-days of the index TAVR procedure. Patients with pre-existing left bundle branch block or PPM were excluded.

RESULTS Of the 167patients included, 16 (9.5%) were exposed to glucocorticoids prior to TAVR.No differences in age, STS score, pre-existing right bundle branch block or valve type were seen among patients exposed to glucocorticoids versus those who were unexposed (table). Patients exposed to glucocorticoids were more likely to have moderate/severe COPD (43% versus 18%, p<0.01). The cumulative incidence of PPM implantation at 30-days after TAVR was 18%. None of the patients exposed to glucocorticoids required a PPM while 30 (19%) of the unexposed patients did (p=0.04).

	Steroids (n=16)	No Steroids (n=151)	P value
Age	76 (10)	80 (9)	0.07
STS median (IQR)	5.8 (3.9-7.9)	5.6 (3.1-8.8)	0.80
COPD (mod/severe)	(7) 43%	(28) 18%	<0.01
Right bundle brunch block	(1) 7%	21 (13%)	0.49
Implantation Depth (mm, IQR)	4 (3.1-4.5)	4.4 (3.5-5.8)	0.28
Sapien XT	7 (43%)	54 (36%)	0.58
Sapien 3	8 (50%)	79 (52%)	0.87
Corevalve/Evolut	1 (7%)	17 (12%)	0.55
New Pacemaker	0 (0%)	30 (19%)	0.04

CONCLUSION Exposure to glucocorticoids prior to TAVR is associated with reduced incidence of PPM requirement. Tissue edema and inflammation may be significant contributors to the pathophysiology of conduction abnormalities after TAVR and could represent a therapeutic target.

CATEGORIES STRUCTURAL: Valvular Disease: Aortic

TCT-557

Predictors of advanced conduction disturbances requiring a late (>48 hours) permanent pacemaker following transcatheter aortic valve implantation



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BACKGROUND To analyse and determine the predictors of advanced conduction disturbances requiring late (> 48 hours) permanent pacemaker implantation (PPM) after transcatheter aortic valve implantation (TAVI).

METHODS Consecutive patients were identified by retrospective review of a dedicated TAVI database of a single high-volume centre in Milan, Italy between October 2007 and July 2015. Clinical and procedural data were collected to determine predictors of conduction disturbances requiring a PPM at least 48 hours following TAVI.

RESULTS The overall population included 740 patients. We excluded 78 patients who already had a PPM and 51 patients who received a PPM <48 hours after TAVI. The final analysis included 611 patients. Of these, 54 patients (8.8%) developed an advanced conduction disturbance requiring PPM ≥48 hours following TAVI. PPM implantation was performed after a mean time of 6.1±3.9 days after TAVI. Reasons for PPM implantation included: 1) complete atrio-ventricular block (n= 42, 77%); 2) Mobitz type II block (n=4; 7%); 3) pathological pauses and asystole (n=7, 6.6%), and 4) symptomatic junctional rhythm (n=1; 1.8%). Patients who developed an advanced conduction delay and received a late PPM implantation had a wider QRS width at baseline (113±25 msec vs. 105±23 msec; p=0.009). Baseline right bundle branch block was more frequently present in the group of patients who received a late PPM (12.9%±5.3%; p=0.026). Patients that required a late PPM were more likely to have a self-expandable valve implanted (51.8%vs. 31.9%, p=0.003). Multivariable analysis revealed that PR length after TAVI was an independent predictor of the need for a PPM (OR 1.02; CI 95%: 1.01-1.03; p=0.0001), with a post procedural PR length of 179 msec measured 48 hours after TAVI identified as the optimal cutoff point (sensitivity 82%; specificity 44%) for predicting late PPM implantation, with corresponding area under the receiver operating characteristic curve of 0.738 (95% CI: 0.64-0.82; p=0.001).

CONCLUSION This preliminary analysis indicates that post-procedural PR length is the only independent predictor of late (≥48 hours) advanced conduction disturbances requiring PPM implantation after TAVI. Our study suggests that a simple ECG analysis could help in preventing potential lethal advanced conduction disturbances after TAVI.

CATEGORIES STRUCTURAL: Valvular Disease: Aortic

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Impact of an electrophysiology study guided PPM implantation strategy after TAVR



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BACKGROUND Permanent pacemaker (PPM) implantation remains the Achilles heel of transcatheter aortic valve replacement (TAVR) compared with surgical aortic valve replacement (SAVR). We previously demonstrated that an electrophysiology study (EPS) avoids PPM in over 70% of patients with conduction abnormality but no definitive indication for pacing after TAVR. The impact of this strategy in patients receiving contemporary valves has not been well studied.

METHODS Consecutive patients undergoing TAVR at a single US center between 2013 and 2016 with a contemporary balloon expandable or self-expanding TAVR device were included. PPM implantation rates using this strategy were qualitatively compared with published data from recent multicenter trials.

RESULTS A total of 257 patients were included in the study. The PPM implantation rate was 12.7% for the self-expanding Medtronic Evolut R and 4.7% for the balloon-expandable Edwards Sapien 3. Table 1 summarizes published PPM implantation rates from recent multicenter trials according to type of TAVR device. EPS guided strategy resulted in substantially lower PPM implantation rates compared with most of the recent multicenter TAVR trials, and similar rates to the next generation self-expanding Medtronic Evolut Pro.

Study	Sapien	CoreValve/Evolut	Lotus
PARTNER II	8.5%	—	—
NOTION	—	34.1%	—
SURTAVI	—	25.9%	—
REPRISE III	—	19.6%	35.5%
Washington Hospital Center	4.7%	12.7%	—
Evolut Pro US Clinical Study	—	10.0%	—

CONCLUSION Further studies are required to determine whether this observed effect is reproducible, and whether this strategy should be adopted in all patients with conduction abnormality and equivocal pacing indication after TAVR.

CATEGORIES STRUCTURAL: Electrophysiology

TCT-559

Development and Validation of a Risk Prediction Model for Permanent Pacemaker Implantation after Transcatheter Aortic Valve Replacement



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BACKGROUND Atrioventricular conduction disturbance requiring permanent pacemaker (PPM) implantation is the most common complication after transcatheter aortic valve replacement (TAVR). Improved risk stratification prior to TAVR procedures is warranted. The aim of this study was to develop and validate a risk-prediction model for PPM implantation after TAVR, based on pre-procedure clinical data and electrocardiographic (EKG) conduction abnormalities.

METHODS This PPM risk assessment model was developed using the 2012 and 2013 National Inpatient Sample (NIS). A logistic regression model was built to identify the predictors of PPM placement. The performance of the model was validated using the NIS 2014 dataset.

RESULTS Of 18,400 patients in development cohort, 1825 (9.9%) patients required PPM implantation after TAVR. After multivariate analysis, final predictive covariates of PPM implantation included left or right bundle branch block, bradycardia, 2nd-degree AV block and transfemoral approach for TAVR. The estimated regression coefficients associated with these predictors were used to develop a scoring system. The proposed scoring system showed good discrimination in both development and validation cohorts, with c-statistics of 0.754 (95% CI: 0.726-0.782) and 0.746 (95% CI: 0.721-0.772) respectively.

