

Transcatheter Aortic Valve Replacement is Associated With a Higher Rate of Permanent Pacemaker Implantation Compared to Surgical Aortic Valve Replacement: A Propensity Matched Analysis (Poster).

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Transcatheter Aortic Valve Replacement is Associated With a Higher Rate of Permanent Pacemaker Implantation Compared to Surgical Aortic Valve Replacement: A Propensity Matched Analysis

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Background

- Both TAVR and SAVR can cause conduction abnormalities post-procedure due to proximity of aortic valve to AV node and left bundle branch.
- In some patients, this can result in need for permanent pacemaker implantation (PPI) post-procedure.
- The incidence of PPI after TAVR with self expanding valves (Core Valve) ranges from 10-40%¹, after TAVR with balloon expandable valves (Edwards Sapien Valve) ranges from 2.5-11.5%², and after open or surgical AVR (SAVR) ranges from 3-9%¹.
- It is not known whether rates of PPI are comparable in SAVR vs. TAVR using balloon expandable valves. Prior studies have been done outside USA and are single center studies².
- Our study was done to compare differences in PPI incidence after TAVR vs. SAVR in an era of predominantly balloon expandable TAVR valves from Aug 2011 to Dec 2012, before Food & Drug Administration (FDA) approval of self-expanding TAVR valves.

Methods

- Nationwide Inpatient Sample (NIS) was queried from Aug 2011 to Dec 2012 using ICD-9 codes 35.05 & 35.06 for TAVR and 35.21 & 35.22 for SAVR.
- Adult patients aged 18 years or older were included.
- Patients undergoing other concomitant valve surgeries, coronary artery bypass grafting & those with prior pacemakers or defibrillators were excluded.
- Propensity matching was performed (1:1) to match the TAVR & SAVR cohorts on age, gender, right bundle branch block (RBBB), first degree AV block, bifascicular or trifascicular block, hospital region, teaching hospital status & hospital bed size.
- Differences in the two cohorts were tested using the Chi-square test.
- Additionally, multivariate logistic regression was performed to identify predictors of PPI in the TAVR cohort.

Results

- Total 2,990 patients (1,495 in TAVR group & 1,495 in SAVR group) were included.
- Mean age of our population was 80.2 +/- 9.0 years, with 50.4% females & 83.2% Caucasians.
- Baseline characteristics of the TAVR and SAVR cohorts are shown in Table 1.
- 146 (9.8%) patients in the TAVR cohort underwent PPI compared to 98 (6.6%) patients in the SAVR cohort (p = 0.001, Figure 1).
- Significant multivariate predictors of PPI in the TAVR cohort are shown in Table 2.

Table 1: Baseline characteristics of the study population in the TAVR (n = 1,495) and SAVR (n = 1,495) cohorts

Variable	TAVR Cohort	SAVR Cohort	p-value
Age			1.00
≤ 60 years	3.6%	3.55%	
61-70 years	8.4%	8.3%	
71-80 years	24.9%	24.95%	
> 80 years	63.1%	63.2%	
Female gender	50.4%	50.4%	1.00
White race	83.9%	82.4%	0.28
Coronary artery disease	66.5%	48.8%	<0.01
Hypertension	81.1%	79.3%	0.22
Diabetes mellitus	32.4%	28.0%	0.01
Congestive heart failure	71.0%	43.2%	<0.01
Prior cardiac surgery	22.3%	10.5%	<0.01
Chronic kidney disease	34.3%	17.3%	<0.01
Transapical approach	17.1%		
Preceding balloon aortic valvuloplasty	2.9%	0.7%	<0.01
Right bundle branch block	8.1%	8.2%	0.95
Bifascicular or Trifascicular block	2.7%	2.0%	0.19
First degree AV block	3.7%	3.1%	0.42
Teaching hospital status	89.3%	89.5%	0.86
Large hospital bed size	82.5%	82.0%	0.70
Hospital Region			0.98
Northeast	25.9%	25.5%	
Midwest	21.0%	21.4%	
South	35.1%	35.4%	
West	18.1%	17.7%	

Table 2: Multivariate predictors of permanent pacemaker implantation in the TAVR cohort

Predictor	Odds Ratio	95% CI	p-value
RBBB	2.33	1.38-3.96	0.002
Bifascicular or trifascicular block	6.85	2.76-16.98	<0.001
First degree AV block	0.98	0.38-2.55	0.966

(Note): The model was adjusted for age, gender, RBBB, bifascicular or trifascicular block, first degree AV block, balloon aortic valvuloplasty, transapical approach, coronary artery disease, hypertension, diabetes mellitus, CHF, CKD, teaching hospital status, hospital bed size and hospital region)

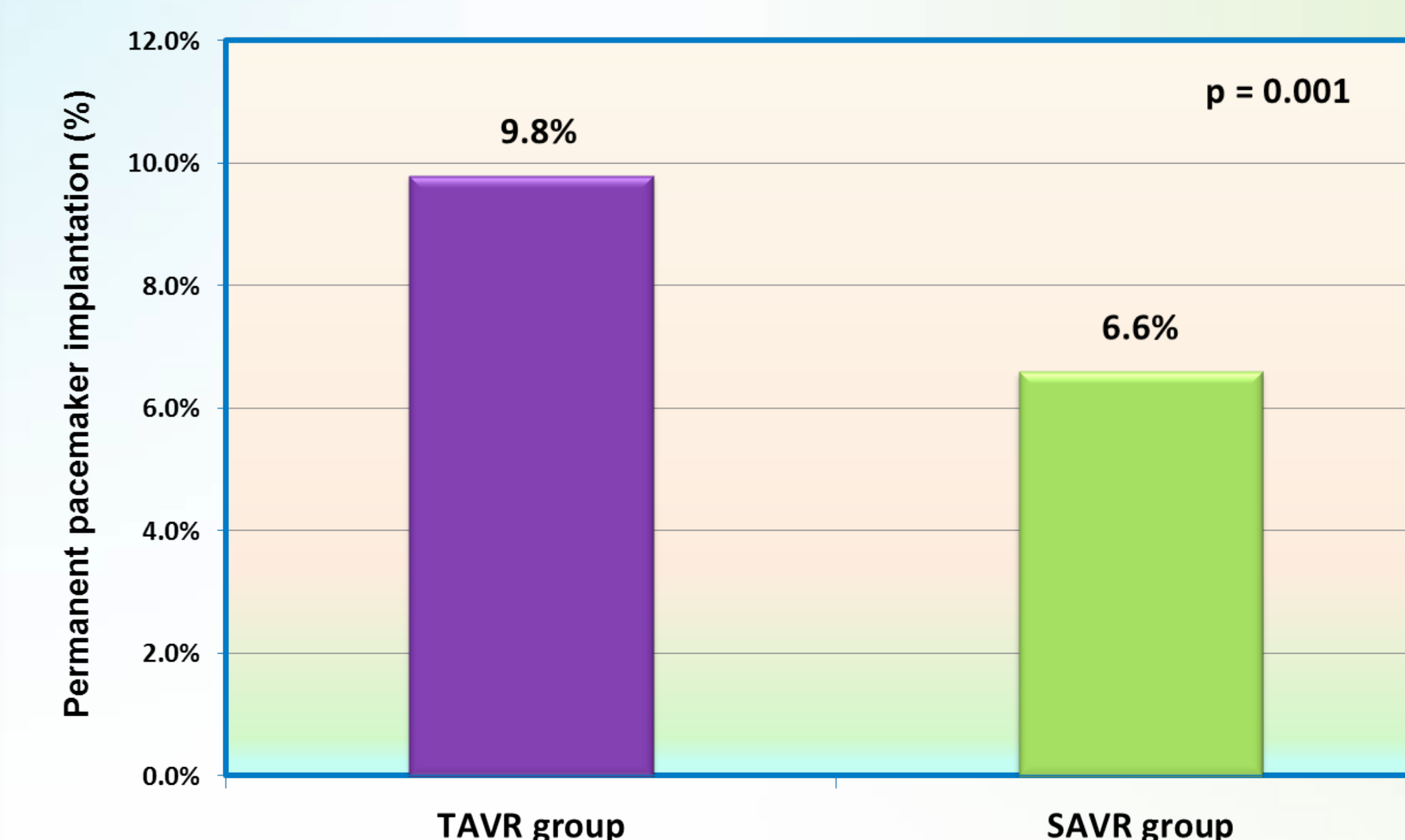


Figure 1: Figure showing permanent pacemaker implantation rates in a cohort of TAVR and SAVR patients matched on age, gender, baseline EKG abnormalities and hospital characteristics

Conclusions

- Using US national data including multiple centers, we show that PPI rates are higher after TAVR (in the balloon expandable valve era) compared to SAVR, even after matching baseline demographic, EKG & hospital characteristics.
- This suggests greater damage to cardiac conduction system with TAVR compared to SAVR.

References:

1. Thygesen J, et al. Journal of Invasive Cardiology. 2014; 26(2):94-99.
2. Bagur R, et al. JACC: Cardiovascular Interventions. 2012; 5(5):540-551.

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