

Impact of New Pacemaker Implantation After TAVR in Low/Intermediate-Risk Patients

A Propensity-Matched Analysis from a United States Registry

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Disclosure of Relevant Financial Relationships

I, Roger Renault Godinho DO NOT have any financial relationships to disclose.

Background

TAVR has evolved into an appropriate treatment across the full spectrum of surgical risk

**Low-risk and
younger patients**

**Intermediate-risk
and old patients**

**High-risk and very
old patients**

Comorbidities
Competing risks
of mortality

Background

Why focus on low- and intermediate-risk patients?

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Why focus on low- and intermediate-risk patients?

**High-risk and very
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**Low-risk and
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**Intermediate-risk
and old patients**

More homogeneous population

Objectives

- This study assesses the impact of new permanent pacemaker implantation (PPI) during the index hospitalization on in-hospital, one-year and five-year clinical outcomes among patients at low or intermediate surgical risk

Methods



A retrospective, 1:1 propensity-matched cohort , elective, transfemoral, balloon-expandable (BE; SAPIEN 3 family) TAVR between 2015 and 2024 in the STS/ACC TVT Registry



Patients excluded: high risk, previous pacemaker, valve-in-valve, redo TAVR, alternative access, and non-elective cases



In-hospital, 30-day and 1-year outcomes
5-year follow-up for mortality and stroke

Methods

Covariates used for 1:1 propensity score matching

Age, sex (male)
Race (White)
Body mass index
Operator reason for procedure
Valve size
Prior percutaneous coronary intervention
Prior coronary artery bypass graft surgery
Prior stroke
Carotid stenosis
Peripheral arterial disease
Hypertension
Diabetes
Chronic lung disease
Immunocompromise
Porcelain aorta
Atrial fibrillation
Creatinine
Hemoglobin level
Estimated glomerular filtration ratio
Aortic valve mean gradient

Left ventricular ejection fraction
Aortic regurgitation (<mild, moderate, severe)
Mitral regurgitation (<mild, moderate, moderate-to-severe, severe)
Tricuspid regurgitation (<mild, moderate, severe)
NYHA functional class III/IV
5-meter walk test
KCCQ-OS score
STS
Home oxygen
Currently on dialysis
Cardiogenic shock with 24h
Prior TIA
Endocarditis
Heart failure within 2 weeks
Prior MI
Left main stenosis $\geq 50\%$
Proximal LAD $\geq 70\%$
Number of diseased vessels
Hostile chest

Results



201,544 low- and intermediate-risk patients who underwent transfemoral balloon-expandable TAVR between 2015 and 2024 in the STS/ACC TVT Registry



12,188 patients (6.4%) received a PPI



After propensity-matched: 12,188 per group

Results - Baseline Unadjusted

	New Discharge Pacemaker (n=12188)	No New Pacemaker (n=189356)	P-value
Age (year)	78.9 ± 7.6 (12187)	77.3 ± 7.8 (189321)	<0.0001
Male	66.2% (8069/12187)	59.9% (113508/189347)	<0.0001
STS risk score (%)	3.4 ± 2.0 (11984)	3.1 ± 1.9 (186684)	<0.0001
Diabetes mellitus	41.2% (5018/12184)	36.2% (68610/189276)	<0.0001
Currently on dialysis	2.0% (245/12178)	1.6% (2966/189118)	0.0002
Chronic lung disease	24.9% (3029/12164)	22.7% (42877/188984)	<0.0001
Prior PCI	28.9% (3524/12181)	26.7% (50609/189268)	<0.0001
Prior CABG	12.3% (1499/12182)	9.7% (18318/189289)	<0.0001
Prior stroke	9.5% (1154/12183)	8.4% (15827/189301)	<0.0001
Prior TIA	6.8% (828/12178)	6.0% (11413/189185)	0.0006
Previous cardiac surgeries	13.4% (1628/12144)	10.4% (19580/188505)	<0.0001
Peripheral arterial disease (PAD)	16.2% (1976/12184)	14.7% (27796/189289)	<0.0001
Prior MI	14.7% (1786/12170)	13.0% (24660/189209)	<0.0001
HF hospitalization within past year	18.5% (976/5281)	16.3% (14455/88843)	<0.0001
Heart failure within 2 weeks	66.7% (7479/11208)	62.6% (108430/173168)	<0.0001
Atrial fibrillation/flutter	32.5% (3965/12186)	25.6% (48440/189275)	<0.0001

Results - Baseline Adjusted

	New Discharge Pacemaker (n=12188)	No New Pacemaker (n=12188)	<i>P-value</i>
Age (year)	78.9 ± 7.6 (12187)	78.9 ± 7.5 (12187)	0.81
Male	66.2% (8069/12187)	66.3% (8078/12188)	0.91
STS risk score (%)	3.4 ± 2.0 (11984)	3.4 ± 2.0 (12027)	0.96
Diabetes mellitus	41.2% (5018/12184)	41.0% (4995/12182)	0.77
Currently on dialysis	2.0% (245/12178)	2.1% (261/12169)	0.47
Chronic lung disease	24.9% (3029/12164)	25.0% (3042/12159)	0.83
Prior PCI	28.9% (3524/12181)	29.2% (3556/12182)	0.65
Prior CABG	12.3% (1499/12182)	12.4% (1512/12182)	0.80
Prior stroke	9.5% (1154/12183)	9.9% (1209/12184)	0.23
Prior TIA	6.8% (828/12178)	6.7% (818/12171)	0.81
Previous cardiac surgeries	13.4% (1628/12144)	13.0% (1584/12141)	0.41
Peripheral arterial disease (PAD)	16.2% (1976/12184)	16.4% (2004/12184)	0.63
Prior MI	14.7% (1786/12170)	14.8% (1804/12180)	0.77
HF hospitalization within past year	18.5% (976/5281)	18.7% (1025/5474)	0.75
Heart failure within 2 weeks	66.7% (7479/11208)	66.6% (7440/11176)	0.80
Atrial fibrillation/flutter	32.5% (3965/12186)	33.0% (4020/12182)	0.44

Results - In-hospital Outcomes

	New Discharge Pacemaker (n=12188)	No New Pacemaker (n=12188)	P-value
All-cause mortality	0.5% (64/12188)	0.7% (85/12188)	0.08
Cardiac death	0.3% (34/12188)	0.4% (48/12188)	0.12
Stroke	1.2% (150/12188)	0.9% (106/12188)	0.006
Aortic valve re-intervention	0.2% (23/12188)	0.0% (6/12188)	0.002
Life-threatening bleeding	0.9% (111/12188)	0.6% (68/12188)	0.001
Major vascular complication	1.3% (162/12188)	0.8% (96/12188)	<0.0001
New onset of atrial fibrillation	2.9% (293/9947)	1.5% (150/9817)	<0.0001
Index hospitalization (days) - median (IQR)	3.0 [2.0, 4.0]	1.0 [1.0, 2.0]	<0.0001
ICU length of stay (hours)	38.6 ± 52.7 (4828)	17.8 ± 29.8 (4673)	<0.0001
Discharge to home	90.0% (10973/12188)	95.7% (11657/12187)	<0.0001

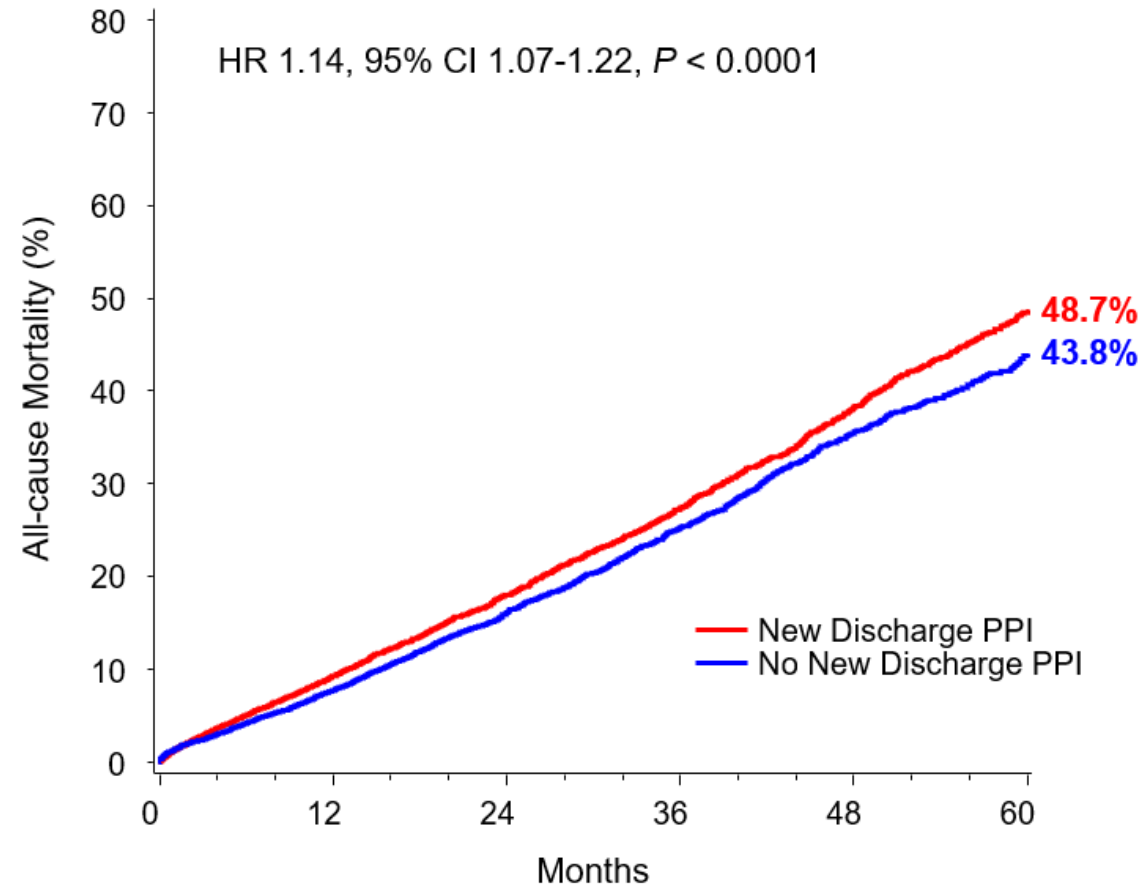
Results - 30-day Outcomes

	New Discharge Pacemaker (n=12188)	No New Pacemaker (n=12188)	P-value
All-cause mortality	1.2% (144)	1.3% (158)	0.40
Cardiac death	0.4% (49)	0.6% (68)	0.07
Stroke	1.5% (179)	1.4% (172)	0.73
Aortic valve re-intervention	0.2% (30)	0.1% (9)	0.0008
Life-threatening bleeding	1.0% (121)	0.6% (73)	0.0006
Major vascular complication	1.5% (181)	1.0% (115)	0.0001
Any readmissions	7.0% (816)	5.9% (684)	0.0007
New onset of atrial fibrillation	3.5% (347)	2.0% (196)	<0.0001

Results - One-year Outcomes

	New Discharge Pacemaker (n=12188)	No New Pacemaker (n=12188)	P-value
All-cause mortality	8.6% (789)	7.2% (652)	0.0006
Cardiac death	1.9% (175)	1.6% (149)	0.17
Stroke	2.6% (274)	2.7% (277)	0.84
Aortic valve re-intervention	0.6% (56)	0.2% (23)	0.0002
Life-threatening bleeding	1.5% (164)	1.0% (105)	0.0004
Major vascular complication	1.6% (188)	1.0% (122)	0.0002
Any readmissions	26.9% (2537)	23.3% (2142)	<0.0001
New onset of atrial fibrillation	4.6% (422)	3.0% (261)	<0.0001

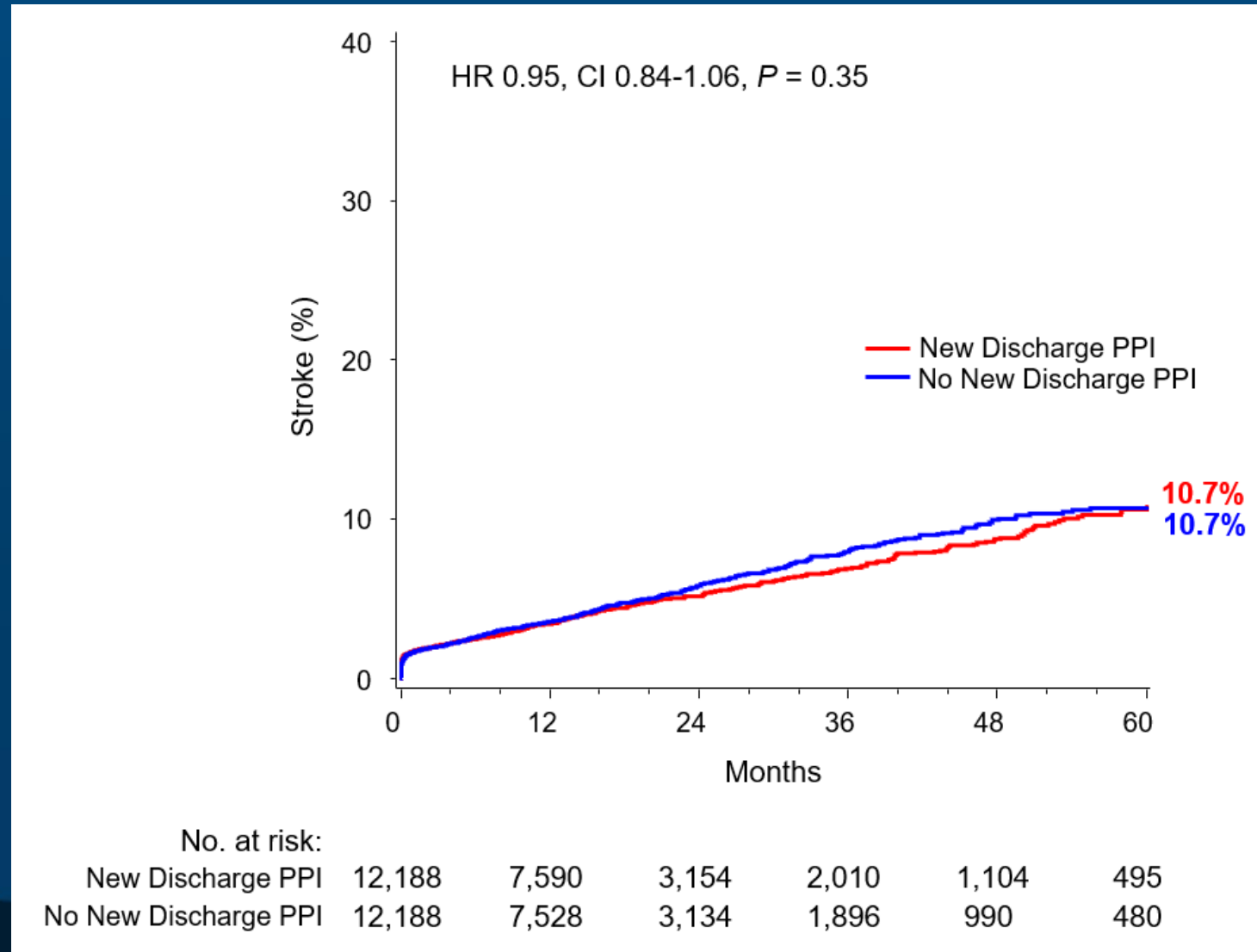
Results - Five-Year Outcomes: All-Cause Death



+14% 5-year mortality

No. at risk:						
New Discharge PPI	12,188	7,801	3,297	2,123	1,170	531
No New Discharge PPI	12,188	7,754	3,288	2,019	1,077	521

Results - Five-Year Outcomes: Stroke



Conclusions

In patients with low- to intermediate-risk undergoing BEV TAVR

The incidence of PPI requirement was low (6.4%)

Nonetheless, it correlated with

1. More procedure-related complications
2. Prolonged ICU and hospital length of stays
3. New onset atrial fibrillation and any readmissions
4. Higher long-term all-cause mortality