

Automated Titanium Fastener Use in Minimally Invasive Aortic Valve Replacement: A Propensity Matched Analysis

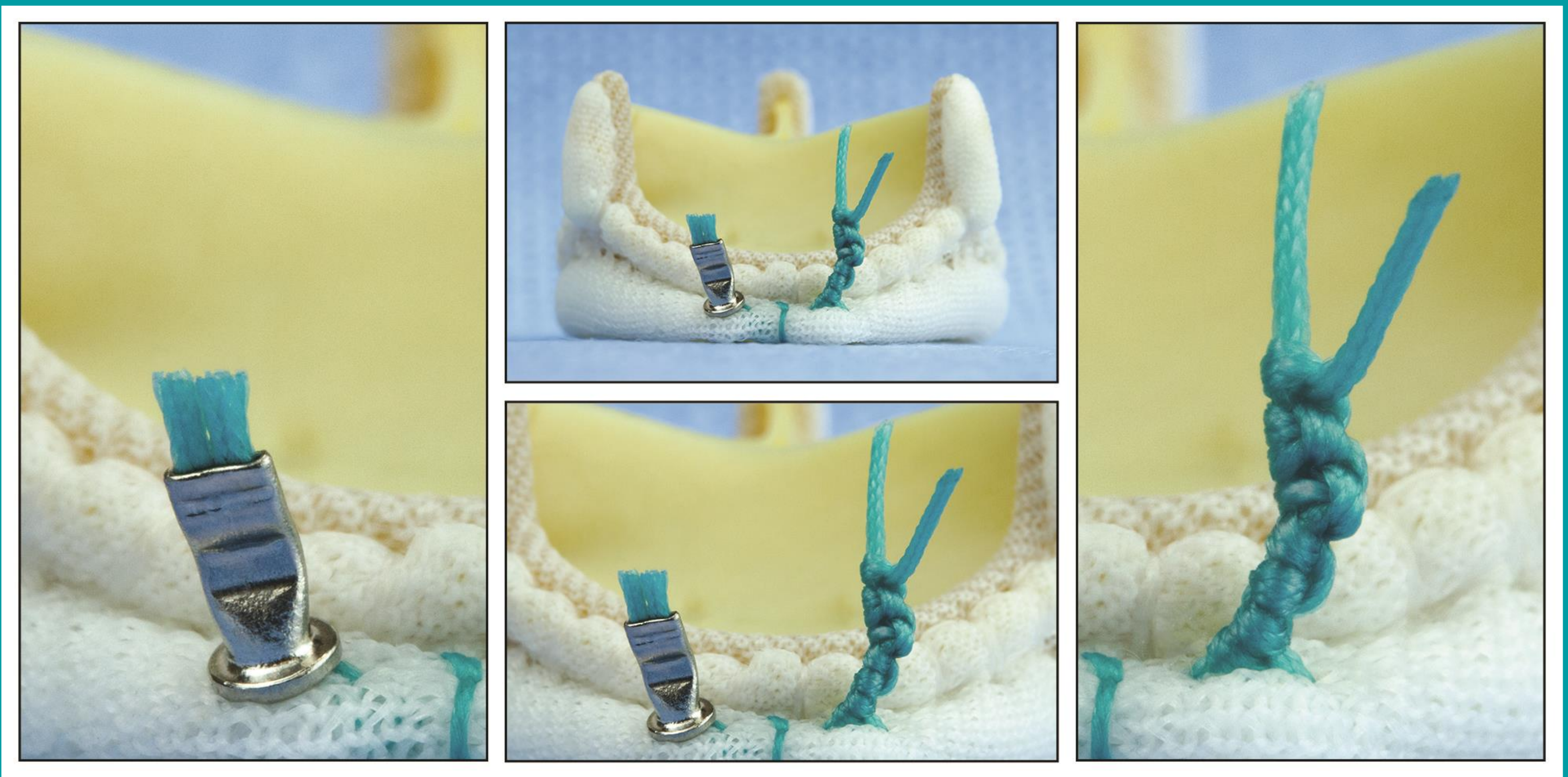
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Background

Less invasive approaches to surgical aortic valve replacement (SAVR) have been demonstrated to provide numerous patient benefits. Using titanium fasteners (TFs) to secure valve suture in minimally invasive SAVR (MIAVR) may further enhance these benefits by making procedures faster and more reliable.

Methods

We identified 424 patients who underwent MIAVR via a right anterolateral minithoracotomy at our institution between 2011 and 2019. Patients were stratified based on suture securement method: TFs (n=299) or HT knots (n=125). **Propensity score analysis yielded 111 matched pairs.** Preoperative characteristics, intraoperative variables, and postoperative outcomes were compared between the TFs and HT knots groups.



Results

Patients in the matched groups had similar baseline characteristics. Patients in the TF group experienced a statistically significant reduction in aortic cross-clamp time (64.67 min vs. 76.72 min; $P < 0.001$); less intraoperative blood product use (5.4% of cases vs. 13.5% of cases; $P = 0.039$); and shorter overall hospital length of stay (5.88 days vs. 7.47 days; $P = 0.0177$). Patients in the TF group also did not experience an increase in operative complications or mortality.

Outcome Variables	Titanium Fasteners (n=111)		Hand-Tied Knots (n=111)		P-Value
Cross-Clamp Time (min)	64.67	(±11.88)	76.72	(±20.15)	<0.001
Intraoperative Blood Product	6	(5.4%)	15	(13.5%)	0.039
Conversion to Sternotomy	3	(2.7%)	2	(1.8%)	1.000
Mortality (n)	1	(0.9%)	1	(0.9%)	1.000
Total Hospital LOS (days)	5.88	(±2.94)	7.47	(±6.32)	0.018
Stroke	0	(0.0%)	0	(0.0%)	NA
Aortic Insufficiency	0	(0.0%)	0	(0.0%)	NA
Reoperation for Bleeding	3	(2.7%)	7	(6.3%)	0.196
Readmission	5	(4.5%)	3	(2.7%)	0.361
Renal Failure	0	(0.0%)	2	(1.8%)	0.498
Prolonged Ventilation	6	(5.4%)	7	(6.3%)	0.775
Any Complication	37	(33.3%)	48	(43.2%)	0.129

Conclusions

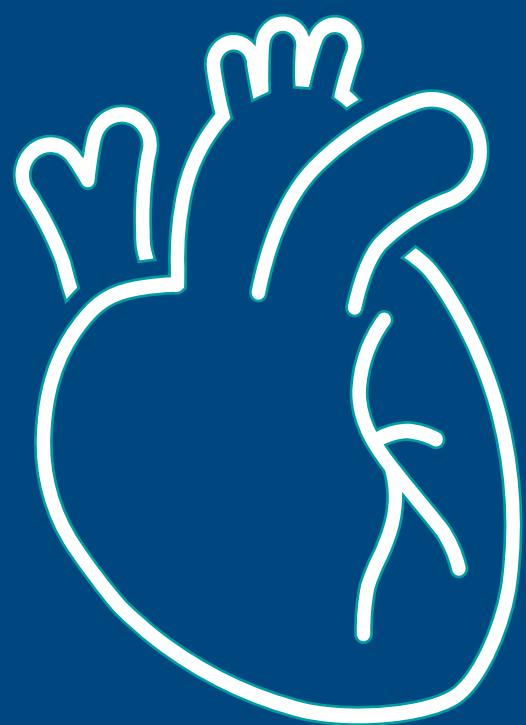
Using TFs to secure valve sutures appears to offer many patient benefits. MIAVR patients in the TF group experienced significantly reduced aortic cross-clamp time, intraoperative blood product use, and overall hospital length of stay compared to those in the HT knots group, without any increase in operative complications or mortality.

Shorter
Procedure
Times



ACC
Time
↓ 15.7%

Less
Bleeding



Blood
Product
↓ 60.0%

Reduced
Hospital
LOS



Postop
LOS
↓ 21.3%