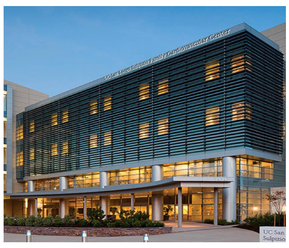
Tricuspid Surgery and Pulmonary Thromboendarterectomy in Patients with Chronic Thromboembolic Pulmonary Hypertension



E. M. Golts[1], K. C. Aoki[1], K. Afshar[2], J. M. Bigbee[1], M. M. Madani[1].
[1]Division of Cardiovascular and Thoracic Surgery, UC San Diego Health System, La Jolla, CA, [2]Medicine, UC San Diego Health System, La Jolla, CA,

OBJECTIVES

Pulmonary Thromboendarterectomy (PTE) has been shown to reduce tricuspid regurgitation. Tricuspid valve
Repair, or replacement (TVR) in addition to the PTE has been used primarily in patients with more severe tricuspid regurgitation (TR), but the effects have not been evaluated.

METHODS

In a review of medical records we have identified 48 patients who underwent PTE with TVR and compared
them to 96 control patients who underwent PTE only between January 2009 and August 2017. Echocardiographic and hemodynamic outcomes pre- and post-PTE were compared in these two groups using one-way ANOVA and operating times and hospital stay were examined using independent samples t-test. Multivariate linear regression was used to identify predictors of hospital length of stay.

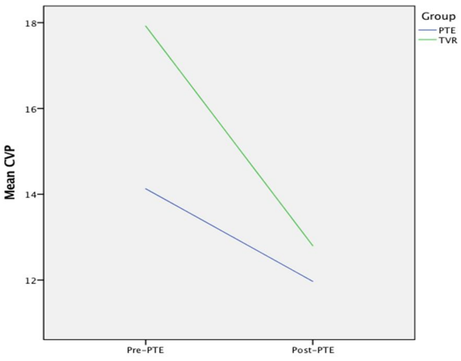
RESULTS

At baseline, PTE+TVR patients had a significantly higher mean TR severity (moderate-severe) than the PTE control patients (mild) (p<.001). Post-operatively, TR severity was reduced in both groups, and the difference was no longer statistically significant (p=.089). TR severity was decreased in 81% of TVR patients and 55% of PTE patients (Fig 1). Post-operatively, patients in both groups had significant changes in arterial pressure, pulmonary artery pressure, cardiac output, pulmonary vascular resistance, and central venous pressure (CVP). Of those variables, CVP demonstrated the most significant drop in the PTE+TVR group as compared to the PTE group (18±7.4 mm Hg to 13± 4.2 mm Hg vs
14±5.8 mm Hg to 12±4.4 mm Hg, p<0.001). Total operating room time was significantly longer in the TVR group (10±1.4 hr vs. 9.1± 1 hr, p<.001). Postoperative echocardiographic measurements were significant for improved pulmonary arterial pressures and decrease in the severity of tricuspid regurgitation (Table 1). Treatment group, cardiac index, and glomerular filtration rate in TVR patients were predictors of hospital length of stay, which averaged 8 with optimal and 36 days with poor cardiac and renal function.

Table 1. Pre- and Post-Operative Echocardiographic Measures

	Group	Pre-Op N	Pre-Op Mean ± SD	Pre-Op Sig	Post-Op N	Post-Op Mean ± SD	Post-Op Sig	Mean Difference (pre- to post-)	Sig
Days	PTE	96	-13 ± 23	(.132)	95	11 ± 19	(.501)		
	TVR	47	-8 ± 6		45	9 ± 6			
LVEF	PTE	92	67 ± 6.4	**(.007*)**	90	66 ± 7.2	(.225)	-0.7 ± 1.2	.549
	TVR	46	63 ± 9.8		43	64 ± 9.8		1.4 ± 1.7	.404
LAVI	PTE	78	23 ± 6.5	**(.004*)**	79	23 ± 8.6	**(.033*)**	0.8 ± 1.7	.635
	TVR	37	29 ± 19		31	28 ± 11		-0.6 ± 2.6	.822
CO	PTE	65	6.0 ± 1.9	(.052)	69	6.6 ± 1.6	**(.004*)**	0.6 ± 0.3	**.038***
	TVR	33	5.3 ± 1.6		29	5.4 ± 1.9		0.2 ± 0.5	.641
CI	PTE	65	3.0 ± 0.8	(.456)	69	3.8 ± 4.7	(.125)	0.8 ± 0.5	.132
	TVR	33	2.6 ± 0.7		28	2.8 ± 1.0		0.2 ± 0.7	.768
PAP	PTE	85	65 ± 23	(.926)	86	34 ± 18	(.074)	-31 ± 3.3	**<.001***
	TVR	45	66 ± 23		39	42 ± 18		-24 ± 4.8	**<.001***
TR	PTE	90	2.3 ± 0.8	**(<.001*)**	92	1.7 ± 0.7	(.089)	-0.6 ± 0.1	**<.001***
	TVR	46	3.5 ± 0.8		44	1.9 ± 0.9		-1.6 ± 0.2	**<.001***

Fig.1 Change in Central Venous Pressure by Treatment Group



CONCLUSIONS

Both arms had a significant improvement in echocardiographic and hemodynamic measures postoperatively. TVR patients had more severe tricuspid regurgitation (and higher CVP) at baseline. Post-operatively, the hemodynamic profiles in both arms were similar. In conclusion, although TVR patients had more abnormal hemodynamics at baseline, the addition of TVR to PTE for CTEPH patients appears to produce nearly identical hemodynamic outcomes compared to those undergoing PTE alone, except for significantly more dramatic drop in the CVP.

UC San Diego Health
Cardiovascular Institute