THE ROLE OF RIGHT SIDED HEMODYNAMIC PARAMETERS AS PREDICTORS OF 30 DAY OUTCOME AFTER TRANSCATHETER AORTIC VALVE REPLACEMENT (TAVR): THE IMPACT OF RIGHT VENTRICULAR STROKE WORK INDEX (RVSWI)

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Background

- 30 day mortality for patients undergoing surgical aortic valve replacement who have pulmonary artery pressures two-thirds of systemic arterial pressures is as high as 50%

- RVSWI <5g/m^2/beat has been found to be an independent predictor of post-operative right ventricular (RV) failure, prolonged hospitalization, and inotropic dependence.

- Parameters of RV function are often not taken into consideration in the prognostication of patients undergoing TAVR

- We sought to explore various parameters of RV function on 30 day outcomes in patients undergoing TAVR.

Methods

- We collected demographic and hemodynamic data on 120 patients undergoing TAVR at our institution over a 1 year period and examined their 30 day rates of death or readmission.

- Trans-pulmonary gradient (TPG), pulmonary vascular resistance (PVR), and RVSWI were then retrospectively calculated.

  - $RVSWI = (MPAP - CVP) \times (SVI \times 0.0136)$

- Statistical calculations were performed using JMP software.

Results: Baseline Characteristics

Parameter (N=120)	Average Value
Age (years)	82.8 ± 8.2
Female Sex	74 (61.7%)
BSA	1.82 ± 0.26
HTN	101 (84.2%)
DM	41(34.2%)
CAD	89 (74.2%)
STS Score	8.14 ± 5.53
AVA (cm²)	0.63 ± 0.16
Mean Gradient (mmHg)	50.4 ± 13.7
Creatinine (mg/dL)	1.37 ± 0.82
MELD Score	10.4 ± 4.3
TF Approach	76 (63.3%)
TA Approach	40(33.3%)
TAo Approach	44 (3.3%)
Length of Stay (days)	5.5 ± 4.5
Deaths /Readmissions	5/5 (10)

Univariate Analysis of Hemodynamic Parameters as Predictors of 30 Day Outcomes (N=120)

Parameter	Pre-TAVR	30 Day Death or Readmission (Prob > ChiSq)	Post-TAVR	30 Day Death or Readmission (Prob > ChiSq)	p-Value for Change in Hemodynamics Post TAVR
RAP (mmHg)	11.6 ± 4.22	0.3146	7.36 ± 3.68	0.4608	<0.0001
PASP (mmHg)	40.4 ± 12.3	0.8588	37.2 ± 9.55	0.6468	0.0016
PADP (mmHg)	20.5 ± 7.2	0.7086	16.6 ± 5.56	0.6529	<0.0001
MPAP (mmHg)	28.5 ± 9	0.8343	23.1 ± 6.41	0.9850	<0.0001
CO (L/min)	3.83 ± 1.33	0.4437	4.67 ± 1.63	0.0482*	<0.0001
CI (L/min/m²)	2.08 ± 0.7l	0.6866	2.56 ± 0.9	0.115	<0.0001
PVR (Woods units-m²)	2.32 ± 2.54	0.8621			
TPG (mmHg)	8.05 ± 6.9	0.8969			
RVSWI (mmHg x mL/m²)	5.46 ± 4.81	0.2827	6.9 ± 3.9	0.049*	0.0003

Results

- Trends toward higher event rates were seen in patients with higher STS scores, lower pre-operative AVA, mean gradients, LVEF, CO, CI or that had TA access.

Results

- Low post-operative CO, SVI, and RVSWI were associated with statistically significant higher 30 day mortality and readmission rates.

- Pre- or post-operative RAP, PCWP, TPG, PVR, creatinine, MELD score had no effect.

Conclusions

- TAVR results in modest improvements in most hemodynamics parameters.

- However, poor post-TAVR CO, SVI, and RVSWI were the strongest hemodynamic parameter of death or readmission after 30 days.