Title: Correlation of Aortic Valve Gradient Obtained by Catheterization and Echocardiogram Post Transcatheter Aortic Valve Replacement

Authors: Riaz Mahmood, DO; Abdullah Asreb, MD; Hossny Alaws, MD; Ansleigh Setzer, ACNP; Kyle Thompson, MD; Daniel Winston, MD; Nima Ghasemzadeh, MD; and Pranav Kansara, MD

Background:
There are limited studies assessing simultaneous aortic valve (AV) gradient derived by echocardiography (EC) and cardiac catheterization (CC) following Transcatheter aortic valve replacement (TAVR). We aimed to study the discordance between the EC and CC derived mean AV gradient and identify contributing factors to this discordance post TAVR.

Methods:
We conducted a retrospective analysis of patients from our institutional National Cardiovascular Data Registry from June 2020 to December 2021. Absolute difference between EC and CC derived mean AV gradient was identified to assess for discordance. Stroke volume index (SVI) was recorded pre and post TAVR by EC during the procedure. Multivariable regression analysis was performed to identify predictors of discordance (Table 1).

Results:
Total 122 from 148 pts had mean AV gradient recorded simultaneously by EC and CC immediately post TAVR (6.24 ± 2.8 vs 3.15 ± 1.9, p=<0.0001, Pearson correlation coefficient of 0.196). Mean age was 80.5 ± 6.9, 61% were male, mean left ventricular systolic function (LVEF) was 52.6 ± 10.5, 92% received balloon expandable valve and 8% received self-expanding valve, 42% received small valve size (20 or 23 mm), 58% received large valve size (26, 29 or 34 mm), 87% received conscious sedation. There was significant improvement in SVI (ml/m2) immediately post TAVR compared to pre TAVR as recorded by EC (38.44 ± 12.03 vs 32.31 ± 10.07, p<0.0001). Multivariable regression analysis demonstrated body surface area (p=0.005), valve size (p=0.02) and post TAVR SVI (p=0.038) to be significant predicators of discordance (Table 1).

Conclusion:
The mean AV gradient obtained immediately post TAVR by echocardiography was higher compared to catheterization. Larger body surface area, smaller valve size and higher post TAVR SVI were significant predictors of discordance. Our observations suggest that changes in flow acceleration and flow dynamics post TAVR may be associated with higher gradients recorded by echocardiogram.

Table 1: Effect of Variables on Difference in Mean AV Gradient for ECHO and Cath			
Variable	Estimate	Standard Error	P values
Age	-0.0182	0.0411	p = 0.6587
Gender	0.3915	0.3625	p = 0.2825
Body Surface Area	3.3237	1.1548	p = 0.0048
Valve Size (small vs large)	0.8339	0.3568	p = 0.0212
Post TAVR Stroke Volume Index	0.0478	0.0228	p = 0.0381
Preaortic Root Size	-0.8145	0.7755	p = 0.2959
Left Ventricle Ejection Fraction	-0.0139	0.0254	p = 0.5850