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Long-Term Outcomes of Transcatheter Aortic Valve Replacement (TAVR) in Patients with Renal Failure on Dialysis

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BACKGROUND

- Aortic stenosis (AS) (Fig. 1) is narrowing of the aortic valve (AV) opening. AS affects ~2% of patients ≥65 in the U.S.¹ Surgery is indicated for symptomatic severe AS (sSAS), severe AS (SAS) with left ventricle ejection fraction <50, and mean aortic valve gradient ≥40 mmHg.²
- TAVR is a minimally-invasive risk-independent procedure for SAS (Fig. 2).
- The FDA approved TAVR in 2011.³
- End-Stage Renal Disease (ESRD) patients on dialysis with AS have a median survival of 9 months without TAVR (Fig. 3).
- Limited data exists on long-term outcomes of patients with pre-existing ESRD on dialysis who had TAVR.**

OBJECTIVES

The objectives of this study are to:

- 1) Investigate survival rate of the dialyzed cohort over 8 years
- 2) Assess bioprosthetic valve function over time through post-TAVR echocardiogram findings

METHODS

Develop

• Conducted a thorough medical literature review to develop/write a study protocol and submit it to LVHN's 3-step research process for approval. Scanned 1,700 TAVR patients registered in the Transcatheter Valve Therapy (TVT) Registry from January 2016 to April 2024 for inclusion criteria. Identified 39 patients who were on dialysis for ESRD prior to TAVR for AS.

Collect

• Built Research Electronic Data Capture (REDCap) database with 79 fields for investigation. Conducted retrospective Epic chart review and read echocardiogram reports of n = 39 patients (38 hemodialysis - HD & 1 peritoneal dialysis - PD) who underwent TAVR during the 8-year study period.

Analyze

• Developed a Kaplan-Meier actuarial analysis survival curve to determine median survival using the Statistical Package for the Social Sciences (SPSS).
• Utilized descriptive statistics to develop a line graph and compare mean aortic valve gradient metrics over time to assess valve function for each patient and the aggregate cohort.

RESULTS

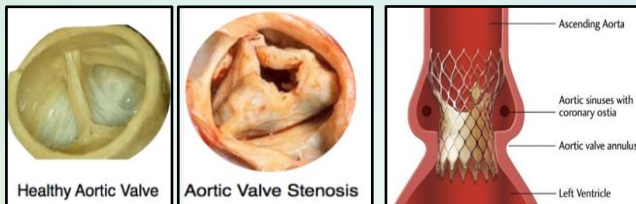


Figure 1: Healthy aortic valve and stenosed aortic valve.

Figure 2: TAVR valve in-position.

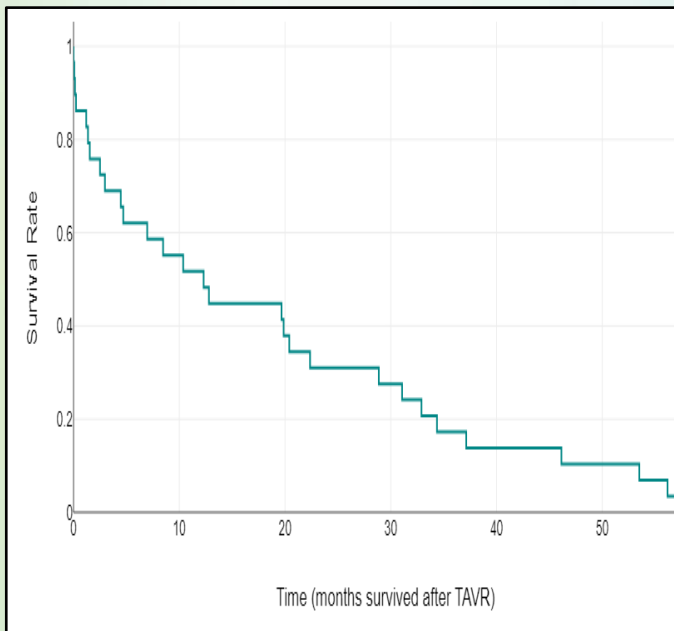


Figure 4: Kaplan-Meier survival curve of patients with pre-existing ESRD on HD/PD who underwent TAVR for AS.

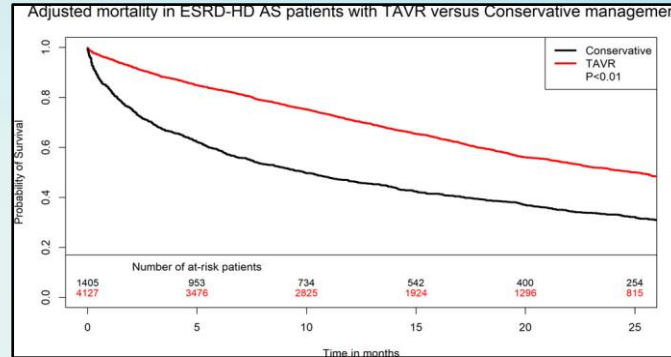


Figure 3: Hypothetical Kaplan-Meier baseline survival curve (ESRD-untreated AS vs. ESRD-AS with TAVR).⁴

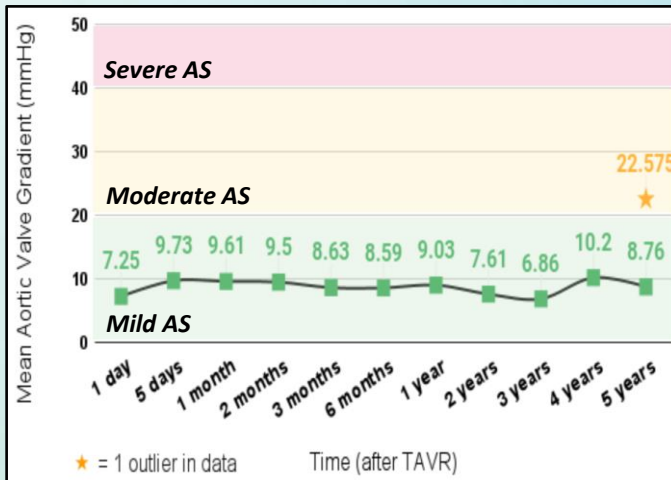


Figure 5: Mean aortic valve gradient post-TAVR (indicating aortic valve function).
★ = 1 outlier in data

CONCLUSION

- 10 (25.64% of cohort) are currently alive.
- Baseline survival for ESRD patients with untreated AS (no TAVR) is ~9 months (Fig. 3).
- Median survival for ESRD-AS patients post-TAVR is 16.2 months. The mean survival is 22.55 months (Fig. 4).
- There is minimal structural deterioration of the bioprosthetic valve in the long-term as evidenced by the mean aortic valve gradient values in the mild AS range (Fig. 5). At 5 years, the mean without the outlier is 8.76 mmHg.

FUTURE DIRECTIONS

- Longer term follow-up studies are necessary to further evaluate the effects of hemodialysis on TAVR valve durability

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Acknowledgements: I would like to thank Dr. Wu, Mr. Nelson, and the LVHN Department of Education for their support.