

# Changes in Diuretic Regimen and Impact on Readmission Rates Following Transcatheter Aortic Valve Replacement

Allie Wasik<sup>1</sup>, PharmD; Zachary Noel<sup>1</sup>, PharmD, BCPS; Anuj Gupta<sup>2</sup>, MD, FACC

<sup>1</sup>University of Maryland School of Pharmacy; <sup>2</sup>University of Maryland School of Medicine; Baltimore, MD

## Background

- Aortic stenosis (AS) is one the most common causes of valvular heart disease
  - Heart failure symptoms are common in patients with severe AS
  - Loop diuretics are often needed to maintain euvoemia and control symptoms
  - Transcatheter aortic valve replacement (TAVR) is a treatment option for patients with symptomatic severe AS who are intermediate-high risk of mortality with surgical valve replacement
  - After TAVR, cardiac output is improved immediately but reverse remodeling takes time
  - Loop diuretic requirements may change after intervention
- Study Purpose:**
- Discern if there is a difference in readmissions rates in the first 30 days after TAVR in patients discharged on the same or different loop diuretic dose compared to admission dose
  - Determine if these readmissions are related to acute kidney injury or heart failure exacerbations related to dose change

## Endpoints

- Primary Endpoint:**
- Hospital readmission within 30 days
- Secondary Endpoints:**
- Hospital readmission within 7 days
  - Hospital readmission within 90 days
  - Time to first hospital readmission
  - Rates of hospitalization for heart failure exacerbation and acute kidney injury

## Methods

Retrospective Chart Review

**Inclusion Criteria:**

- Admitted to University of Maryland Medical Center following TAVR
- On loop diuretic therapy before TAVR

**Exclusion Criteria:**

- Death during hospitalization
- End stage renal disease – dialysis dependent
- Conversion to surgical aortic valve replacement

## Statistical Analysis

- Descriptive statistics – used to describe patient demographics, clinical and laboratory data, rates of acute kidney injury and heart failure related readmissions
- Student t-test and Wilcoxon rank sum tests – used to identify potential cofounders for continuous and categorical variables respectively
- Logistic regression model – used to detect association between time to readmission, and impact of same or different diuretic dose on discharge
- p < 0.05 was set for statistical significance
- Analyses performed with SAS version 9.4

## Results

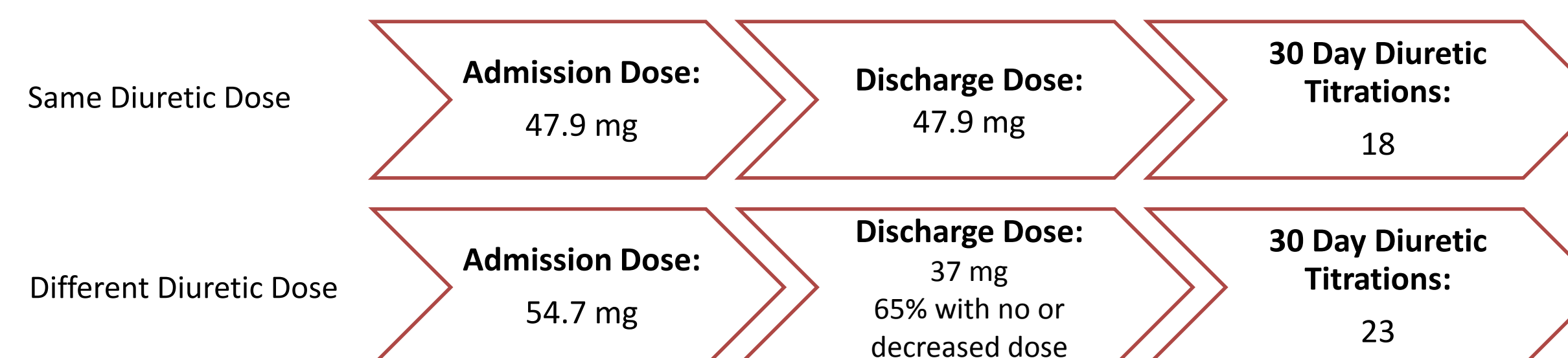
- 240 patient reviewed for study inclusion
  - 104 patients were not on loop diuretic therapy
  - 8 died during hospitalization
  - 2 converted to surgical valve replacement
  - 8 had no follow up data after TAVR
- 116 patients met inclusion criteria
  - 58 patients included that were discharged on same diuretic dose
  - 58 patients included that were discharged on different diuretic dose

**Table 1: Baseline Demographics**

	Same Diuretic Dose (n = 58)	Different Diuretic Dose (n = 58)	p-value
Male Gender	35 (60%)	30 (51.7%)	0.9
Age, years	79	79	0.3
<b>Past Medical History</b>			
Chronic Kidney Disease	14 (24.1%)	14 (24.1%)	1
Heart Failure			
Reduced Ejection Fraction	21 (36.2%)	27 (46.5%)	0.4
Preserved Ejection Fraction	37 (63.8%)	31 (53.4%)	0.6
Prior Valve Replacement	8 (13.8%)	10 (26.3%)	0.8
Atrial Fibrillation	28 (48.3%)	28 (48.3%)	1
<b>Admission Characteristics</b>			
Society of Thoracic Surgery Score	5.9	6.7	0.2
Length of Stay after TAVR, days	3.2	5.3	0.01*
Left Ventricular Ejection Fraction	48.7	47.2	0.3
Serum Creatinine, mg/dL	1.13	1.17	0.9
Loop Diuretic Dose, furosemide mg equivalent	47.9	54.7	
<b>Discharge Characteristics</b>			
Acute Kidney Injury During Admission	6 (10.3%)	15 (25.9%)	0.03*
Serum Creatinine, mg/dL	1.11	1.13	0.4
Left Ventricular Ejection Fraction	52.6	50.1	0.2
Loop Diuretic Dose, furosemide mg equivalent	47.9	37	0.03*

\* Denotes statistical significance

**Figure 1: Admission and Discharge Diuretic Doses**



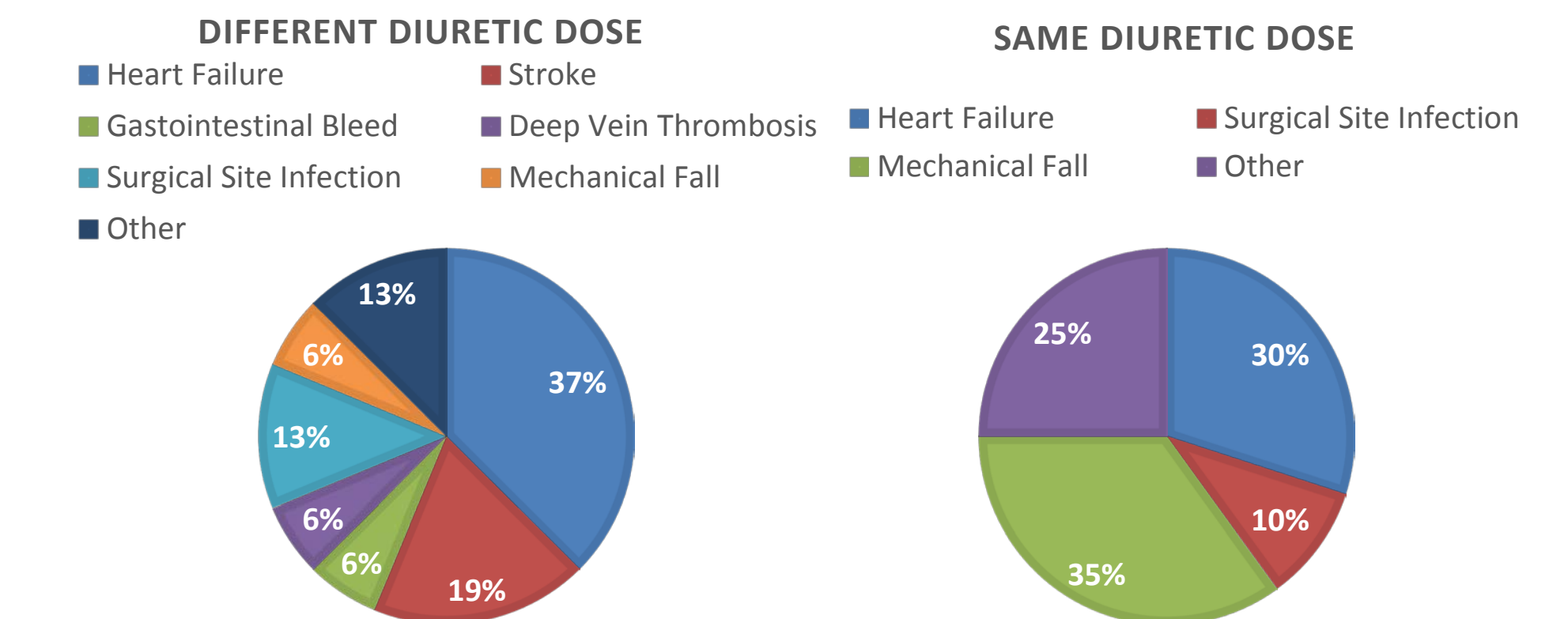
## Results

**Table 2: Readmission Rates**

	Total n (%)	Same Diuretic Dose n (%)	Different Diuretic Dose n (%)	Odds Ratio (95% CI) p-value
7 Day	13 (11.3%)	10 (8.7%)	3 (2.6%)	0.23 (0.05, 0.95) 0.04*
30 Day	36 (31.3%)	20 (17.4%)	16 (13.9%)	0.70 (0.29, 1.67) 0.4
90 Day	61 (53%)	37 (32.1%)	24 (20.9%)	0.60 (0.27, 1.30) 0.2

\* Denotes statistical significance

**Figure 2: 30 Day Readmission Characteristics**



## Conclusions

- No difference seen in hospital readmissions within 30 days for patients discharged on same or different loop diuretic dose following TAVR
- There was an increase in 7 day readmissions for patients discharged on same dose, however most patients were readmitted for stroke or mechanical fall
- The most frequent dose changes post-TAVR were dose reduction or discontinuation of loop diuretic
- There were no significant variables in the subgroup analyses (reduced vs preserved ejection fraction, acute kidney injury during admission)
- Dose titrations were common in clinic follow-up within 30 days after TAVR suggesting diuretic requirements change but may not be fully capturing that through hospital readmissions
- Careful decision making on diuretic doses post-TAVR and close outpatient follow-up are necessary to minimize hospital readmissions

## References

- 2017 AHA/ACC Focused Update on the 2014 AHA/ACC Guidelines for the Management of Valvular Heart Disease.
- Treibel TA et al. JACC 2018; 71: 860-871.
- Smith CR et al. N Eng J Med 2011; 364: 2187-2198.
- Leon MB et al. N Engl J Med 2016; 373: 1609-1620.
- Dauerman HL et al. Circ Cardiovasc Interv 2016; 9: 003425.

## Disclosures

The authors of this presentation do not have any financial or personal relationships with any commercial entities to disclose that may have a direct or indirect impact on the subject matter of this presentation.