

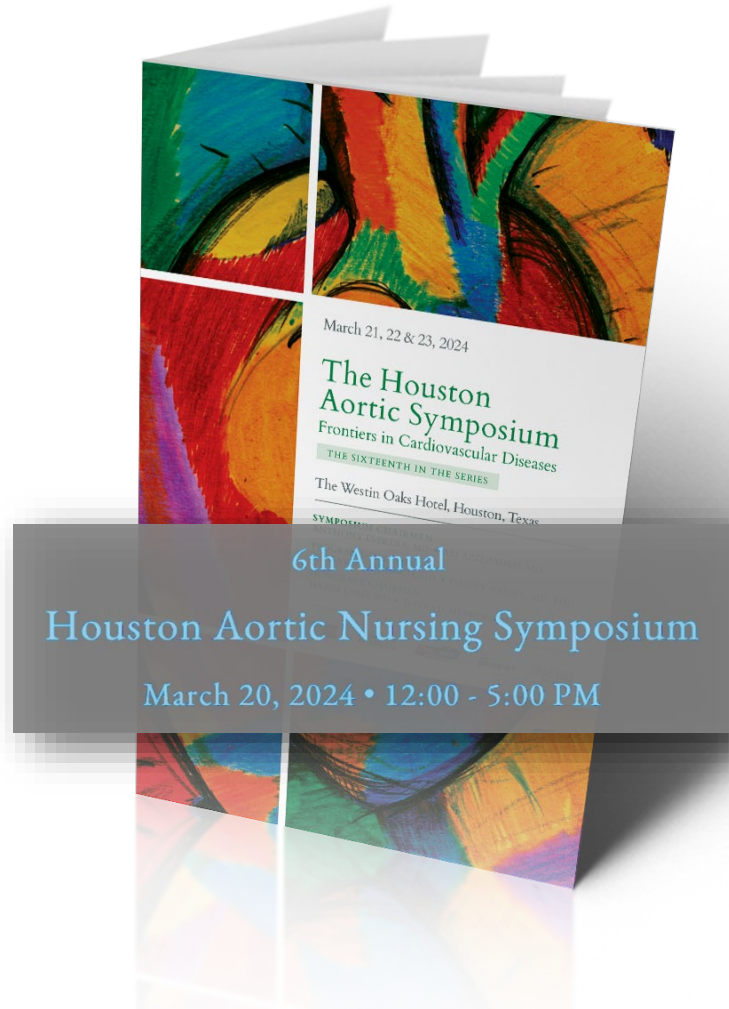
Identifying Patients at Risk for Left Ventricular Obstruction after TAVR

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TAVR Procedure

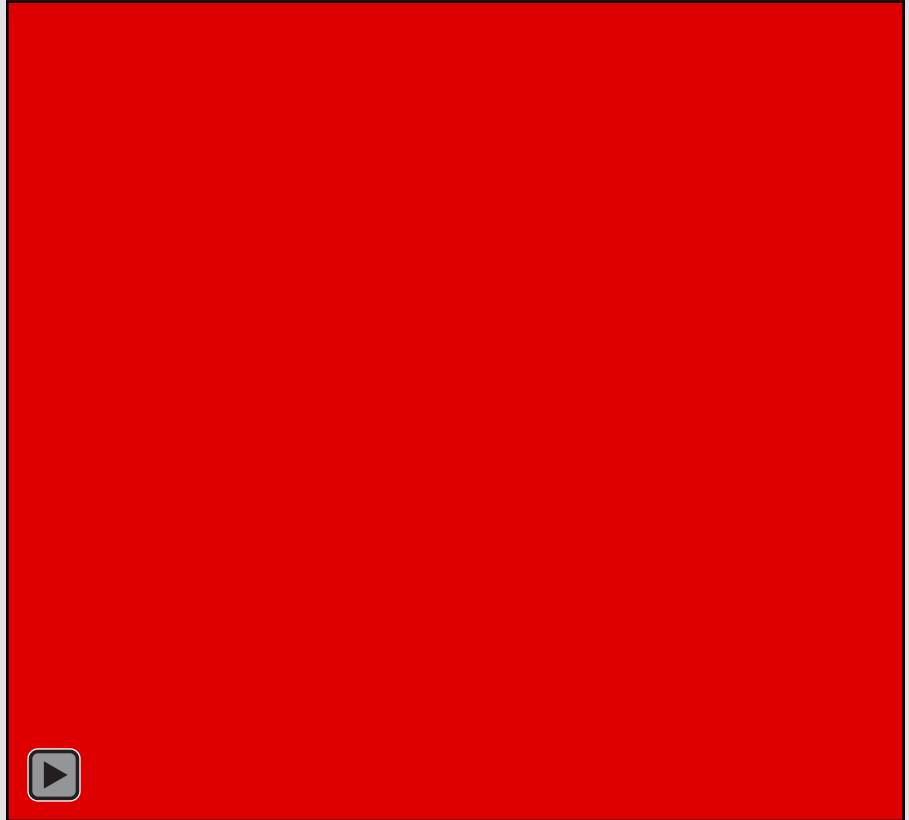
Valve deployment
takes less than 15
seconds

Instantaneous
change in
hemodynamics

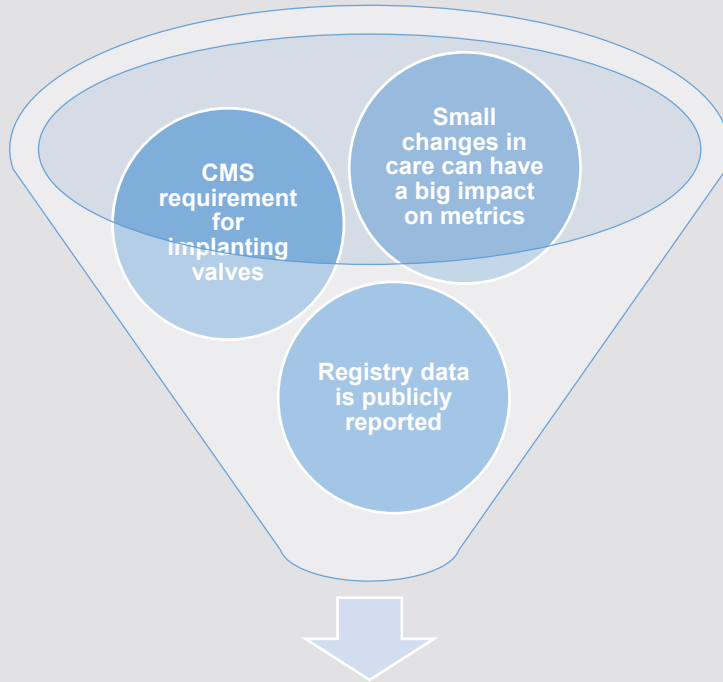
Minimalist
approach
3M Study

The majority of
cases performed
with conscious
sedation

Average age for
intermediate/high
risk patients is 84
years old



Reporting



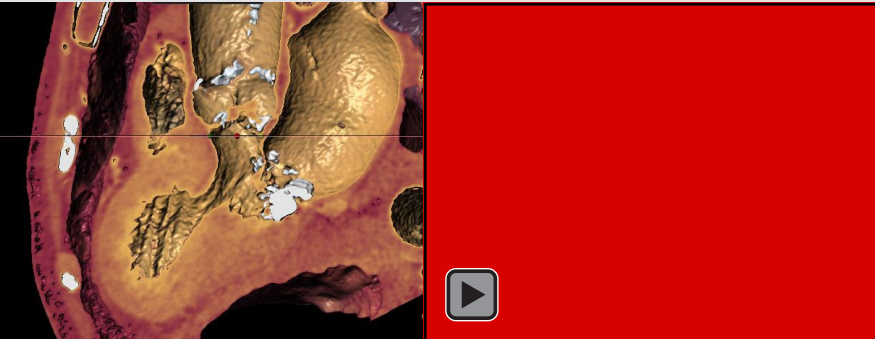
Outcomes reported to the STS/ACC
Transcatheter Valve Therapy (TVT) Registry

The Problem – Treatment of TAVR LVH Patients

PRE-TAVR

High afterload from aortic stenosis leads to compensatory left ventricular overload and chronic pressure overload

↑ ↑ Afterload
LV Hypertrophy



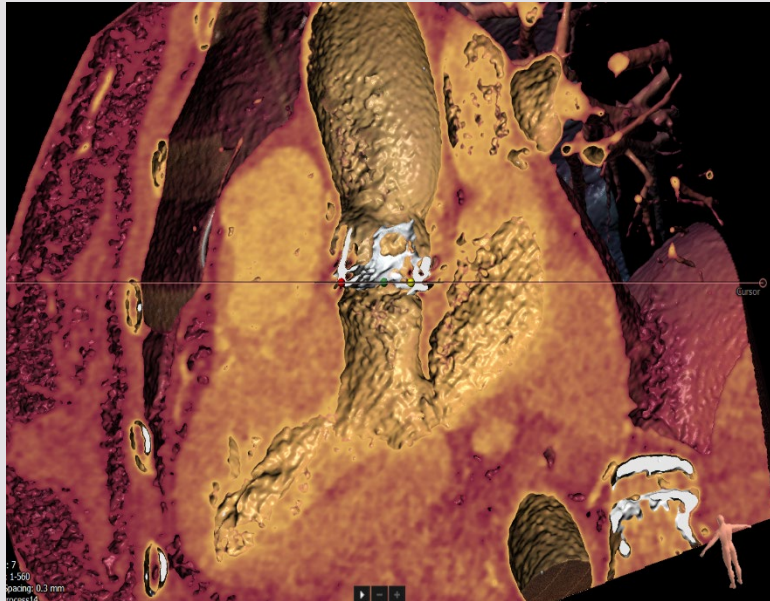
POST-TAVR

Rapid decrease in afterload due to valve deployment can lead to hypercontractility from chronic LVH and LV cavity obliteration can occur

↓ ↓ Afterload
Cavity Obliteration (Left Ventricular Obstruction)



Pathophysiology

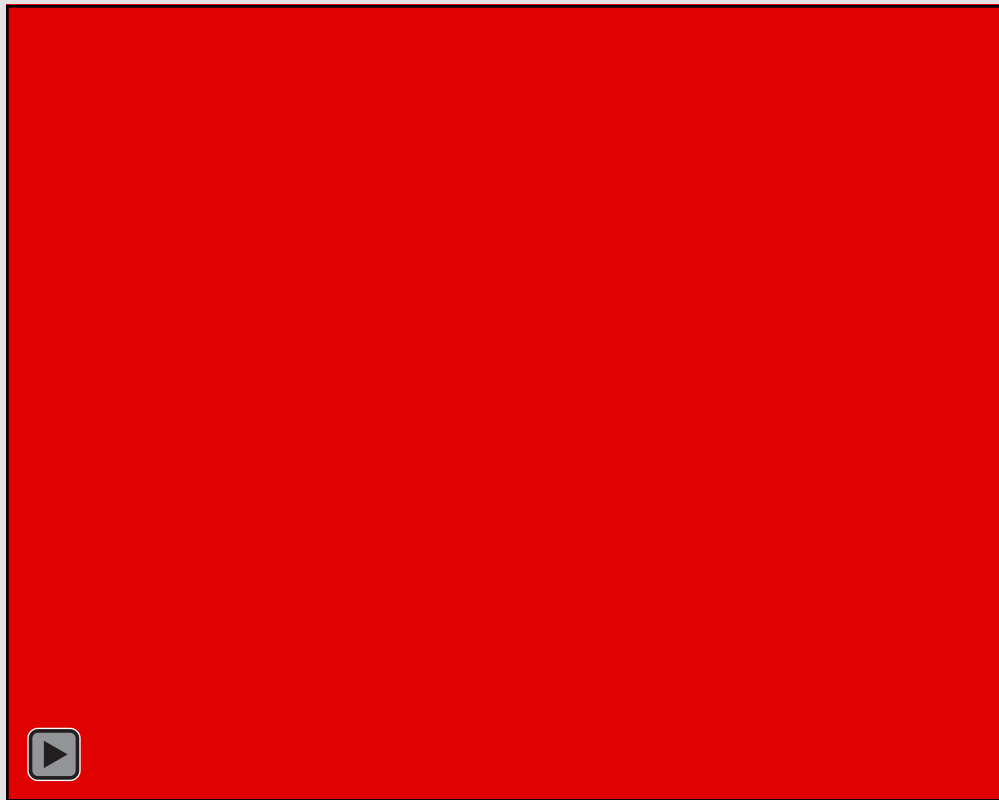


Left Ventricular
Obstruction (LVO)

Mid Ventricular
Obstruction (MVO)
(95%)

Left Ventricular Outflow
Tract Obstruction
(LVOTO)
(5%)

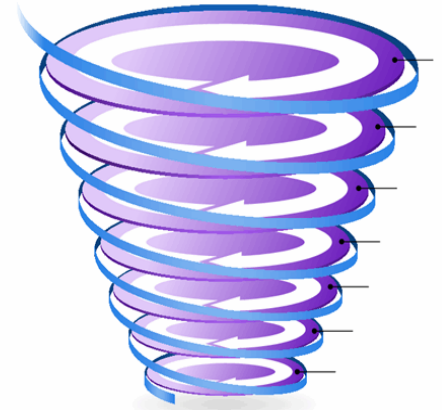
30 Days Post TAVR



Background: Left Ventricular Obstruction after TAVR

Identification and Management:

- Left Ventricular Obstruction (LVO) occurs in 13.3% of patients after TAVR (Tsurutra et al., 2017)
- If Left Ventricular Obstruction occurs after TAVR, hypotension and tachycardia are **treated atypically**



Background:

Left Ventricular Obstruction after TAVR

Identification and Management:

- The importance of identifying predictors of LVO after TAVR is essential in order to be prepared to manage hemodynamic instability (Suh et al., 2010)
- LVO managed appropriately is associated with good outcomes (Suh et al., 2010)
- Failures involving information transfer during hand-off in a patient's care may result in preventable patient harm (Pucher et al., 2015)

Counterintuitive Treatment

- Patients who develop LVO are managed with preload maintenance, vasopressors that are not positive inotropes, and beta-blockers to increase the left ventricular filling time and decrease inotropy, which is counterintuitive in the presence of hypotension

(Suh et al., 2010)



IV FLUIDS



SLOW PROTAMINE



POSITIVE INOTROPES

*Instead use Phenylephrine, Vasopressin, or Esmolol

Significance: Growing TAVR Volume

TAVR treatment
of all Society of
Thoracic
Surgeons (STS)
risk categories

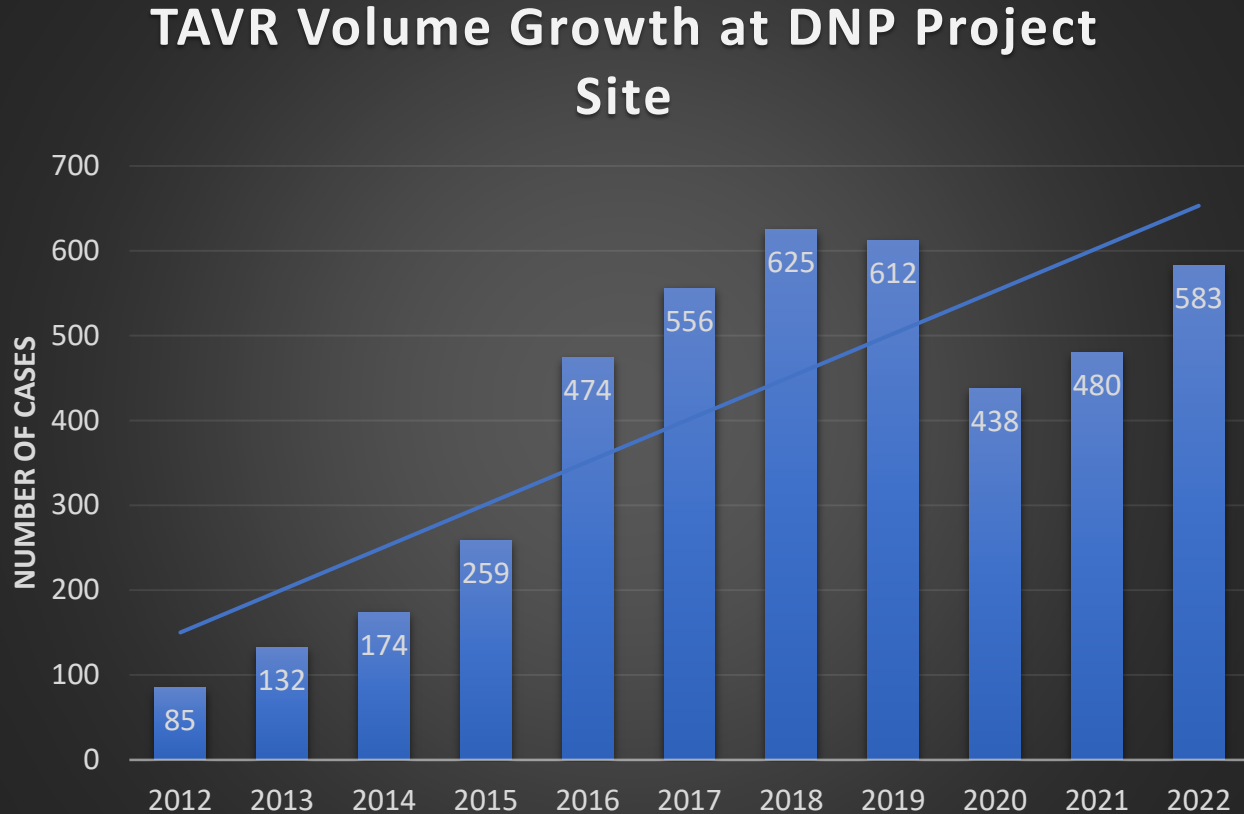


Patients
previously
treated with
SAVR now
being treated
with TAVR



The ratio of
TAVR to SAVR
in the US was
0.06 in 2011
and increased
to **0.98 in 2016**
(Kundi et al., 2019)

Significance: Growing TAVR Volume




What Started It All....

CASE REPORT

WILEY

Suicide left ventricle following protamine: A case report

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Abstract

A patient with severe aortic stenosis and left ventricular hypertrophy underwent a transcatheter aortic valve replacement. The patient's blood pressure significantly dropped after protamine administration. A diagnosis of suicide left ventricle post-valve replacement was made. The diagnosis and management of the protamine reaction are detailed. This case highlights the need to slowly infuse protamine sulfate and monitor for adverse events.

KEYWORDS

aortic valve, complication, heart failure, left ventricle function, valve replacement

1 | INTRODUCTION

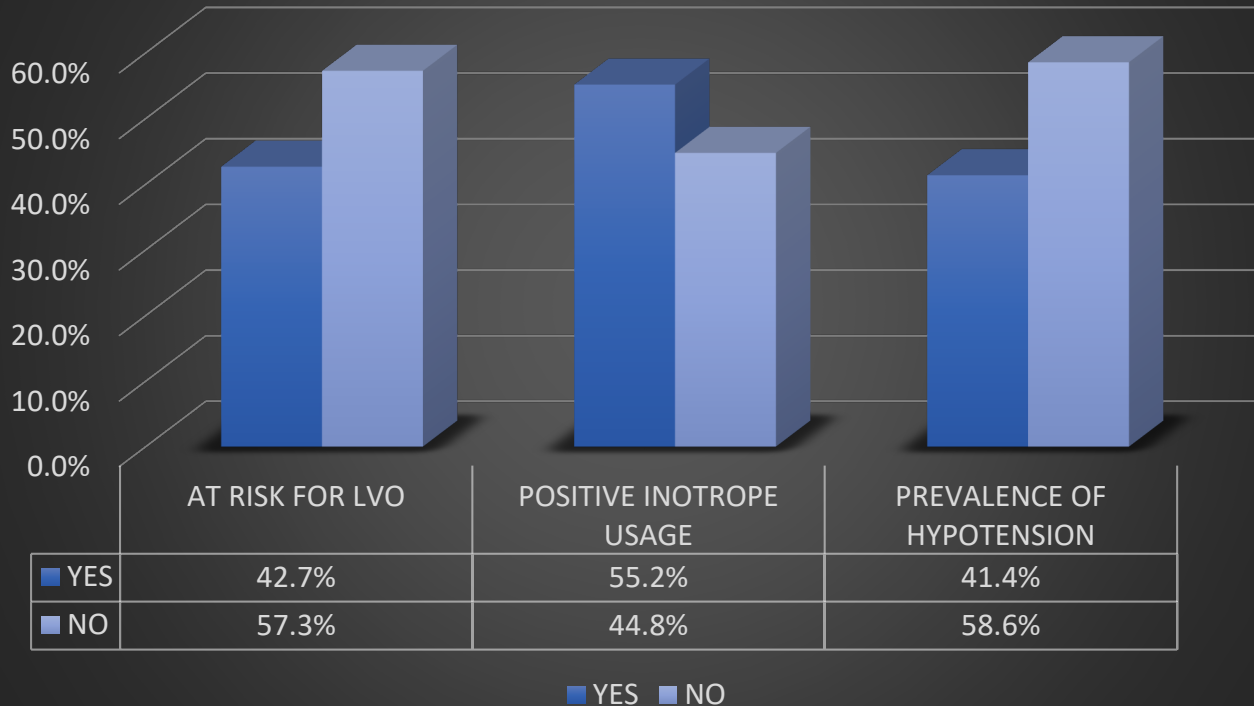
While rare, protamine reactions do occur during cardiac procedures. Appropriate therapeutic interventions for protamine reactions in patients with a structural heart disease are vital to a favorable patient

murmur in the aortic area peaking late in systole. Audible bilateral carotid bruits were noted.

The patient's baseline electrocardiogram revealed a left bundle branch block. Transthoracic echocardiography (TTE) showed a calcified tricuspid aortic valve with severe AS, mild mitral stenosis, and moderate

Houston we have a problem

Patients at Risk for LVO Baseline Data



Local Problem

System not in place to identify patients at risk for LVO after TAVR

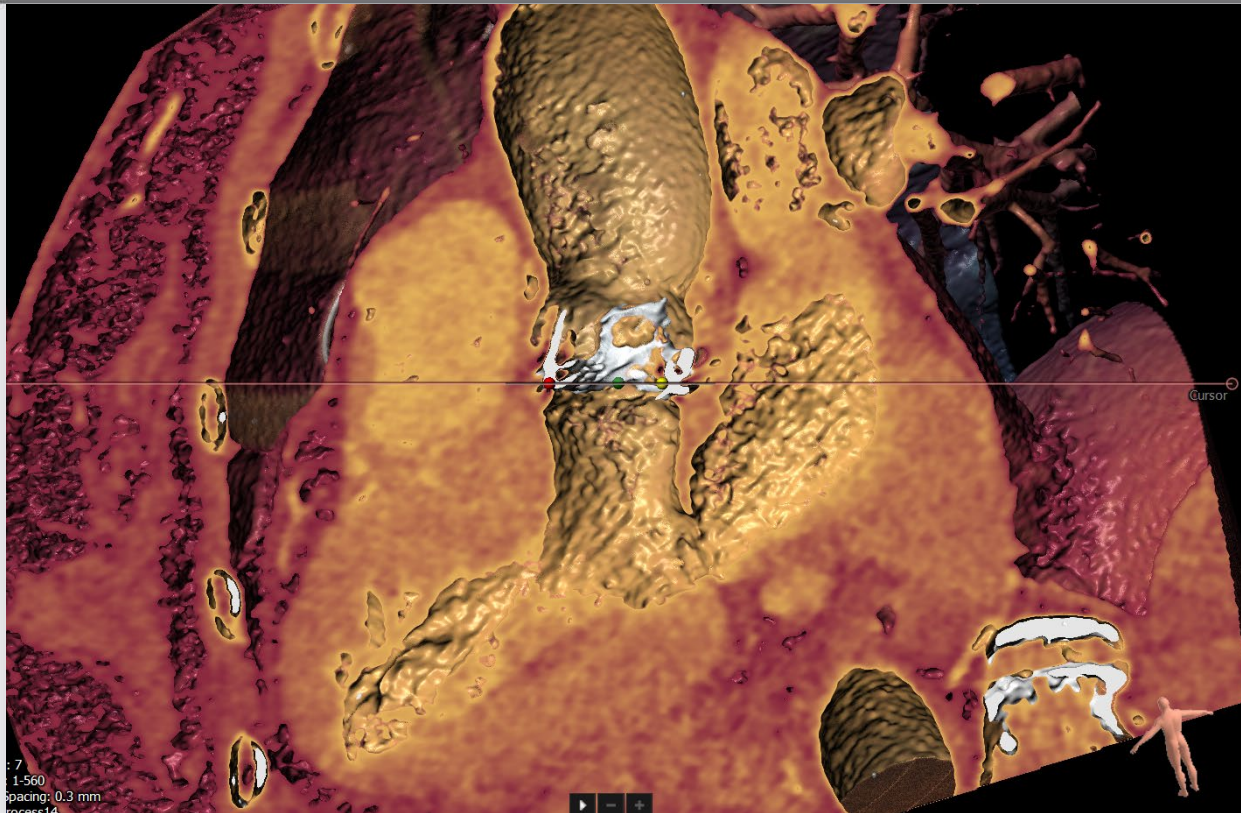
High acuity TAVR cases with high case volume

Teaching hospital with frequent rotating providers

Minimal understanding of LVO after TAVR outside of the structural heart team

Management of LVO is provider dependent

Choosing Identifiers

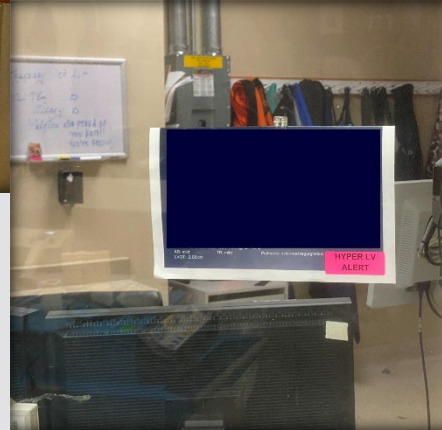


At Risk Patients:

- **EF \geq 70%**
- **or**
- **LVEDD*:**
<42mm Males
<38mm Females

*ASE Criteria

How do we identify?

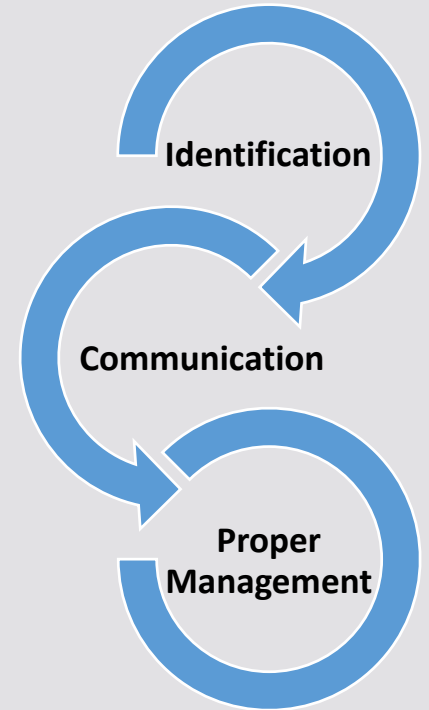


**HYPER LV
ALERT**

SMART AIM Statement

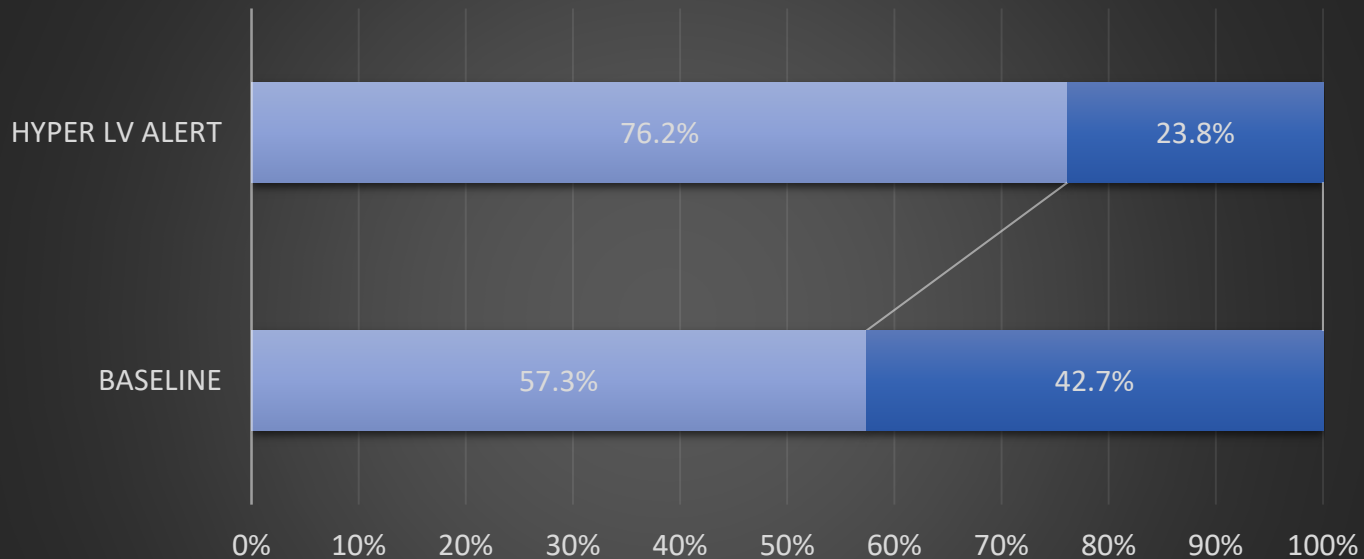
Within 4 months of implementing an alert system, 50% of patients at risk for LVO undergoing TAVR will be identified resulting in:

- 10% reduction in the prevalence of hypotension
- Improved management of hypotension in LVO patients as evidenced by a 10% reduction in positive inotrope use



Results

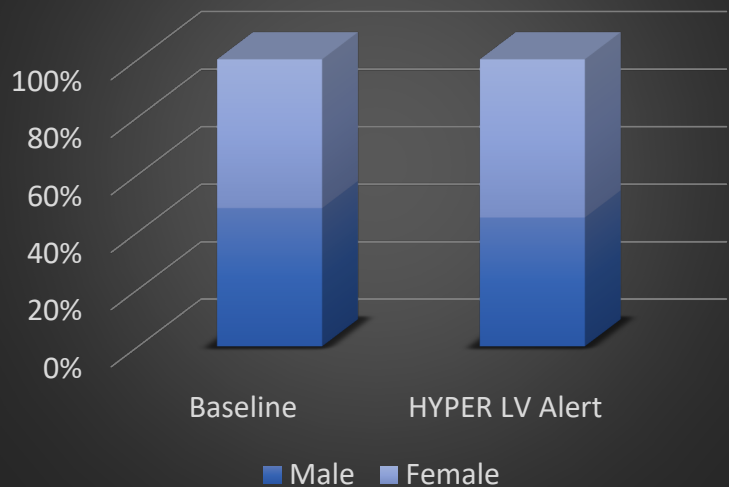
Patients at Risk for LVO



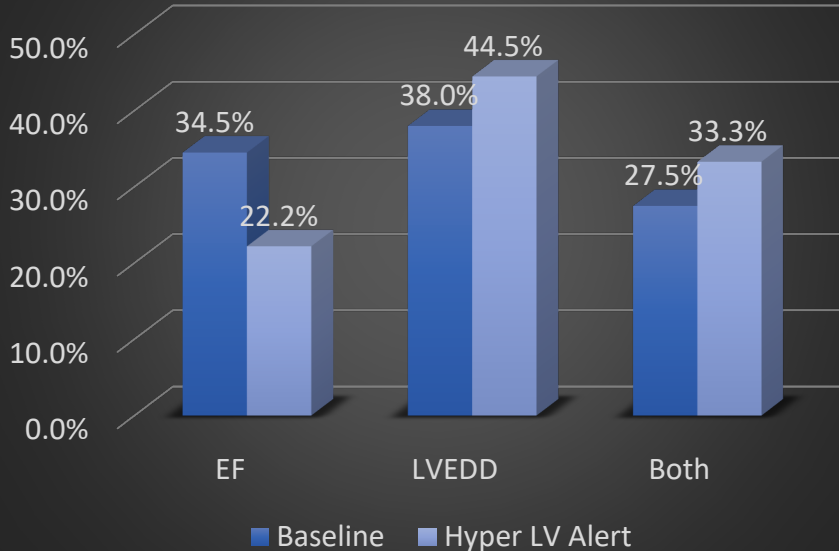
| | BASELINE | HYPER LV ALERT |
|-------------------|----------|----------------|
| ■ DID NOT QUALIFY | 39 | 64 |
| ■ QUALIFIED | 29 | 20 |

Results

Patients at Risk for LVO by Gender

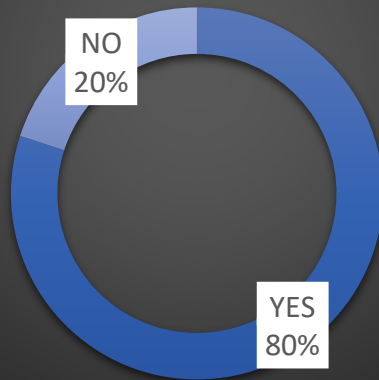


LVO Risk Qualifying Metric



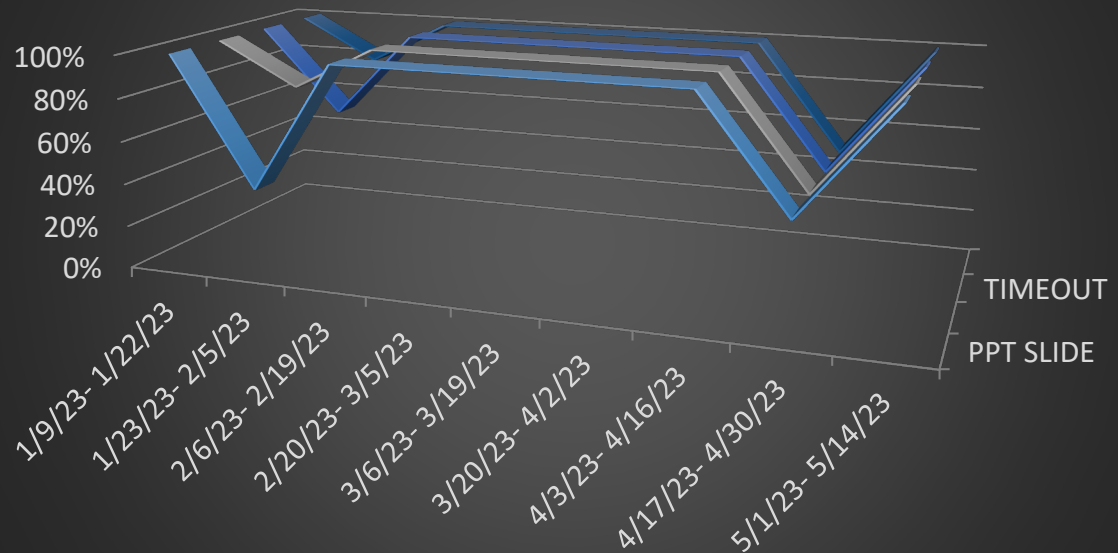
Results

Identification of HYPER LV Patients Post-Implementation



■ YES ■ NO

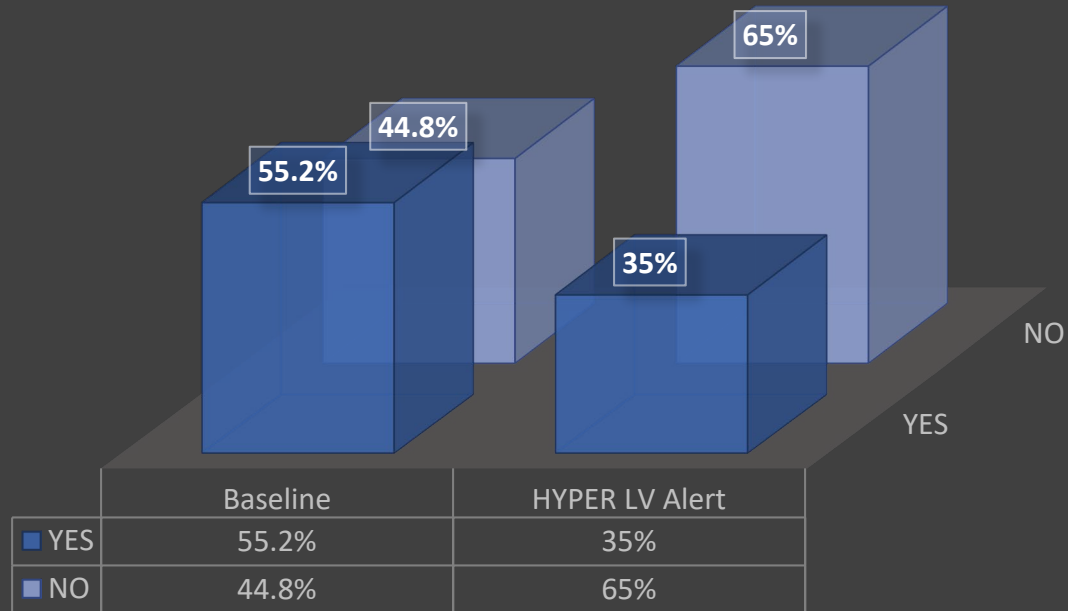
Methods of Identifying HYPER LV ALERT Patients



■ PPT SLIDE ■ OR TRACKER ■ TIMEOUT ■ HANDOFF COMMUNICATION

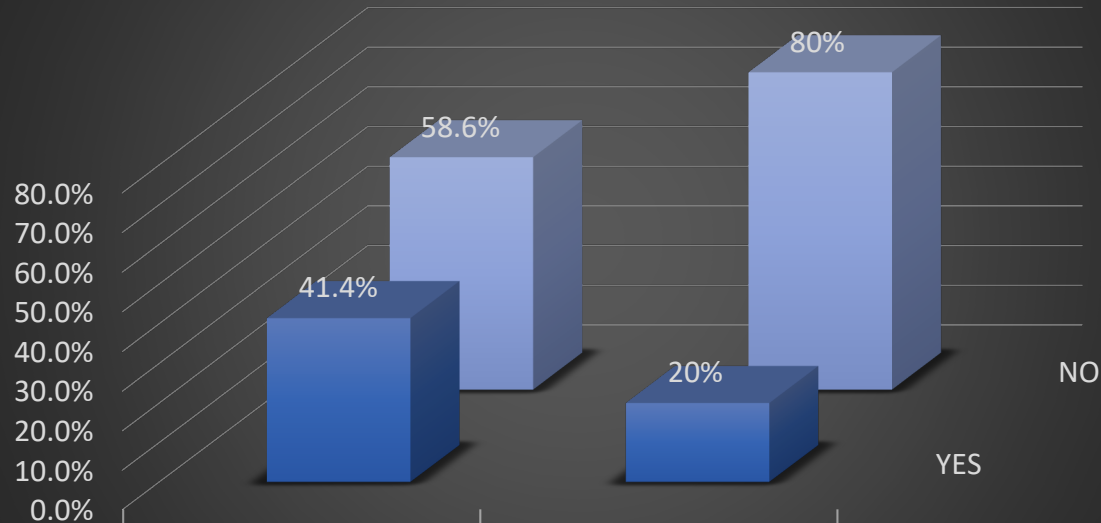
Results

POSITIVE INOTROPE USAGE IN PATIENTS AT RISK FOR LVO



Results

Prevalence of Hypotension in patients at risk for Ivo




| | Baseline | HYPER LV Alert |
|-------|----------|----------------|
| ■ YES | 41.4% | 20% |
| ■ NO | 58.6% | 80% |

Lessons Learned


Treatment is provider dependent



Always need a champion with staff turnover



Protamine is an issue for HYPER LV and Non-Hyper LV patients



We continue to improve management with time

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Thank You!



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