

## Outcomes of Ultrasonic Aspirator Use for MAC Debridement in Mitral Valve Replacement Surgery

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## Background

- Mitral annular calcification (MAC): calcium deposits on the mitral valve annular ring → hinder surgeon's abilities to secure sutures for replacement and repair surgical devices
- Severe MAC is associated with higher mortality and morbidity rates for MVR patients.<sup>4,5</sup>
- The ultrasonic aspirator focuses low-frequency ultrasound vibrations on the calcium bar, creating fragments that can be aspirated while protecting surrounding normal tissue.

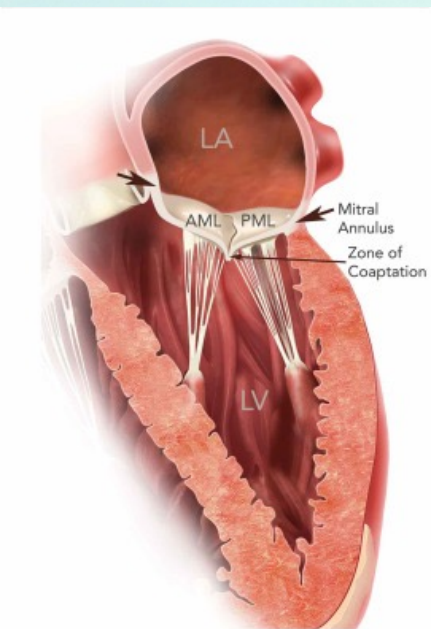


Figure 1: left-sided heart, showing mitral valve

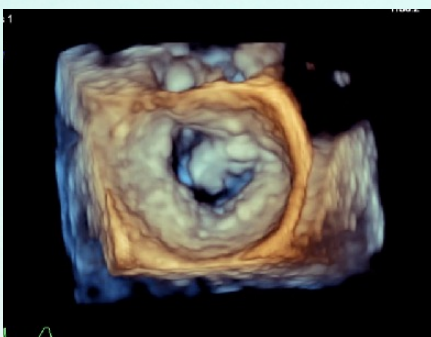


Figure 2: echocardiogram showing MAC

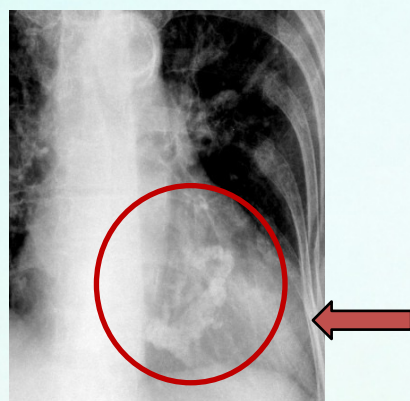


Figure 3: x-ray showing MAC

## Objective

Determine the affects of severe MAC debridement using a surgical aspirator on survival rates in MVR patients (n=37)

## Methods

1. retrospective review of patients with ultrasonic aspirator use from 2019-2022 at LVHN
2. Create a REDCap database to record patient information such as past surgical/medical history, pre-op and post-op valve conditions, and survival rates
3. Use descriptive statistics to evaluate patient survival rates

## Results

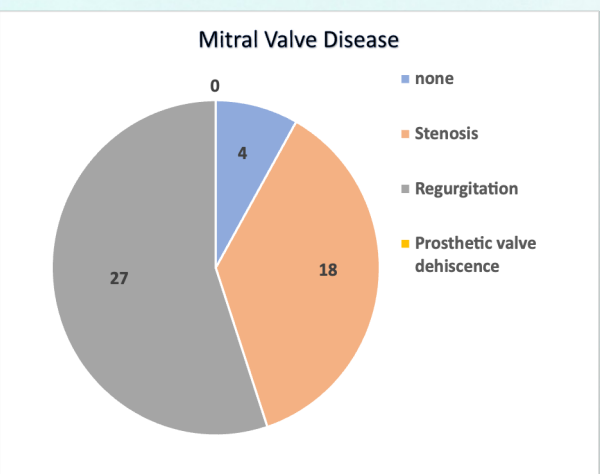


Figure 4 (above): Pre-op Mitral Valve Disease conditions

Figure 5 (right): Severity grading of pre-op mitral valve conditions.

Figure 6 (bottom): chart to determine severity grading of mitral stenosis

Severity Grading of Mitral Stenosis			
Measurement	Mitral Valve Area (cm <sup>2</sup> )	Mean pressure gradient (mmHg)	Pulmonary artery mean pressure (mmHg)
Normal	4.0-6.0	<2	10.0-20.0
Mild	1.5-2.5	2.0-6.0	<30.0
Moderate	1.0-1.5	6.0-12.0	30.0-50.0
Severe	<1.0	>12	>50.0

- 37 total patients
  - 5 died (13.9%)
- Average patient age at time of surgery: 70.36 years

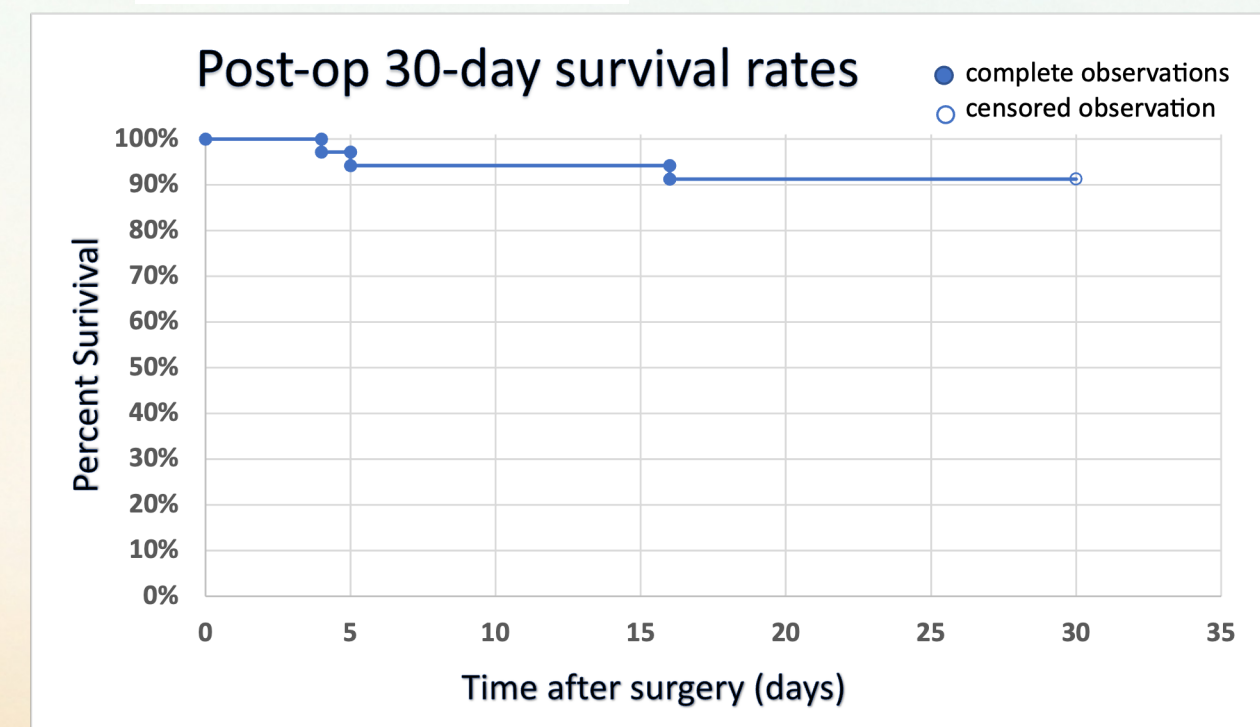
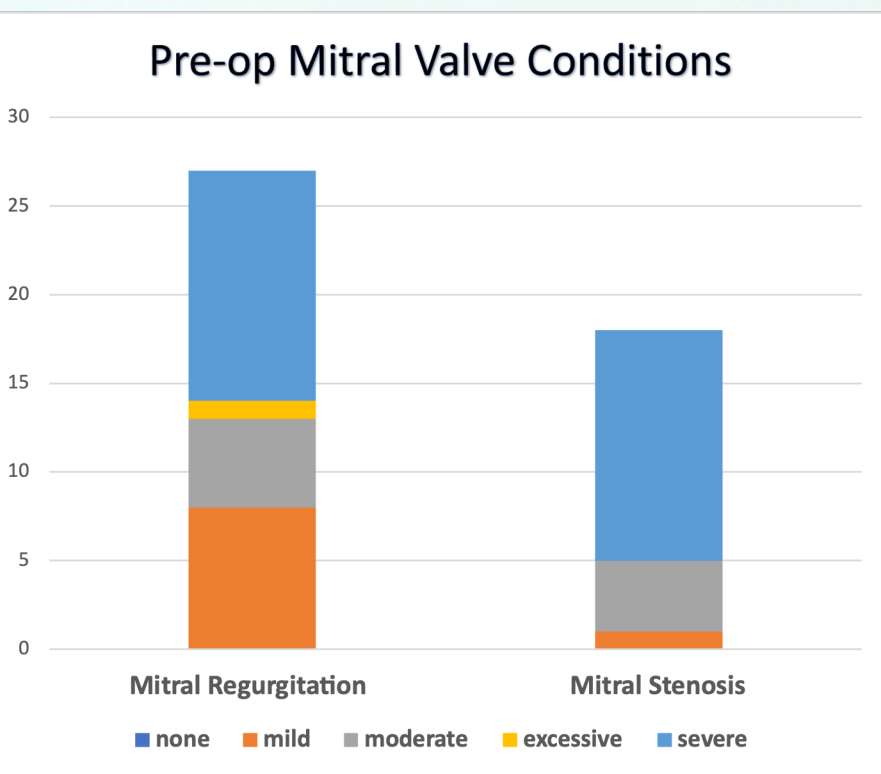


Figure 7: Kaplan Meier curve of MVR patients with ultrasonic aspirator use 30 days after surgery

## Conclusions

- Patients more commonly presented with mitral regurgitation pre-op, compared to mitral stenosis.
- Patients with ultrasonic aspirator use are most vulnerable one-week post-op as that period have the greatest drops in survival rates.
- There have been no operative deaths or post-op complications found due to the ultrasonic aspirator from this study.
- Future research should evaluate long-term outcomes after five and ten years to better understand long-term survival rates.

## Recommendations

Further studies can be performed to compare patients with ultrasonic aspirator debridement to patients without ultrasonic MAC debridement. The study can explore the presence of left atrioventricular groove injury and survival rates in both groups.

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