APOLLO TMVR Trial Update: Case Presentation

Anelechi Anyanwu, MD, MSc, FRCS-CTh

Professor and Vice-Chairman
Department of Cardiovascular Surgery
Icahn School of Medicine at Mount Sinai
New York, NY
Disclosure

- I will discuss use of an investigational device (Medtronic Intrepid TMVR)
- I have no financial disclosures
Medtronic Intrepid™ TMVR

Self expanding nitinol valve
27mm tri-leaflet bovine pericardium valve
43, 46 or 50 mm diameter

Transapical Delivery (35 F Sheath)
Case Presentation

- 77-year-old female dyspnea on minimal exertion
- Two prior sternotomies CABG (2005), AVR (biological) (2013)
- Ischemic cardiomyopathy (LVEF 27%, AICD)
- Multiple hospitalizations for CHF exacerbations

- Other comorbidity - CKD, PVD (toe amputation), TIA, AF
- STS Score (MV repair) 9.21
Baseline Transesophageal Echocardiogram

BP 106/53  Height 5ft 4in
Weight 173lb
LVEF 26%
Further Work-up

- **RHC:** PCW 34/45 mmHg, PA 64/25/38 mmHg, RA 60/14 mmHg, CO 4.3 L/min

- **CTA:**
  - Patent SVG’s (LAD, RCA)
  - LVEF 26%
  - Focal ascending aorta calcification,
  - Celiac artery occlusion (SMA collaterals)
Heart Team Review

- Declined for surgery due to prohibitive risk
- Enrolled in the Intrepid Global Pilot Study
SURGICAL PLANNING
ANNULUS SIZING

- 43mm implant
- 15% perimeter oversizing
- 20% diameter oversizing
- 17% CC compression
- Patent LVOT
SURGICAL PLANNING
LVOT & LV ASSESSMENT

- Wide 135° aortomitral angle
- Very thin <1mm wall at incision site
- Similar thickness at diastole
- Anterior "annulus" 7.5mm from bioprosthetic Aortic Valve
- No interaction expected with AoV replacement
Preoperative Optimization – 3 Days prior to procedure

- Myocardial Contractility: Milrinone
- Diuresis: Intravenous Furosemide
- Nutrition
- Physical
Procedure: Intrepid™ TMVR

- Echo guided procedure
- Transapical surgical access
Introducer Sheath Placed in Apex
Catheter Advanced and Guided Through Mitral Valve
Catheter in Left Atrium
Partial Device Release and Alignment with Annulus

CAUTION: Investigational Device Limited by Federal (United States) Law to Investigational Use
Rapid Pacing & Implant Positioning Parallel to Mitral Plane
Rapid Pacing, Retraction of Device & Valve Deployment
Final Deployment Complete and Delivery Catheter Withdrawal
Final Result
Final Result LVOT Gradient
Post-operative Course

- Extubated on POD 4
- Renal failure requiring CVVH (renal recovery 10 days after the procedure)
- Maintained on low-dose milrinone for two weeks
- Discharged on POD 21
- Died a year post-implant from complications of renal failure
APOLLO TRIAL
TO EVALUATE INTREPID™ TMVR IN PATIENTS WITH SEVERE SYMPTOMATIC MITRAL REGURGITATION

<table>
<thead>
<tr>
<th></th>
<th>Randomized Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Primary Endpoint</strong></td>
<td>• The rate of all-cause mortality, all stroke, reoperation (or reintervention) and cardiovascular hospitalization at 1 year</td>
</tr>
</tbody>
</table>
| **Secondary Endpoint** | • Composite of all-cause mortality, disabling stroke, acute kidney injury, prolonged ventilation, deep wound infection, reoperation (or reintervention) for any reason and major bleeding at 30 days or hospital discharge whichever is longer  
• Change in NYHA at 1 year  
• Quality of Life (QoL) Improvements at 30 days (SF-12) and 1 year (KCCQ)  
• Echocardiographic assessments of degree of mitral valve regurgitation at 1 year  
• Days alive out of hospital at 1 year (all hospitalizations) from index procedure  
• Cardiovascular hospitalization through 1 year                                                                                                                                                                                                                                                                                                                                                                               |
| **Follow-up Evaluations** | • 30-days, 3-months, 6-months, and annually starting 1 Through 5 years                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

CAUTION: Investigational Device Limited by Federal (United States) Law to Investigational Use
Principal Investigators: David Adams and Marty Leon
Study Chair: Michael Mack

Evaluate safety and efficacy of Medtronic Intrepid™ TMVR System in patients with symptomatic mitral regurgitation

1:1 Randomization

Assessment by Multidisciplinary Heart Team

Ineligible for surgical procedure

Single-arm Cohort

TMVR

Treatment Arm TMVR

Control Arm MV surgery

CAUTION: Investigational Device Limited by Federal (United States) Law to Investigational Use
# APOLLO TRIAL

## TRIAL DESIGN

<table>
<thead>
<tr>
<th>Key Inclusion Criteria</th>
<th>Randomized Cohort</th>
<th>Single-arm Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Subject has severe symptomatic mitral regurgitation</td>
<td>Predicted risk of operative mortality is &lt;3% at 30 days or has ≥35% risk of mortality or irreversible major morbidity at 30 days</td>
</tr>
<tr>
<td></td>
<td>Heart Team agrees that patient is a candidate for bioprosthetic mitral valve replacement</td>
<td>Currently implanted mitral valve</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Key Exclusion Criteria</th>
<th>Randomized Cohort</th>
<th>Single-arm Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Predicted risk of operative mortality or irreversible major morbidity &lt; 35% and ≥ 50% 30 days</td>
<td>Estimated life expectancy of less than 12 months due to associated non-cardiac co-morbid conditions</td>
</tr>
<tr>
<td></td>
<td>Estimated life expectancy of &lt;24 months due to associated non-cardiac comorbid conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Subject with mitral anatomy that would preclude management of the sub-valvular apparatus and/or full chordal sparing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prior mitral valve surgery including previously implanted mitral valve, ring, or band</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Additional Exclusion Criteria</th>
<th>Randomized Cohort</th>
<th>Single-arm Cohort</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior transcatheter mitral valve procedure with device currently implanted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anatomic contraindications for Intrepid™ TMVR system (eg., annular dimensions, high risk of LVOT obstruction, transapical access, etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prohibitive mitral annular calcification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reduced ventricular function with left ventricular ejection fraction (LVEF) &lt;25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemodynamic instability requiring either inotropic agents or mechanical circulatory support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Need for emergent or urgent surgery</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

*CAUTION: Investigational Device Limited by Federal (United States) Law to Investigational Use*
Transcatheter Mitral Valve Replacement With the Medtronic Intrepid™ TMVR System in Patients With Severe Symptomatic Mitral Regurgitation (APOLLO)

The safety and scientific validity of this study is the responsibility of the study sponsor and investigators. Listing a study does not mean it has been evaluated by the U.S. Federal Government. Know the risks and potential benefits of clinical studies and talk to your health care provider before participating. Read our disclaimer for details.

Sponsor:
Medtronic Cardiovascular

Information provided by (Responsible Party):
Medtronic Cardiovascular
Transcatheter Mitral Valve Replacement With the Medtronic Intrepid™ TMVR System in Patients With Severe Symptomatic Mitral Regurgitation (APOLLO)

**United States, New York**

- **North Shore University Hospital**
  - Manhasset, New York, United States, 11030
  - Principal Investigator: Bruce Rutkin, MD
  - Principal Investigator: Sheel Valiela, MD

- **The Mount Sinai Hospital**
  - New York, New York, United States, 10020
  - Principal Investigator: Samir Sharma, MD
  - Principal Investigator: David Adams, MD

- **Columbia University Medical Center/NYPH**
  - New York, New York, United States, 10032
  - Principal Investigator: Martin Leon, MD
  - Principal Investigator: Isaac George, MD

**United States, North Carolina**

- **Saint Francis Hospital**
  - Roanoke, New York, United States, 11576
  - Principal Investigator: George Petrosslis, MD
  - Principal Investigator: Newell Robinson, MD

- **United States, North Carolina**
  - Duke University Medical Center
  - Durham, North Carolina, United States, 27710

- **United States, New York**
  - New York-Presbyterian Hospital
  - New York, New York, United States, 10026

**Relevant Study Details**

- **Study Identifier:** NCT03242642
- **Status:** Recruiting
- **Recruitment:** August 8, 2017
- **Post Date:** November 19, 2018
Thank You