

# Transcatheter Mitral Valve Replacement Current Evidence and Experience

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Centre for  
Heart Valve Innovation  
St. Paul's Hospital, Vancouver



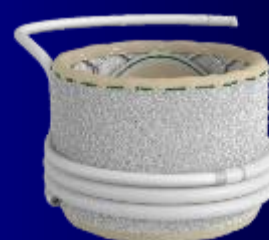
**HEART CENTRE**  
AT ST. PAUL'S HOSPITAL

# Disclosure

**Consultant:**

**Edwards Lifesciences  
JC Medical Inc.**

# First in Human TMVR



**Edwards  
CardiAQ  
June 2012**

**Neovasc  
Tiara  
Jan 2014**

**Medtronic  
Intrepid  
Nov 2014**

**Highlife  
Feb 2016**

**Edwards  
M3  
Aug 2017**

**AltaValve  
2018**

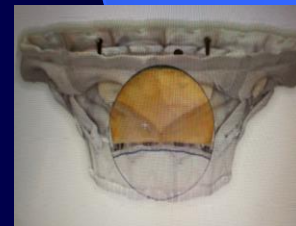
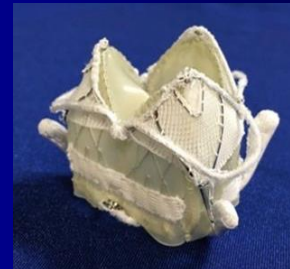
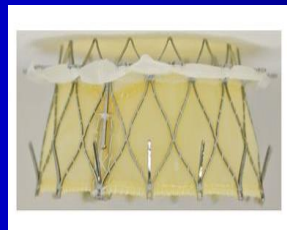
**Feb 2013  
Abbott  
Tendyne**

**Feb 2014  
Edwards  
Fortis**

**Oct 2015  
NaviGate**

**June 2016  
Caisson**

**2018  
Cardiovalve**



# Transsepatal TMVR

## Edwards SAPIEN M3 System

### Dock Delivery

SAPIEN M3 Dock



SAPIEN M3 Dock Delivery System



### Valve Delivery

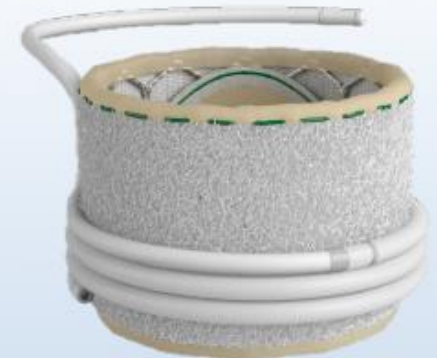
SAPIEN M3 Valve



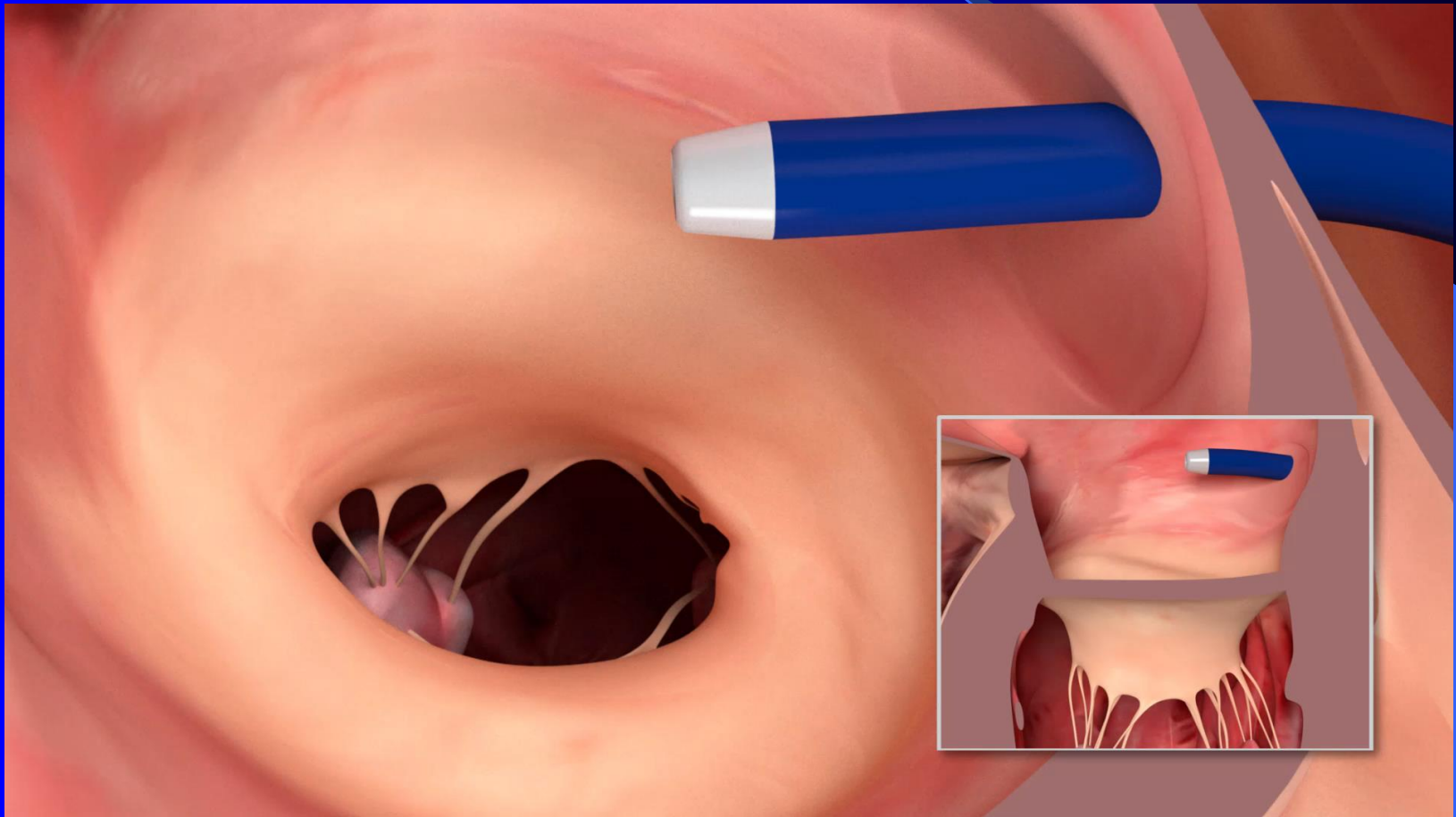
Commander Delivery System



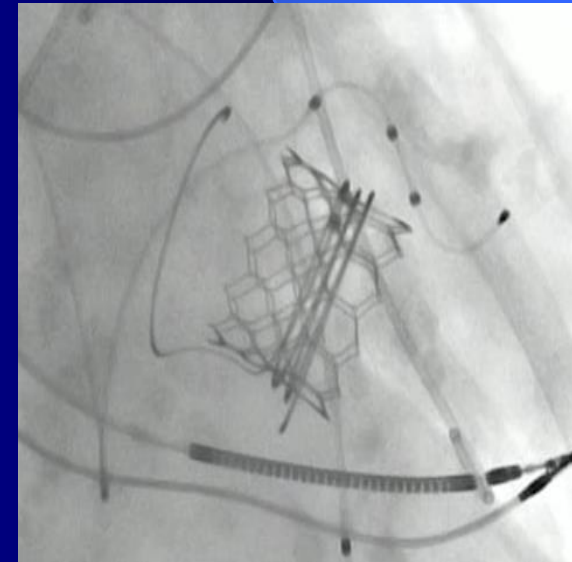
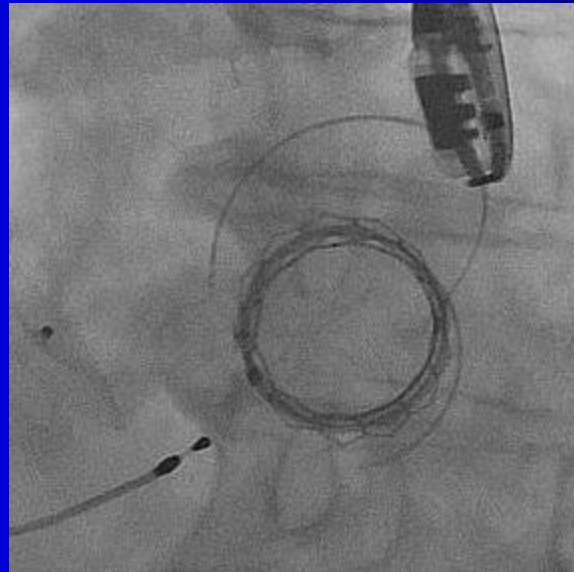
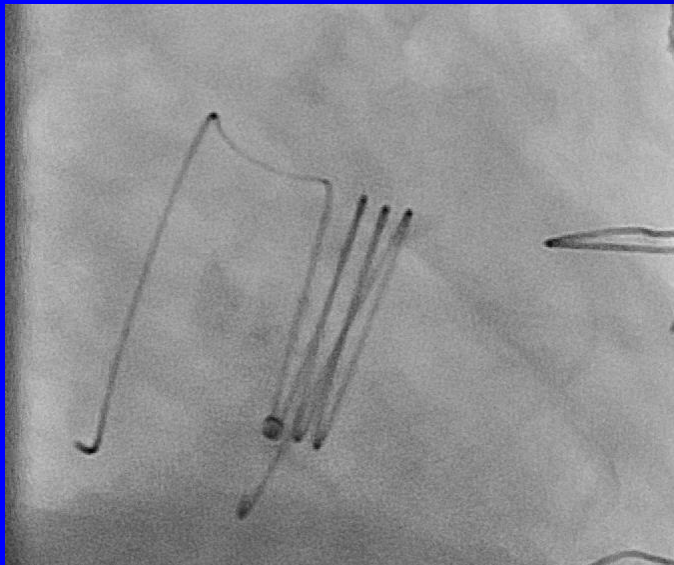
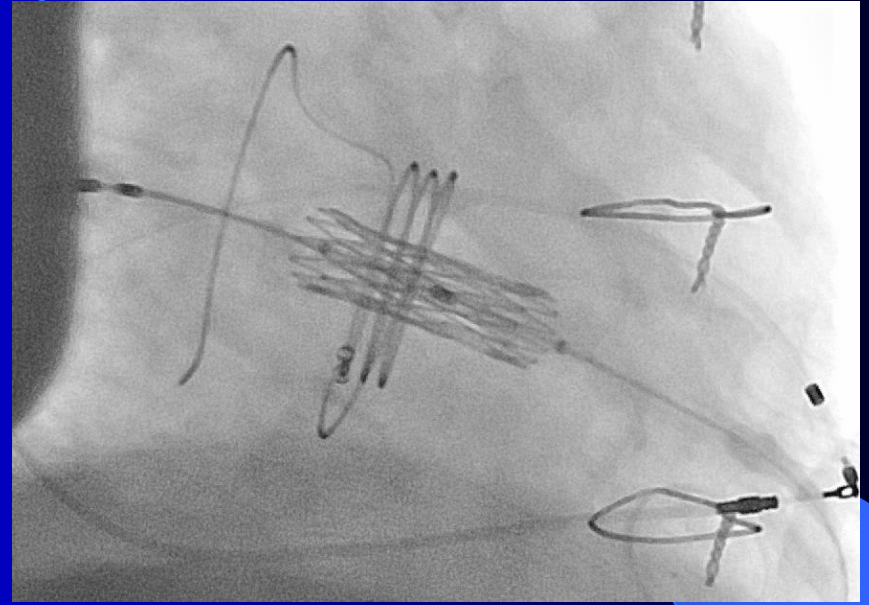
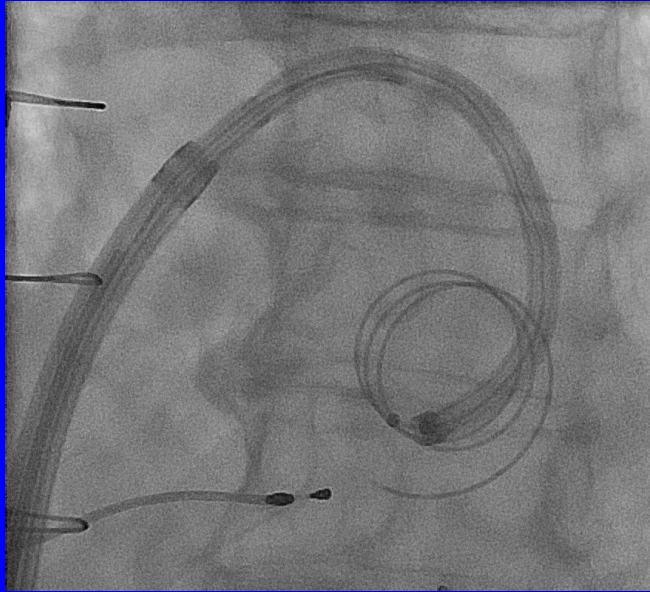
### Final Implant



# SAPIEN M3 System



# M3 TMVR System



# Reported Early Clinical Outcomes

	Cases	30-day mortality	Residual MR $\geq$ Moderate	Technical success	30-day stroke	1-year survival
Tendyne	100	6%	1.1%	97%	2%	72.4%
Tiara	58	10.3%	2%	95%	3%	
Intrepid	50	14%		92.6%	4%	76.5%
SAPIEN M3	10	0%	10%	90%	10%	
TS CardiAQ	12	16%		75%		
Caisson	21			81%		
Cardiovalve	5		0%	100%		
HighLife	15					

# Initial Feasibility Study of a New Transcatheter Mitral Prosthesis

The First 100 Patients

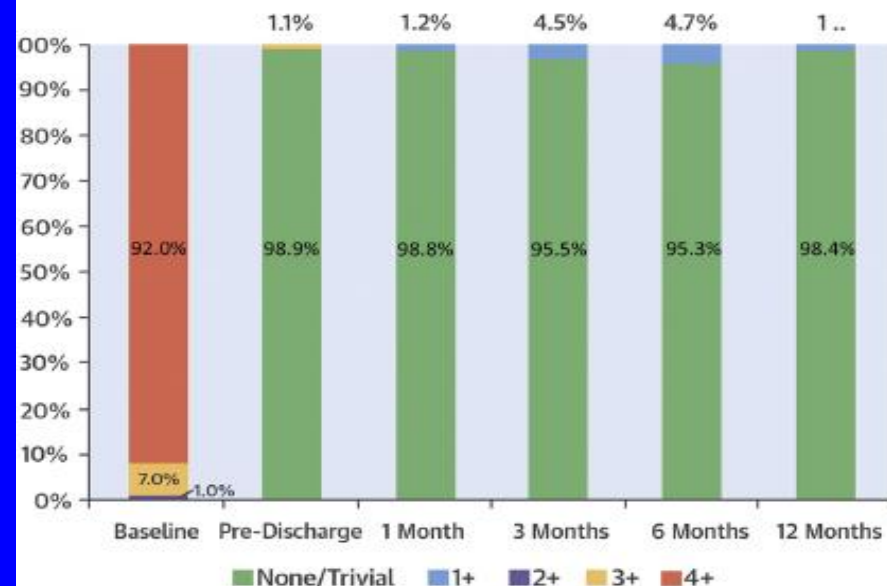


J Am Coll Cardiol 2019;73:1250-60

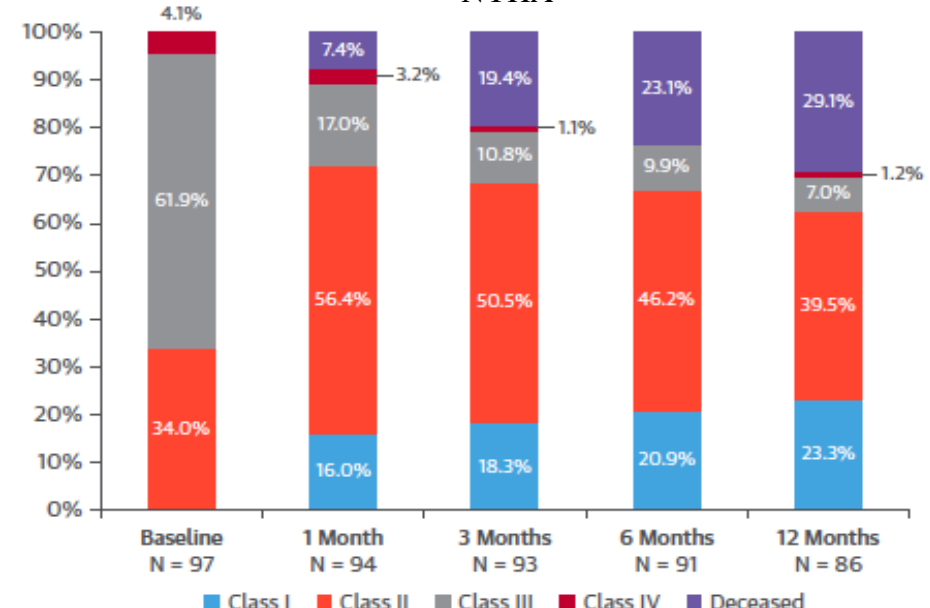
**TABLE 4** Paired Analysis of Changes in Echocardiographic Parameters

	n	Baseline	1 Year	Change	p Value
LV ejection fraction, %	49	45.4 ± 9.1	39.2 ± 10.3	-6.2 ± 10.1	0.0001
LVEDV, ml	41	174.0 ± 60.4	159.0 ± 41.4	-15.0 ± 39.3	0.019
LVESV, ml	41	97.6 ± 40.2	98.4 ± 35.5	0.9 ± 29.1	0.852
Forward stroke volume, ml	39	54.0 ± 16.3	56.4 ± 16.7	2.3 ± 17.6	0.411
Cardiac output, l/min	37	3.9 ± 1.1	4.0 ± 1.1	0.1 ± 1.3	0.563
RVSP, mm Hg	20	43.5 ± 11.3	35.5 ± 12.4	-8.0 ± 15.6	0.034
LVOT gradient, mm Hg	43	1.4 ± 0.6	1.7 ± 1.0	0.3 ± 1.0	0.073
Mean mitral gradient, mm Hg	38	2.9 ± 1.3	3.0 ± 1.1	0.1 ± 1.6	0.627

**Change in Mitral Regurgitation**



**NYHA**





# Randomized Controlled Clinical Trials

**APOLLO Trial**  
**Medtronic Intrepid TMVR**

**Intrepid TMVR**  
**VS**  
**Surgical MVR**  
**1:1 randomization**

**SUMMIT Trial**  
**Tendyne TMVR**

**Tendyne TMVR**  
**VS**  
**Surgical MVR/r**  
**2:1 randomization**

# Challenges

Targeting different disease and etiology

Delivery (transapical, transseptal)

Complexity of implantation (transseptal)

Anchoring (instability, migration, embolization)

Sealing (PVL)

High screening failure rate

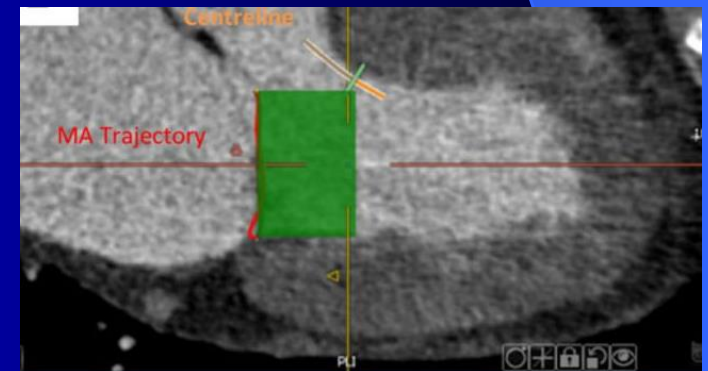
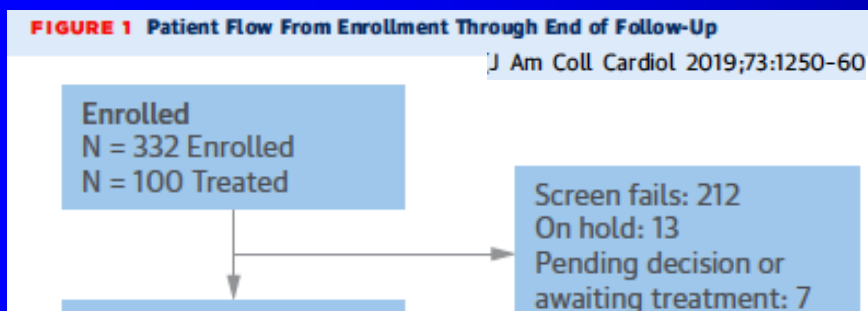
Durability

Valve thrombosis

Valve performance

Stent fatigue/fracture

LVOT obstruction



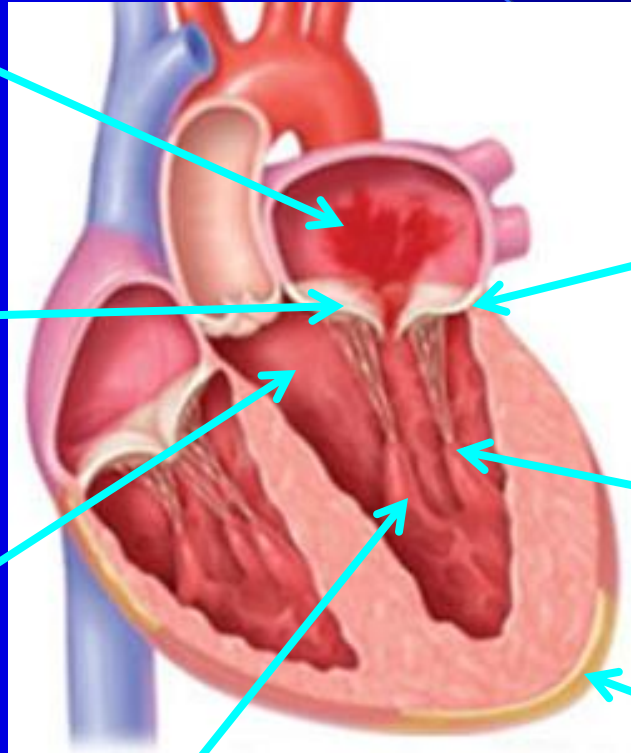
# CT Assessment

## LA

*height*  
*size near annulus*

## Leaflets

*height*  
*calcification*  
*commissure*



## Annulus

*size (area, perimeter)*  
*a-p, c-c or t-t distance*  
*calcification*

## Papillary

*distance to annulus*  
*p-p distance*

## LVOT

*aorto-mitral angle*  
*septum thickness*  
*Neo-LVOT*

## LV

*size (short and long axis)*

## TA approach

*apico-mitral distance*  
*implanting angle*

# Interdisciplinary Rounds

- Interventional cardiologists
- Cardiac surgeons (**Valve repair surgeon**)
- Heart failure specialist
- Echocardiologist
- Radiologist
- Anesthetist
- THV nurses
- Other specialists



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THANKS!