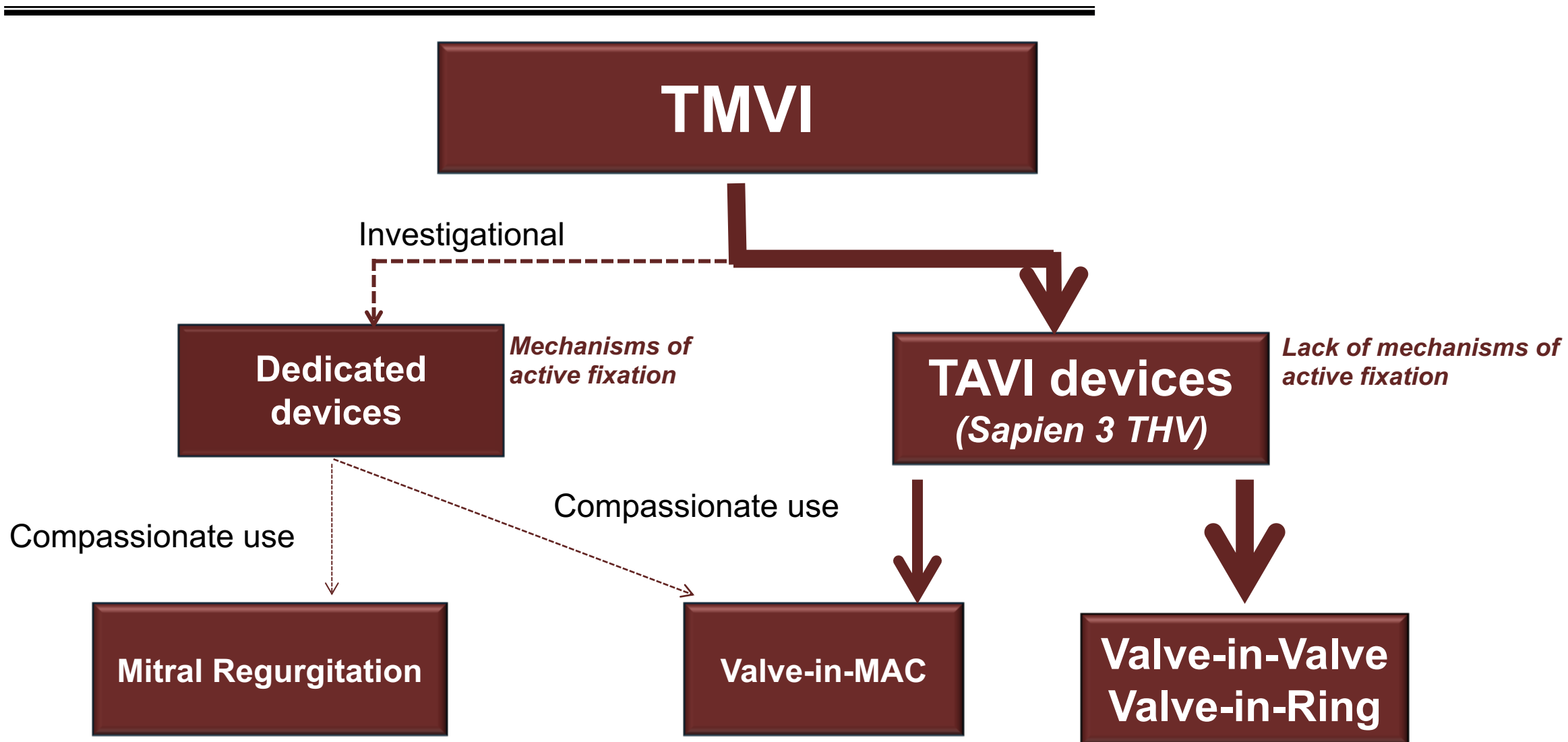


# Quand la mitrale profite ... du TAVI - Actualités et perspectives

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# TMVI Today



# Challenges of percutaneous mitral prostheses

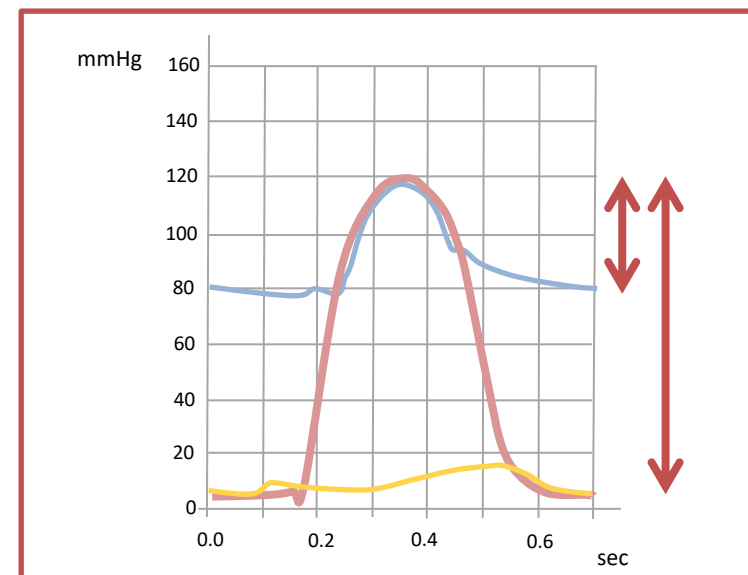
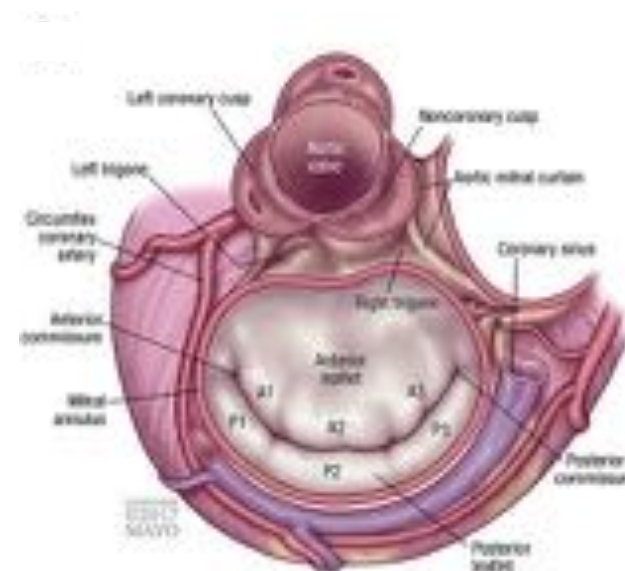
## 1. Lack of support:

- D-shaped and dynamic changes
- larger annulus (~36mm)
- less frequently calcified

## 2. Greater forces of migration ( Grad LV/LA)

## 3. Interaction with structures in proximity

- LVOT
- Circ
- Coronary sinus



Maréchaux. *Progress in Cardiovascular Diseases* 2017  
Urena et al. *Circulation* 2021.

# Indications for TMVI

Failing bioprostheses or rings or severe MAC  
(Mitral stenosis and/or mitral regurgitation)

+

High surgical risk/*(Heart team prioritize a percutaneous therapy)*

+

Suitable anatomy

**2017 ESC/EACTS Guidelines for the  
management of valvular heart disease**

*Valve-in-valve and valve-in-ring procedures may be reasonable alternatives if the patient is at increased surgical risk, but it is necessary that the multidisciplinary Heart Team discusses every patient and chooses the best individualized approach.*

# Work-up before interventions

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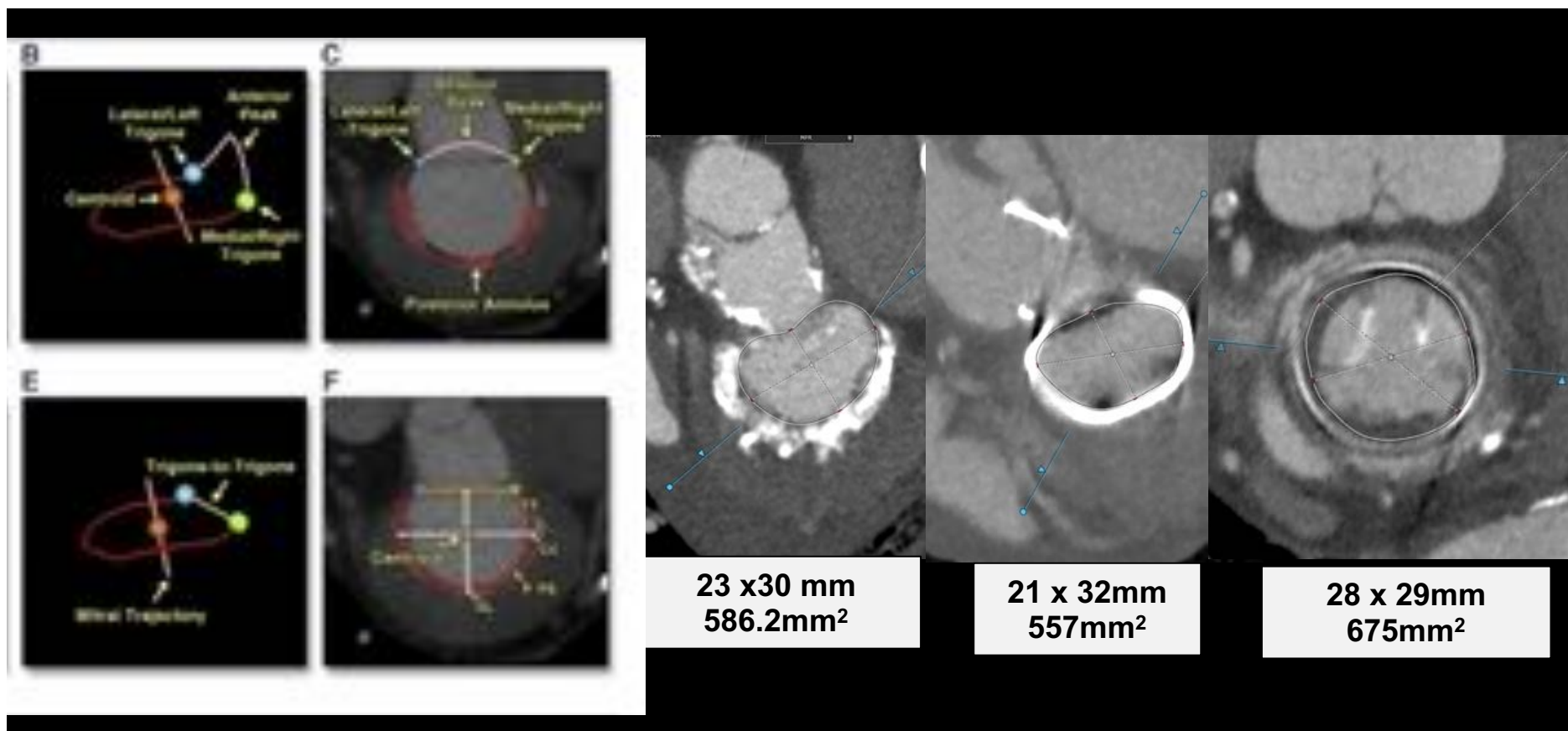
1. Identification of **contraindications** for TMVI
2. Evaluation of the risk of **futility**
3. Risk of **periprocedural complications**
  - Risk of valve embolization
  - Risk of LVOT obstruction
  - Risk of suboptimal results
4. **Planning of the procedure**
  - **Sizing** of the THV
  - Selection of **approach** (Transseptal as default via)

# Multimodality imaging for screening before TMVI

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		<b>TTE/TOE</b>	<b>Cardiac CT</b>
<b>Severity of cardiac disease</b>		+++	+
<b>Contraindications for TMVI</b>	<b>Endocarditis</b>	+++	-
	<b>Valve thrombosis</b>	++	+++
	<b>Prosthesis/ring disinsertion/PVL</b>	+++	++
<b>Risk of valve embolization</b>	<b>Annulus dimensions</b>	++	+++
	<b>Severity and extension of calcification</b>	++	+++
<b>Risk of LVOT obstruction</b>	<b>Morphology of anterior leaflet</b>	+++	+
	<b>Neo LVOT dimensions</b>	+	+++
<b>Risk of THV dysfunction</b>	<b>Characteristics of bioprostheses/rings</b>	++	+++
<b>Sizing of the THV</b>	<b>Annulus/bioprostheses/rings dimensions</b>	++	+++
<b>Selection of approach</b>		+++	+++

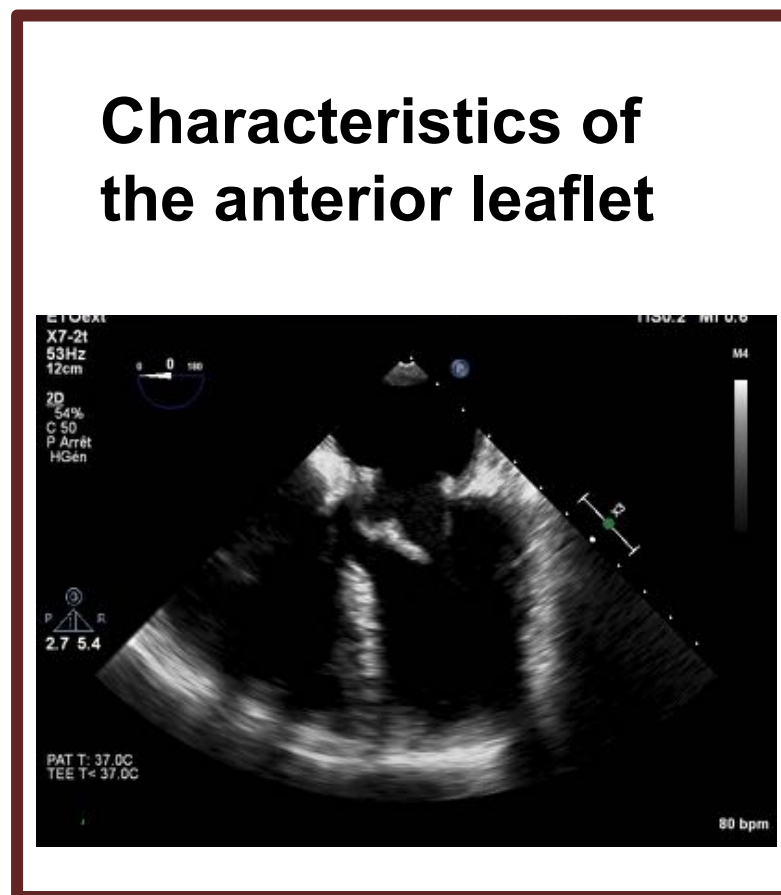
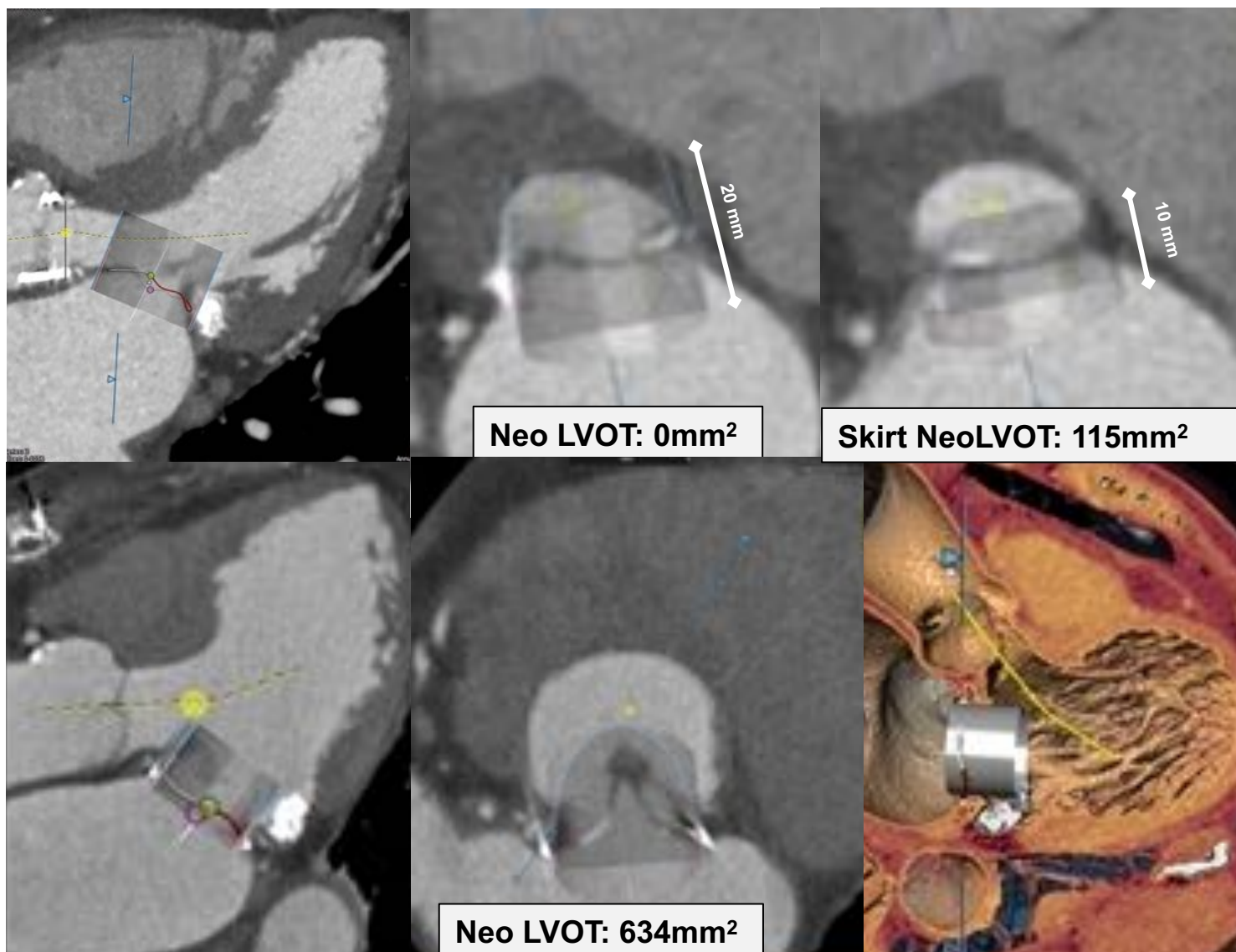
# Dimensions of the Mitral Annulus, Bioprosthesis or Ring



Blanke et al. JACC Imaging 2016

Urena et al. Circulation 2021

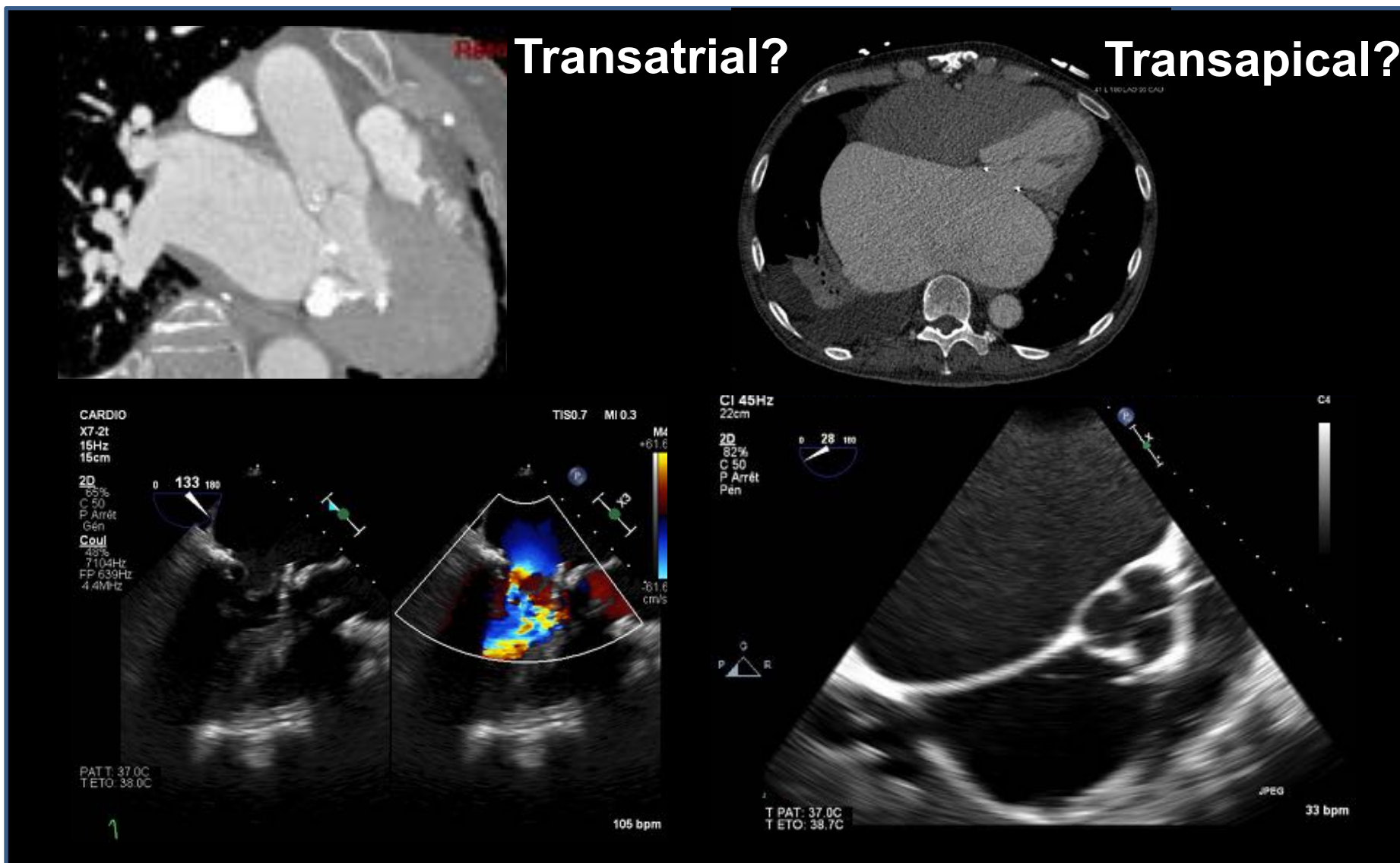
# Assessment of the risk of LVOT obstruction



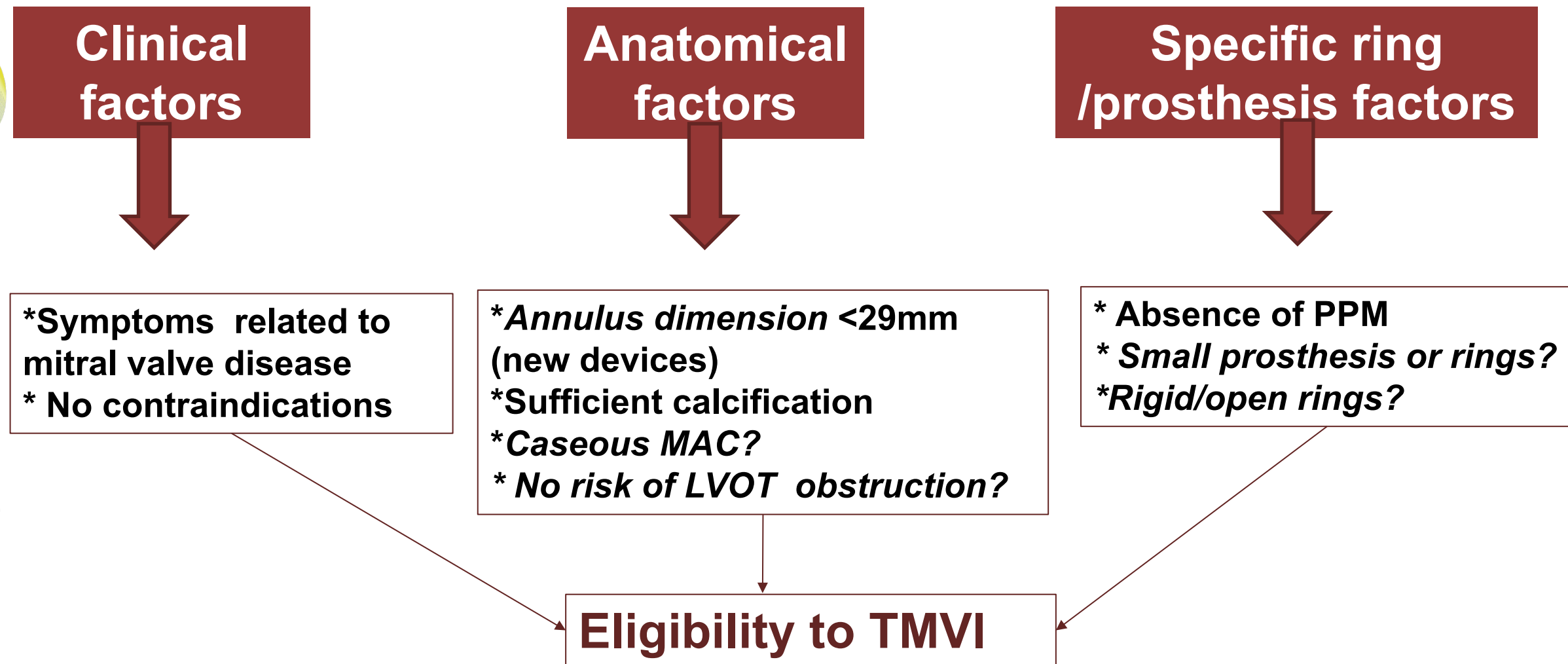
Risk of LVOT obstruction: Predicted Neo LVOT area < 170-190mm<sup>2</sup>



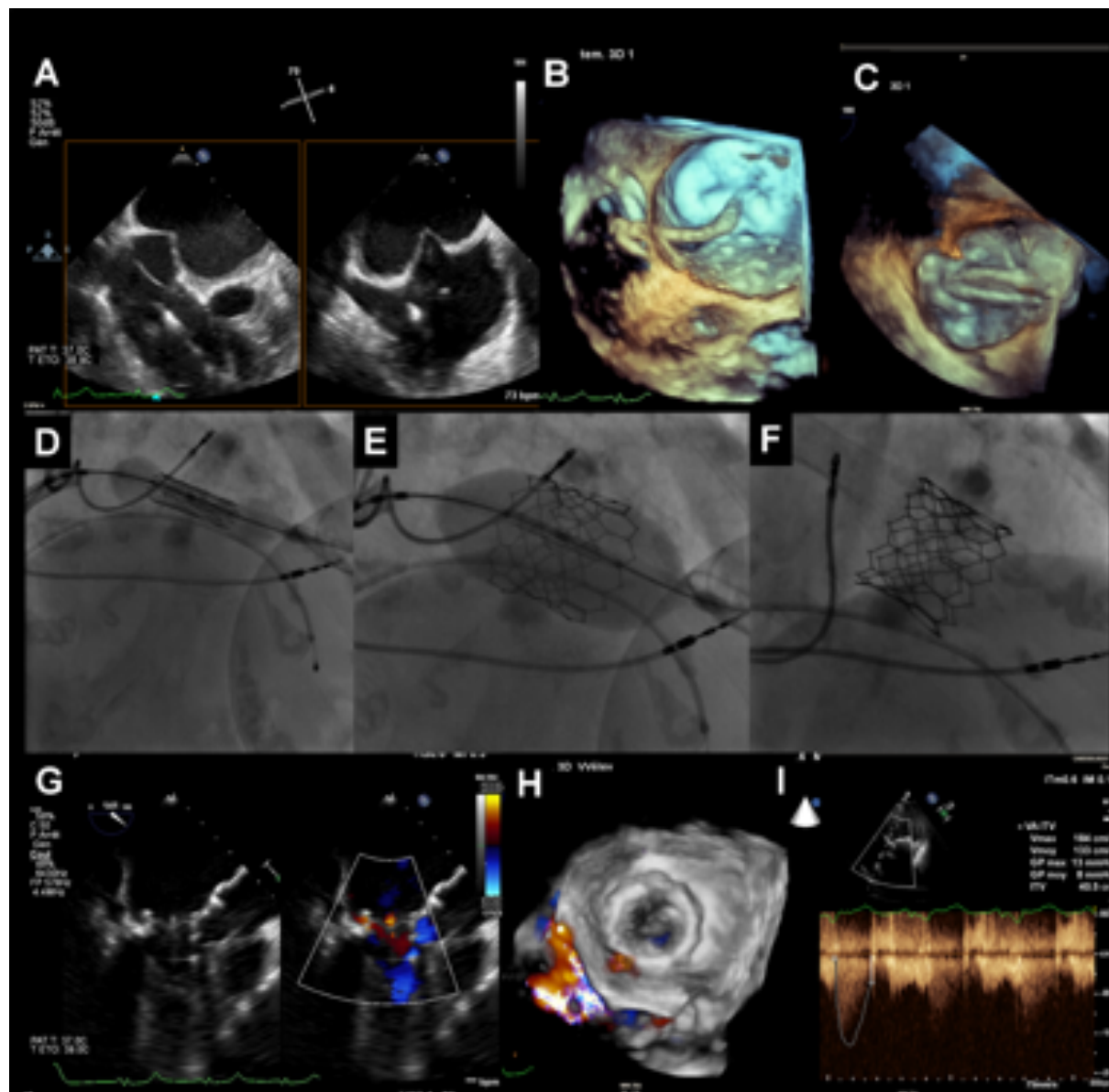
# Selection of Approach



# Patient selection

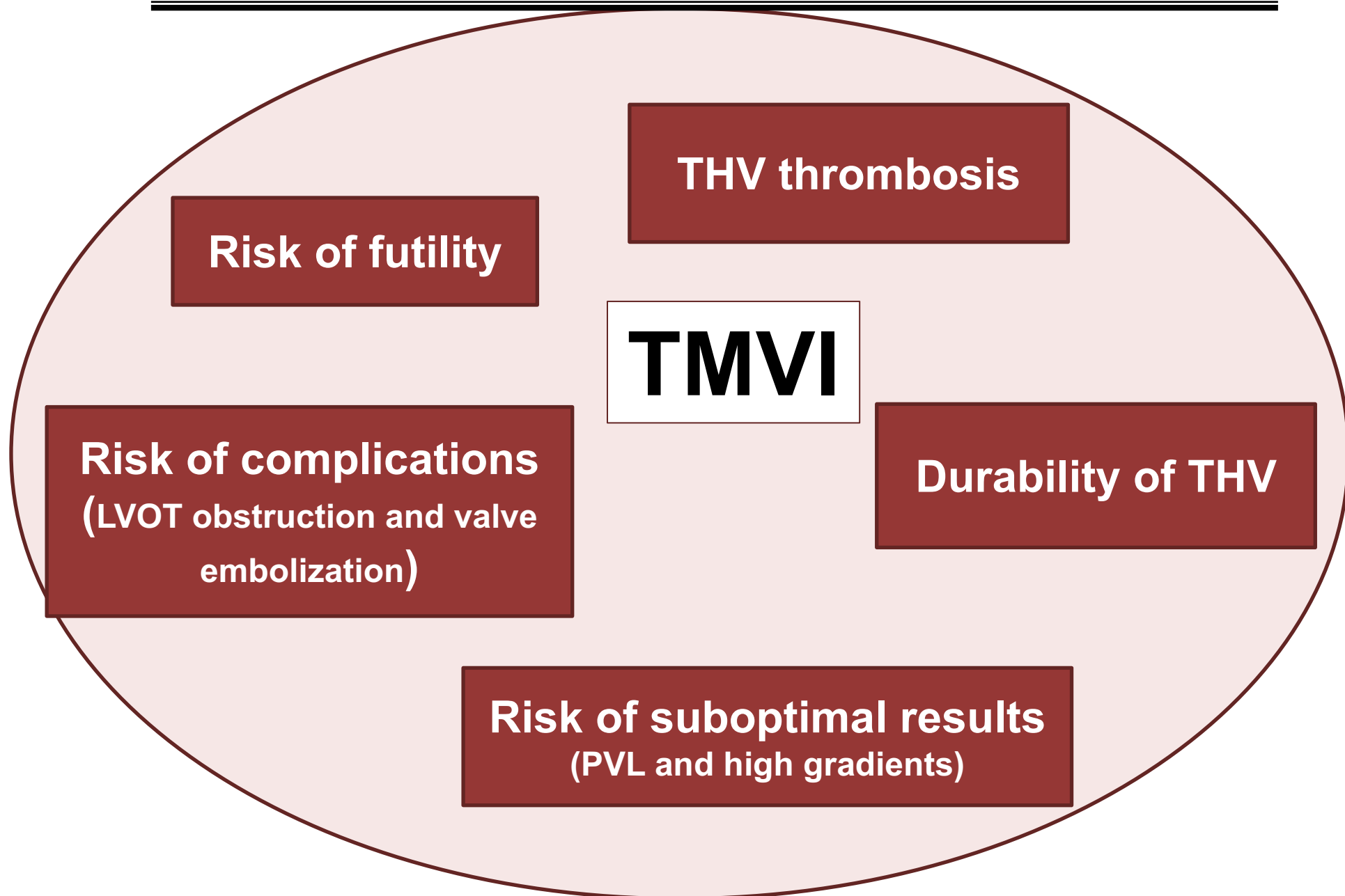


# Procedure-Step by step

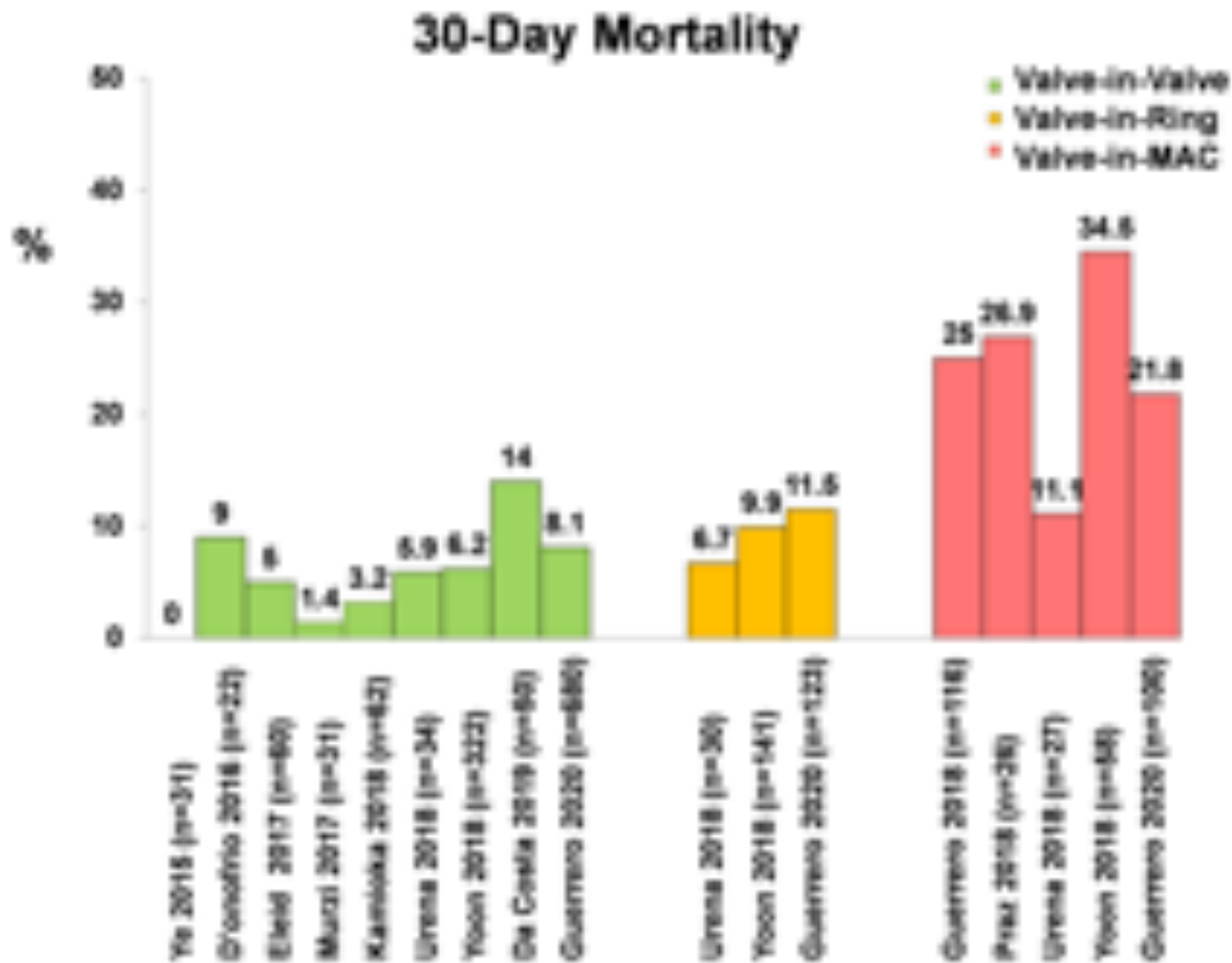


# Challenges of TMVI

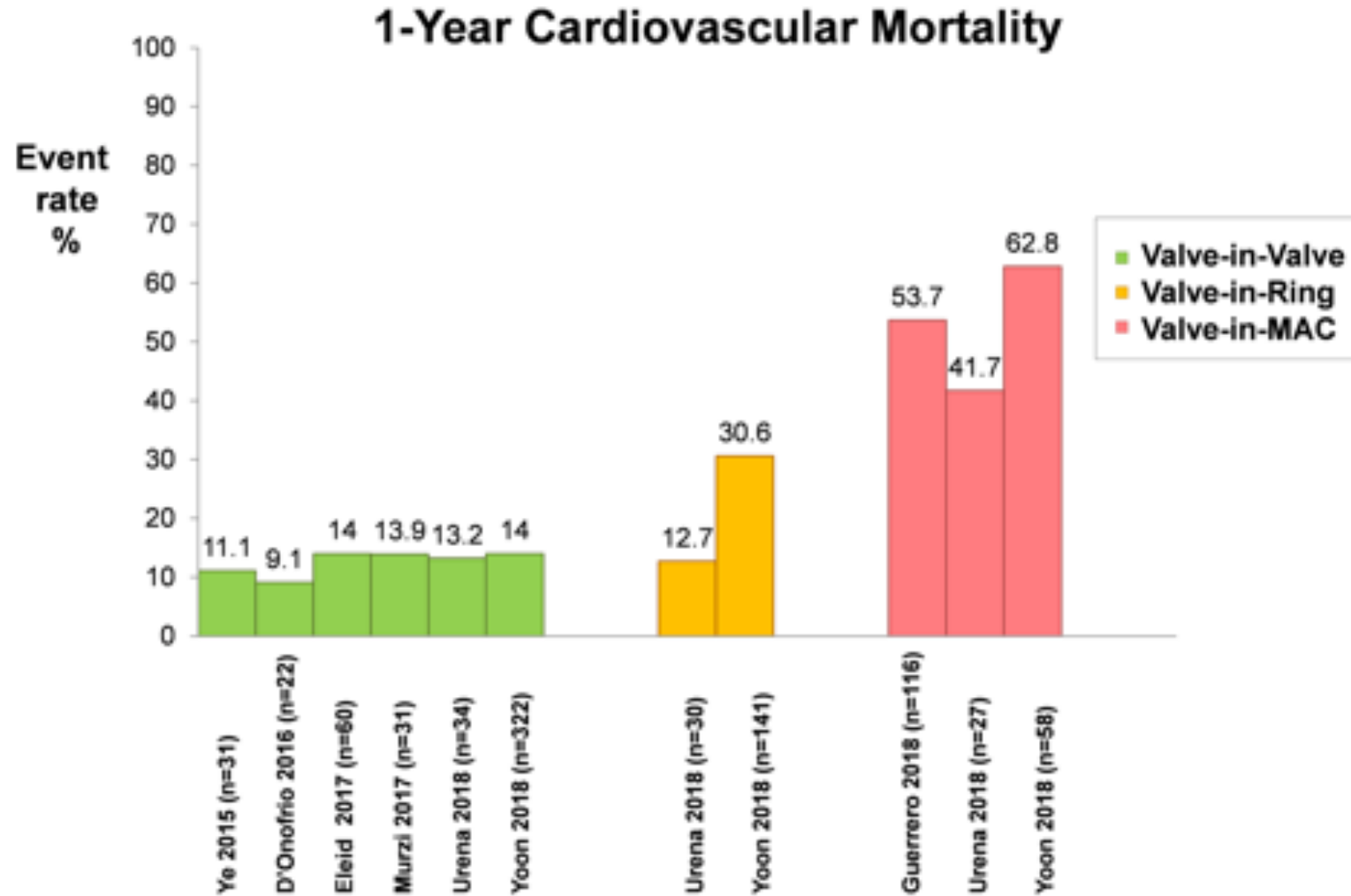
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# Risk of futility-30-Day Outcomes



# Risk of futility- 1-Year Outcomes

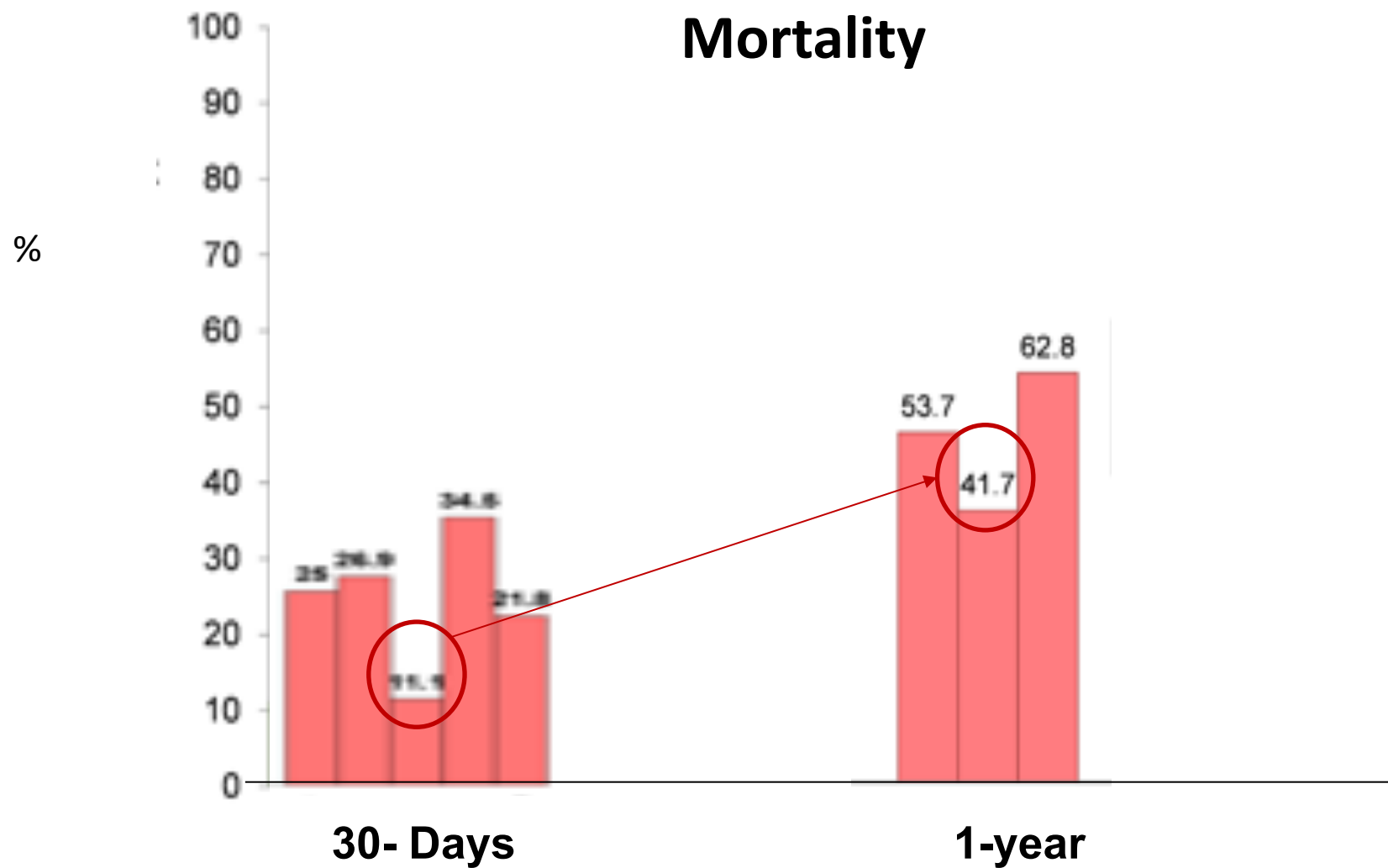


# Risk of futility

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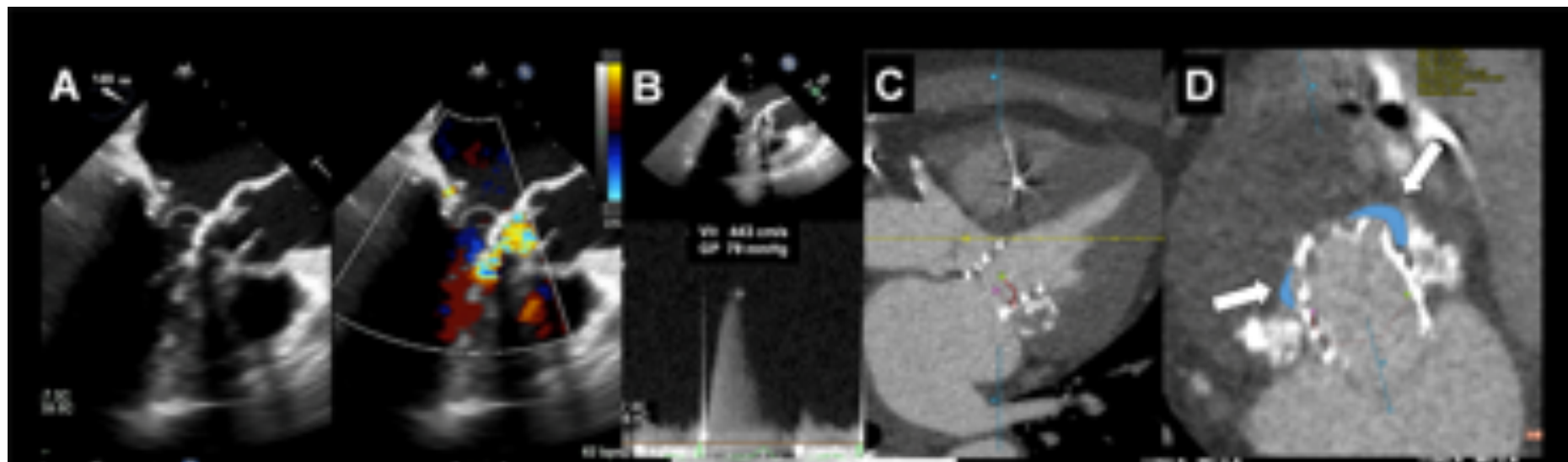
- **Multiple heart valve disease (++)**
- **Advanced cardiac disease (severe LV or RV dysfunction)**
- **Severe comorbidities**
- **Mitral valve disease due to paravalvular leaks or prosthesis patient mismatch**
- **MAC?**

# Risk of futility-*MAC*



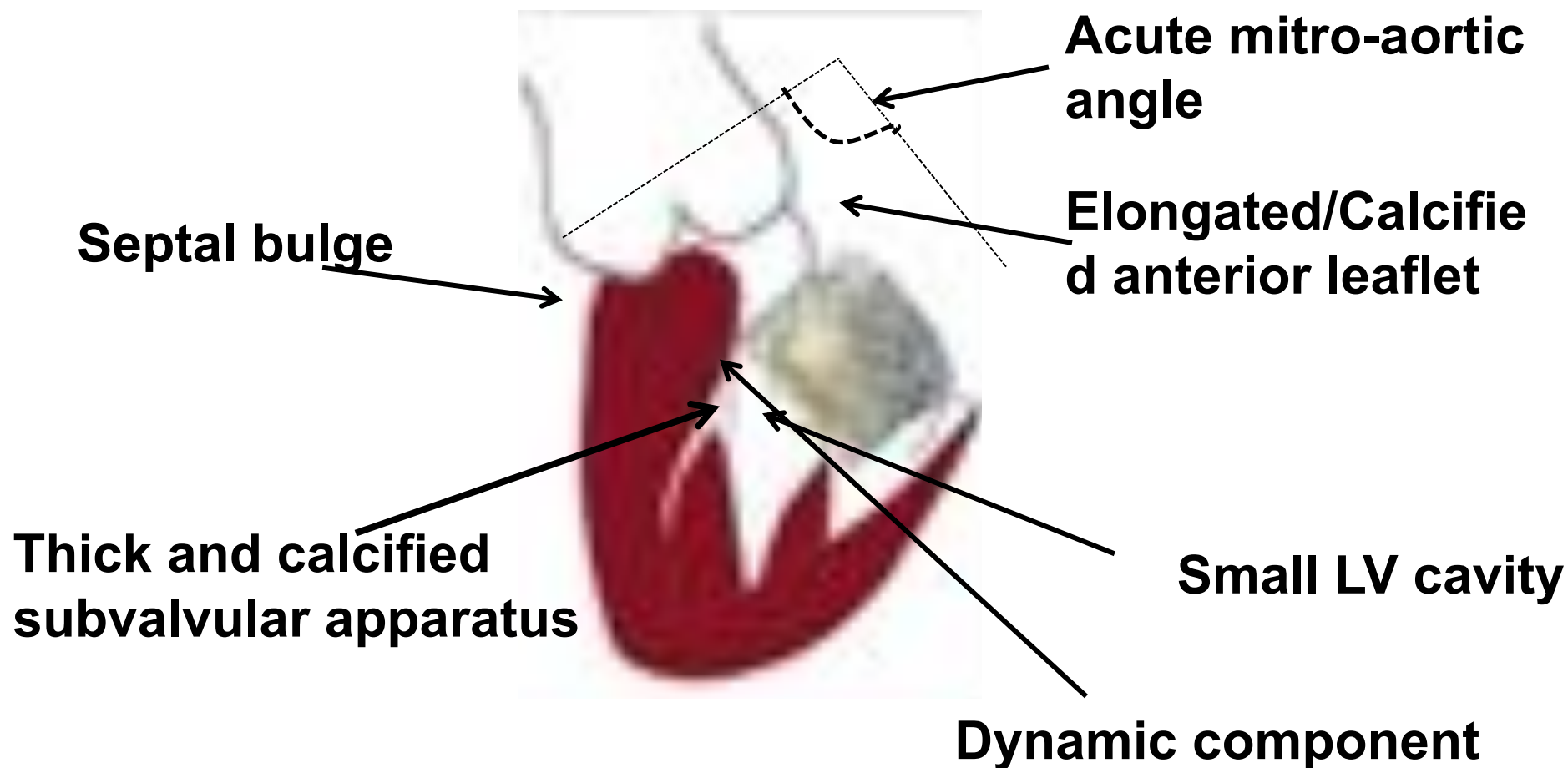


# Risk of complications- *LVOT Obstruction*



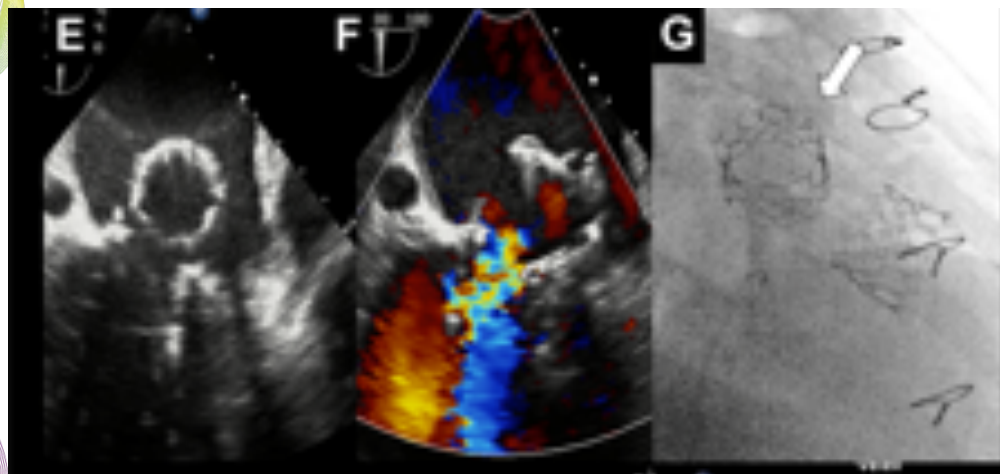
- **Lack of standardized definition**
  - MVARC definition: Increase in LVOT gradient  $>10$  mmHg
  - Most used definition: Increase in LVOT gradient  $>30$  mmHg
- **$>50\%$  risk of death**

# Predictors of Risk of LVOT Obstruction

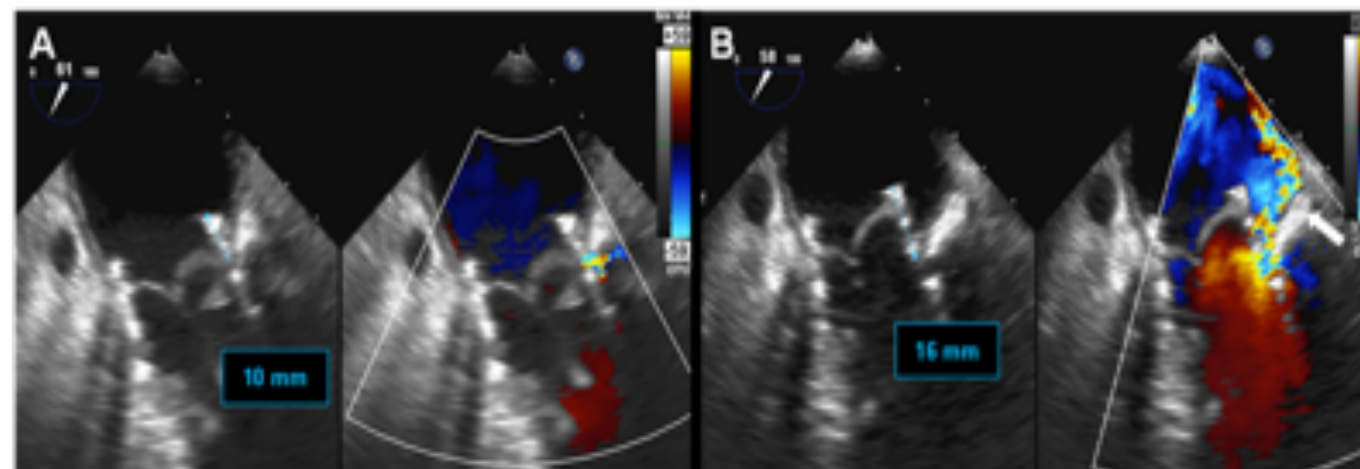


# Anchoring and risk of migration

Acute valve embolization

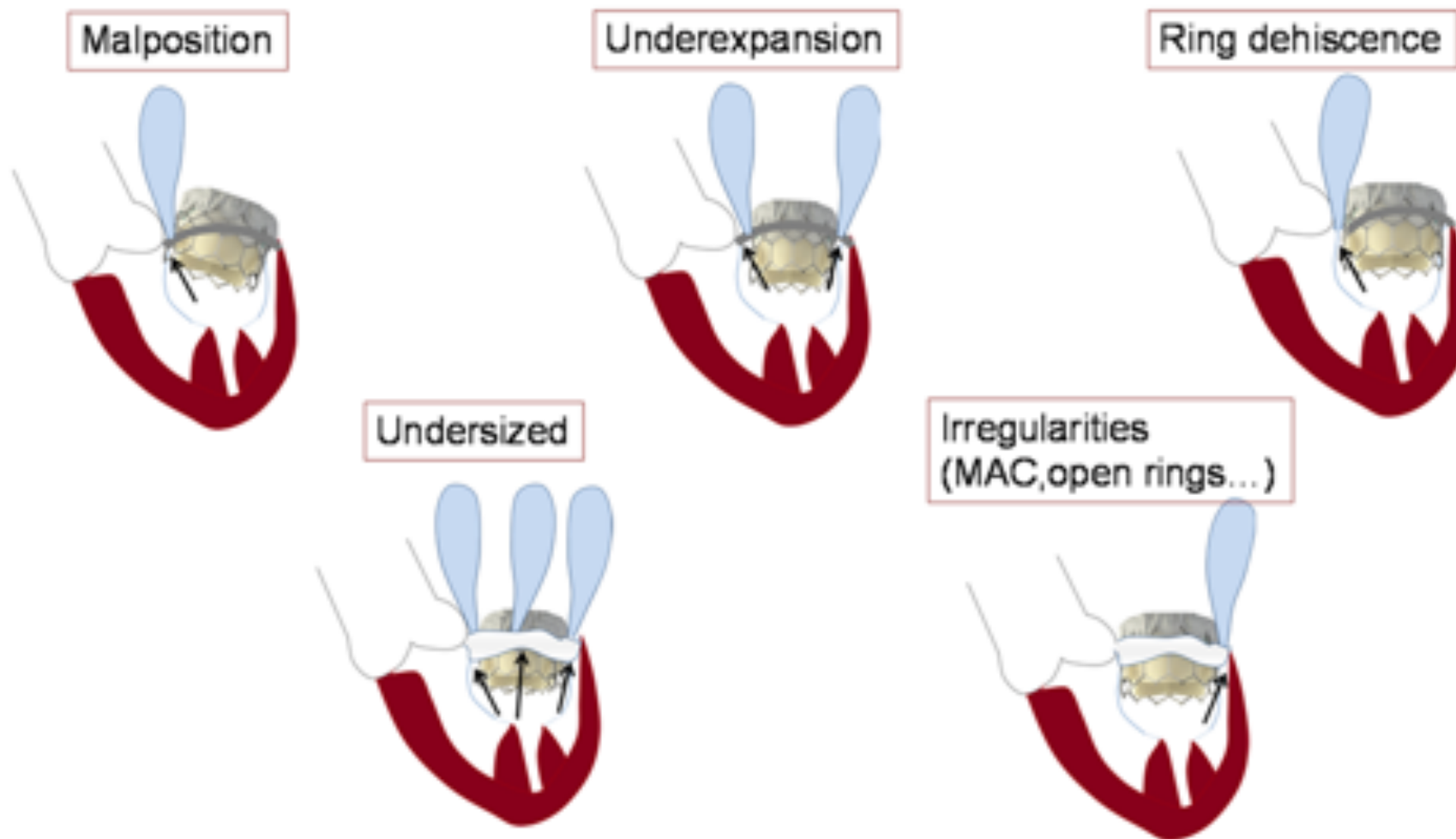


Slight late valve displacement



- Malposition of the THV
- Inaccurate THV size selection
- Insufficient amount of calcification

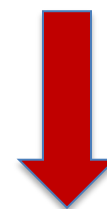
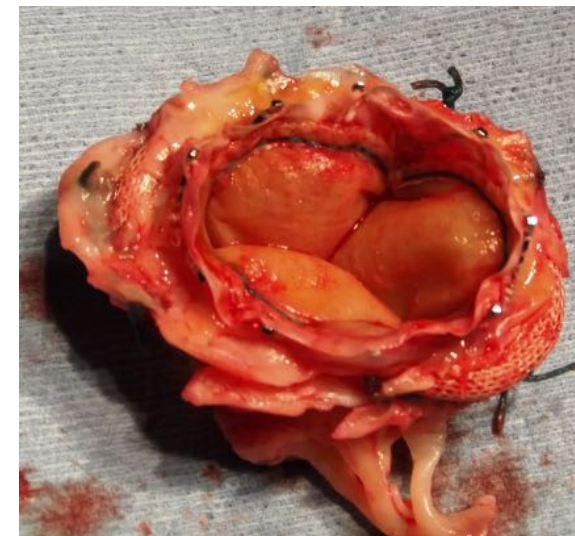
# Risk of suboptimal results-*Paravalvular Leaks*



# Risk of suboptimal results-*High gradients*

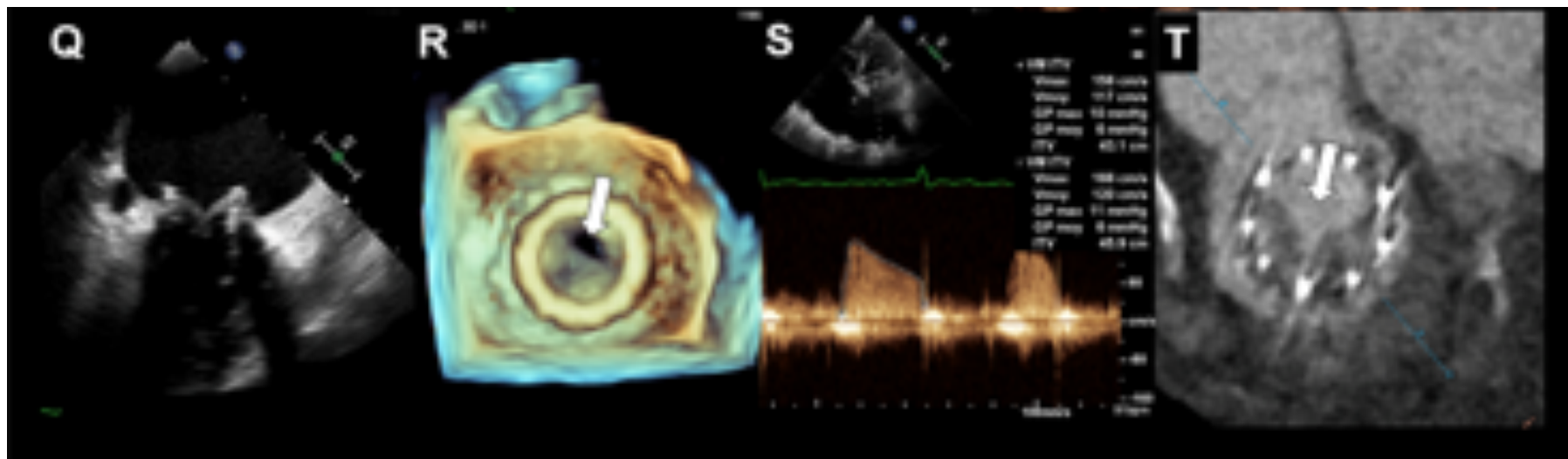
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- Underexpansion
  - Rigid rings
  - Oversized THV (>20%)
- Small surgical prostheses (Patient prosthesis mismatch)



Risk of early valve degeneration

# Risk of valve thrombosis

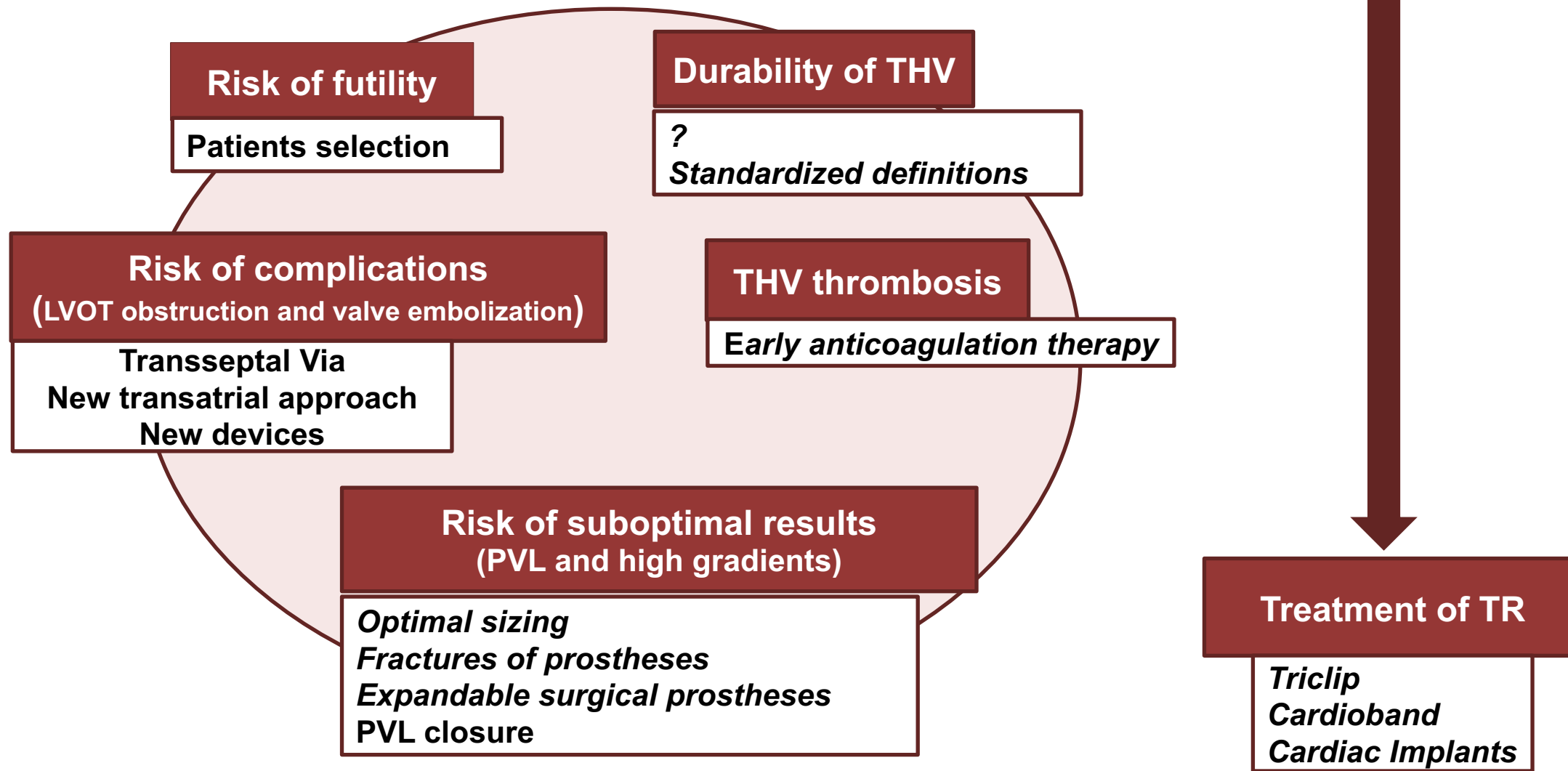


## Impact:

- No clinical consequences in most cases
- However, THV might be an early phase of a common process resulting in valve degeneration

# Perspectives-TMVI

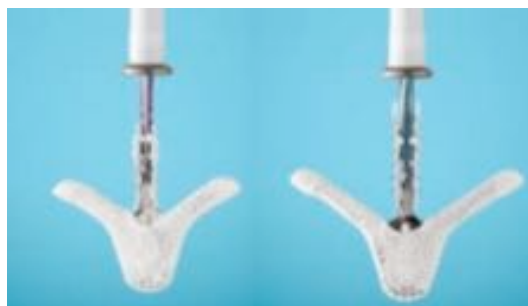
VIV the 1st choice therapy and VIR and VIMAC a second line therapy  
 TMVI for native MR will compete with surgery if reparation is not possible



# Perspectives- Tricuspid Regurgitation

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- Percutaneous therapies for tricuspid valve repair



**Triclip**



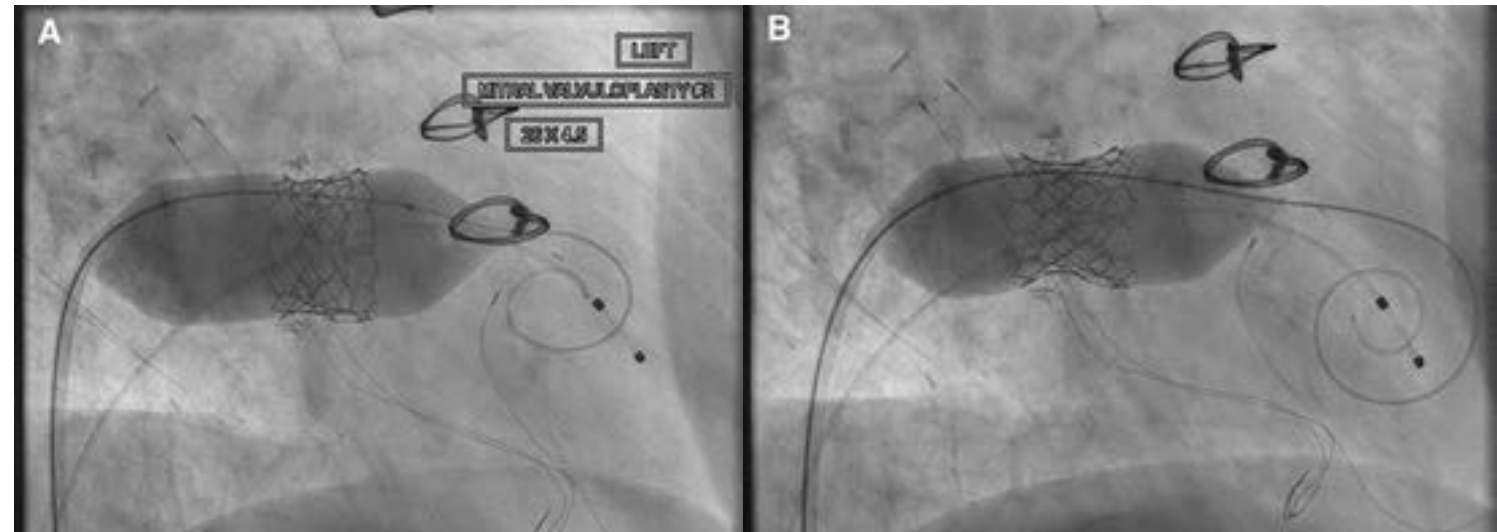
**Cardioband**



**Cardiac Implants**



- Use of surgical expansible prostheses and flexible rings (Edwards Inspiris Resilia Valve)
- Fracture of prostheses



# Perspectives-*Risk of LVOT obstruction*

**Alcohol septal ablation  
(Preemptive and bail out)**

Septal bulge

**Transatrial approach**

Thick and calcified  
subvalvular apparatus



Acute mitro-aortic angle

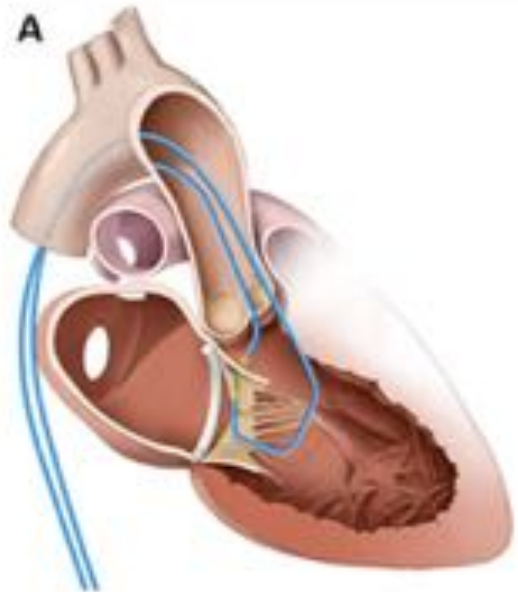
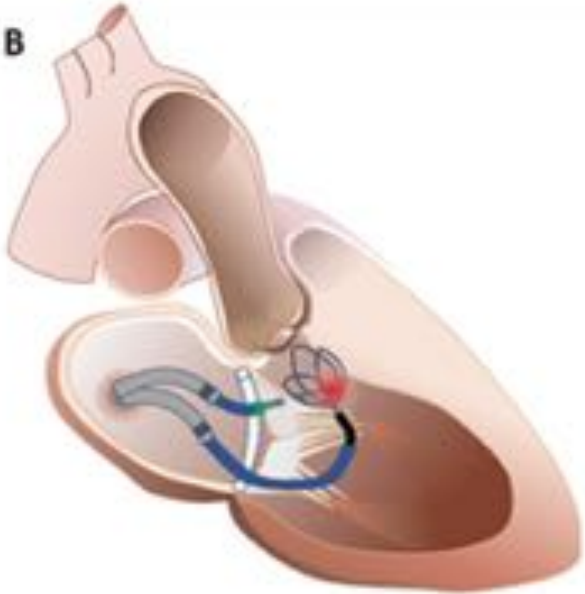
Elongated/severely  
calcified anterior leaflet

**LAMPOON Technique  
Transatrial approach  
Mitral dedicated devices?**

Small LV cavity

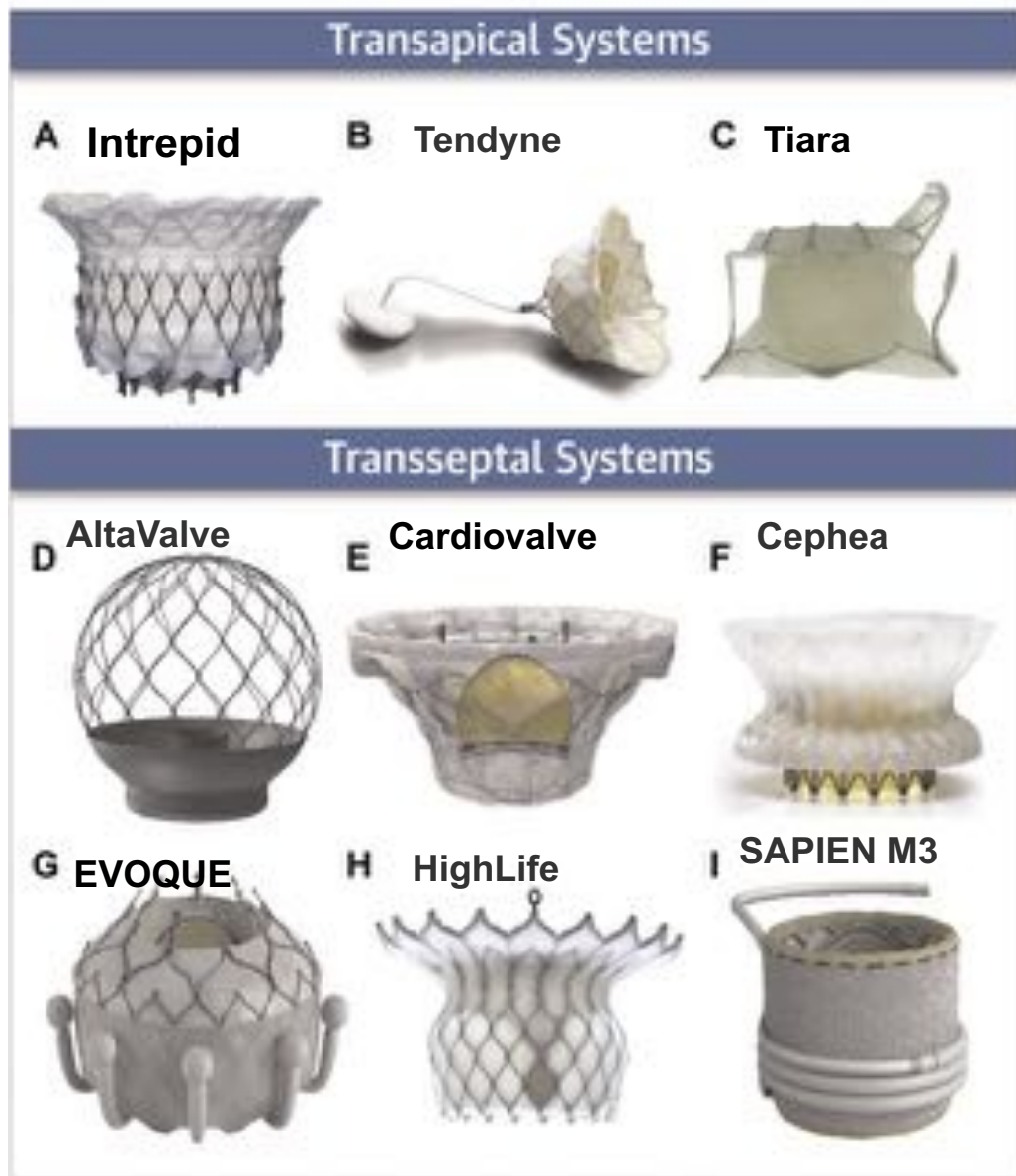
**Contraindication for TMVI?**

# Perspectives-LAMPOON

	
<p><b>Retrograde LAMPOON</b></p>	<p><b>Antegrade LAMPOON</b></p>
<p>Technically challenging</p>	<p>Technically straightforward</p>
<p>May tether open the mitral valve causing pulmonary edema</p>	<p>Allows for stable catheter position on target A2 scallop</p>
<p>Time from Traversal to TMVR: <b>65 ± 35 mins*</b></p>	<p>Time from Traversal to TMVR: <b>39 ± 09 mins</b></p>

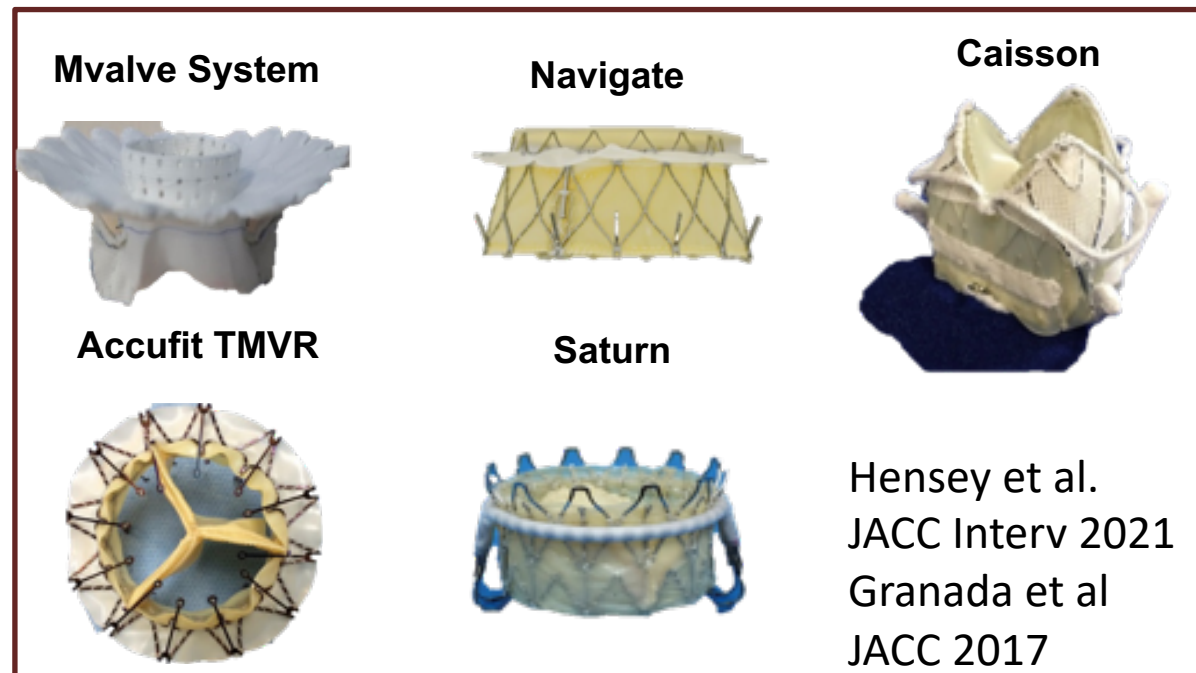


# TMVI with dedicated devices

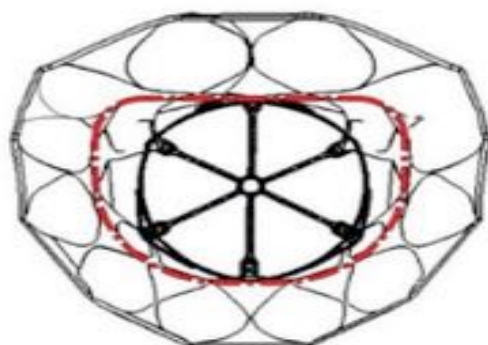


## Available clinical data:

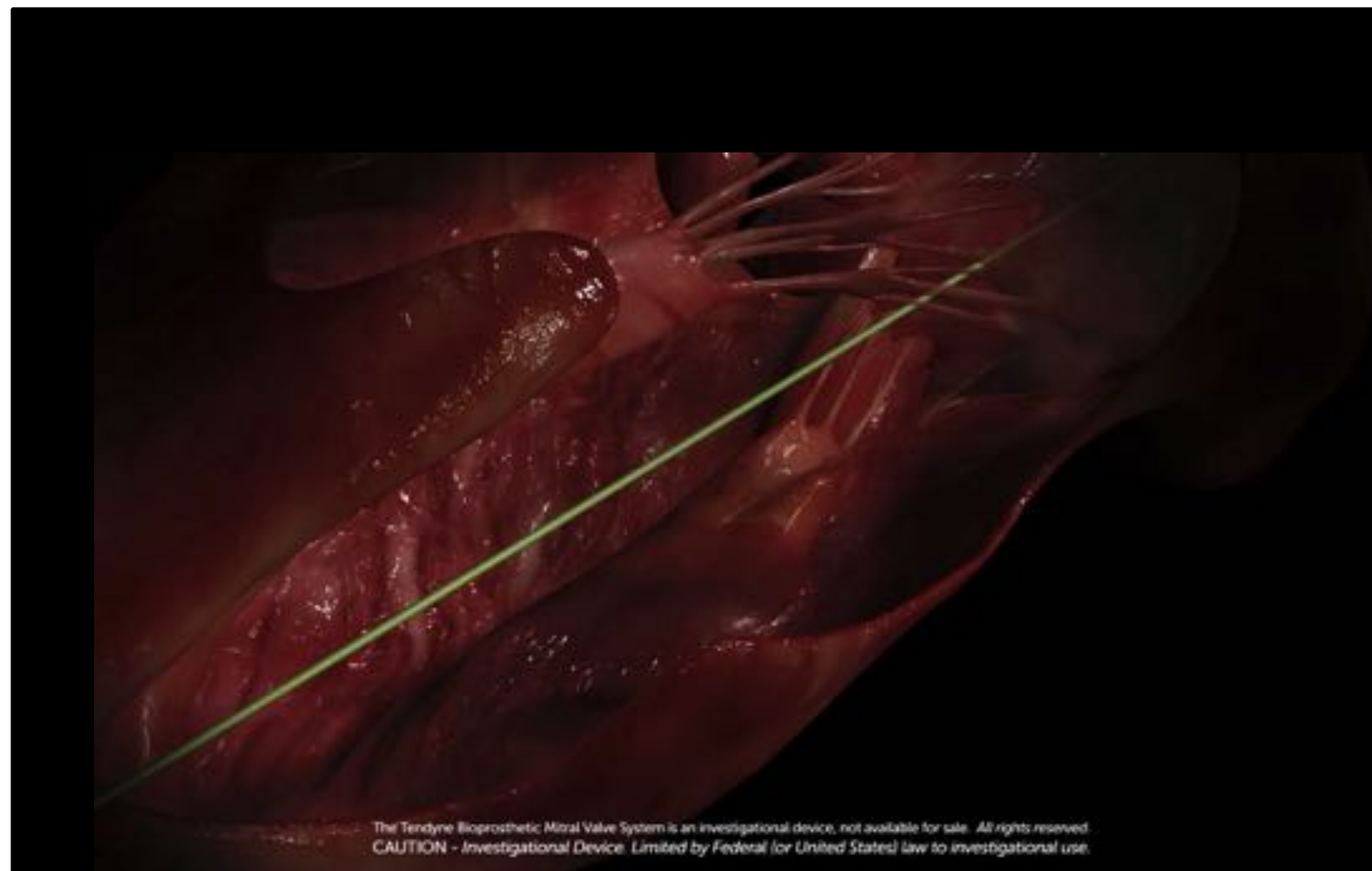
- n=5-79
- Technical success: 89-100%
- 30- Day Mortality: 2-60%



# TMVR with dedicated devices



**Marquage CE**  
**Janvier 2020**



The Tendyne Bioprosthetic Mitral Valve System is an investigational device, not available for sale. All rights reserved.  
CAUTION - Investigational Device. Limited by Federal (or United States) law to investigational use.

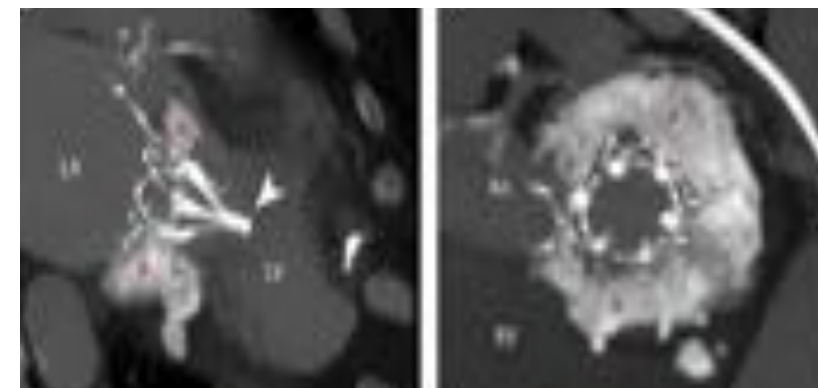
# TMVR with dedicated devices- *Tendyne*

## Global feasibility /CE study -

Procedural Outcomes	N=350
Technical success*	97%
30-day mortality	6%
1-year mortality	28%
Absence of MR 1 year	98%
Improvement in QOL 1 year	78%

- 5 French centers have been involved in the CE Study
- 10 Tendyne THVs have been implanted after commercial approval
- >400 THV have been implanted Worldwide

## THE MAC TRIAL



Procedural Outcomes	N=8
Technical success*	7 (87.5%)
Need for second valve	0 (0%)
LVOT obstruction*	1 (12.5%)
Cardiac perforation	0 (0%)
Conversion to open heart surgery	0 (0%)
MV reintervention	0 (0%)
30-day mortality	0 (0%)

# Take-Home Message

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- In clinical practice, TMVI is performed in patients with **failing bioprostheses, rings or severe MAC** using aortic THV with acceptable results
- Although challenges remain, a better selection process, the development of **new therapies and techniques**, the advent of new **mitral dedicated devices** and the optimization of **anticoagulation therapy** will probably contribute to reduce the risk of complications and improve survival
- Indeed, initial experience using dedicated devices are promising
- VIV TMVI will probably become the first line therapy for most patients with failing bioprostheses in the near future.
- TMVI with dedicated devices has the potential to become a competitor of surgery for the treatment of native mitral regurgitation, in patients with no repair options when the transseptal via is possible

# Merci!

