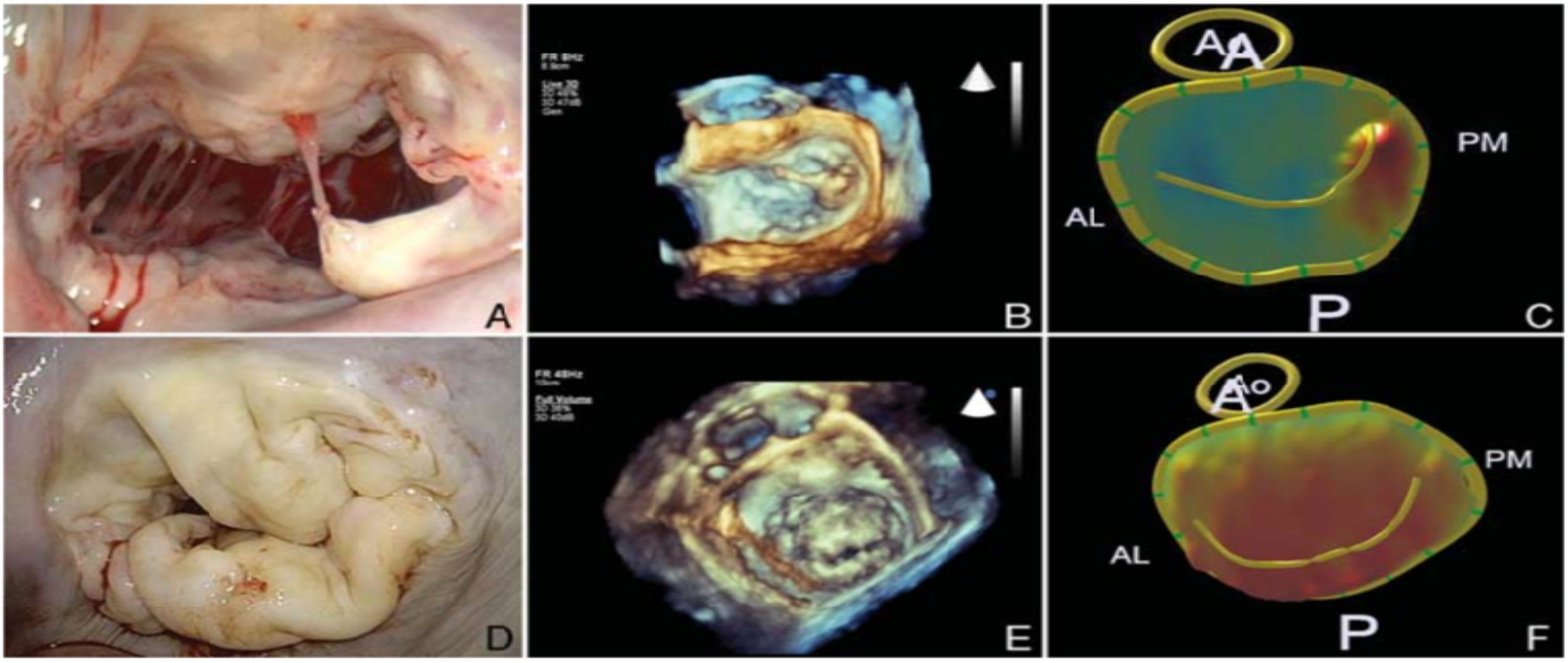
Innovation that changes the outcome (in my field…)

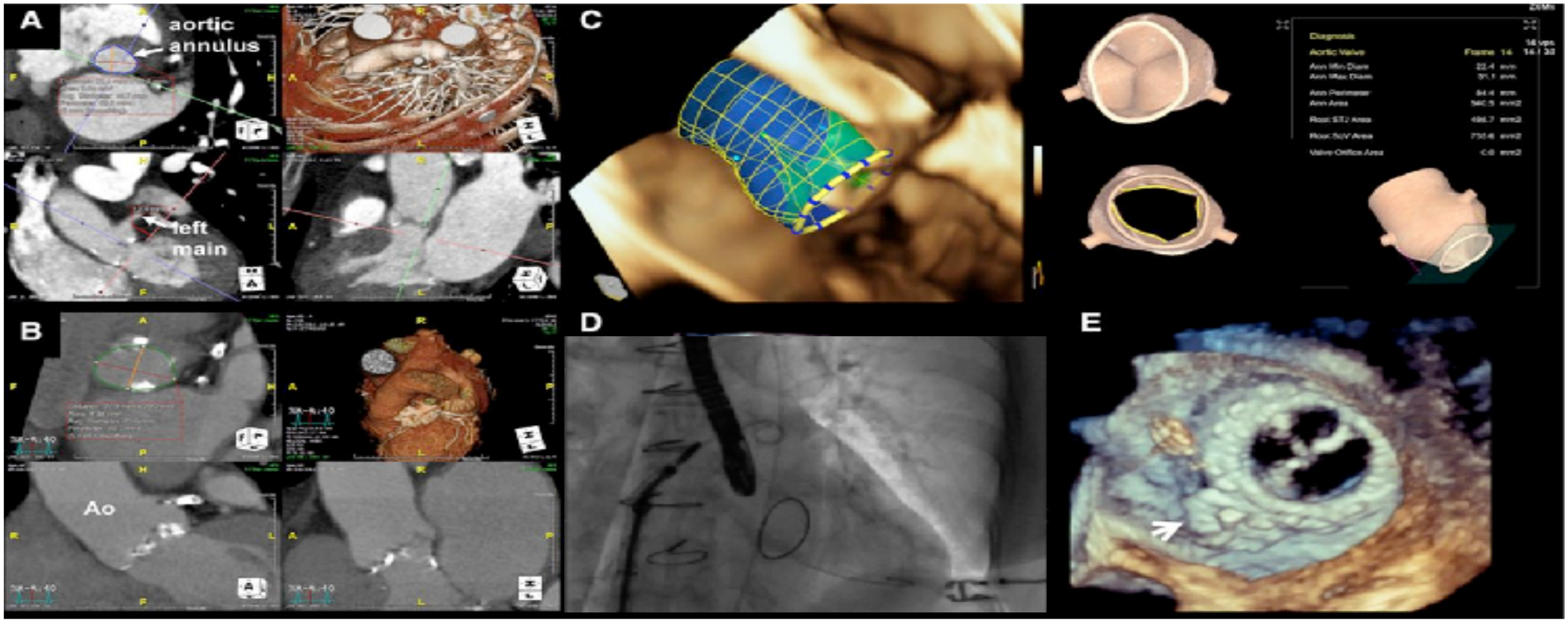
- One-shot anatomic + functional information in CAD

- **Real time imaging during MICS / TCT for SHD**

Surgical Imaging = “Surgical Echocardiography”
Precise Morphologic Assessment



Multimodality imaging during transcatheter structural procedures



Imaging Limitations in SHD Interventions

FLUOROSCOPY

- Information obtained through bi-plane shadows
- Contrast injections in multiple views for adequate spatial information
- Significant radiation and contrast requirements

CT

- Not real-time
- Significant radiation and contrast requirements
- Single-phase

MRI

- Not real-time
- MR compatible equipment
- Poor spatial resolution
- Poor visualization of calcium

ECHO

- Small field of view in real-time 3D TEE
- Slower frame rates with lower resolution
- Very fine structures (i.e. wires) are not well visualized
- There is a need for better spatial and temporal resolution to improve procedural planning and guidance

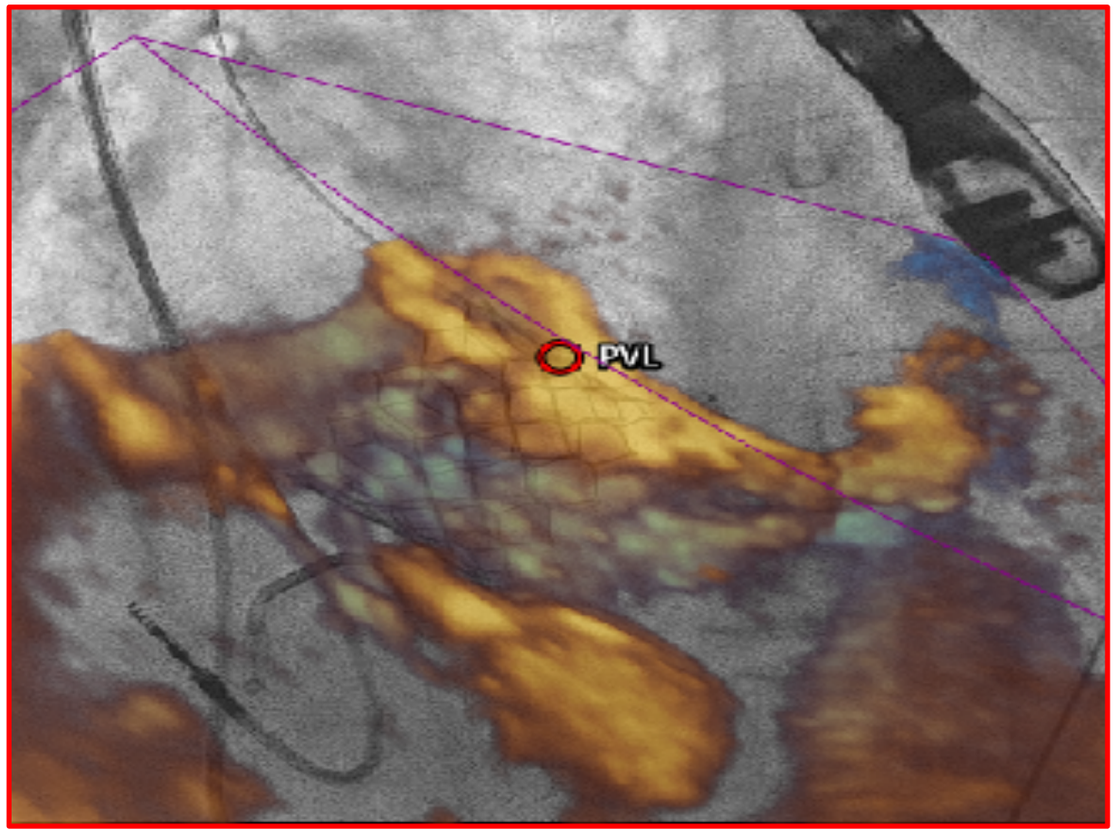
There is not a single imaging modality that can provide all the necessary information

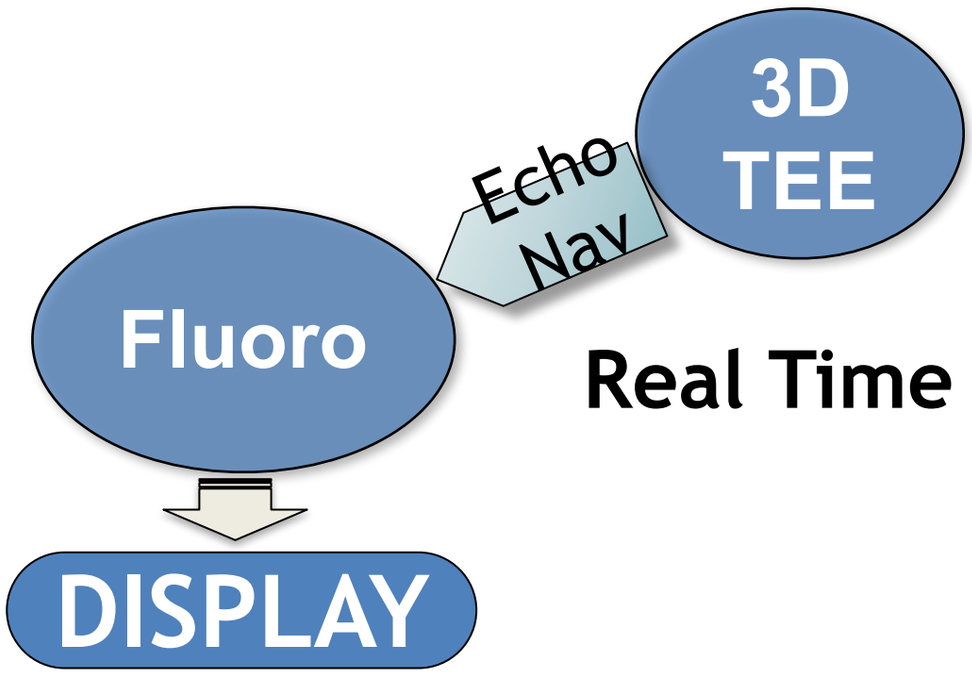
To improve image information

↓

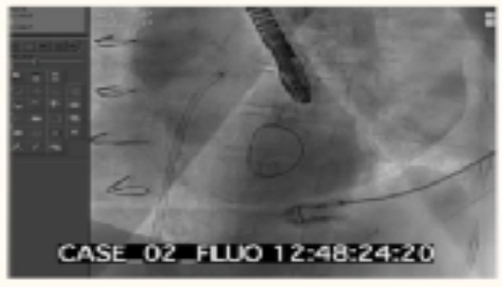
FUSION IMAGING

Fusion Imaging: **MORE INTUITIVE IMAGING**






ESC CONGRESS
BARCELONA 2017
CASE_02_FLUO 12:48:07:24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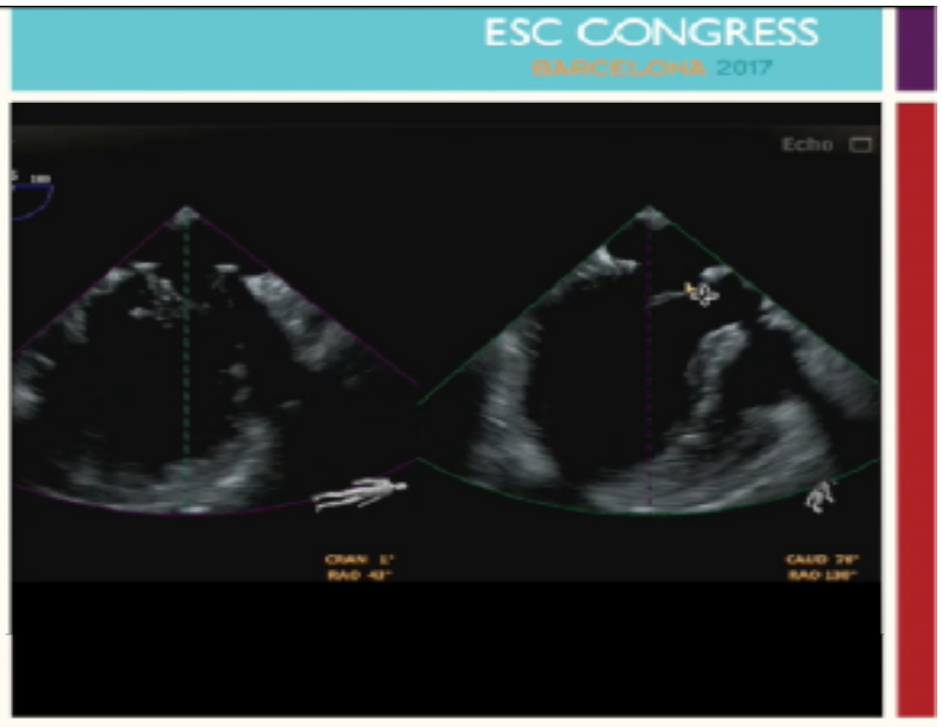
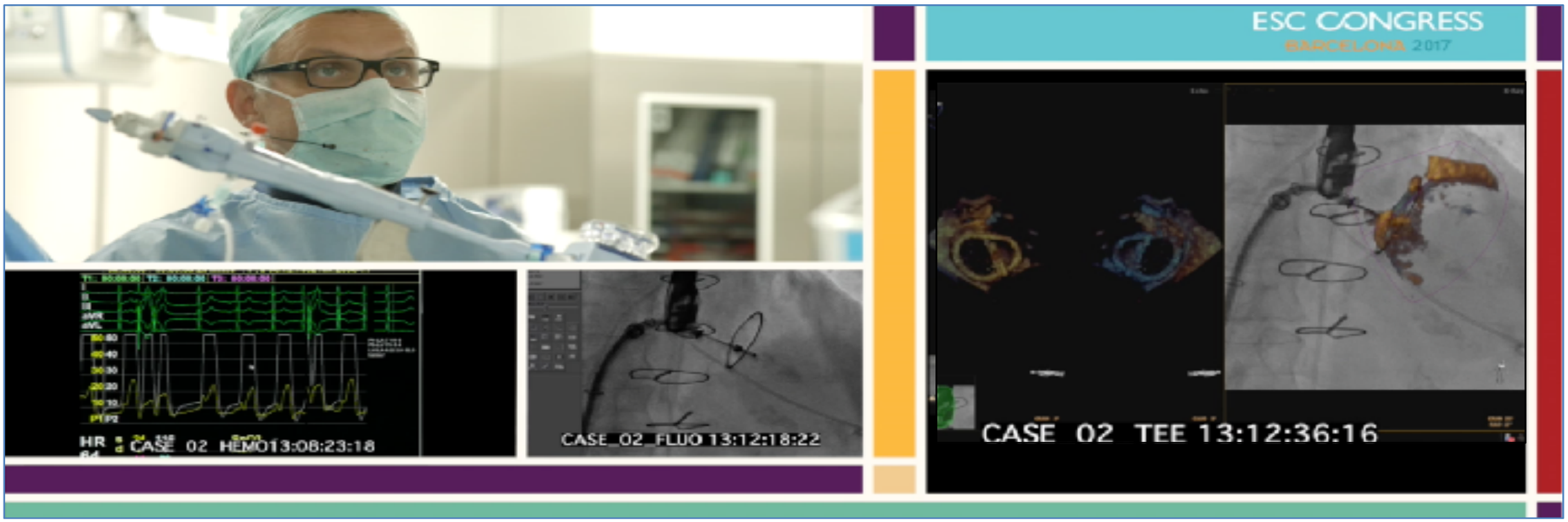
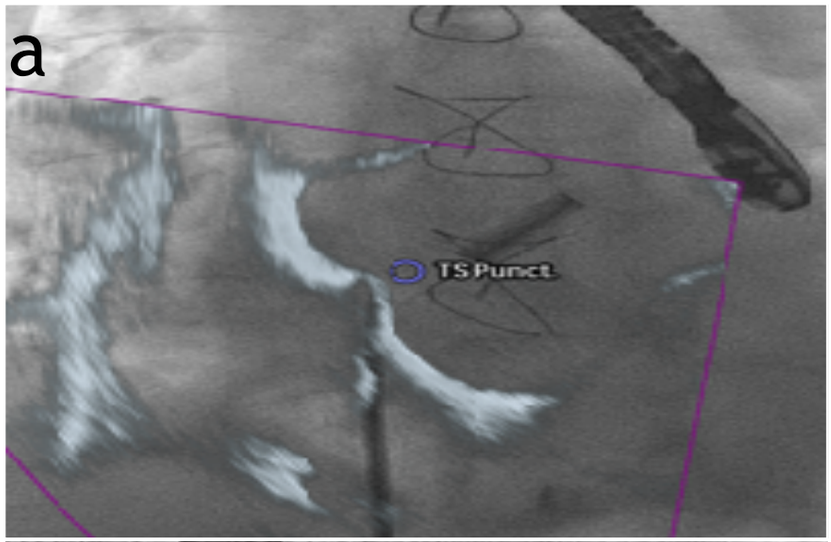
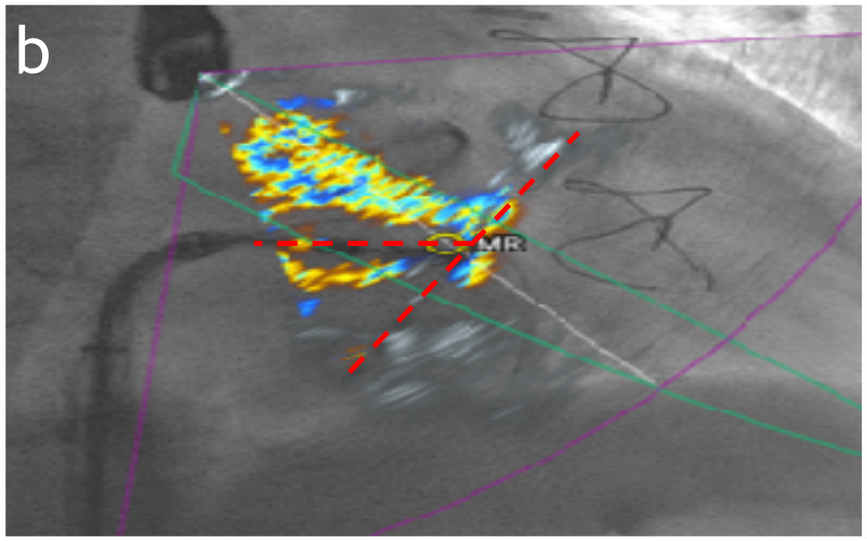
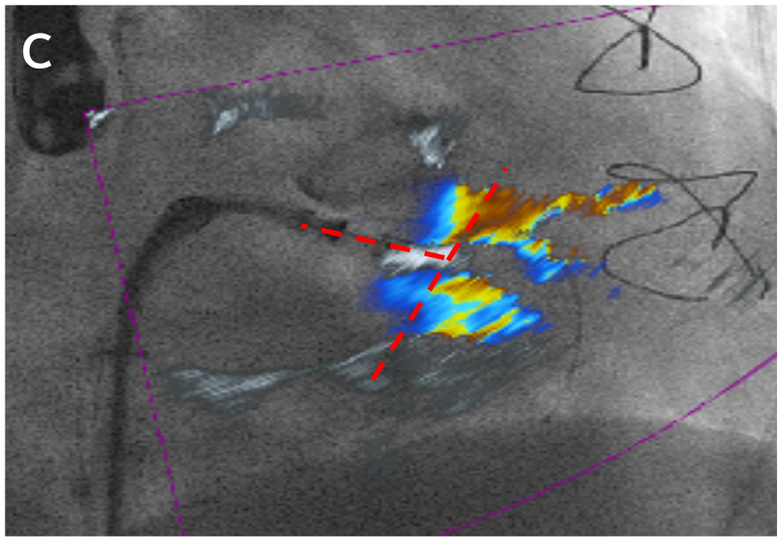

ESC CONGRESS
BARCELONA 2017
Echo

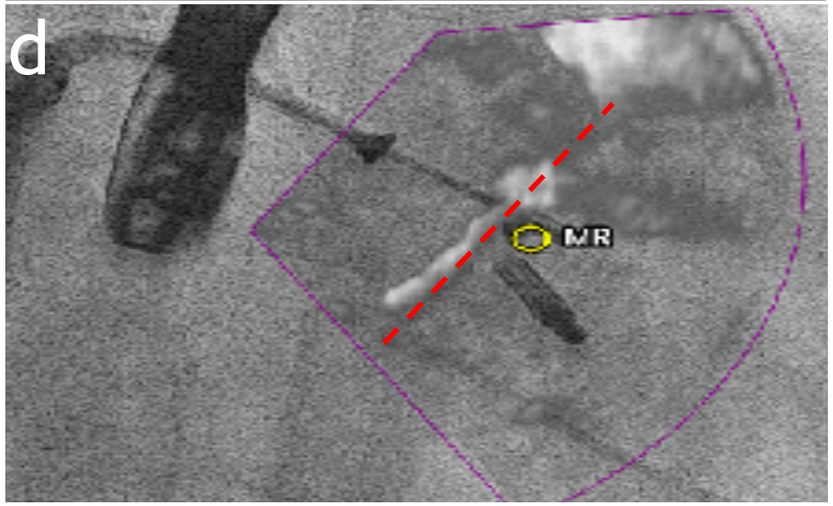

ESC CONGRESS
BARCELONA 2017
HR
CASE 02 HEMO13:08:23:18
CASE_02_FLUO 13:12:18:22
CASE 02 TEE 13:12:36:16

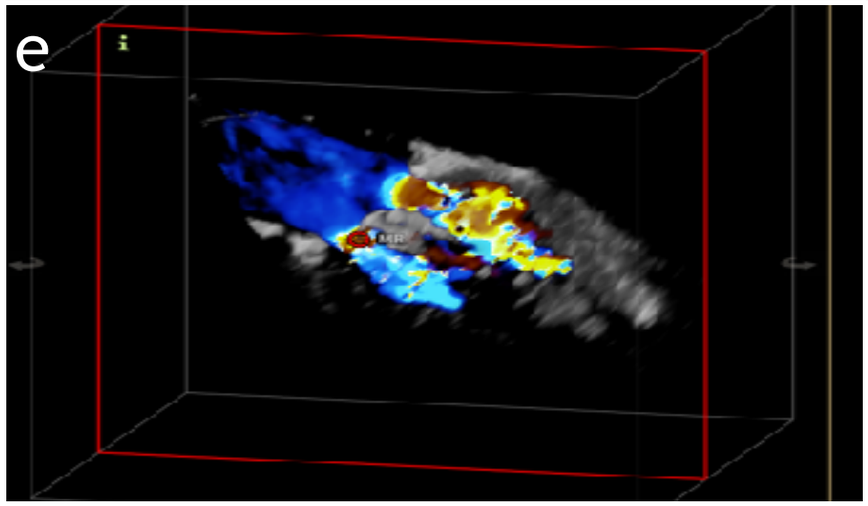
Mitral MitraClip

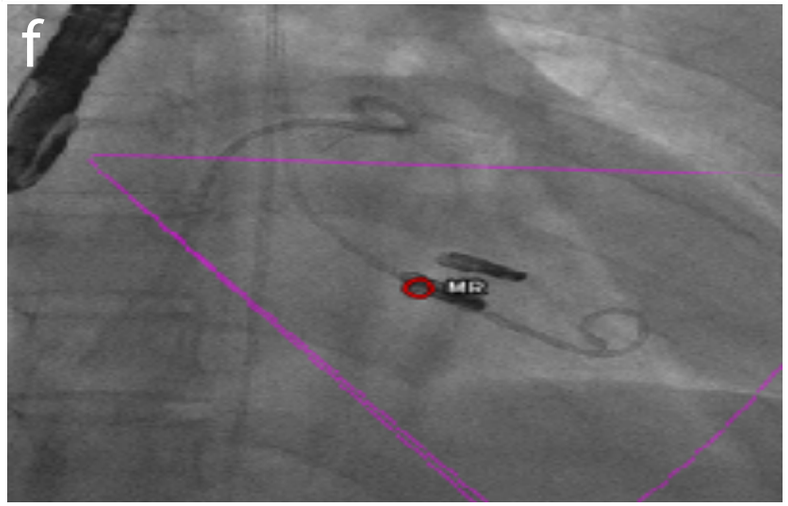




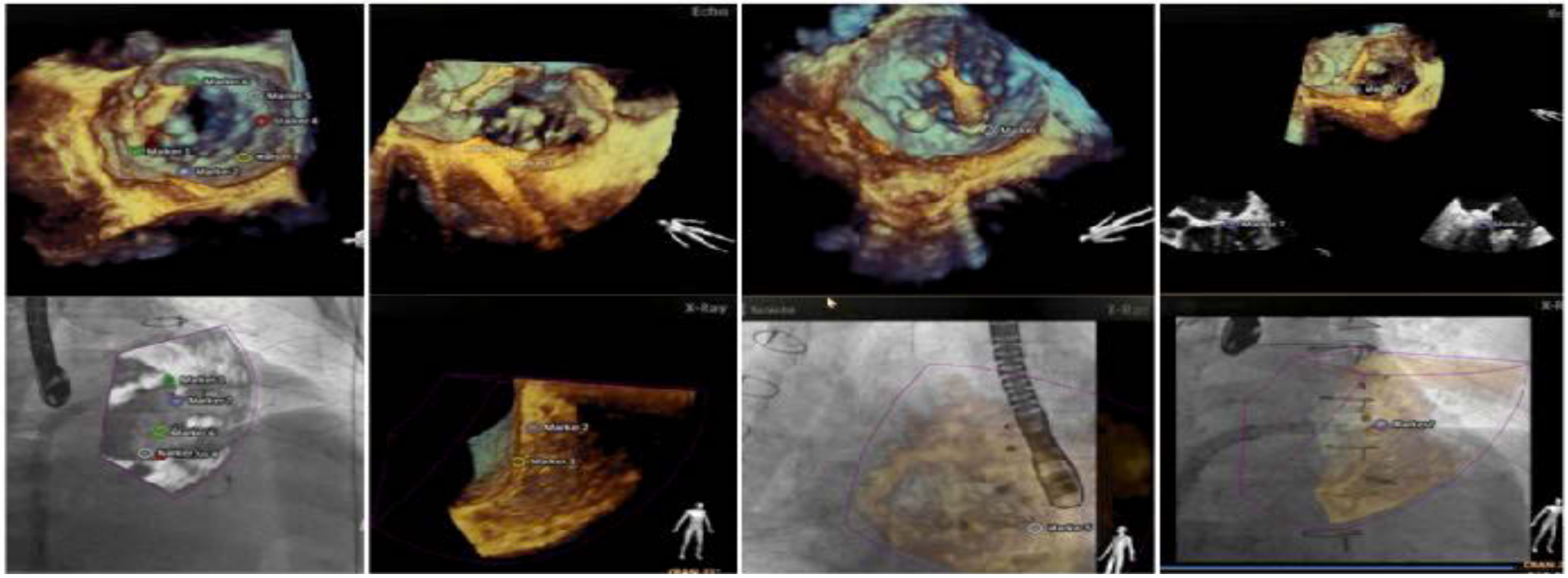








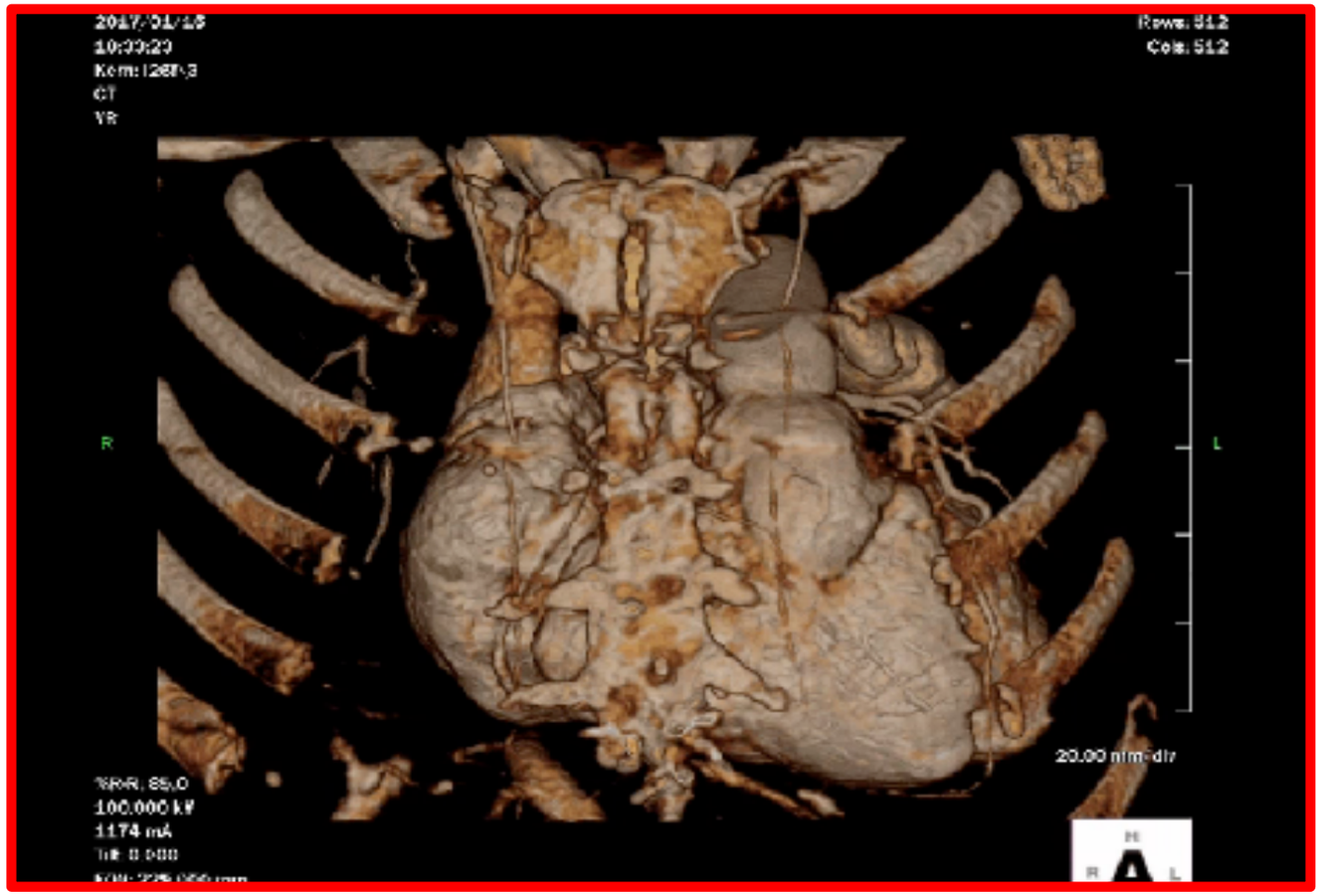
Mitral Cardioband



Pozzoli, Cardioband & Fusion EHJ CVI 2018

What's Next…

- Image Motion Compensation
- 4D Reconstruction/ Fusion
- **TEE-CTA Fusion in one software**

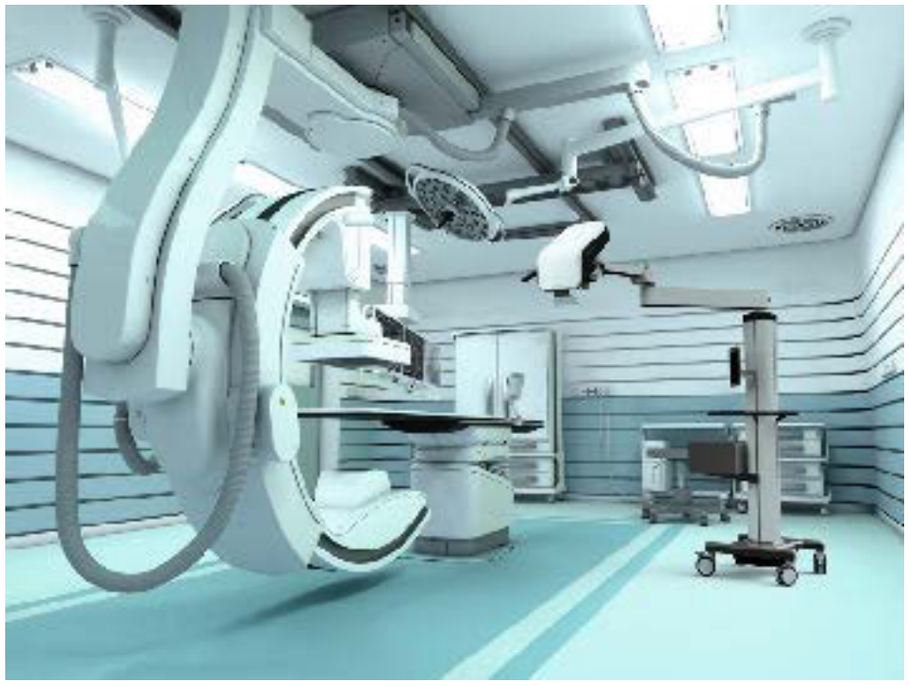


Case of AV Canal Repair

Courtesy of Carlos Ruiz MVM 2017

HOLOSCOPE™

for Interventional Cardiology



- **Extremely realistic 3D holograms floating in “mid air”**
- **Easily accessible and interactive real time images**
- **3D holograms accurately registered to free space**
- **Advanced optics allowing adjustable hologram location**

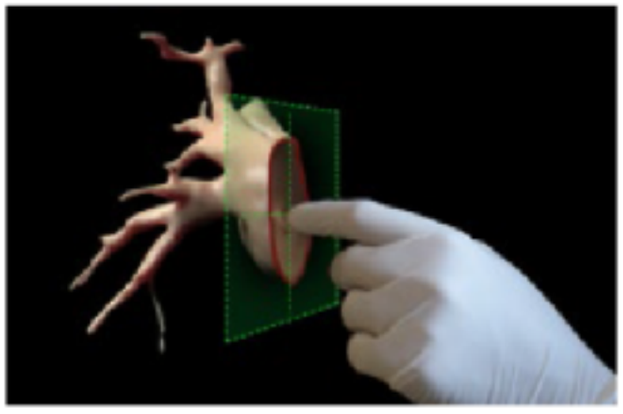
Configuration subject to change as part of the R&D process - not commercially available. Product launch planned for 2017.

3D Holography: image intimacy™ Capabilities

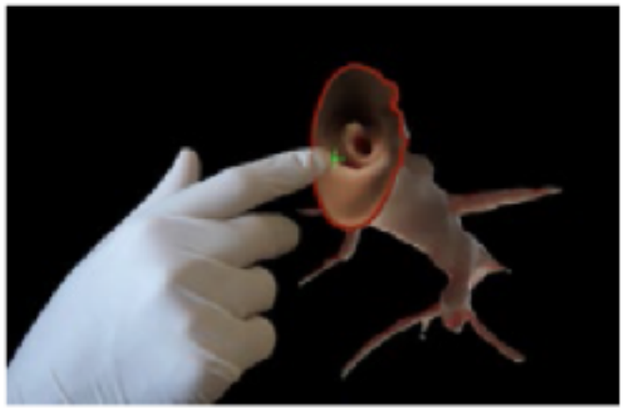
Visualize

Rotate

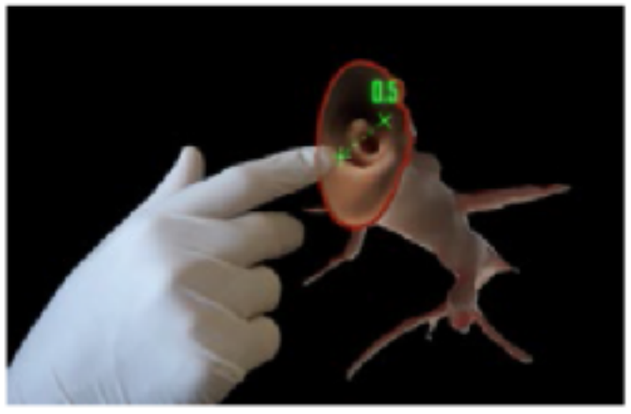
Slice



Mark



Measure



* Partial list of interaction capabilities

3D Volumetric Data to Generate Holograms

3D Acquisition Modalities

Interface

“In-Air” Holographic Display and Interface System

HOLOSCOPE™ *i*

Commercial system unveiling in 2018 !

Stay tuned….

Patient-based computer simulations for

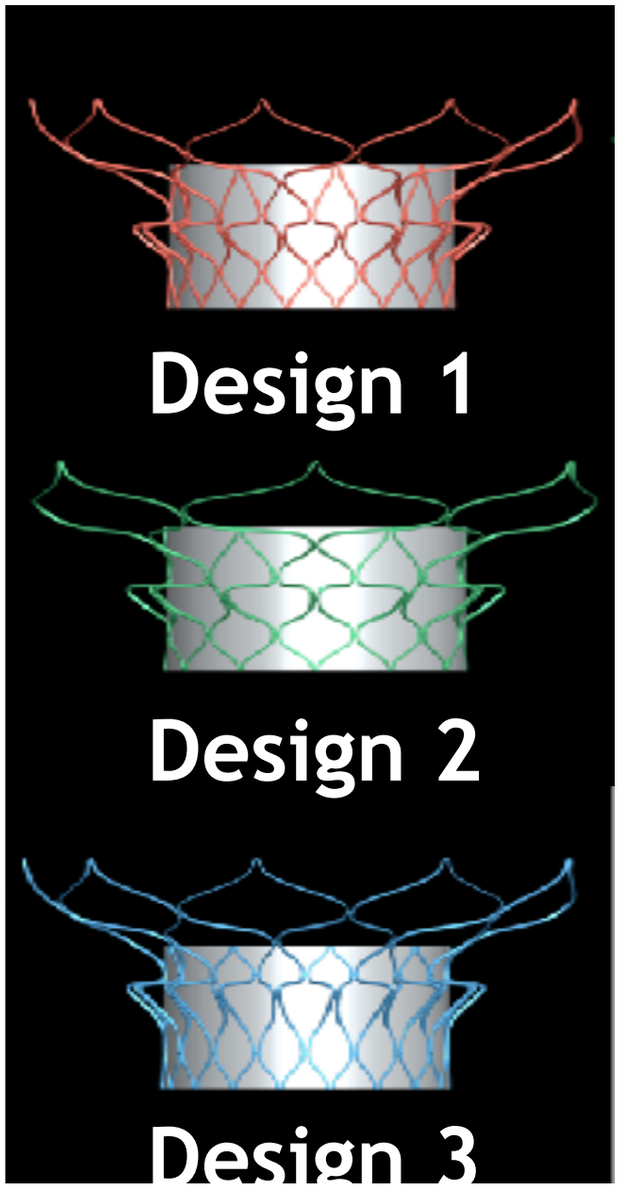
FEOPS
insights for excellence

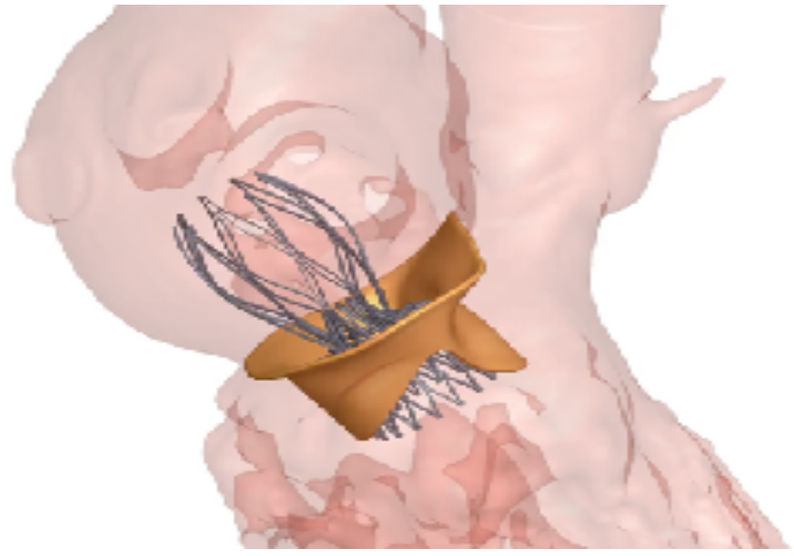
Computational Modeling & Simulation (CM&S)

Figure 1. The existing cracks on the left leg; the main lesions are highlighted.

Figure 2. The existing cracks on the tree trunk; the main lesions are highlighted.

TMVR Design





Medium implant position was targeted:

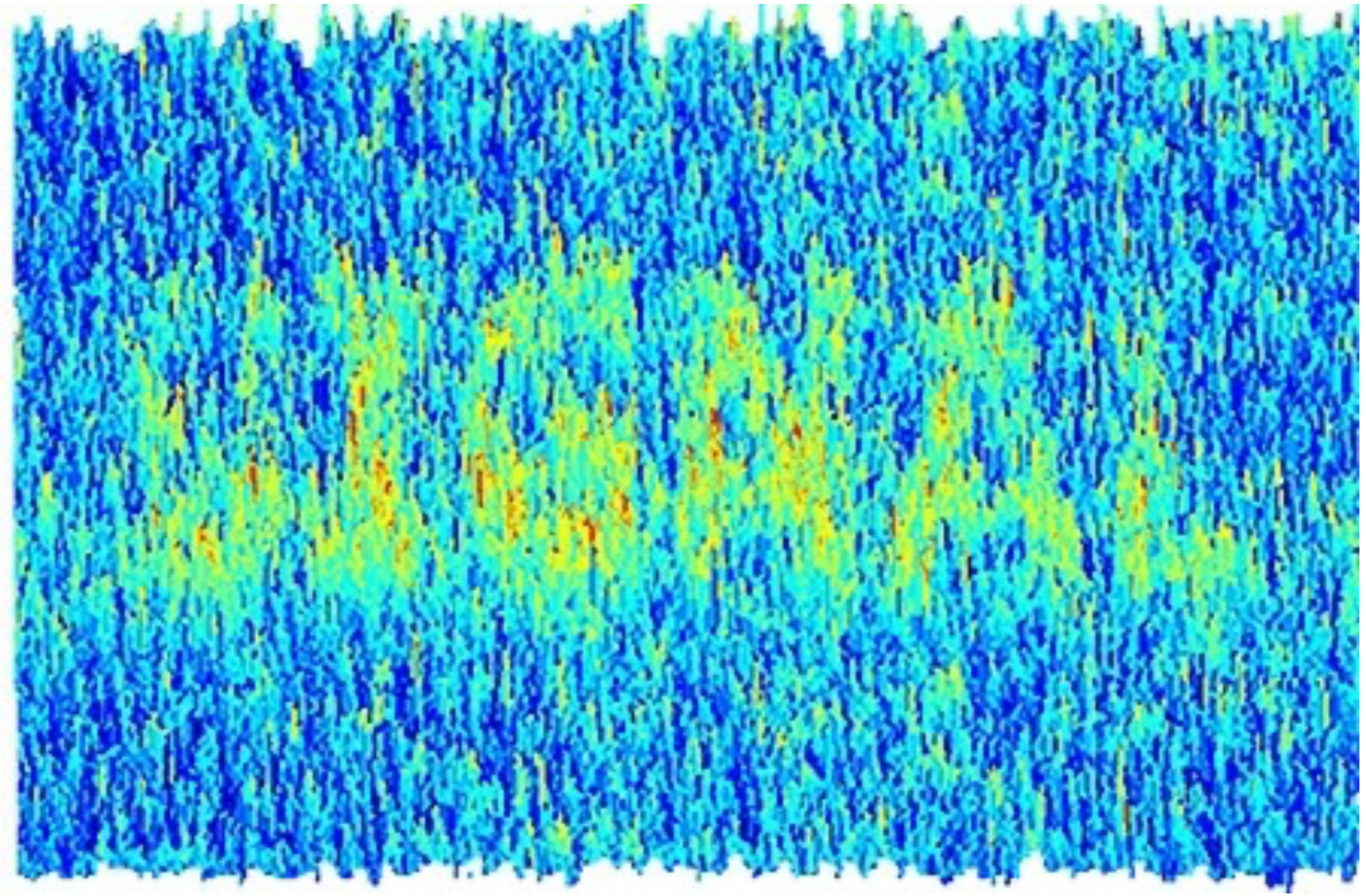
- No LVOTO
- No PVL
- Good anchoring

Conclusive Remarks

- **There is no “Single best” - Multiple modality /Fusion Imaging is a solution for many problems**

- **New technologies will make CV surgery easier**

- **New machines will generate a huge amount of data - we’ll need to understand their meaning and relevance**



Thank you

AG Cerillo, MD
FTGM, Massa