

EuroValve

November 8-9, 2013



Multi-imaging modality approach

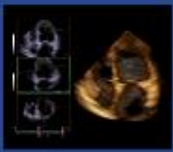
Covadonga Fernández-Golfín

Cardiac Imaging Unit. Cardiology Department.

Ramón y Cajal Hospital. Madrid



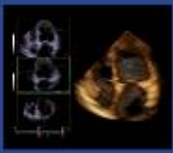
www.eurovalvecongress.com



Faculty Disclosure

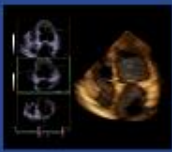
Covadonga Fernández-Golfín

I have **no financial relationships** to disclose.



Valvular heart disease (VHD)

- Increase morbidity and mortality
- Early detection to improve prognosis
- Imaging techniques
 - Diagnosis
 - Prognosis
 - Follow-up
- ECHOCARDIOGRAPHY, cardiac magnetic resonance, computed tomography



Valvular heart disease (VHD)

Guidelines on the management of valvular heart disease (version 2012)

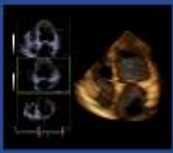
The Joint Task Force on the Management of Valvular Heart Disease

CMR

1. Selected cases for severity assessment (regurgitation)
2. LV and RV volumes and function

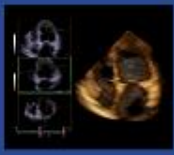
CT

1. Selected cases for severity assessment (AS planimetry)
2. Rule out CHD
3. TAVI



VHD Multi-imaging approach

Combination of complementary information from different imaging modalities to obtain the most accurate information regarding diagnosis or prognosis with clinical application



VHD Imaging

ETIOLOGY

MECHANISM

SEVERITY

IMPACT

CMR

CMR

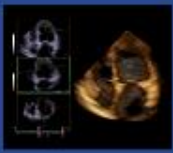
PROGNOSIS

CMR

THERAPEUTIC APPROACH

CT, CMR

ECHOCARDIOGRAPHY



VHD Imaging

Echocardiography

Available
Economic
Unstable patients
No radiation
Temporal resolution
Experience and data
3D technology
Exercise

Acoustic window
Experience
Reproducibility

CMR

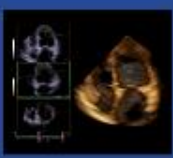
Anatomical and
temporal resolution
Non invasive
No radiation
**Tissue
characterization
Reproducibility**

Costs and availability
Expertise
Contraindications

Computed tomography

Excellent anatomic
information
**Coronary
assessment**
Calcification
3D

Radiation and
contrast
Poor temp. resol



VHD Echocardiography

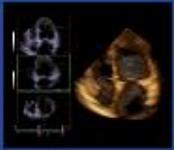
ETIOLOGY

MECHANISM

SEVERITY

IMPACT

- First line imaging modality: screening
- Comprehensive study
- TEE if needed
- Quantitate severity



VHD Echocardiography

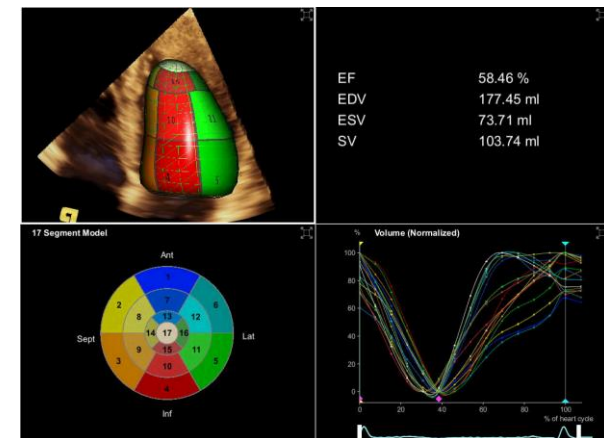
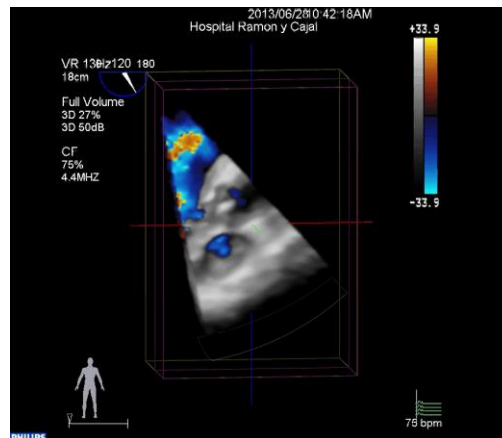
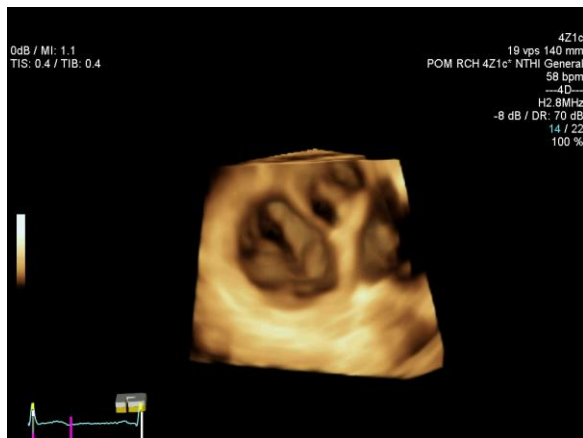
ETIOLOGY

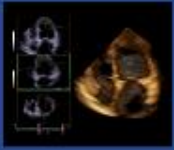
MECHANISM

SEVERITY

IMPACT

3D echo (TT and TEE)

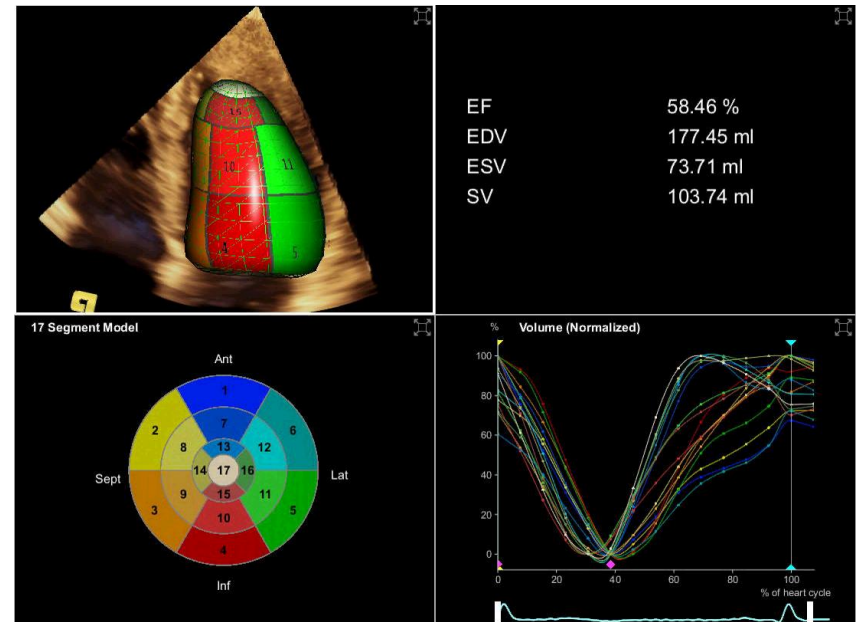
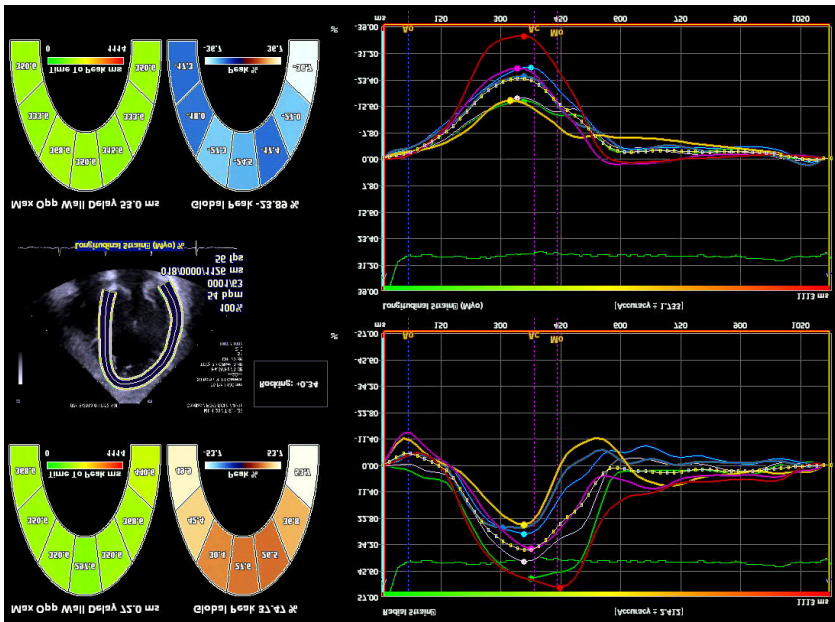


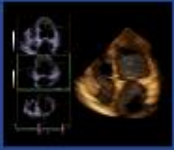


VHD Echocardiography

PROGNOSIS

Speckle tracking, exercise echo, 3D

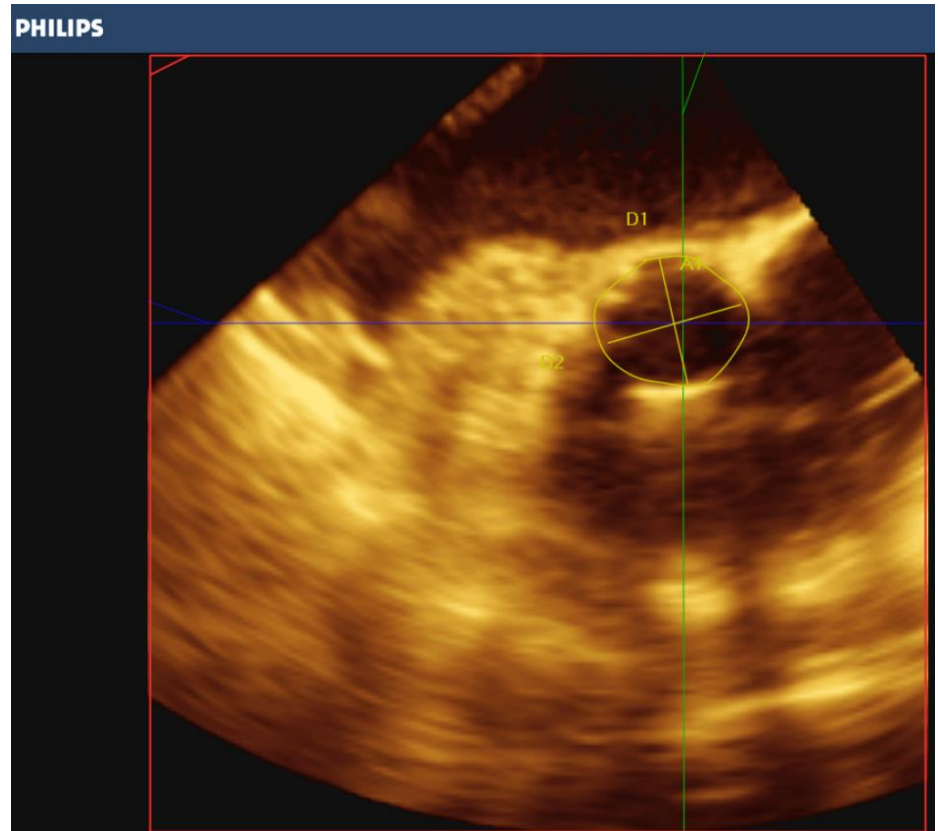
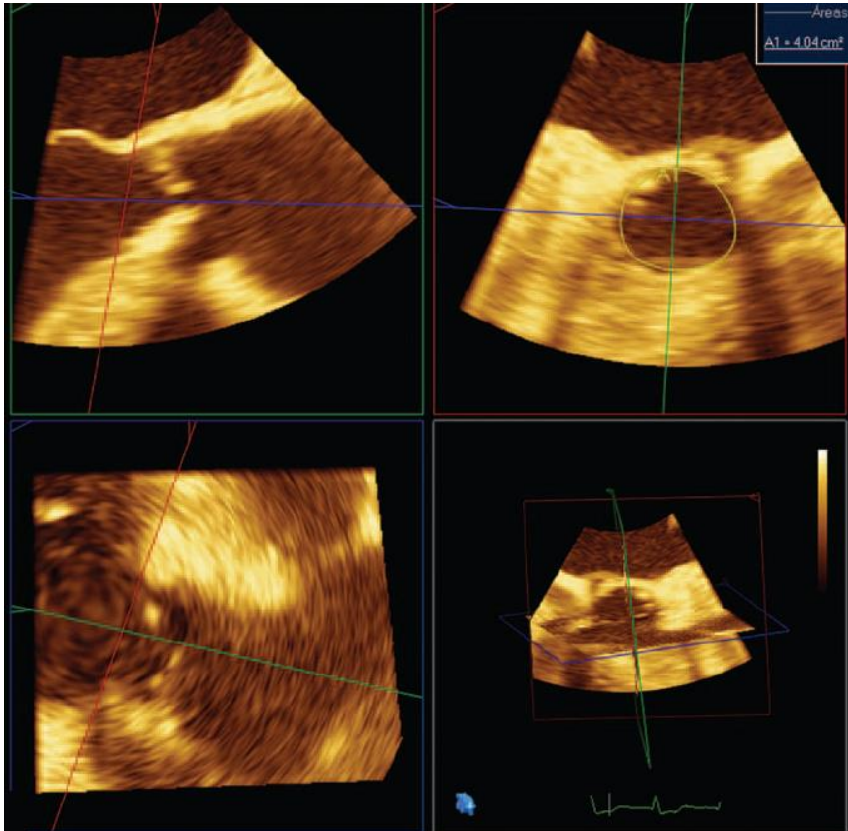


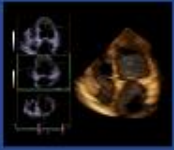


VHD Echocardiography

THERAPEUTIC APPROACH

3D echo

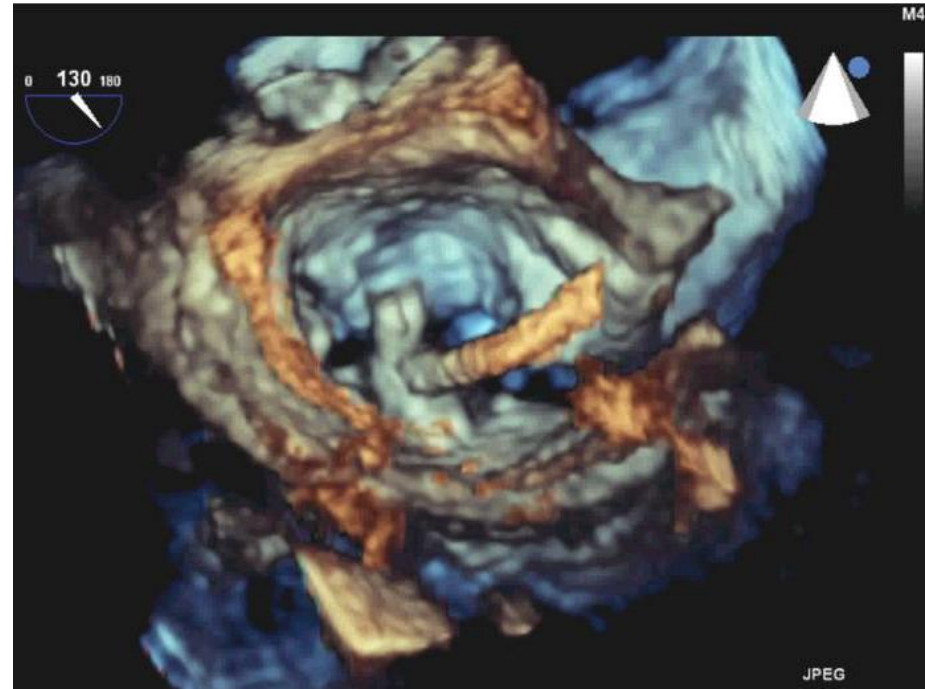
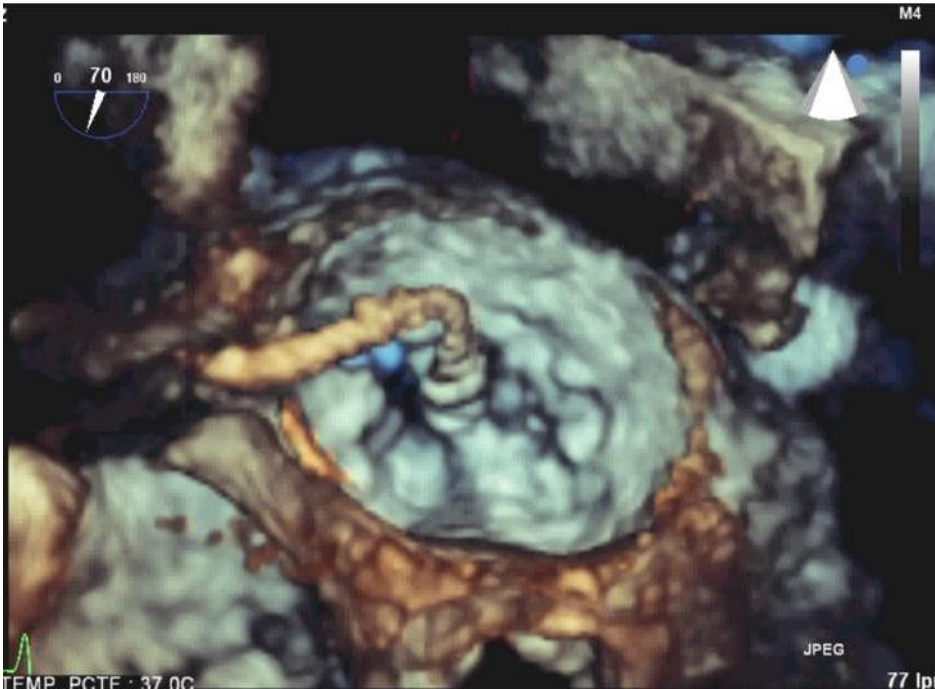


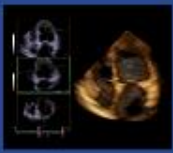


VHD Echocardiography

THERAPEUTIC APPROACH

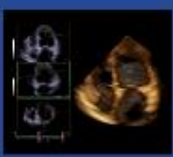
3D echo





VHD Echo

- Full evaluation in most
- Systematic, quantitate, limitations of the technique depending on the type patient and pathology
- Incorporate new technology in VHD assessment



EuroValve



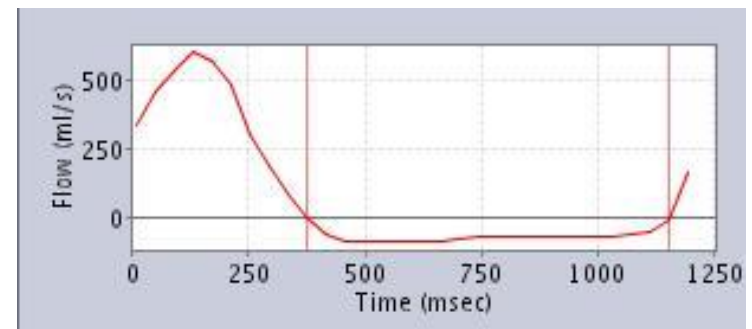
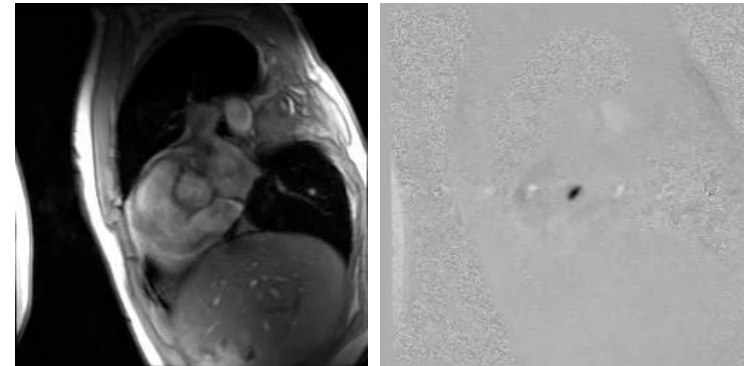
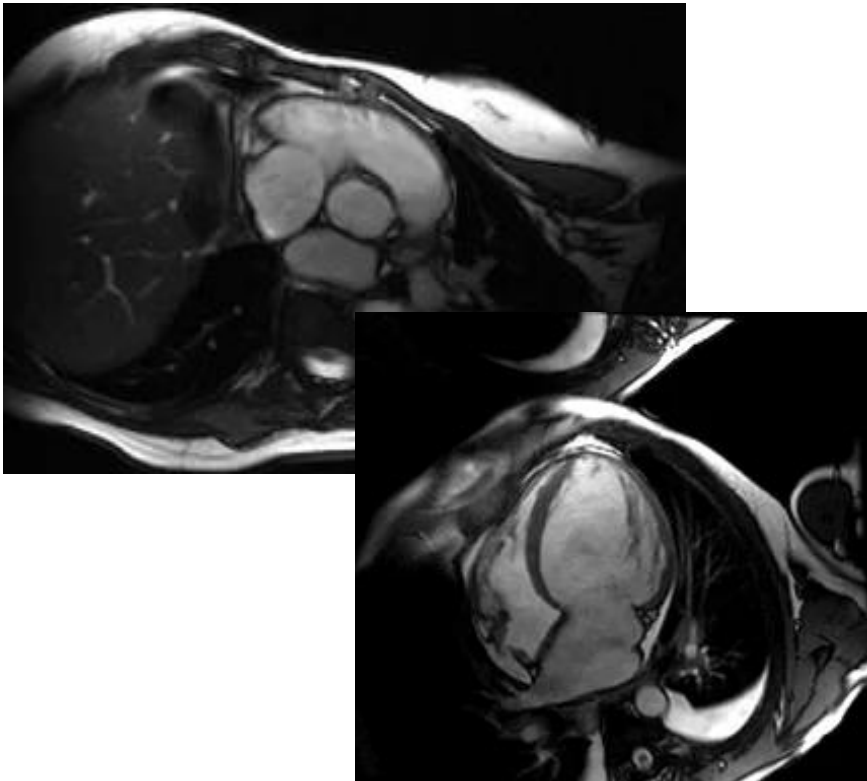
VHD CMR

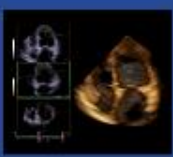
ETIOLOGY

MECHANISM

SEVERITY

IMPACT





VHD CMR

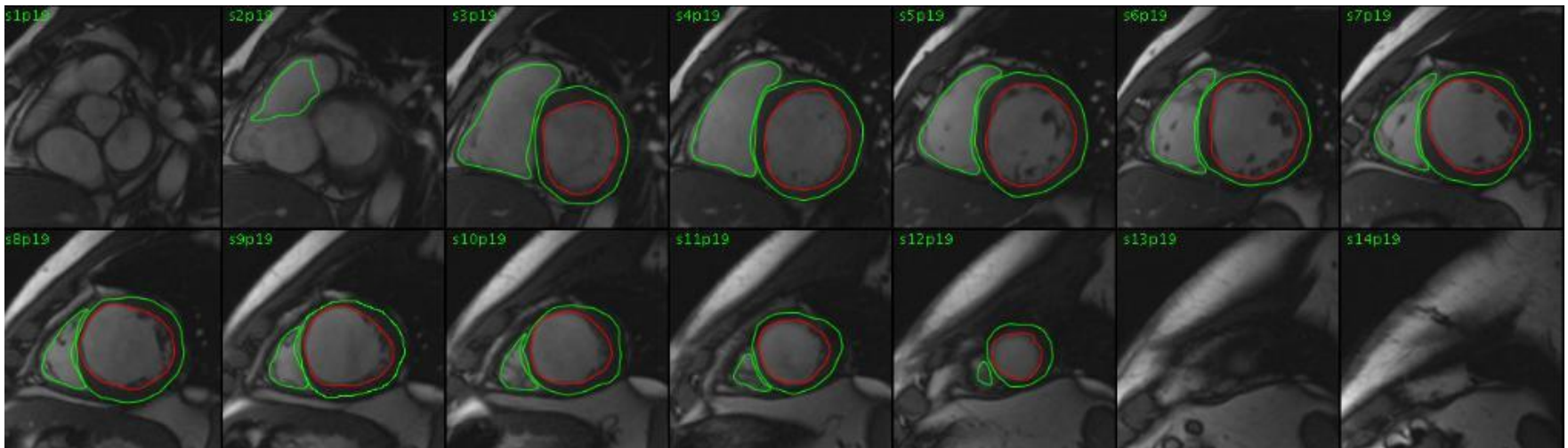
ETIOLOGY

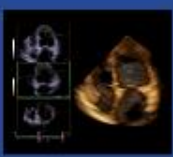
MECHANISM

SEVERITY

IMPACT

- Impact of VHD: LV and RV volumes, mass and EF
- Reproducibility for serial evaluation





VHD CMR

ETIOLOGY

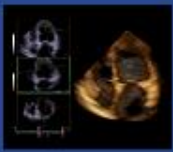
MECHANISM

SEVERITY

IMPACT

- Assessment of great vessels and other possible associated conditions (aortic aneurism or CoA) in the

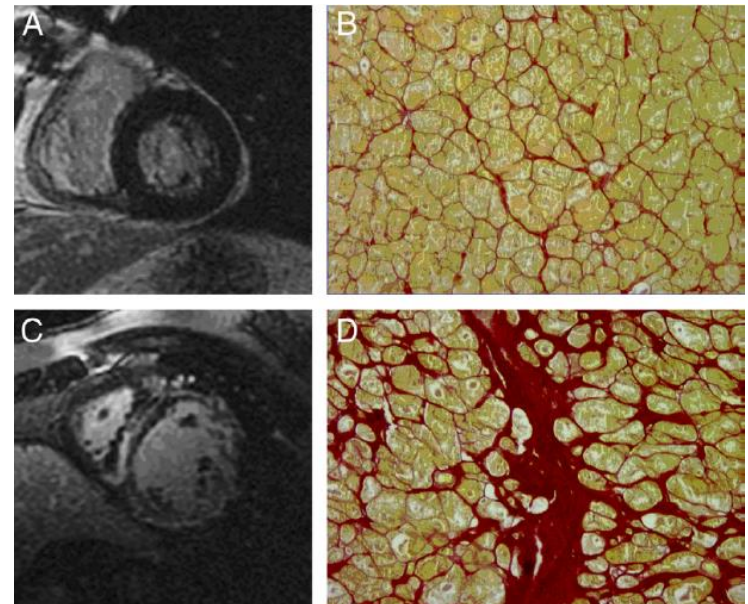


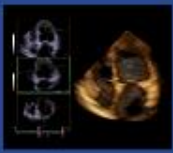


VHD CMR

PROGNOSIS

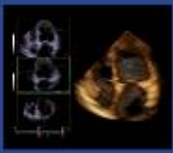
- Non invasive focal LV fibrosis detection
- Early LV dysfunction diagnosis
- Prognosis impact
- T1 mapping sequences for diffuse fibrosis detection





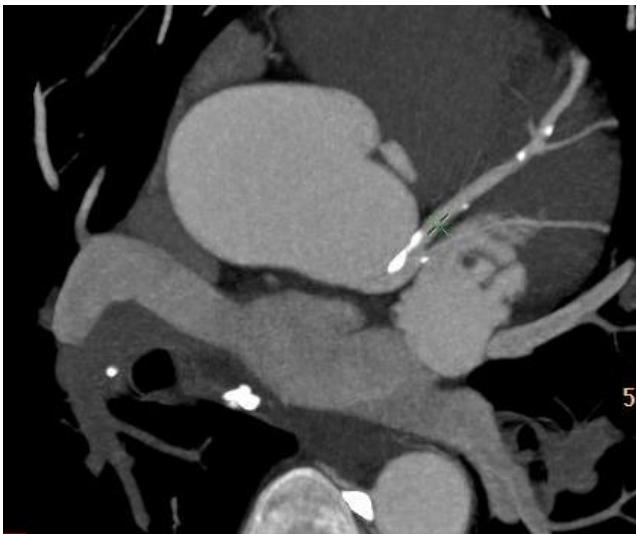
VHD CMR

- Non conclusive echocardiogram: etiology, mechanism, severity or impact
- Symptomatic patients with non severe VHD and normal LV function
- Asymptomatic patients, prognosis assessment and early intervention warranted



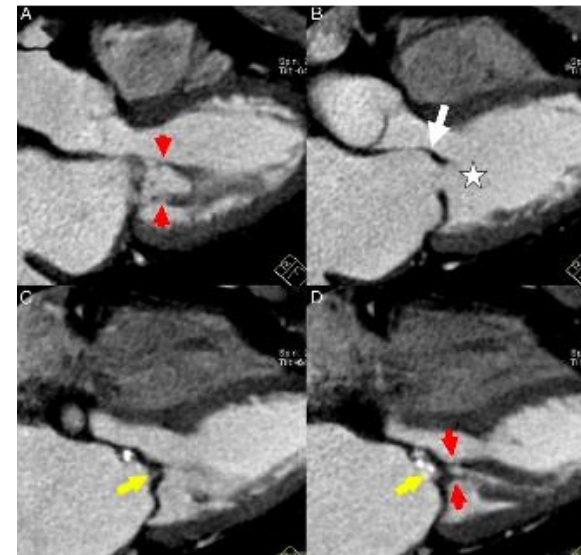
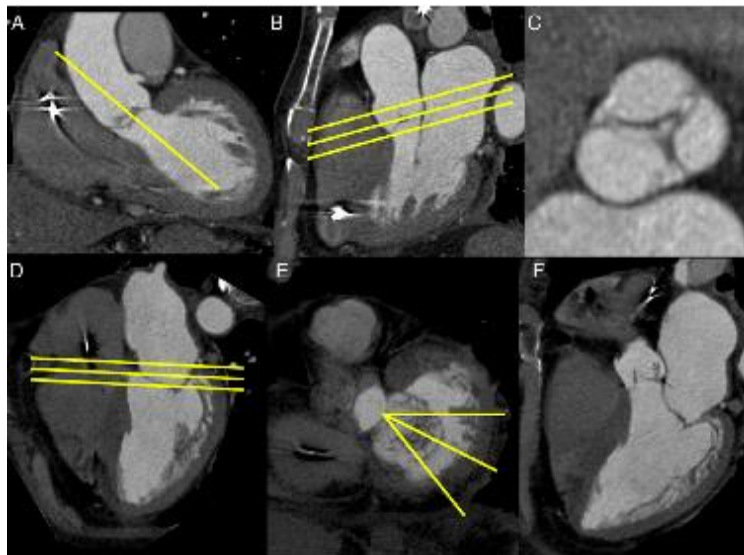
VHD CT

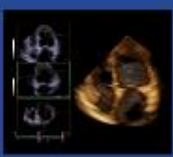
- Rule out coronary disease before valvular surgery
- Assessment of great vessels and other possible associated conditions (aortic aneurism or CoA) in the same study, endocarditis complications





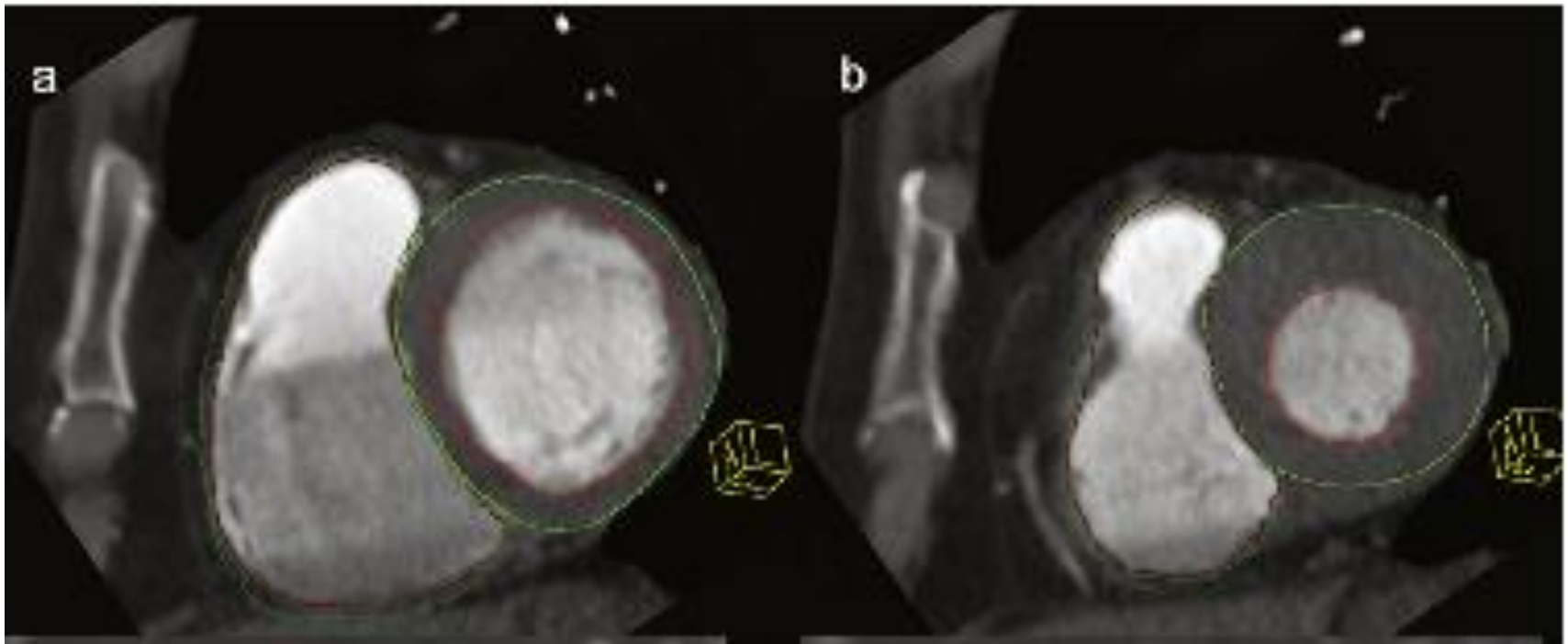
- Valvular anatomy and degree of calcification
- Lesion severity

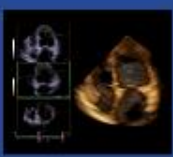




VHD CT

- LV and RV volume and mass assessment

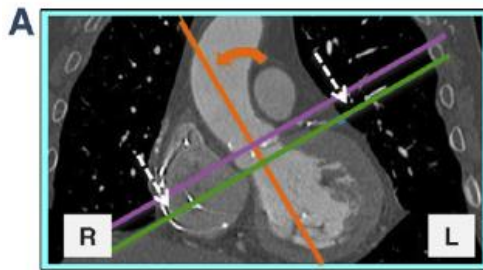




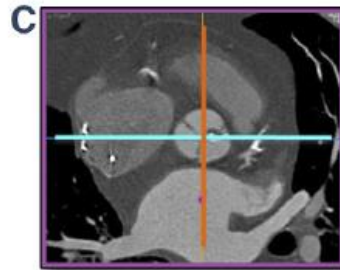
VHD CT

THERAPEUTIC APPROACH

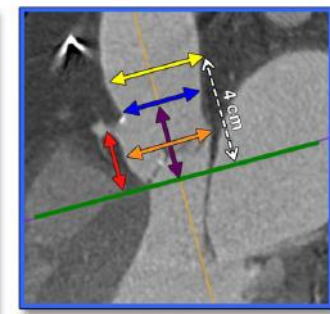
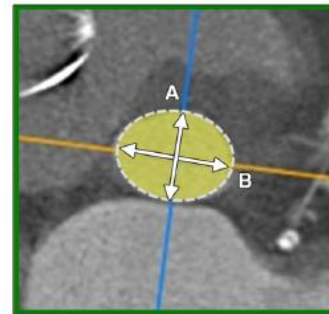
Assessment pre TAVI, complications



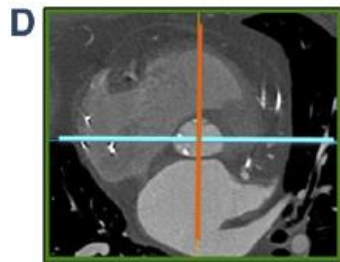
Coronal Oblique Plane



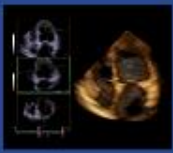
Valve Plane



Sagittal Oblique Plane

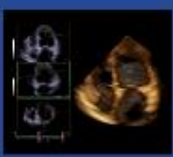


Transverse Plane



VHD CT

- Never performed to evaluate isolated
- Rule CHD before surgery, concomitant assessment of VHD and associated conditions
- TAVI procedure or certain valvular heart disease complication



VHD Multi-imaging AS

INITIAL EVALUATION



ECHOCARDIOGRAPHY: AV anatomy, AS severity, LV function, LVH, PSP, diastolic function



FINAL DIAGNOSIS

YES

NO

TEE (2D, 3D planimetry)
CMR (2D planimetry, LV EF, volume)
Stress echocardiography

SYMPTOMATIC

AVR

CT rule out CHD

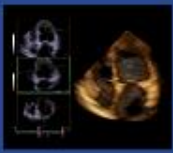
TAVI

TEE (2D, 3D AA)
CT

ASYMPTOMATIC

PROGNOSIS

LV strain, exercise echo
CMR (fibrosis)



VHD Multi-imaging AR

INITIAL EVALUATION



ECHOCARDIOGRAPHY: AV anatomy, AR severity, LV diameters and function, PSP, diastolic function, 3D echo if available



FINAL DIAGNOSIS

YES

NO

SYMPTOMATIC

AVR

CT rule out CHD

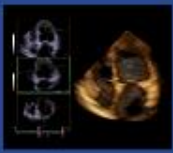
ASYMPTOMATIC

PROGNOSIS

LV strain
CMR (fibrosis)

CMR (AR severity, LV EF, LV volume)

TEE (AR severity, 2D, 3D)



VHD Multi-imaging MS

INITIAL EVALUATION



ECHOCARDIOGRAPHY: MV anatomy, Wilkins score, MS severity, LV diameters and function, , PSP, 3D echo if available



FINAL DIAGNOSIS

YES

NO

TEE (MS severity, score, 2D, 3D)

SYMPTOMATIC

MVR

CT rule out CHD

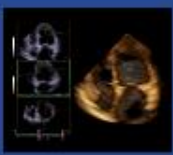
PMV

DISCORDANT

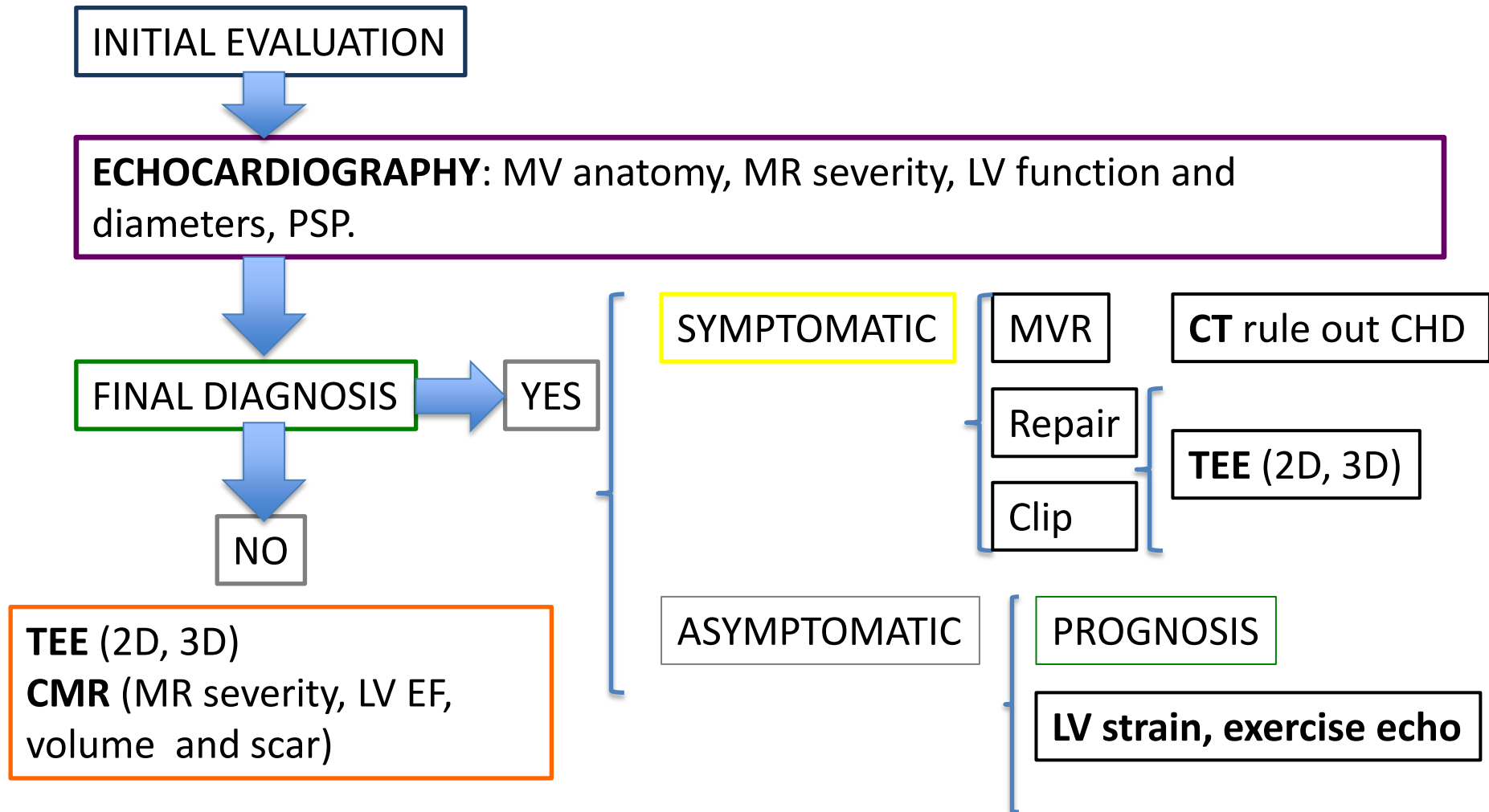
Exercise echo

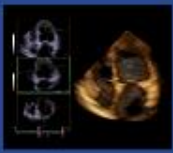
ASYMPTOMATIC

Follow up



VHD Multi-imaging MR





Conclusions

- Echocardiography remains the first line imaging modality in VHD
- Alternative imaging modalities are useful and add complementary information with clinical application in selected patients
- Further clinical data is needed before they can be incorporated in everyday clinical routine