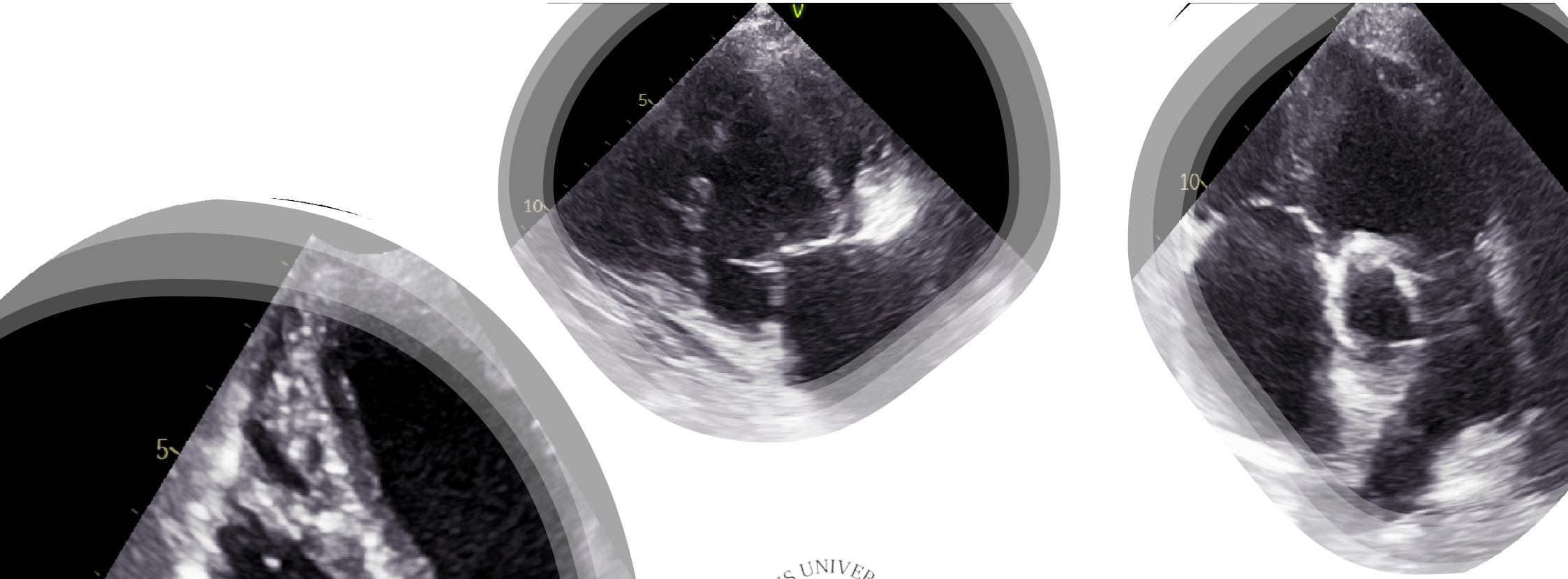
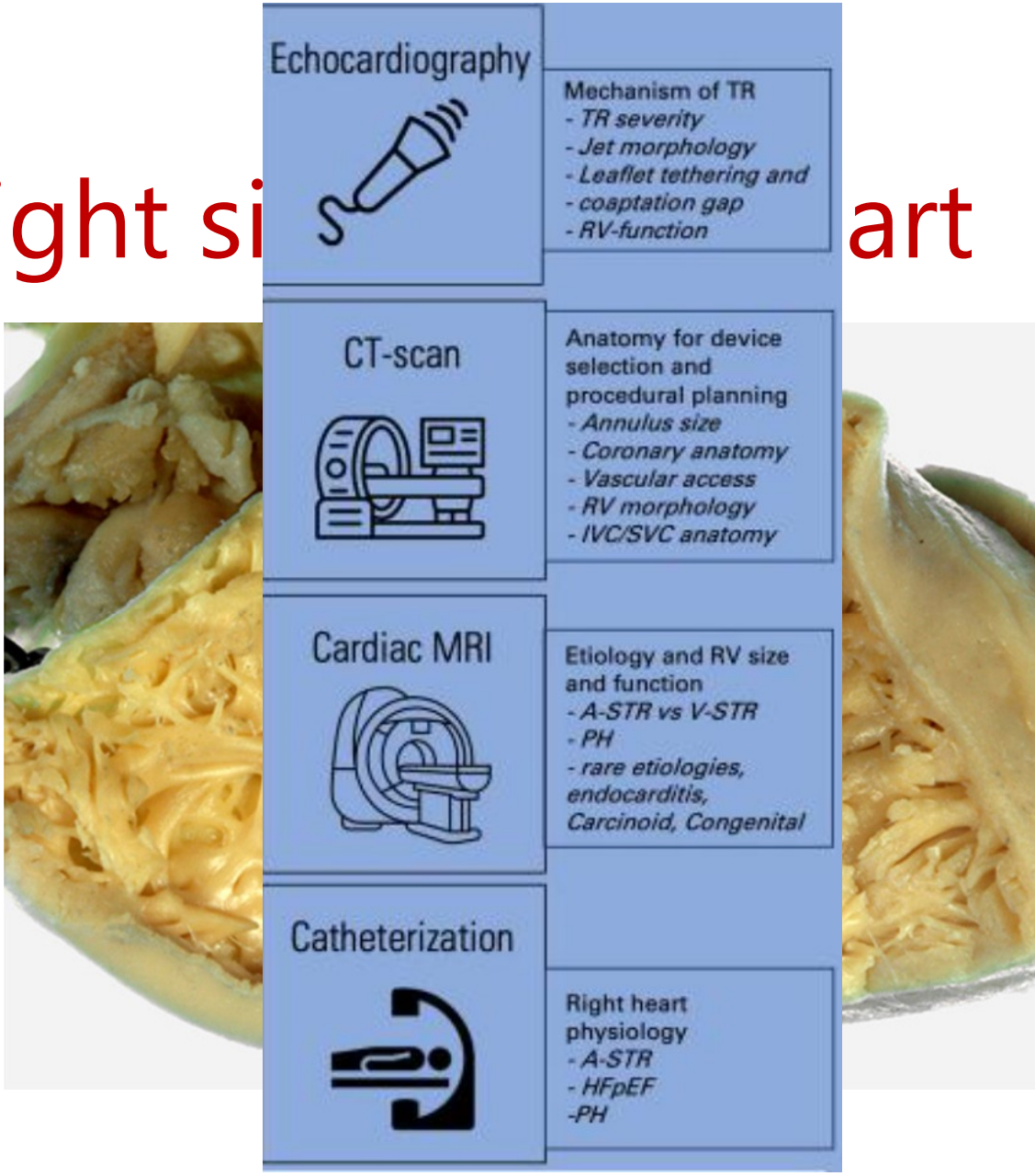


Prof. Jelena Čelutkienė,
Vilnius University, Faculty of Medicine

Evaluating the right ventricl and tricuspid valve in hear failur

No-more-forgotten right si art

- Goals of evaluation:
  - RV and RA remodeling
  - Etiology and severity of TR
  - TA dimensions, leaflet tethering
  - Presence of pulmonary hypertension
  - Feasibility of interventions



Maisano et al. EHJ 2024

RV remodeling

RV size (diameters)

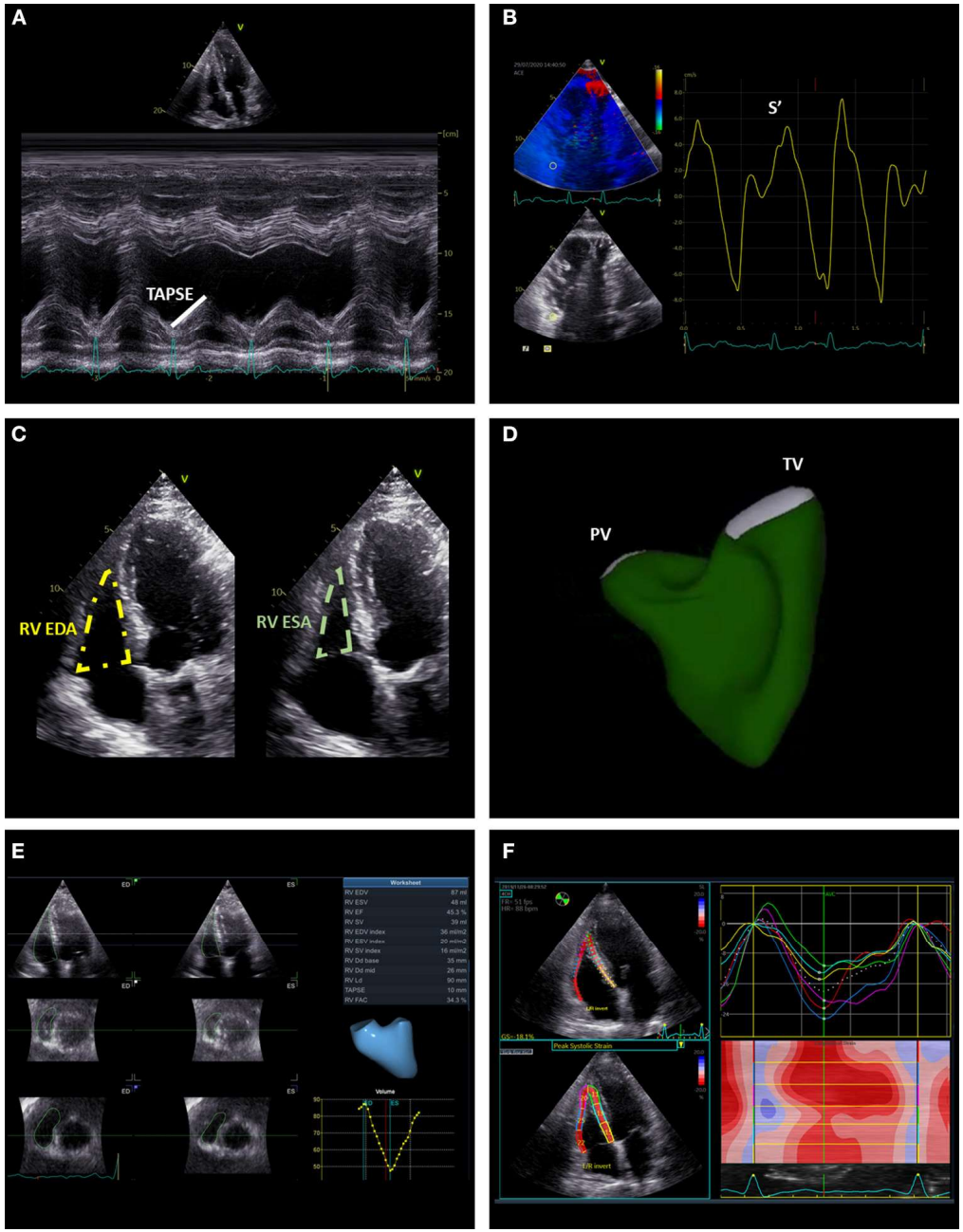
Longitudinal function:

- TAPSE (cut-off 17 mm)
- S' velocity (cut-off 9.5 cm/s)

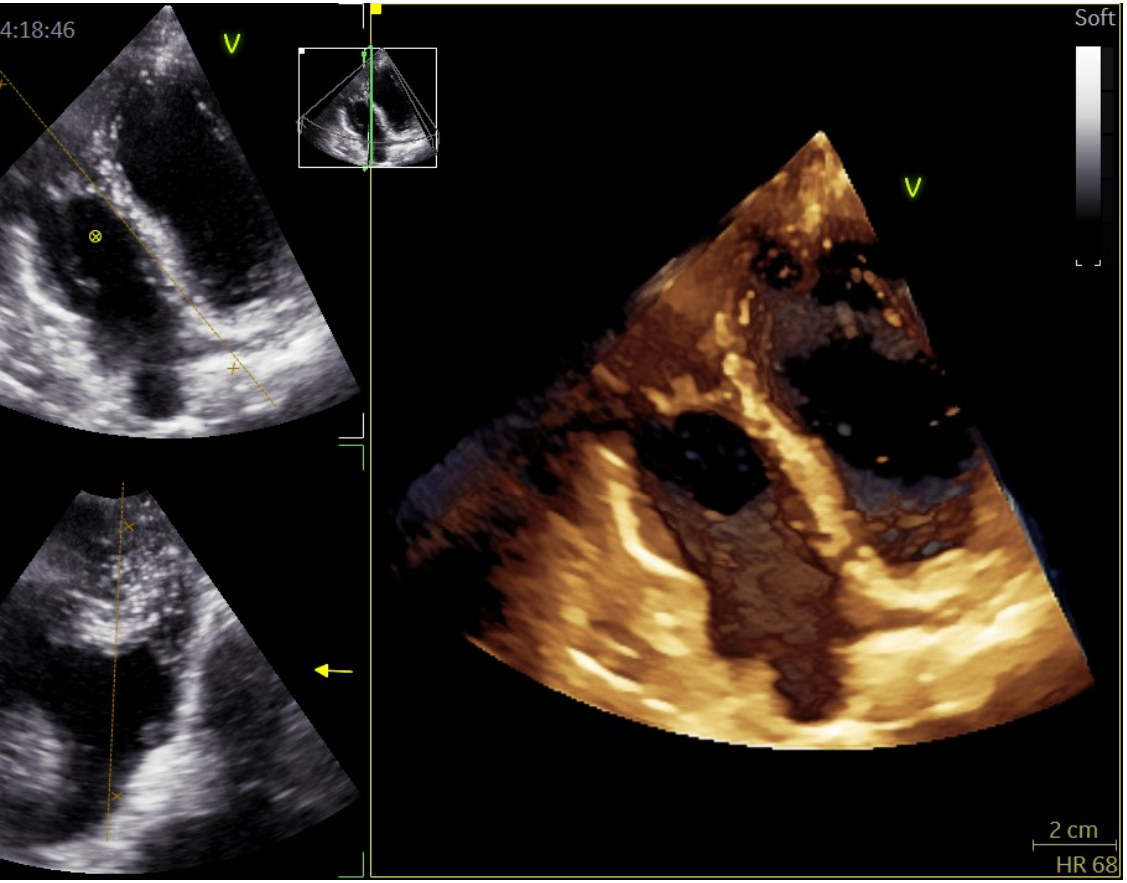
Fractional area change

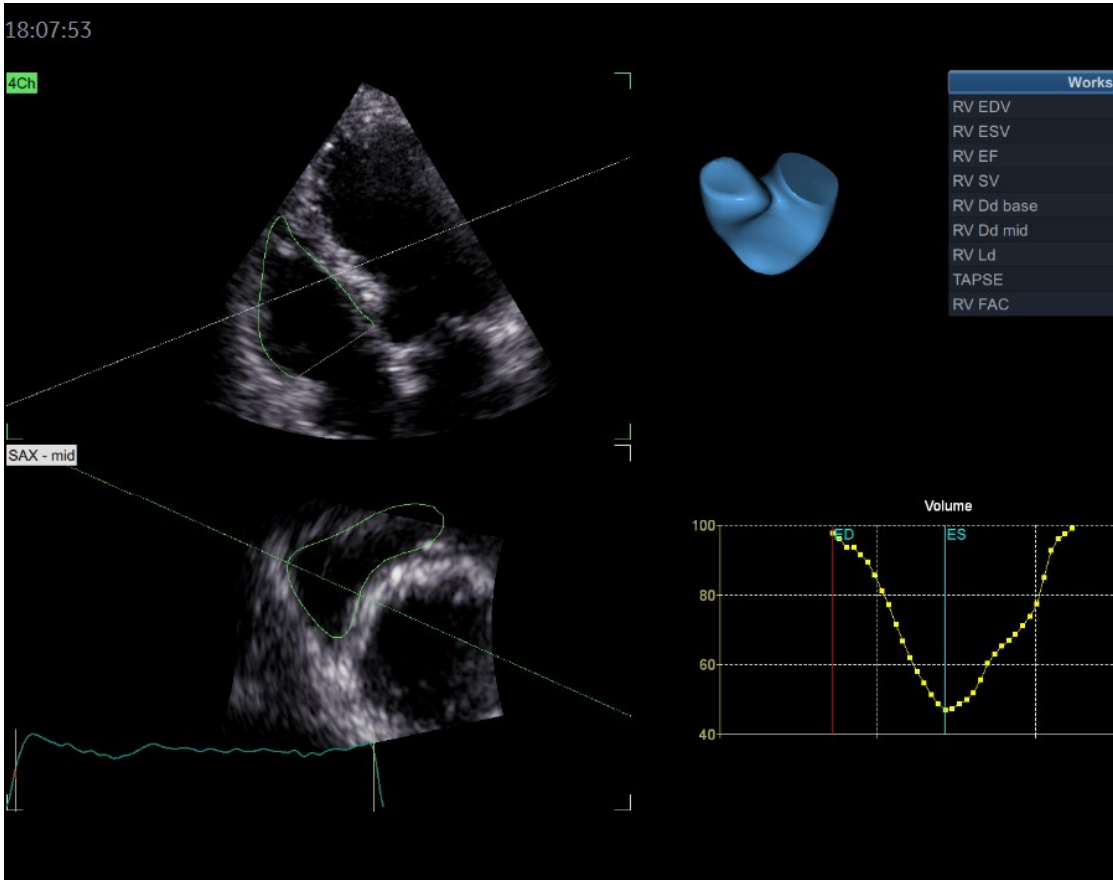
3D RV EF (cut-off 45%)

2D free wall or entire RV longitudinal strain (cut-off -20%)

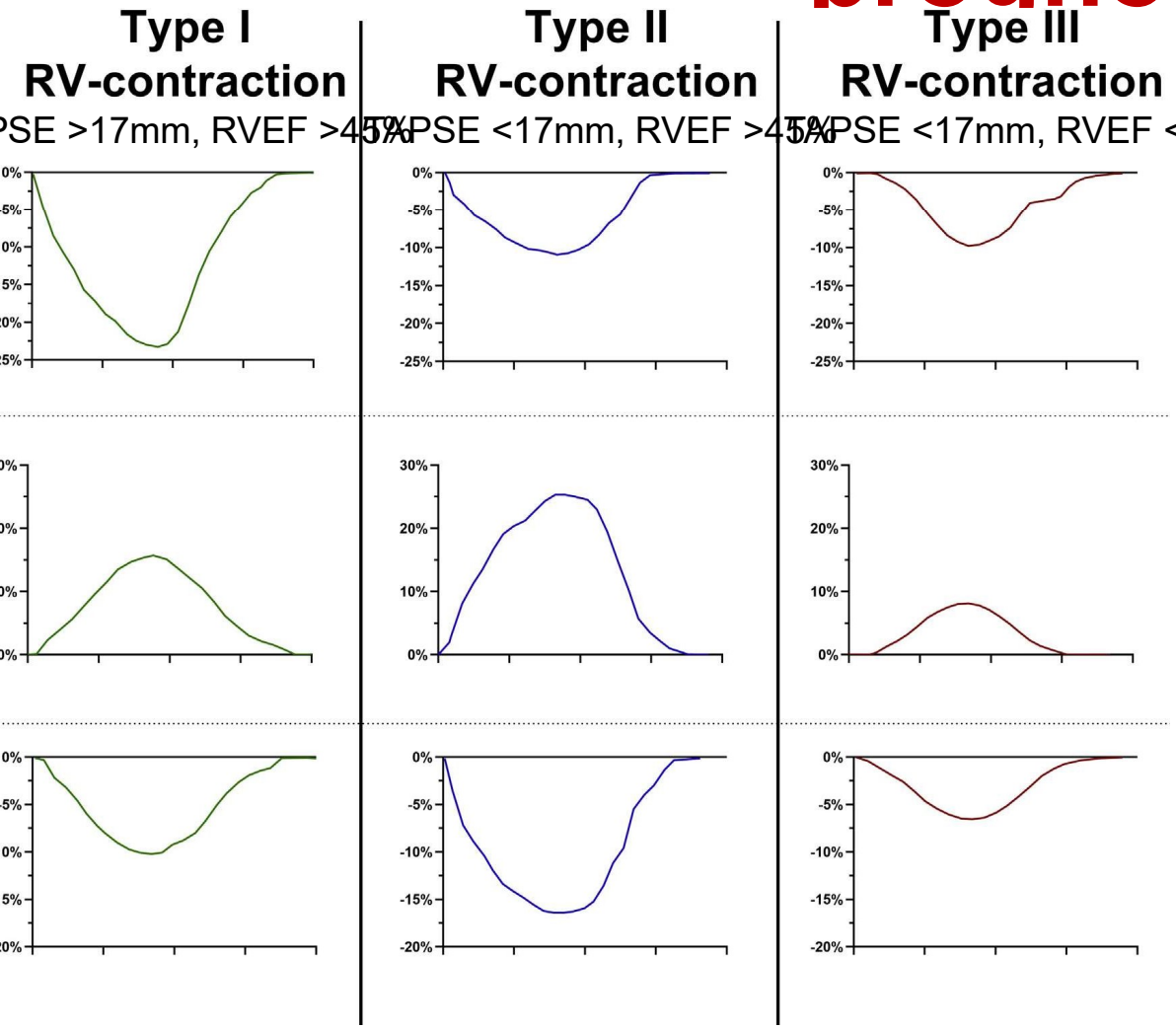


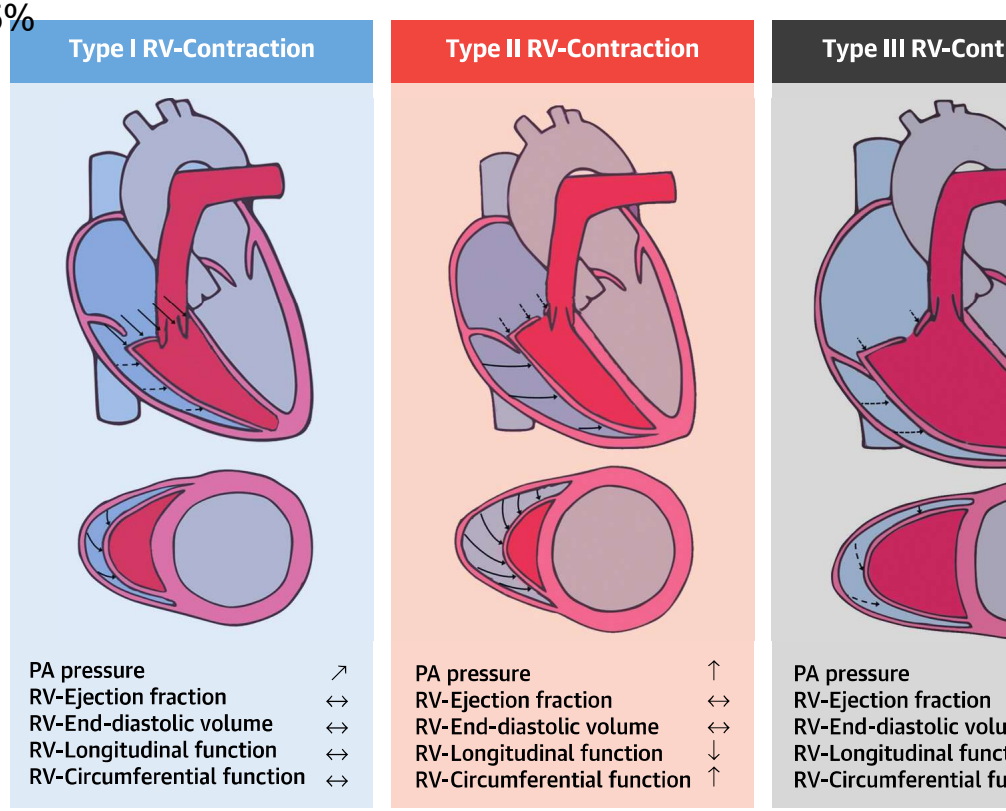
Fortuni F, et al. *Frontiers in Cardiovascular Medicine*,


4:18:46
Soft
2 cm
HR 68


18:07:53
4Ch
SAX - mid
RV EDV
RV ESV
RV EF
RV SV
RV Dd base
RV Dd mid
RV Ld
TAPSE
RV FAC
Volume
ED
ES
100
80
60
40

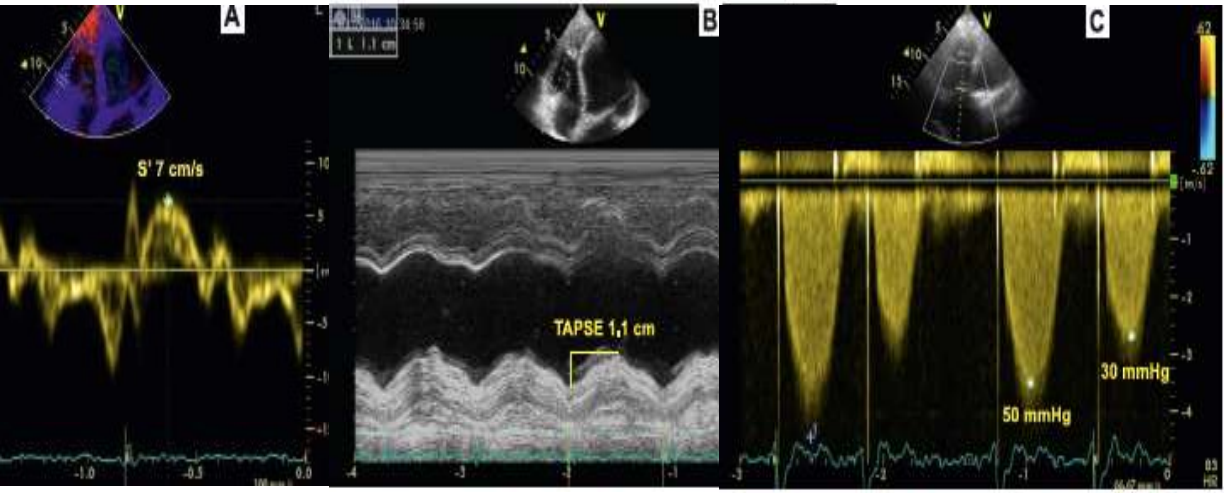
Measurement of longitudinal function (TAPSE) is not sufficient to assess prognosis





Kresoja, K.-P. et al. J Am Coll Cardiol Intv. 2021;14(14):

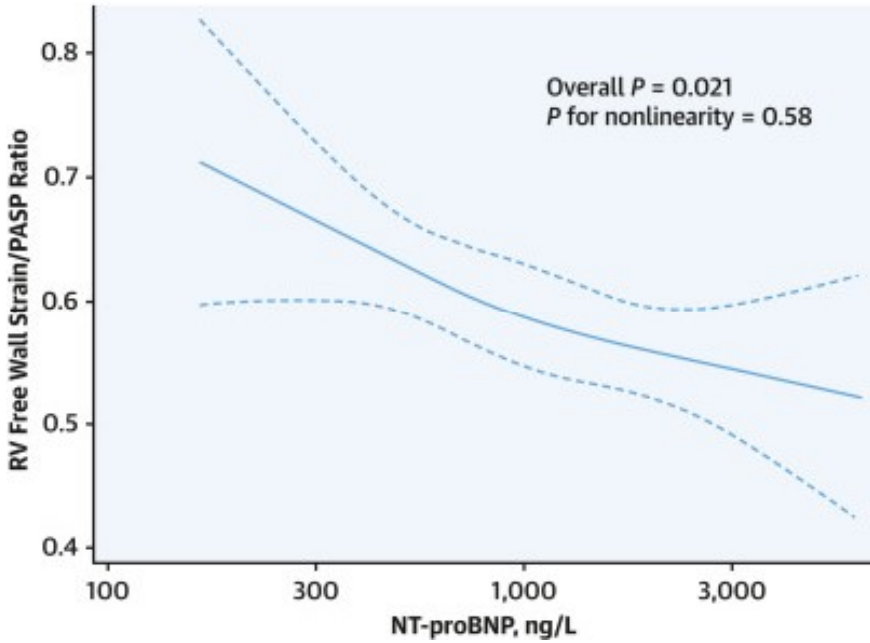
Ratio **TAPSE/PASP** - an index of RV
ngth vs. developed force, an assay of
RV contractile state



		Subjects	Events	% Event-Free Survival
A	TAPSE/PASP >0.64 mm/mmHg	70	0	100
B	TAPSE/PASP 0.50-0.64 mm/mmHg	75	6	92.0
C	TAPSE/PASP 0.36-0.49 mm/mmHg	70	7	90.0
D	TAPSE/PASP </=0.35 mm/mmHg	78	34	56.5

P-Heart Circ Physiol • doi:10.1152/ajpheart.00157.2013

Right Ventricular Function and Coupling to the Pulmonary Circula in Heart Failure with Preserved Ejection Fraction

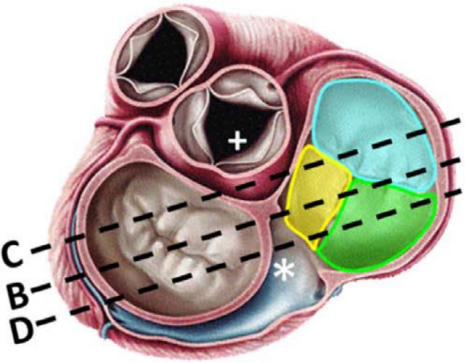


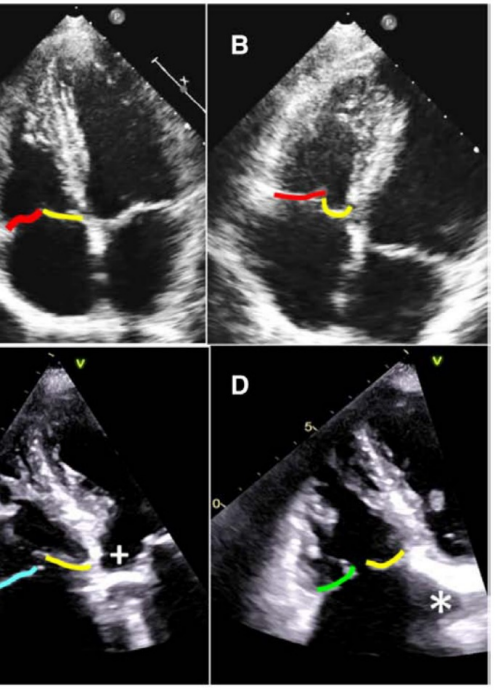
decrease of RVFWLS/PASP ratio (0.2 u

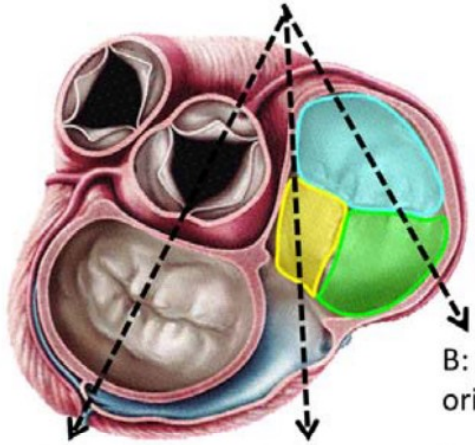
aHR 1.43 (CI 1.13 – 1.80), p=0.0

Inciardi et al. JACC 2023

cuspid valve: 2D vs. 3D anatomy



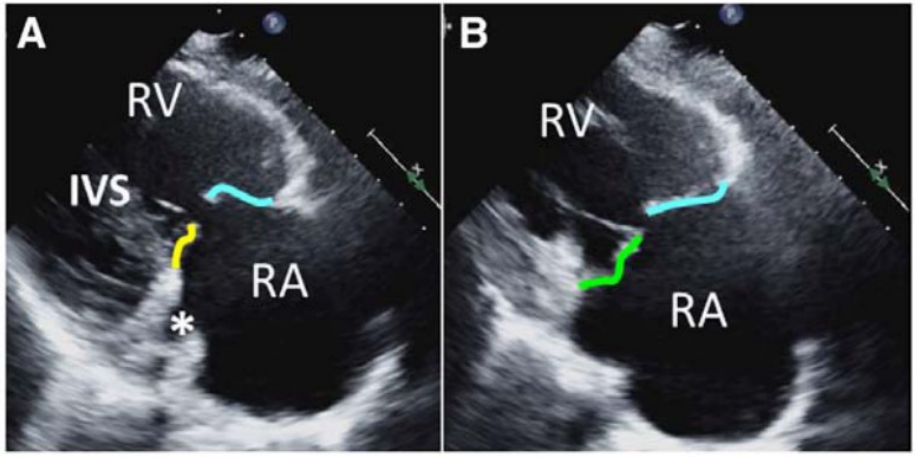


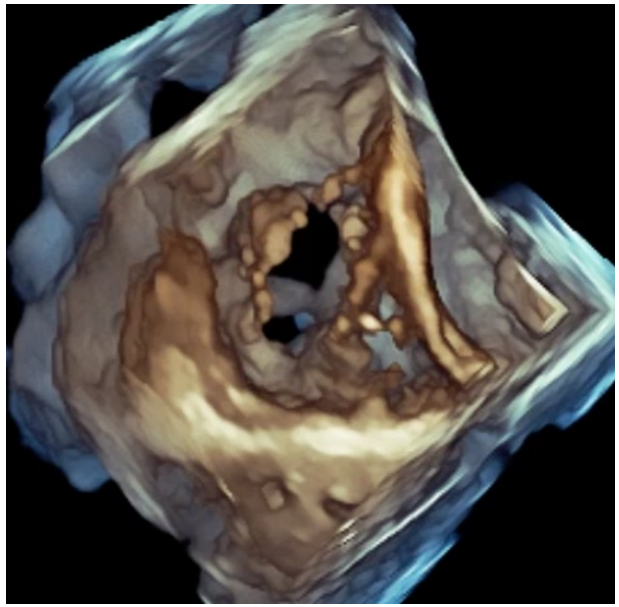


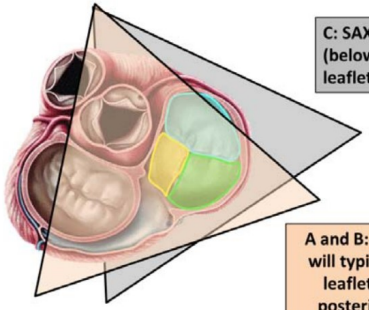
B: No coronary sinus orifice, no septal wall

Parasternal LAX View

A: Coronary sinus orifice (*), LV septum seen (IVS)

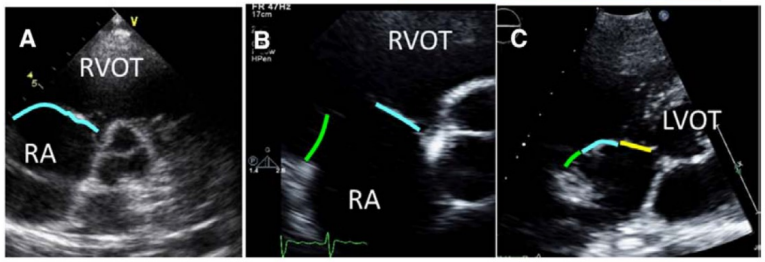






C: SAX at level of LV outflow tract (below AV) with imaging of the septal leaflet

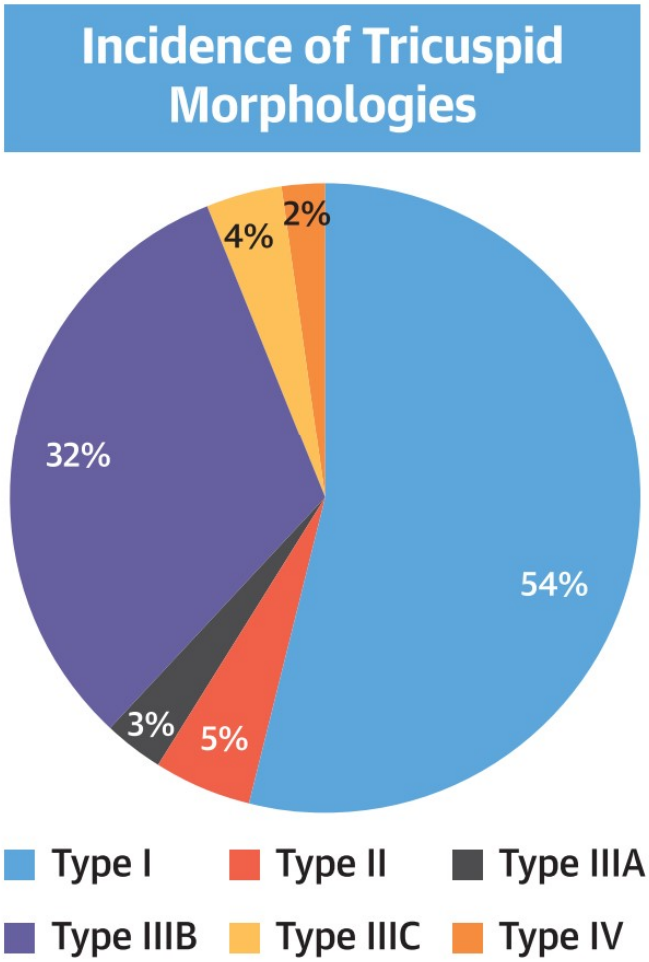
A and B: SAX view at the level of AV will typically image just the anterior leaflet (A) however anterior and posterior leaflets may be seen (B)

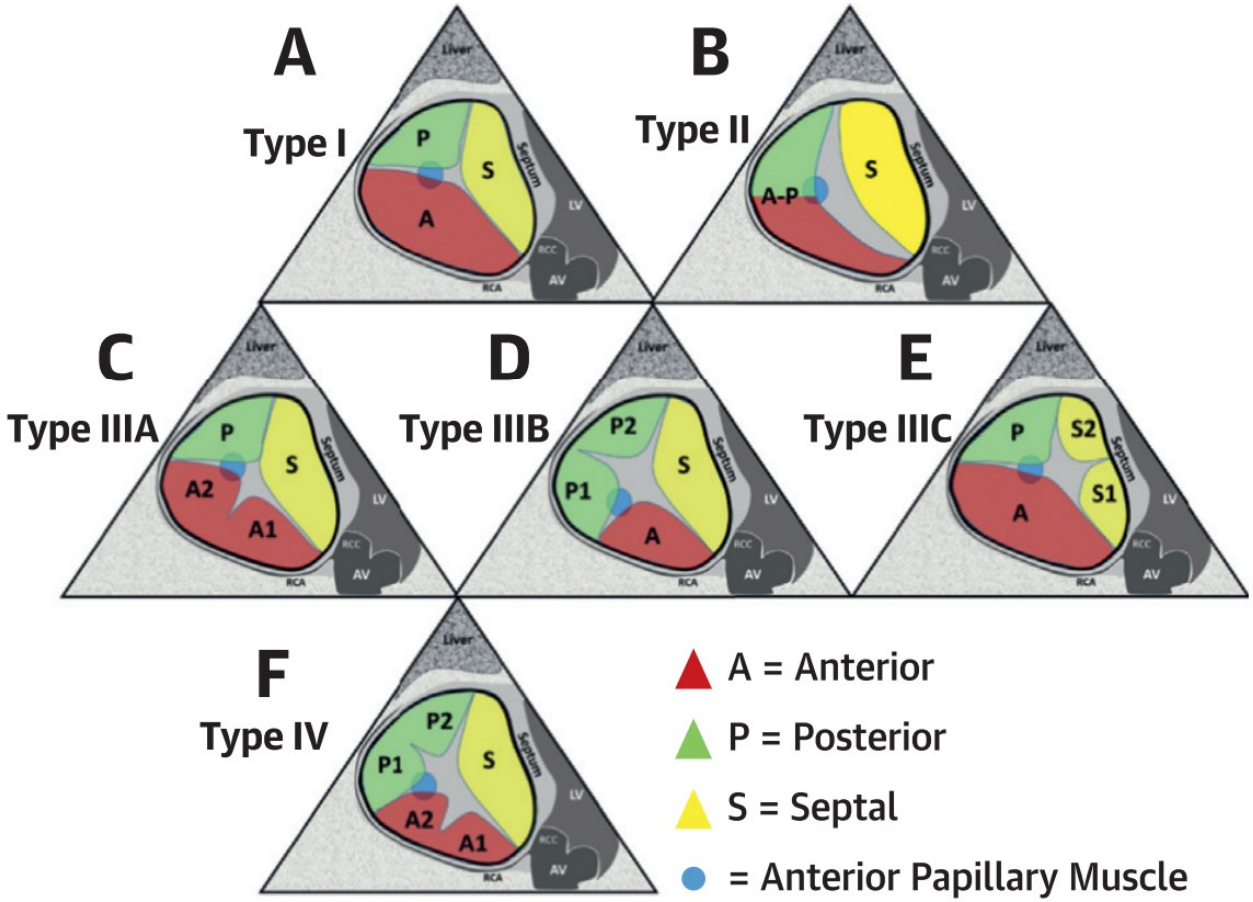


Circ Cardiovasc Imaging 2016;9(12):1-

How many leaflets has the tricuspid valve…?

Greater anatomical variability than mitral valve…

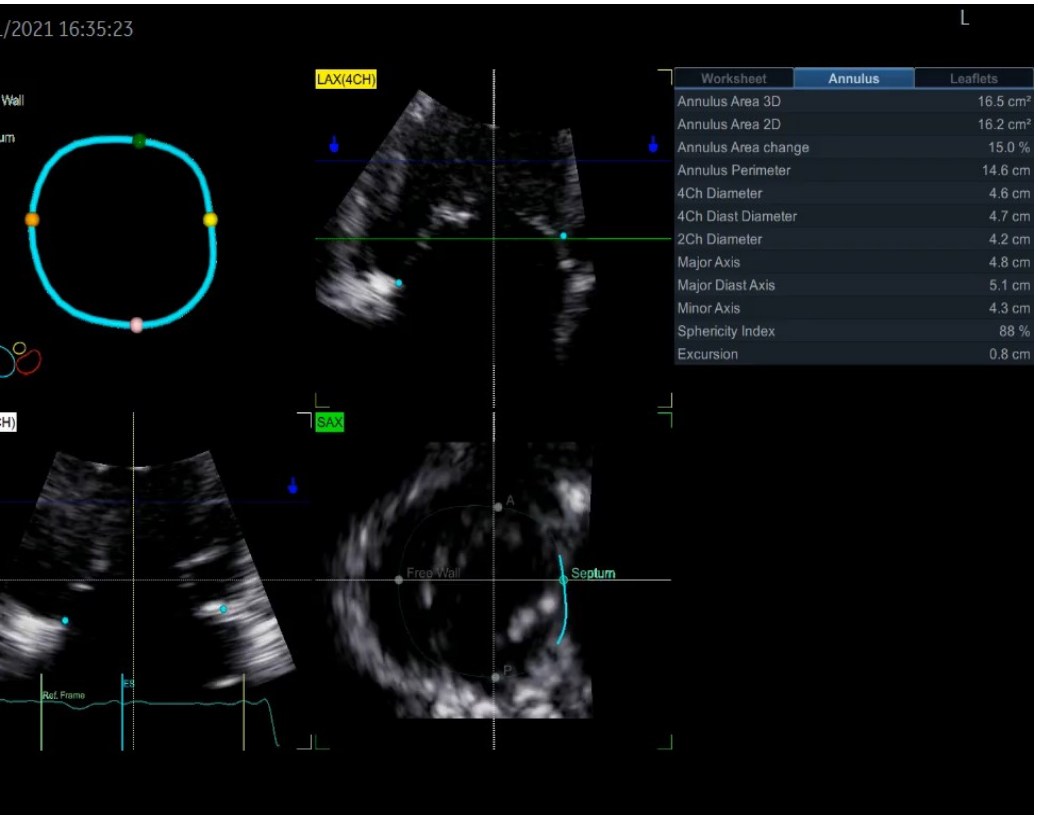




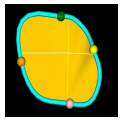
JACC Cardiovasc Imaging. 2021;14(7):1299-1305

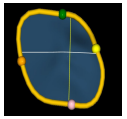
3D TV images analysis

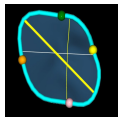
D Auto TVQ software

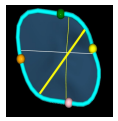


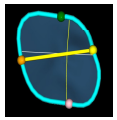
Tricuspid valve parameters

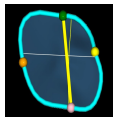

TV area

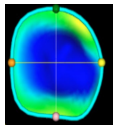

TV perimeter

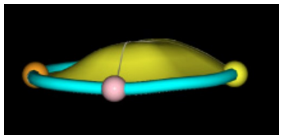

Major axis

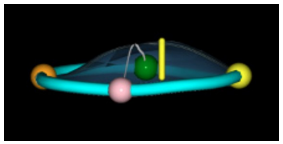

Minor axis

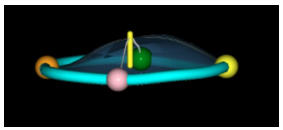

4Ch diameter

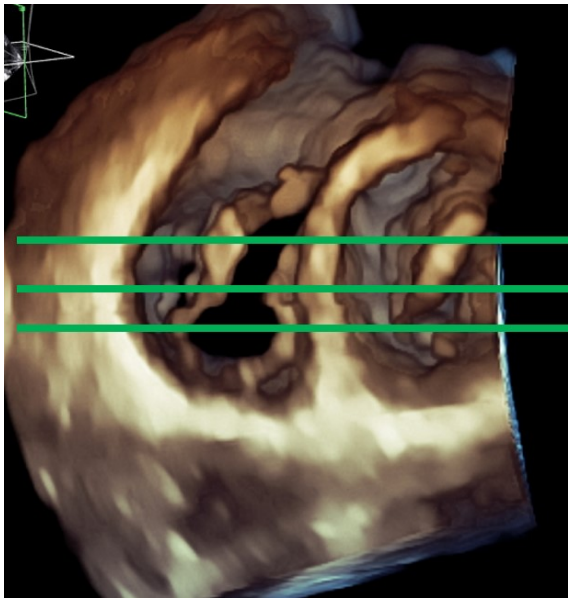

2Ch diameter


Sphericity index


Tenting volum


Max tenting h

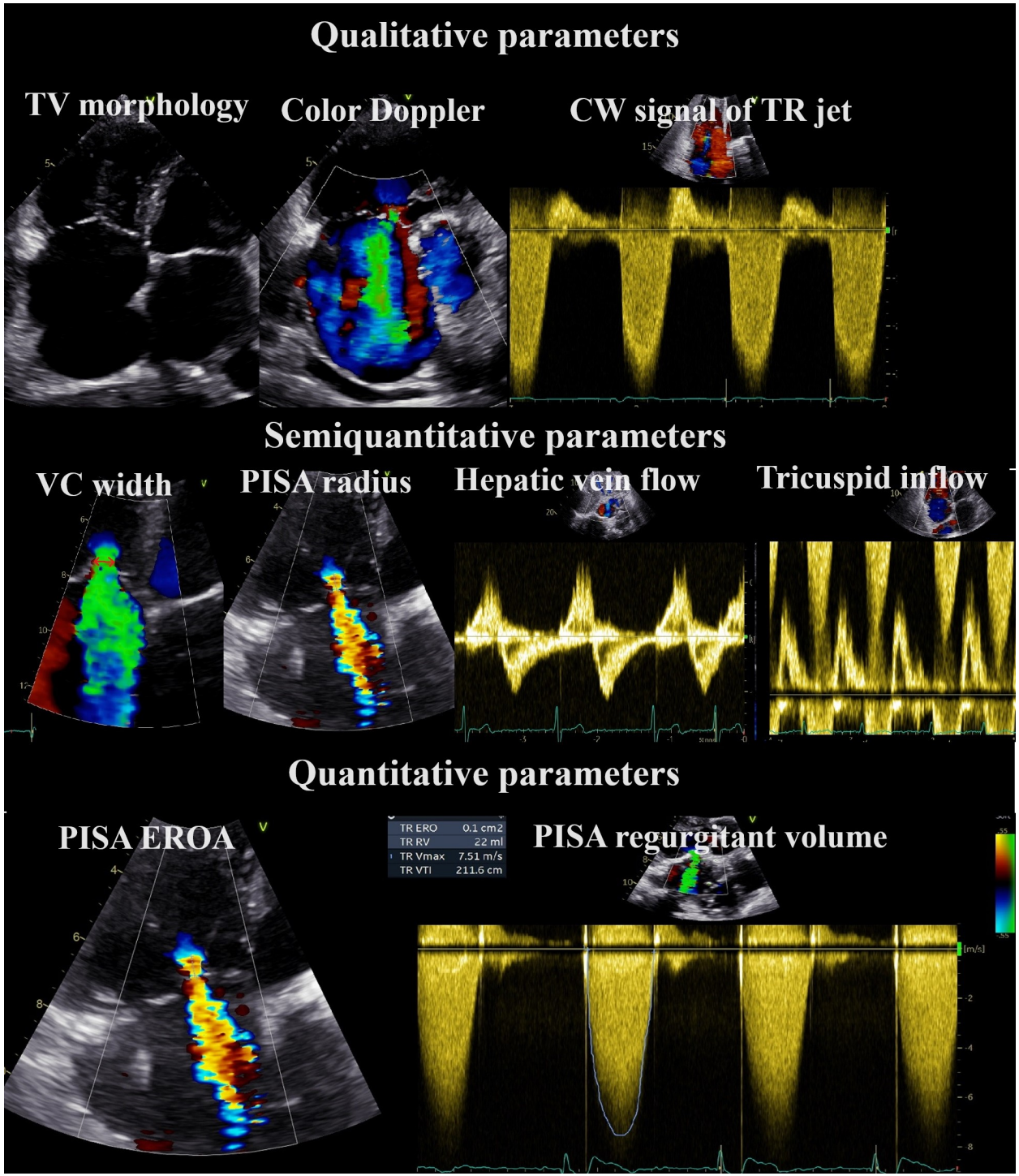

Coaptation h



2D underestimates TA dimensions

JACC Cardiovasc Imaging 2019;12(3):401
Front Cardiovasc Med. 20

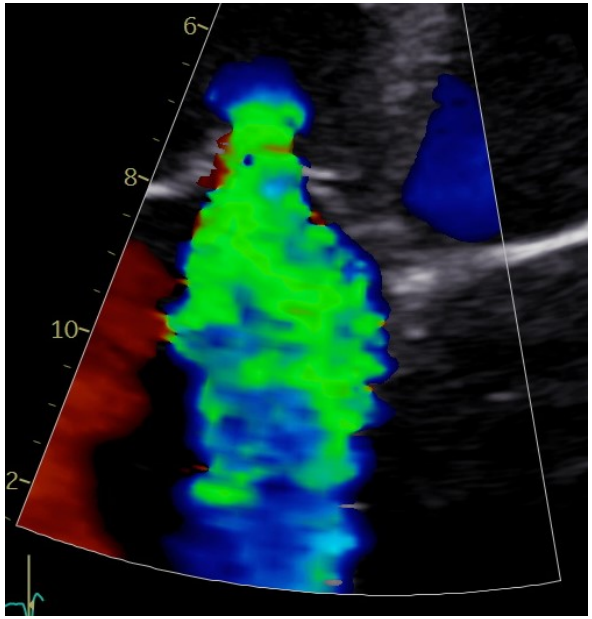
The echocardiographic parameters of TR severity

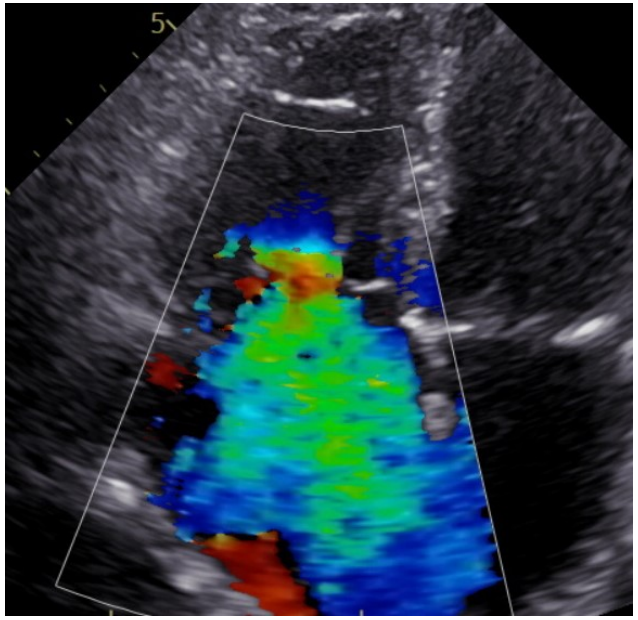


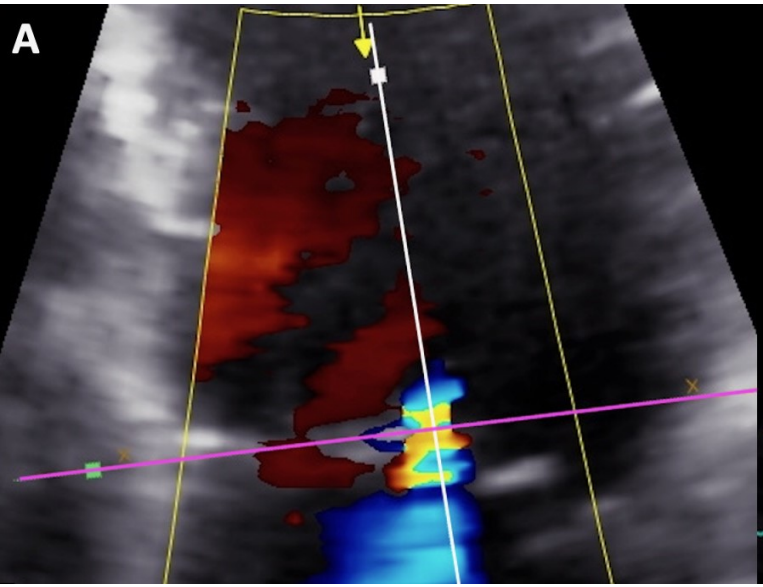
IGHLIGHTS

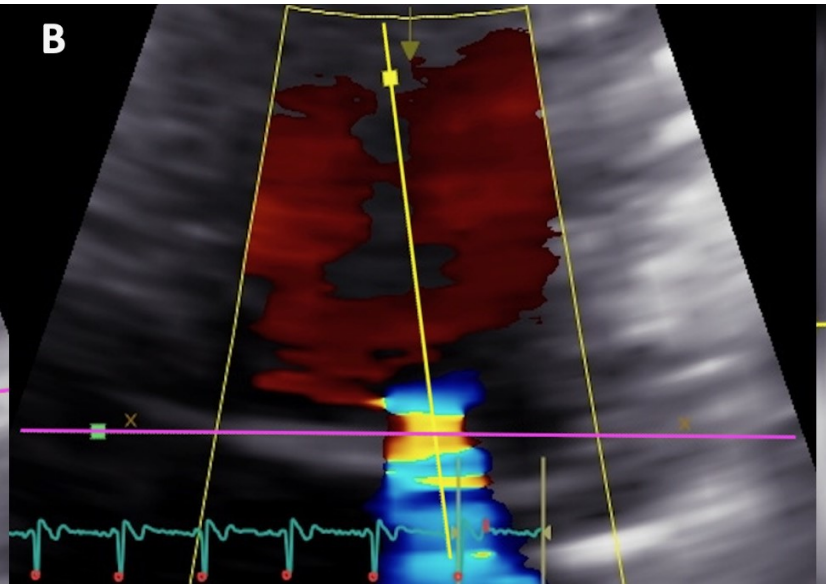
3D VC analysis is feasible to assess TR jet location and severity.
3D VC area has an independent and incremental value to identify severe TR.
Comprehensive evaluation of TR location and severity profits from color Doppler 3D TEE.

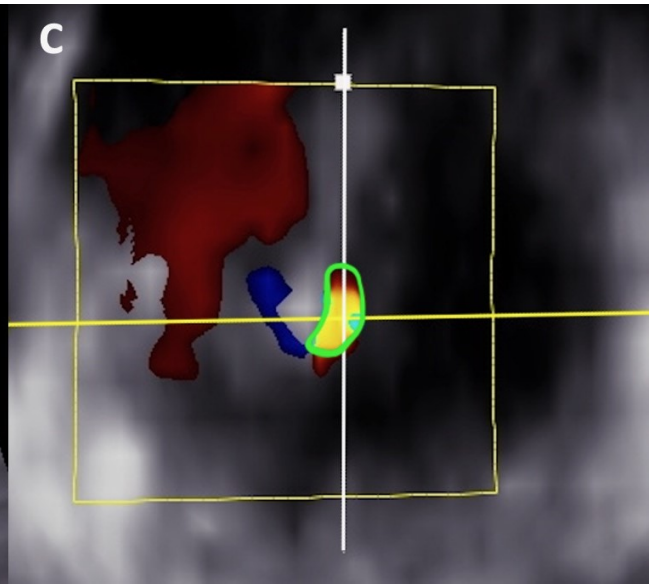
Utsunomiya H et al. JASE 2019

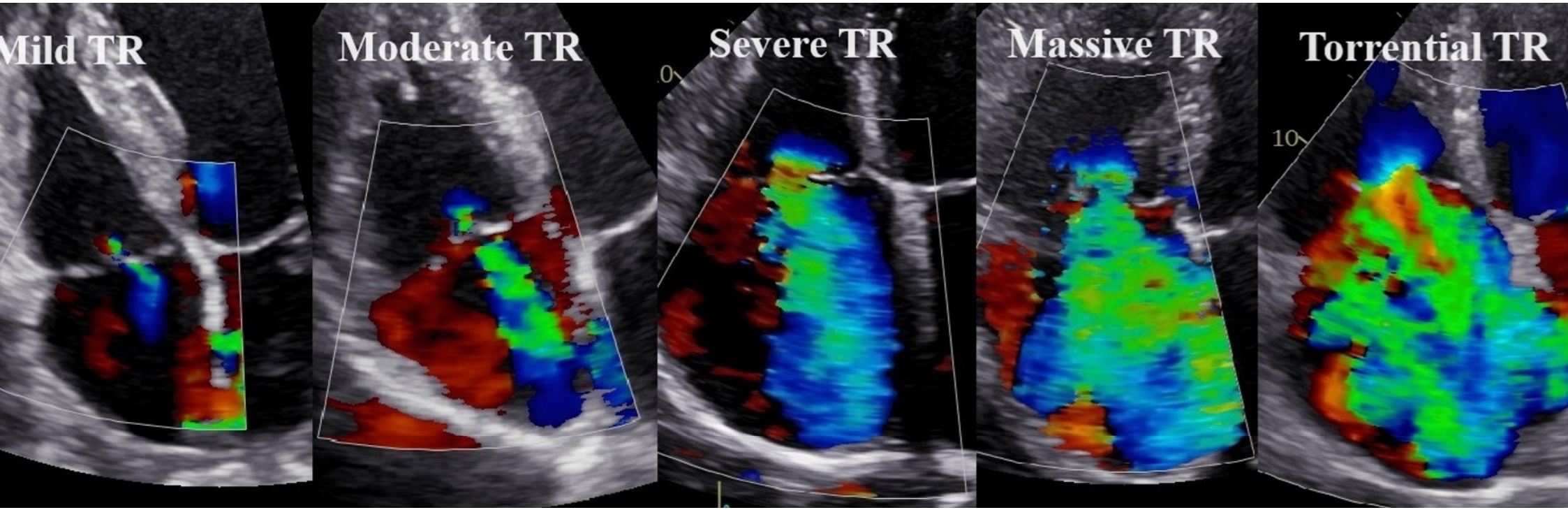


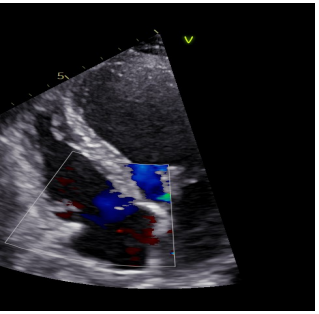


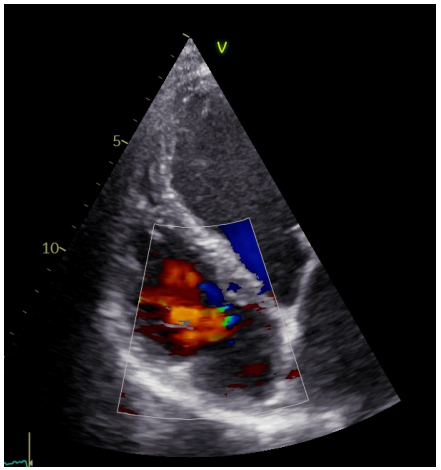


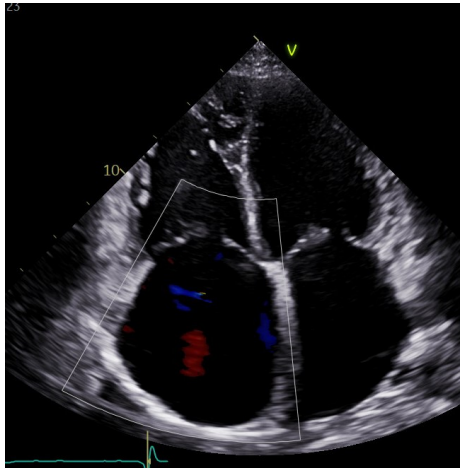


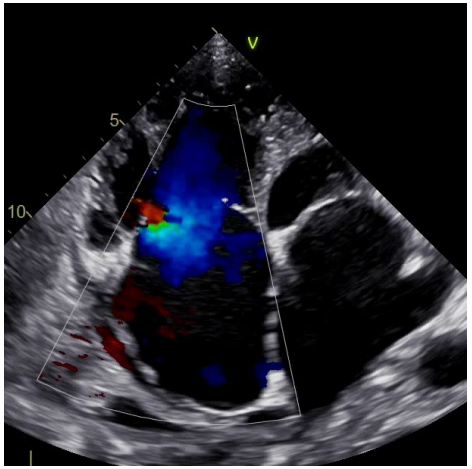


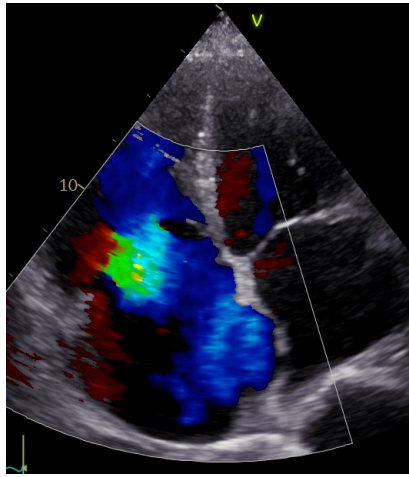

Mild TR
Moderate TR
Severe TR
Massive TR
Torrential TR

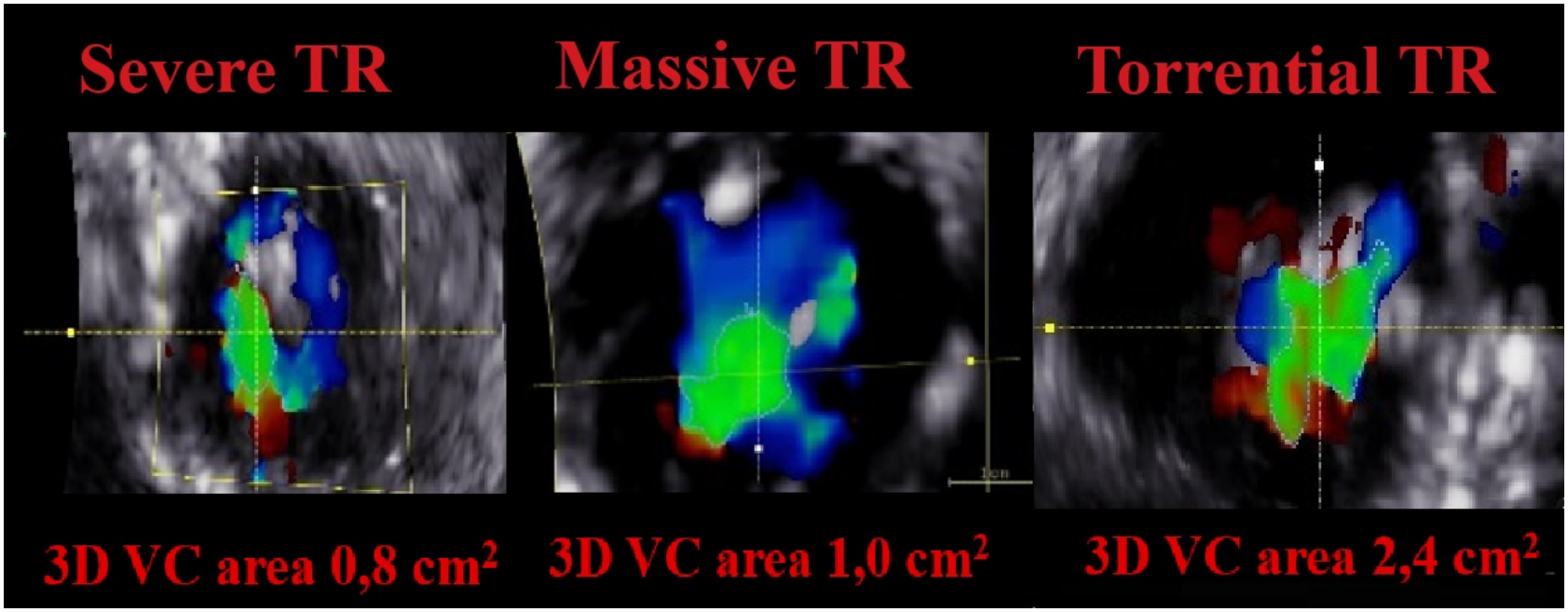


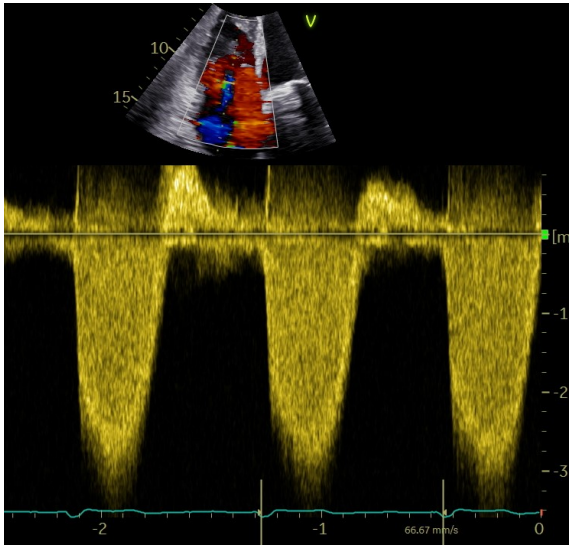


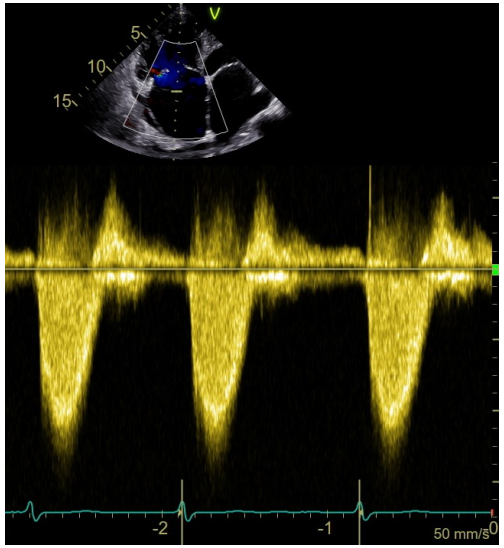


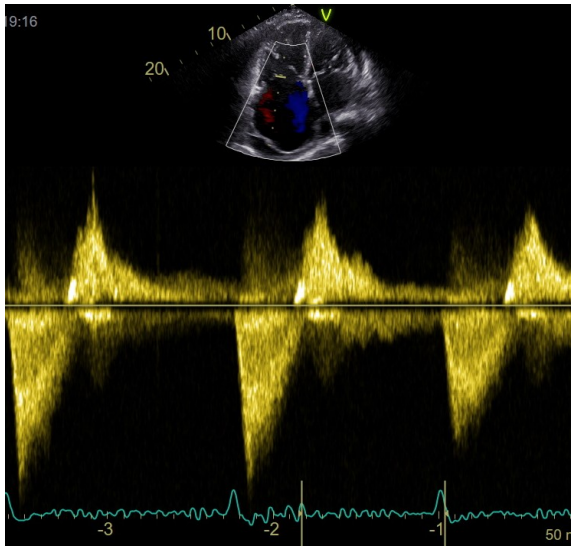




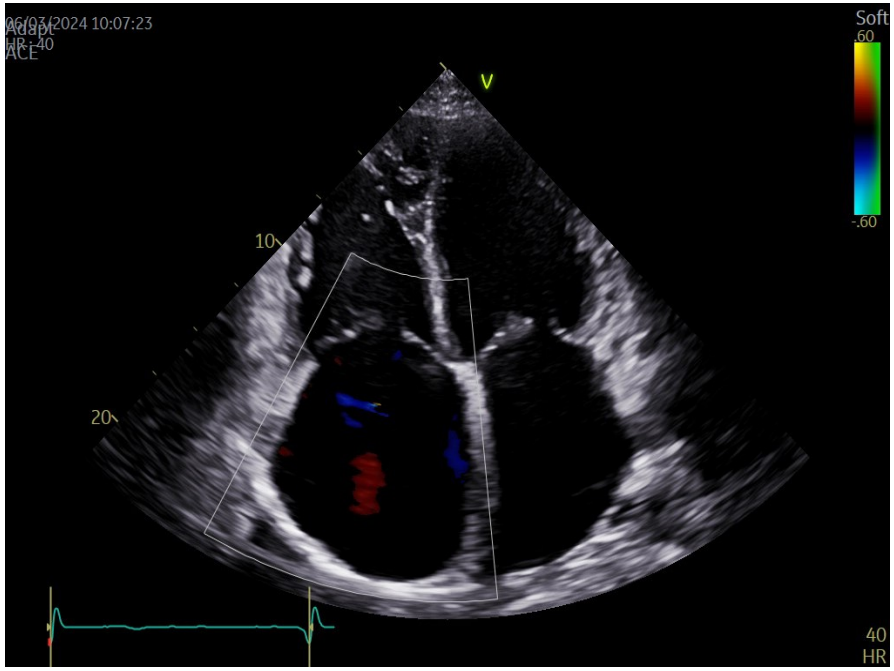

Severe TR
Massive TR
Torrential TR
3D VC area 0,8 cm²
3D VC area 1,0 cm²
3D VC area 2,4 cm²

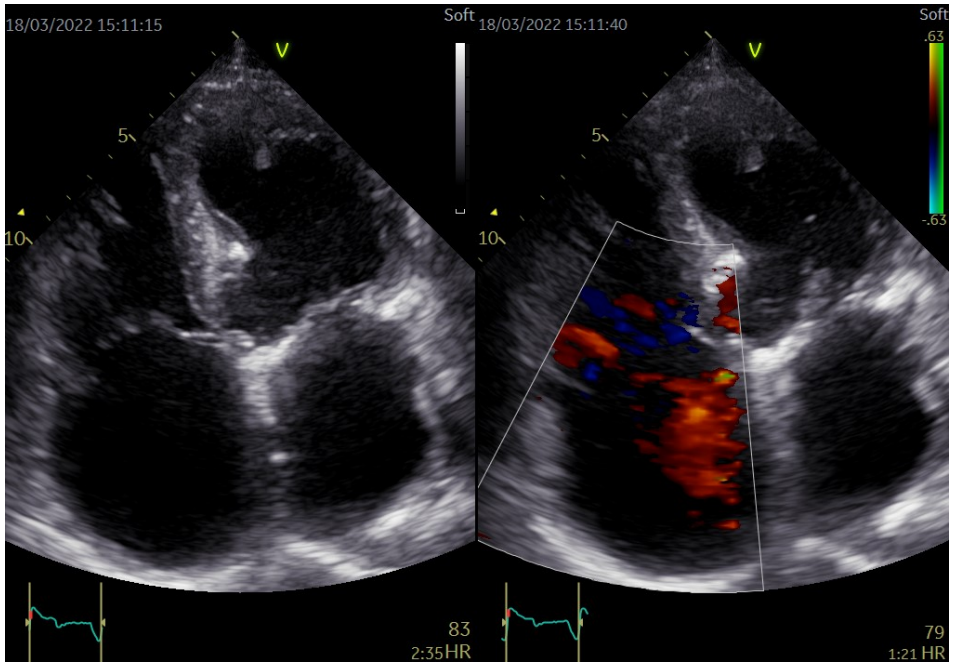

66.67 mm/s


50 mm/s

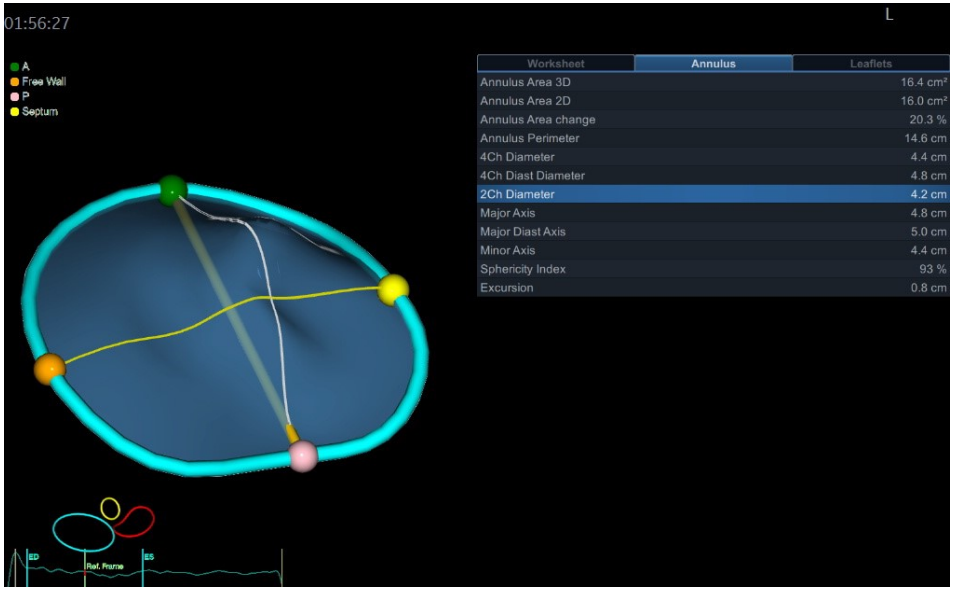


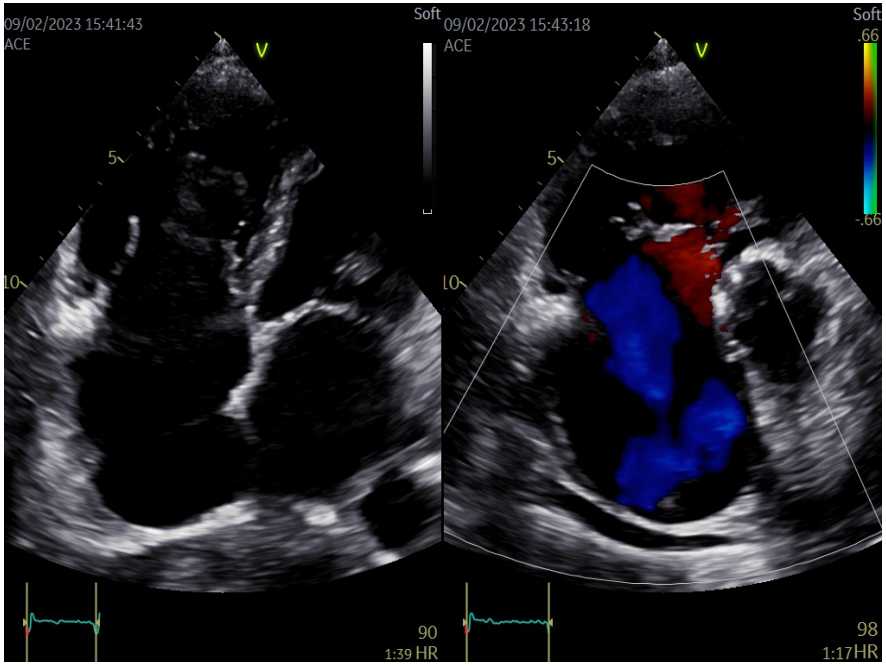
Atrial TVR: isolated RA dilatation/remodelling

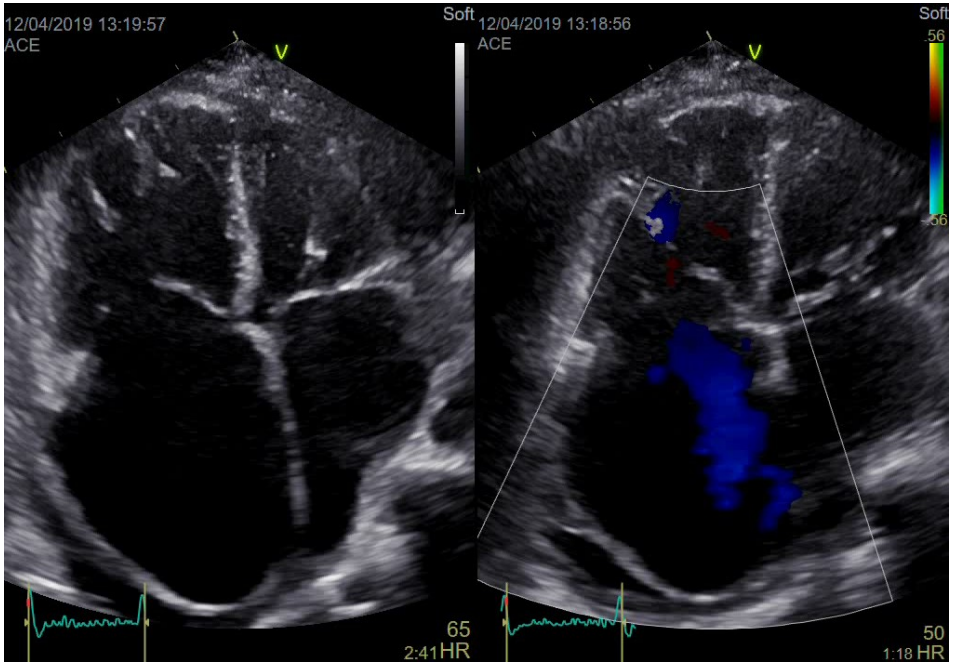




Ventricular TVR: remodeling of RV cavity

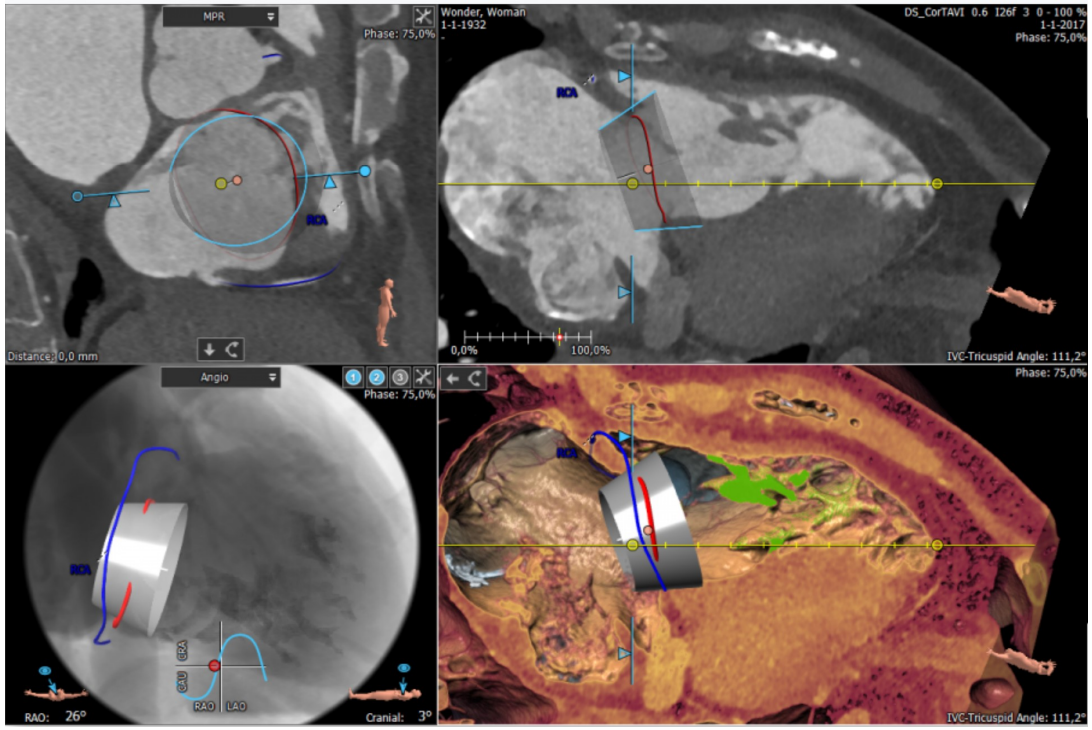


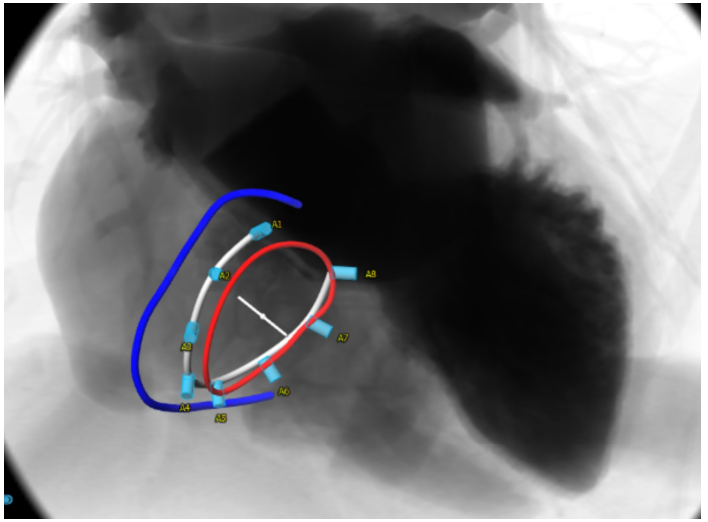


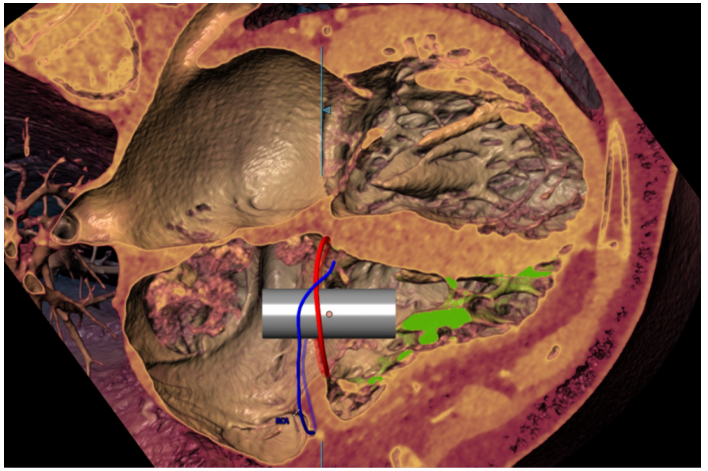


MDCT assessment of TA anatomy and dimensions

- pre-procedural planning of device delivery
- relationship of the TA with the RCA
- assessment of TA dimensions to choose the right device size







Take home messages

Multiparametric multi-modality approach is needed for evaluation of RV, TV, RA remodeling and severity of TR

Assessment of RV function must take into account loading conditions

Loss of longitudinal function of RV can be compensated by increasing circumferential function, preserving RVEF and favorable outcomes

3D echocardiography provides a better assessment of RV size and function, TV geometry and TR severity

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