

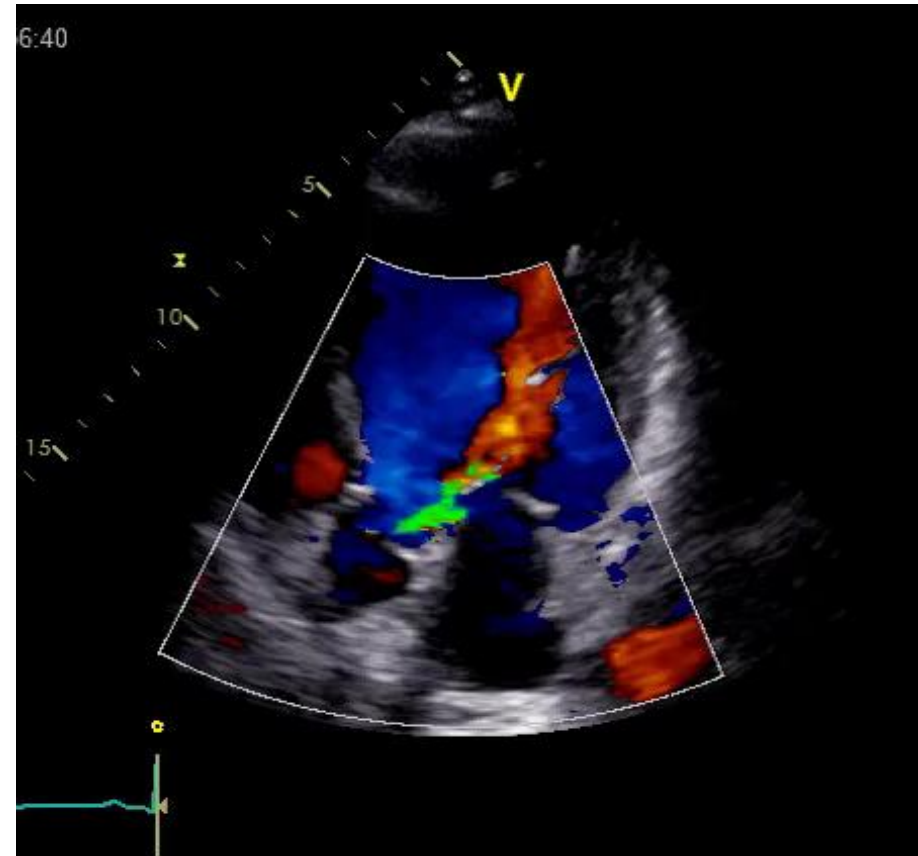
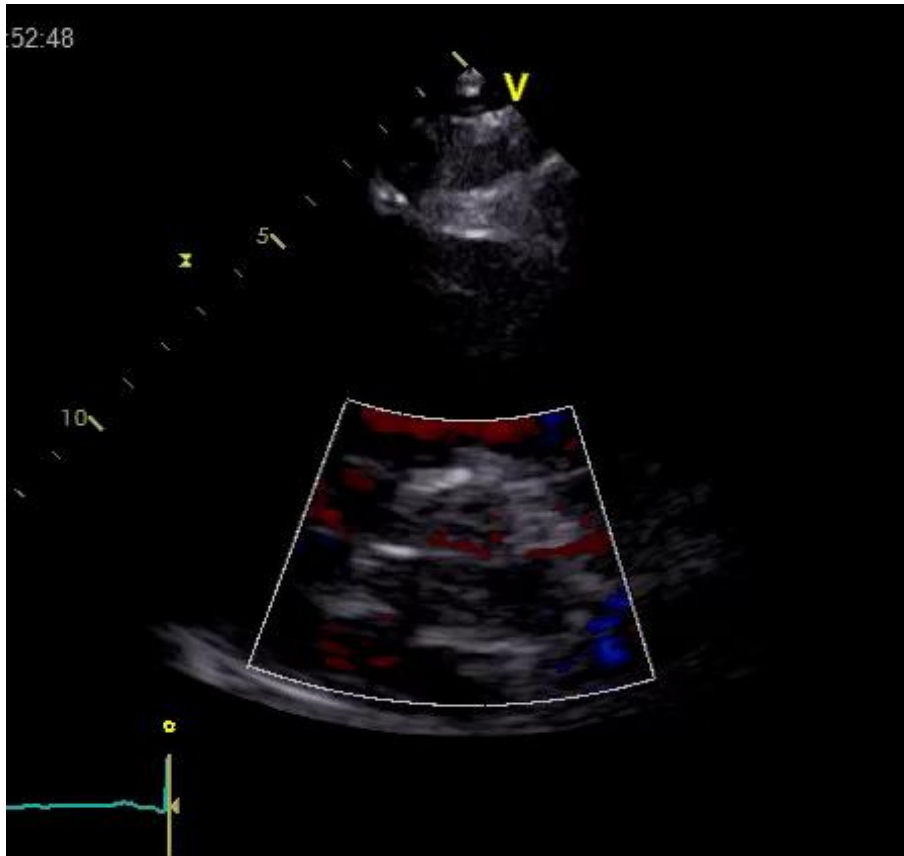


Echo assessment of AR and its mechanisms

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Example: Degenerative AR. TTE





Grading

Parameters	Mild	Moderate	Severe
Qualitative			
Aortic valve morphology	Normal/Abnormal	Normal/Abnormal	Abnormal/flail/large coaptation defect
Colour flow AR jet width ^a	Small in central jets	Intermediate	Large in central jet, variable in eccentric jets
CW signal of AR jet	Incomplete/faint	Dense	Dense
Diastolic flow reversal in descending aorta	Brief, protodiastolic flow reversal	Intermediate	Holodiastolic flow reversal (end-diastolic velocity >20 cm/s)
Semi-quantitative			
VC width (mm)	<3	Intermediate	>6
Pressure half-time (ms) ^b	>500	Intermediate	<200
Quantitative			
EROA (mm ²)	<10	10–19; 20–29 ^c	≥30
R Vol (mL)	<30	30–44; 45–59 ^c	≥60
+LV size ^d			



Qualitative

Parameters

Severe

Qualitative

Aortic valve morphology

Abnormal/flail/large coaptation defect

Colour flow AR jet width^a

Large in central jet, variable in eccentric jets

CW signal of AR jet

Dense

Diastolic flow reversal in
descending aorta

Holodiastolic flow reversal (end-diastolic velocity > 20 cm/s)



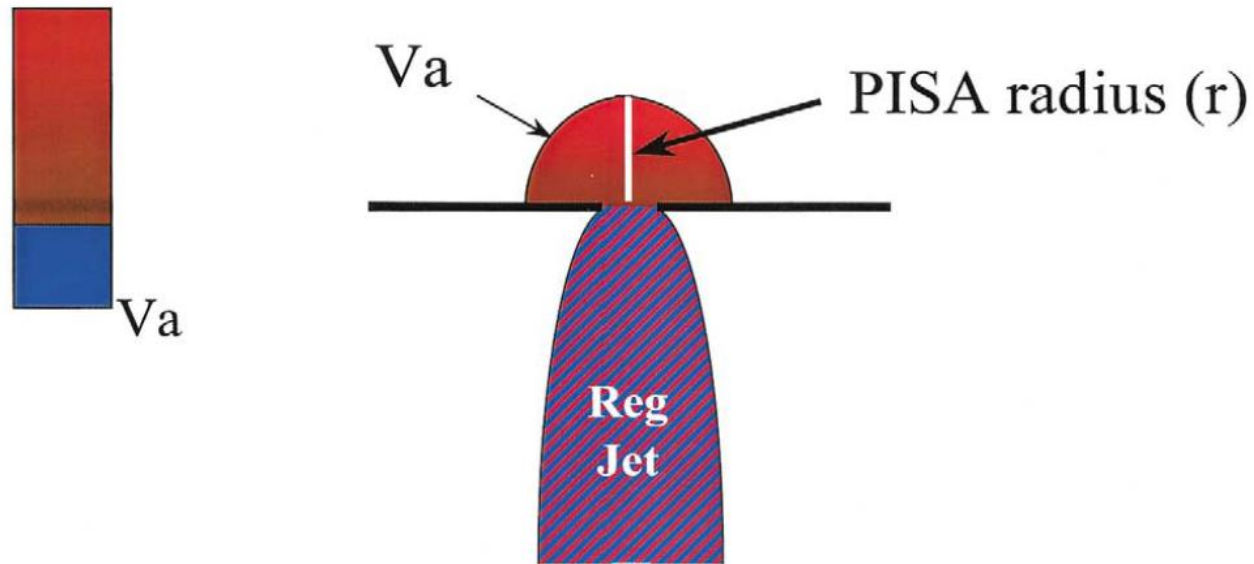
Estimation of the severity of valvular regurgitation: recommendations

- (1) The colour flow area of the regurgitant jet is not recommended to quantify the severity of valvular regurgitation.
- (2) Both the vena contracta measurement and the PISA method are the recommended approaches to evaluate the severity of regurgitation when feasible.
- (3) Adjunctive parameters should be used when there is discordance between the quantified degree of regurgitation and the clinical context.



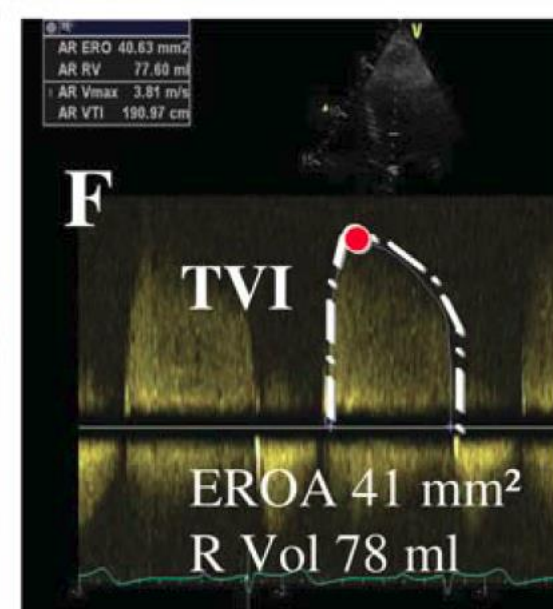
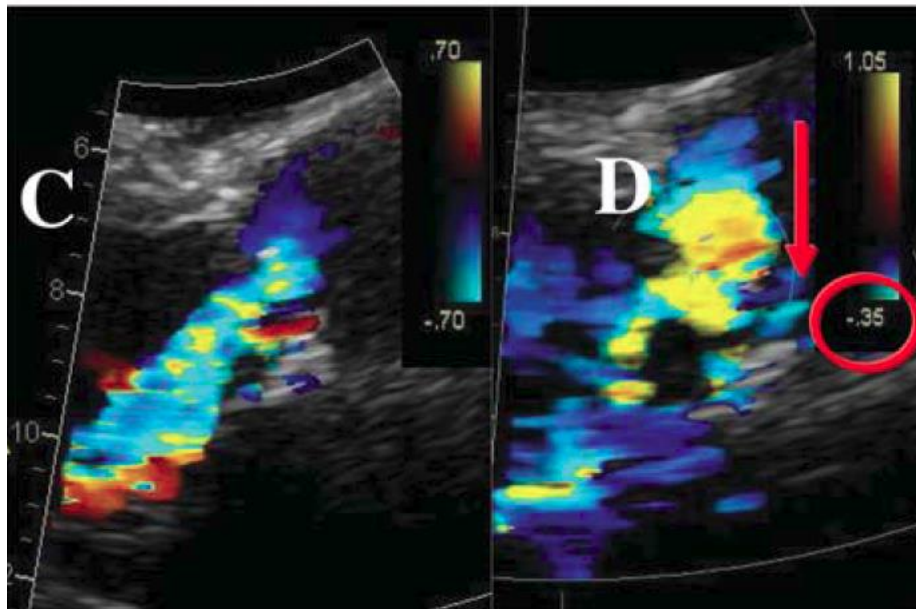
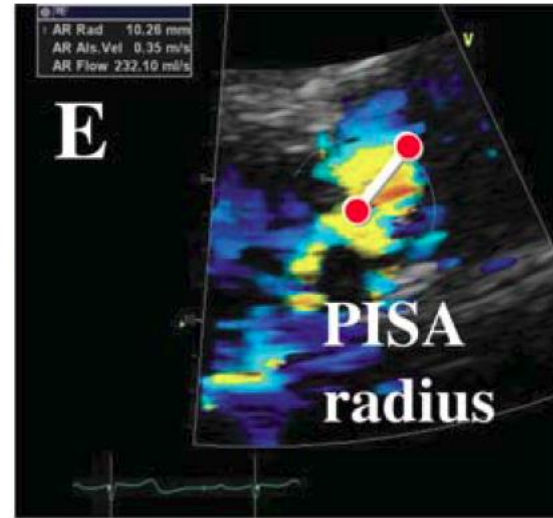
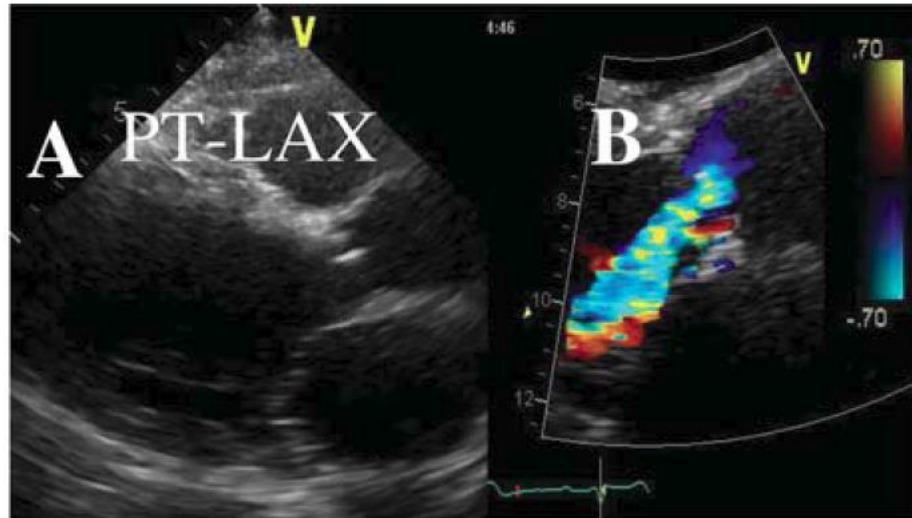
Proximal Isovelocity Surface Area = **PISA**

Flow Convergence Method

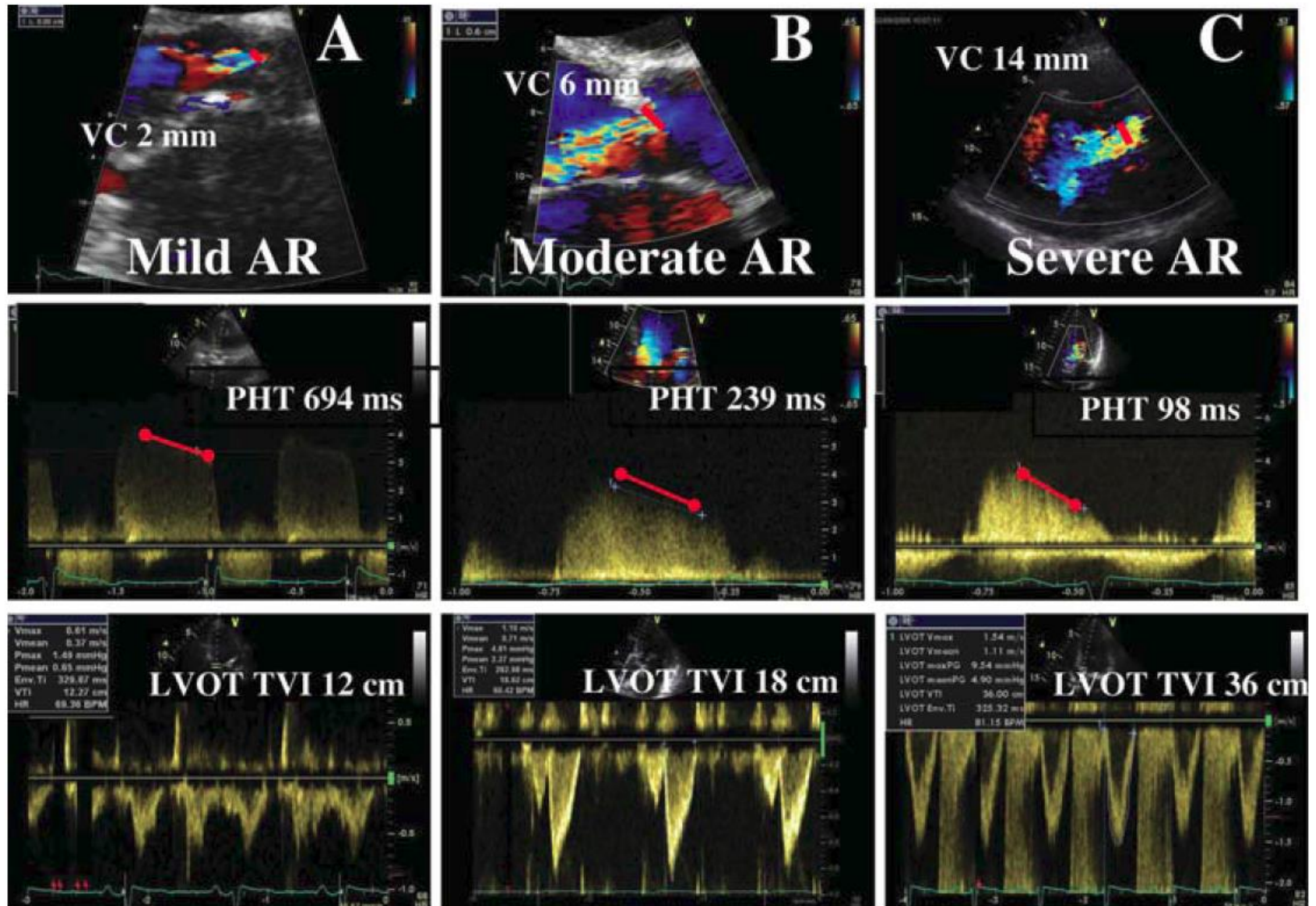


$$\text{Reg Flow} = 2\pi r^2 \times V_a$$
$$\text{EROA} = \text{Reg Flow} / PkV_{\text{Reg}}$$

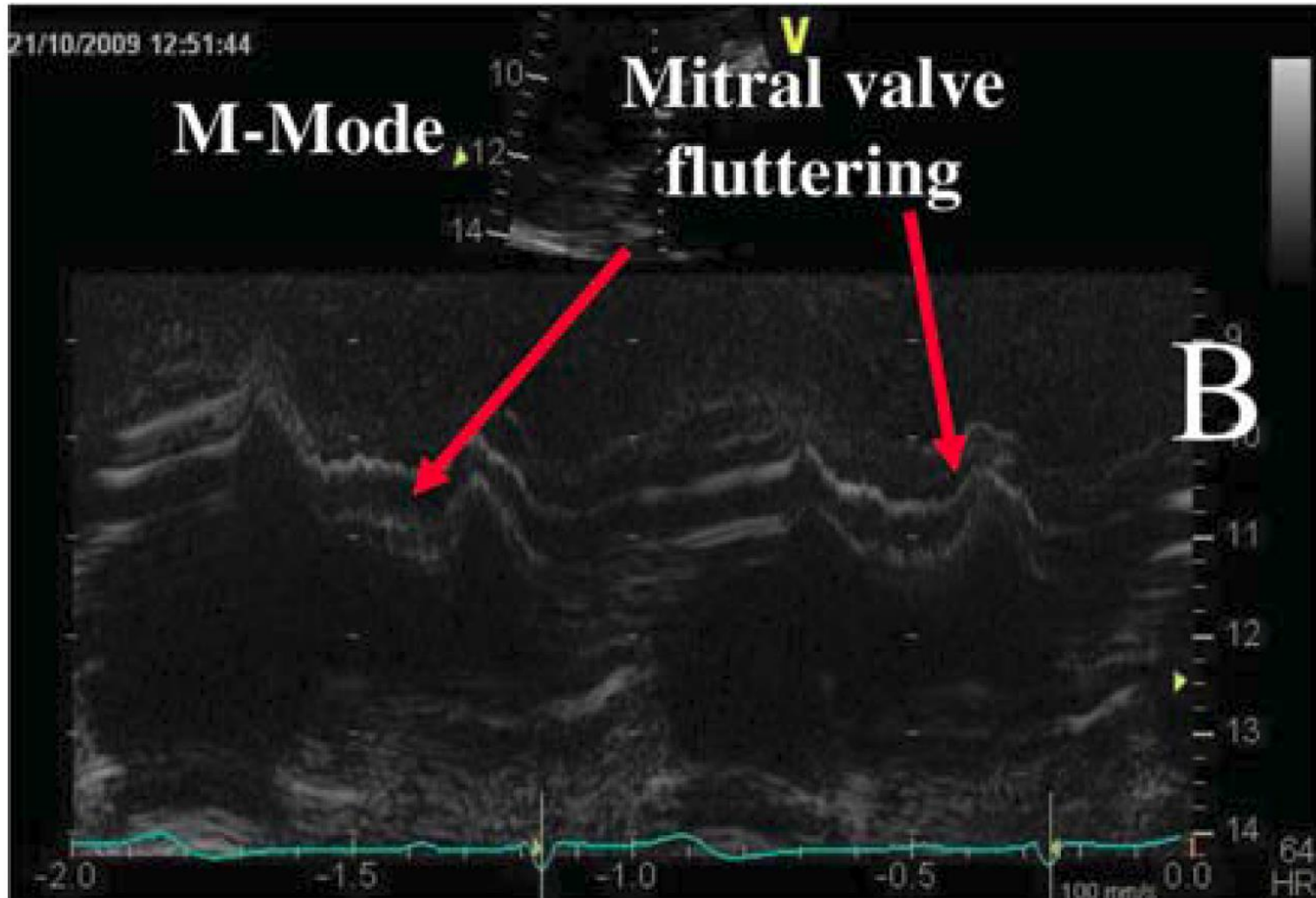
PISA measurement



Other parameters

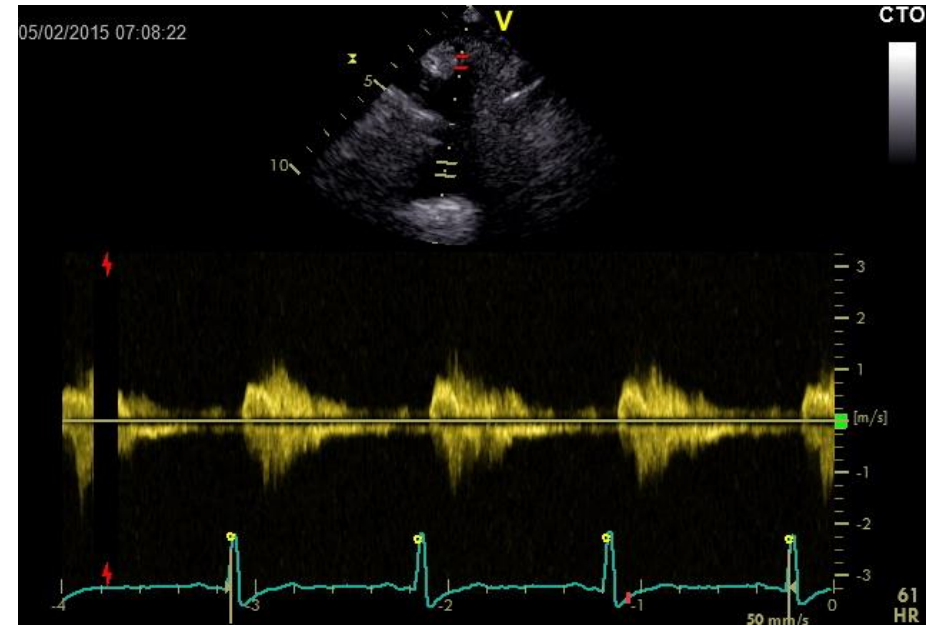
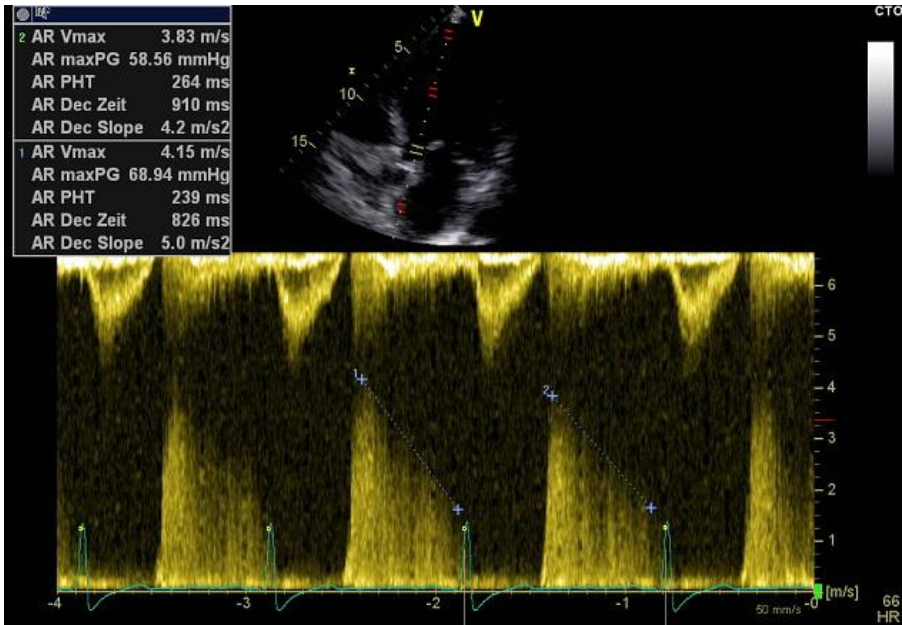


AML fluttering





Doppler measurements





Quantitative

Parameters

Severe

Semi-quantitative

VC width (mm)	>6
Pressure half-time (ms) ^b	<200

Quantitative

EROA (mm ²)	≥ 30
R Vol (mL)	≥ 60

+LV size^d



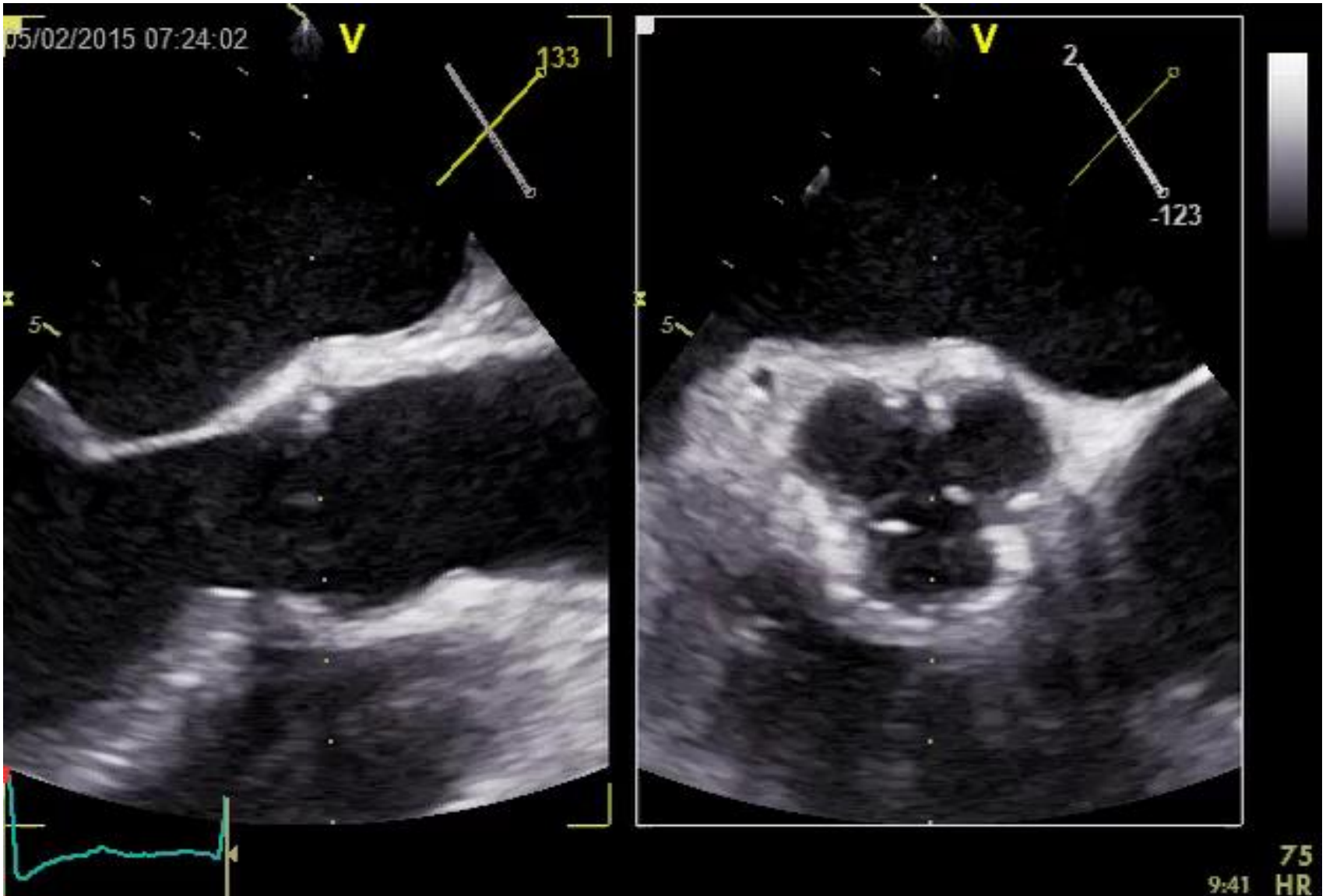
Severity

Variable

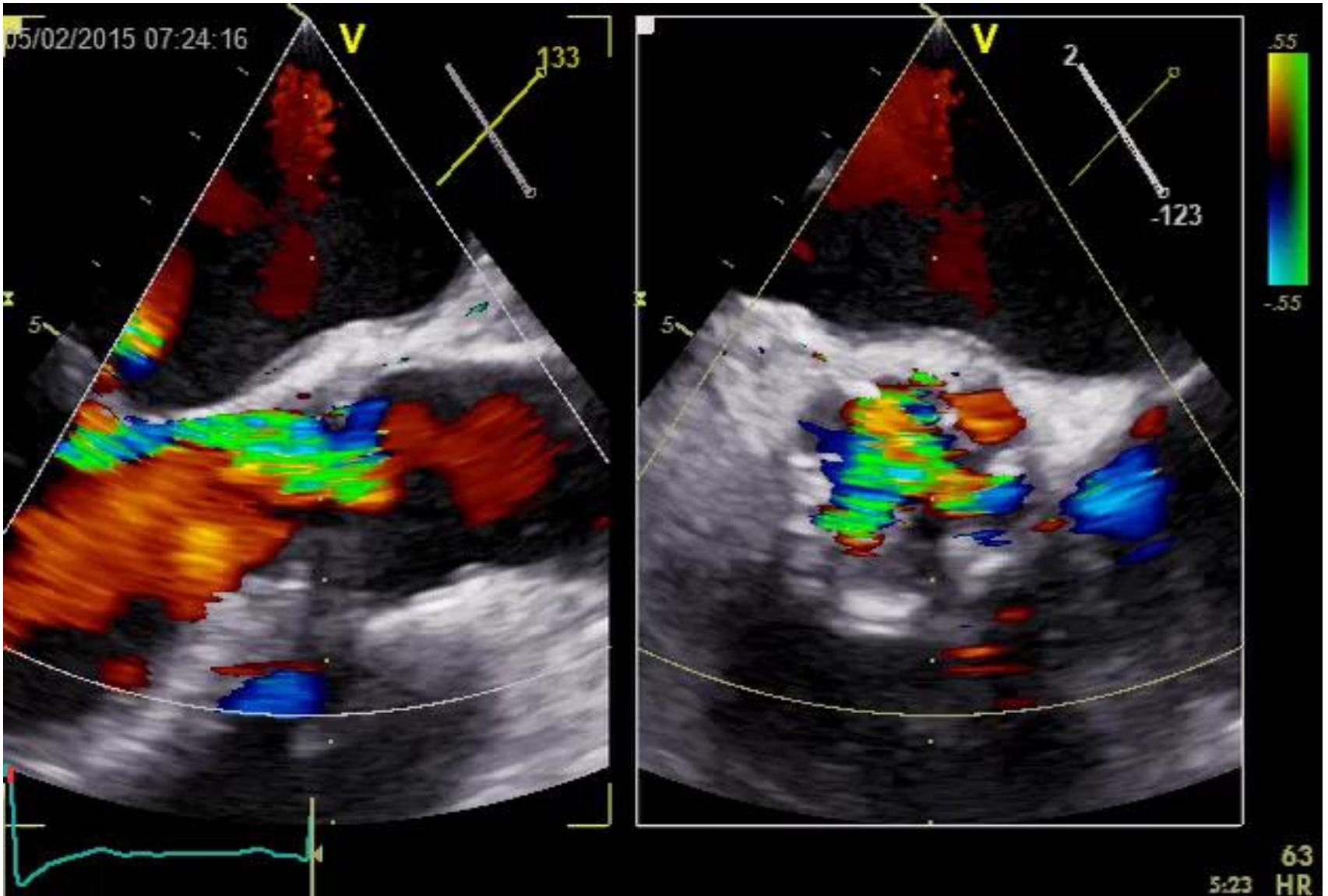
Aortic Regurgitation

	Mild	Moderate [‡]	Severe
Width of vena contracta (mm) [†]	<3.0	3.0–5.9	≥6.0
Ratio of width of aortic regurgitant jet to left ventricular outflow (%)	<25	25–44	45–64
Regurgitant volume (ml per beat)	<30	30–44	45–59
Regurgitant fraction (%)	<30	30–39	40–49
Effective regurgitant orifice (mm ²)	<10	10–19	20–29

TOE



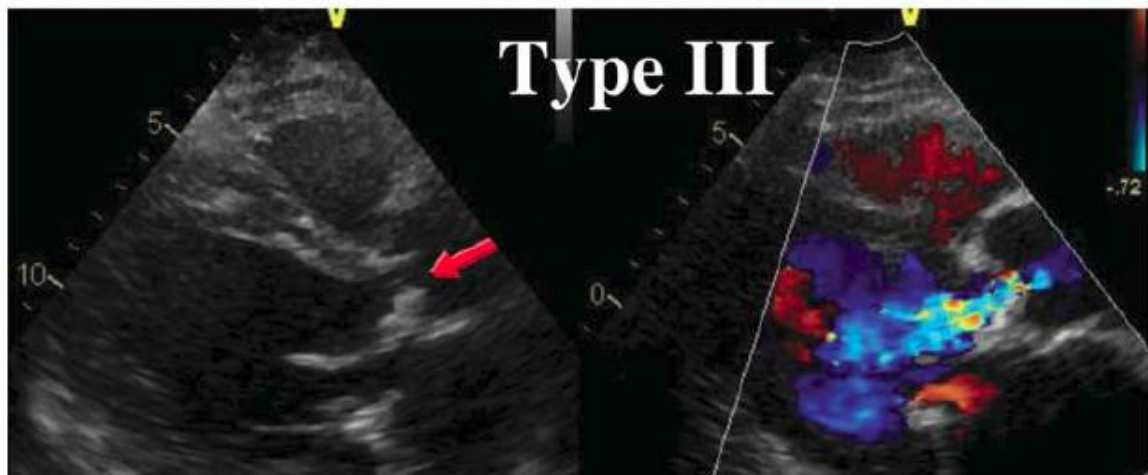
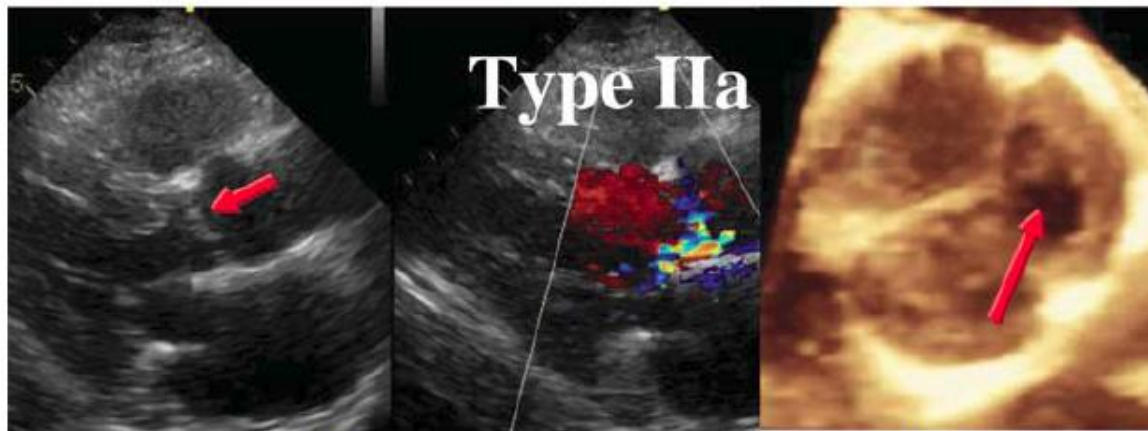
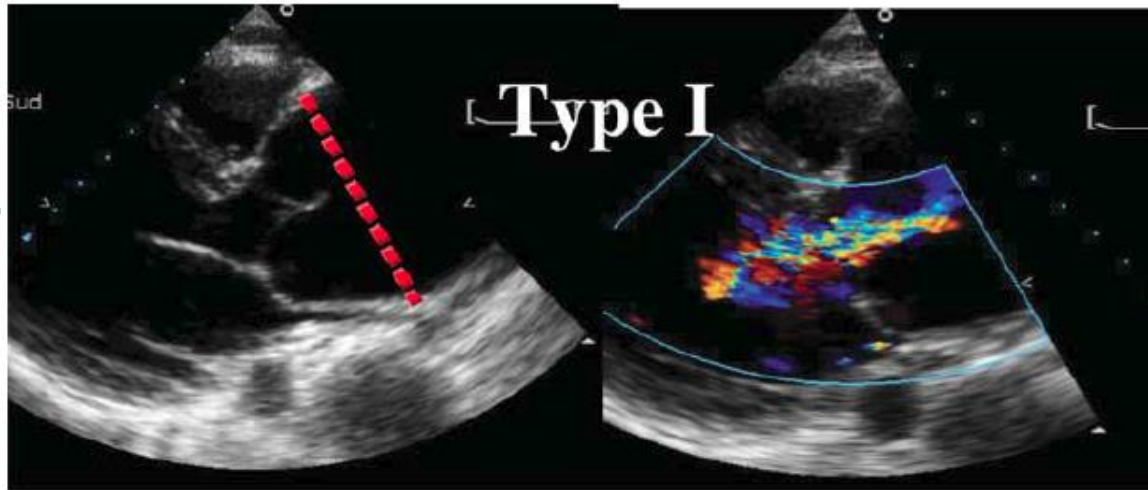
TOE color



3D



Carpentier classification





Functional classification of AR

Dysfunction

Echo findings

I: enlargement of the aortic root with normal cusps

Dilatation of any components of the aortic root (aortic annulus, sinuses of Valsalva, sinotubular junction)

Ila: cusp prolapse with eccentric AR jet

Cusp flail

Complete eversion of a cusp into the LVOT in long-axis views

Partial cusp prolapse

Distal part of a cusp prolapsing into the LVOT (clear bending of the cusp body on long-axis views and presence of a small circular structure near the cusp free edge on short-axis views)

Dysfunction

Echo findings

Whole cusp prolapse

Free edge of a cusp overriding the plane of aortic annulus with billowing of the entire cusp body into the LVOT (presence of a large circular or oval structure immediately beneath the valve on short-axis views)

Ilb: free edge fenestration with eccentric AR jet

Presence of an eccentric AR jet without definite evidence of cusp prolapse

III: poor cusp quality or quantity

Thickened and rigid valves with reduced motion

Tissue destruction (endocarditis)

Large calcification spots/extensive calcifications of all cusps interfering with cusp motion



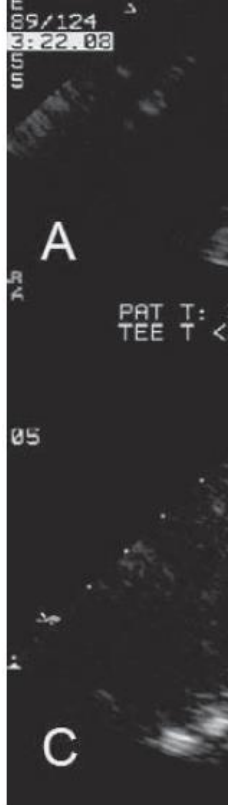
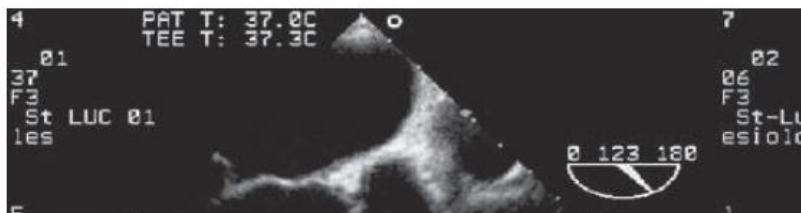
How predictive is TOE?

TABLE 1. Surgical and TEE Classification of Aortic Regurgitant Lesions

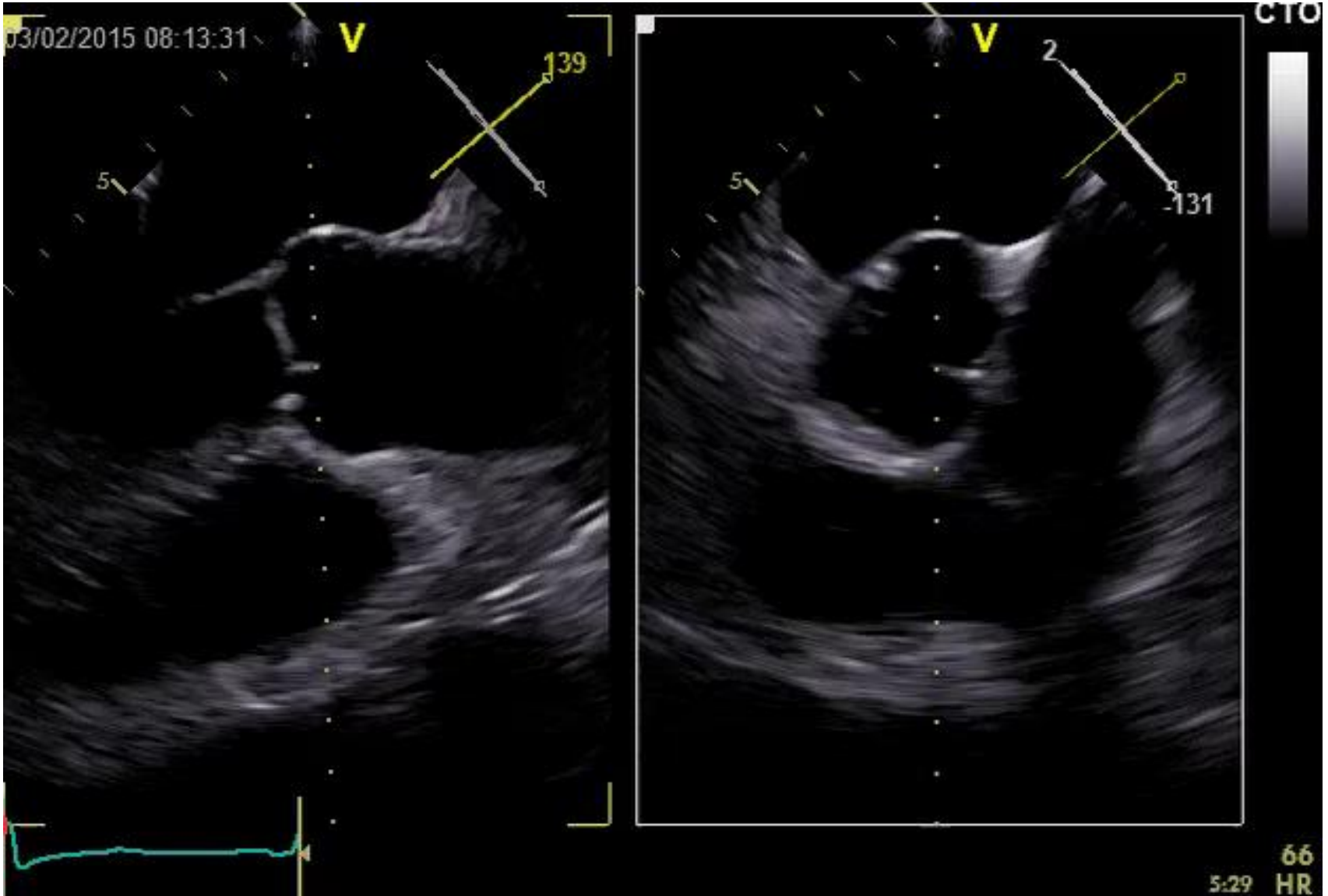
Type 1	Enlargement of the aortic root with normal cusps.
Type 2	Cusp prolapse or fenestration.
Type 3	Poor cusp tissue quality or quantity.

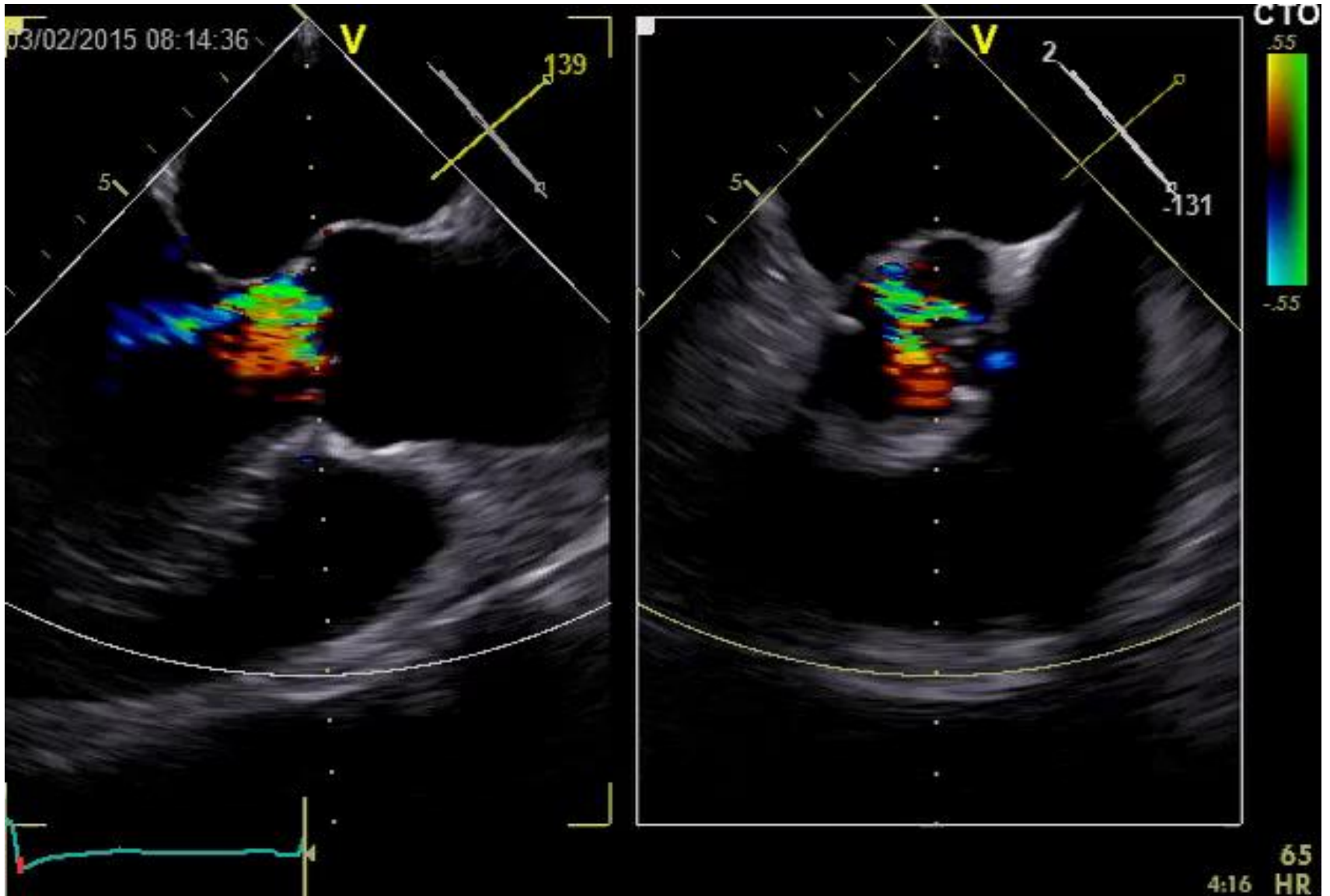
TABLE 5. Agreement Between TEE Prediction of Repairability and the Final Surgical Procedure

		Surgery		
		Repair	Replace	Total
TEE prediction	Repair	108	3	111
	Replace	17	35	52
	Total	125	38	163

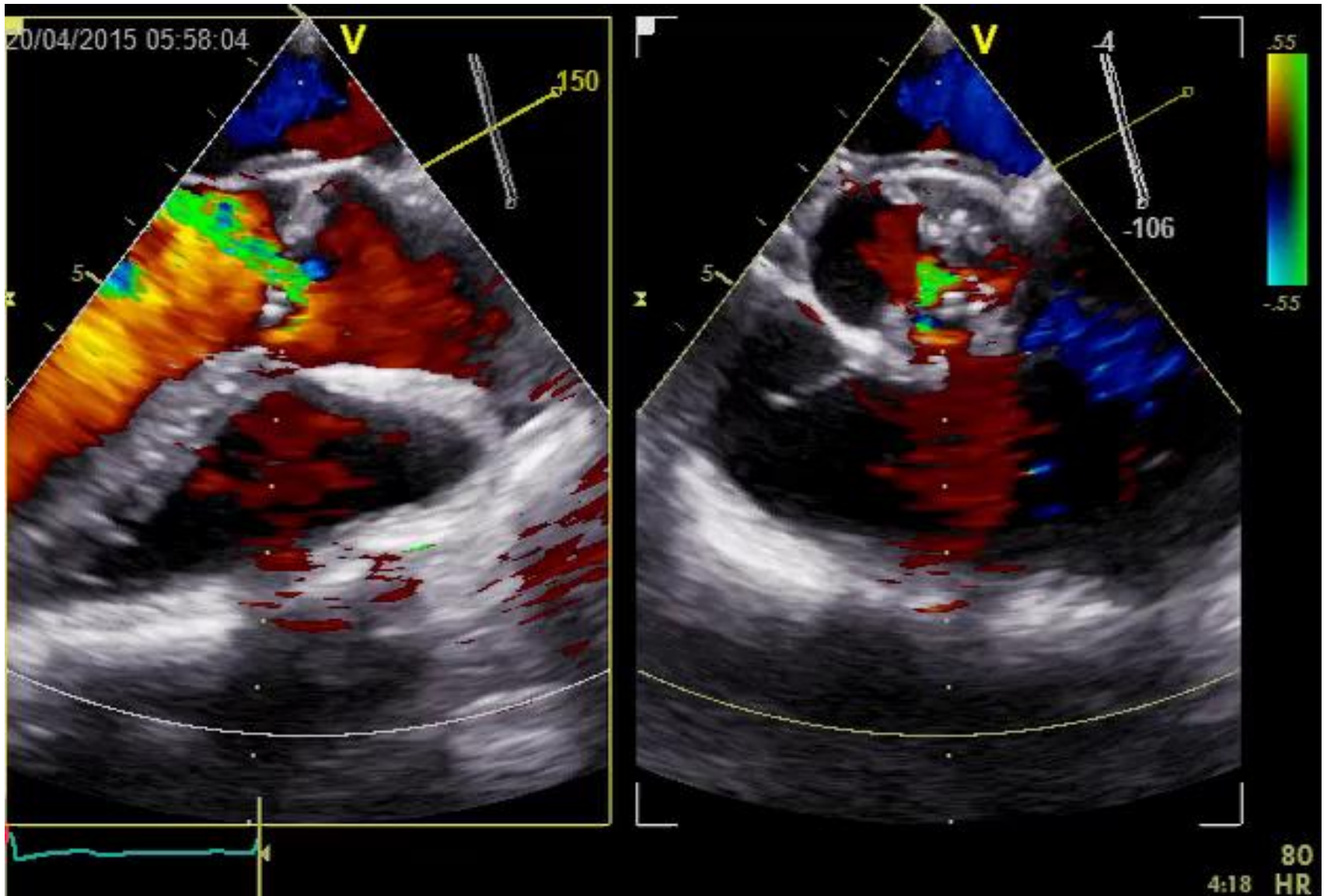


BAV

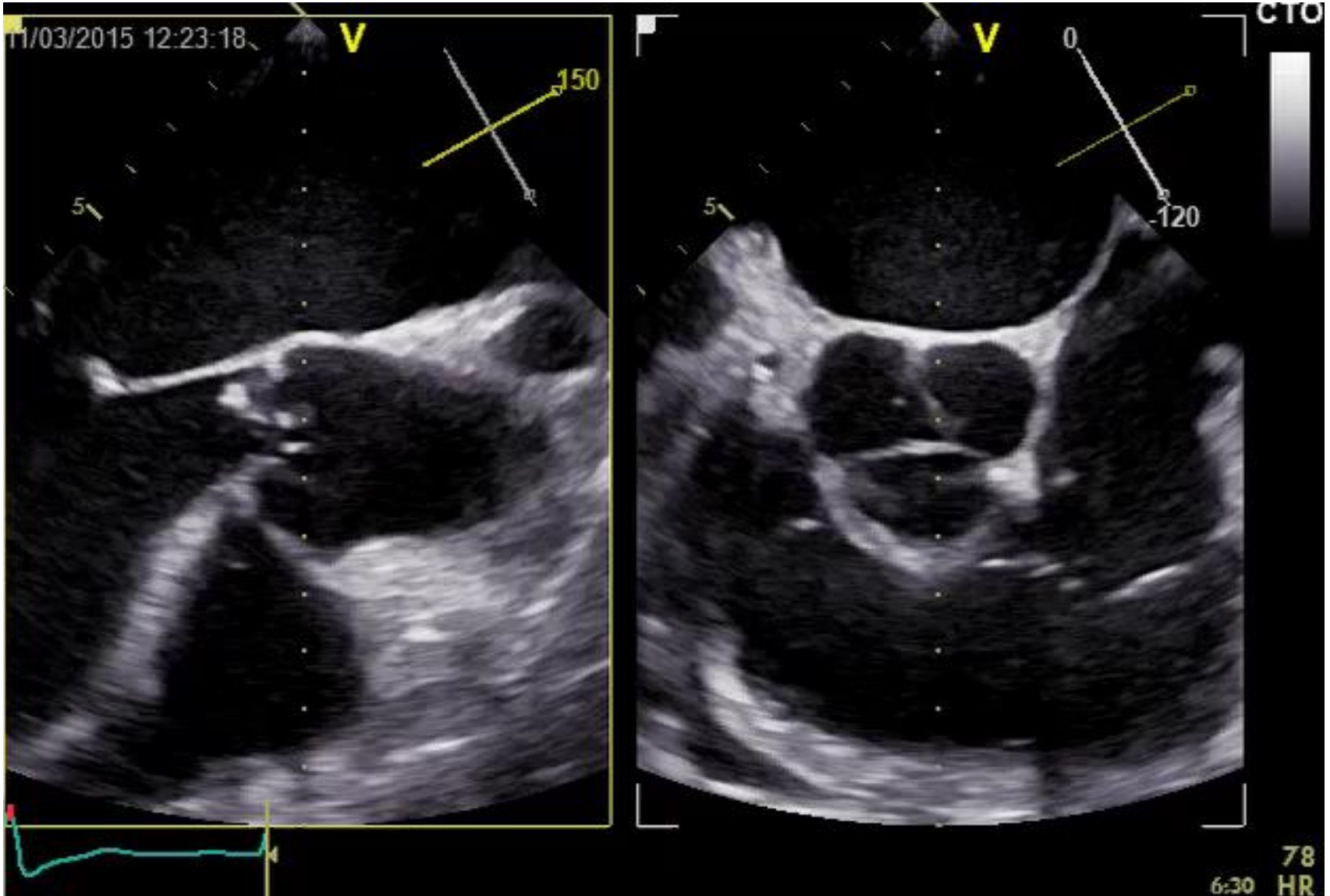




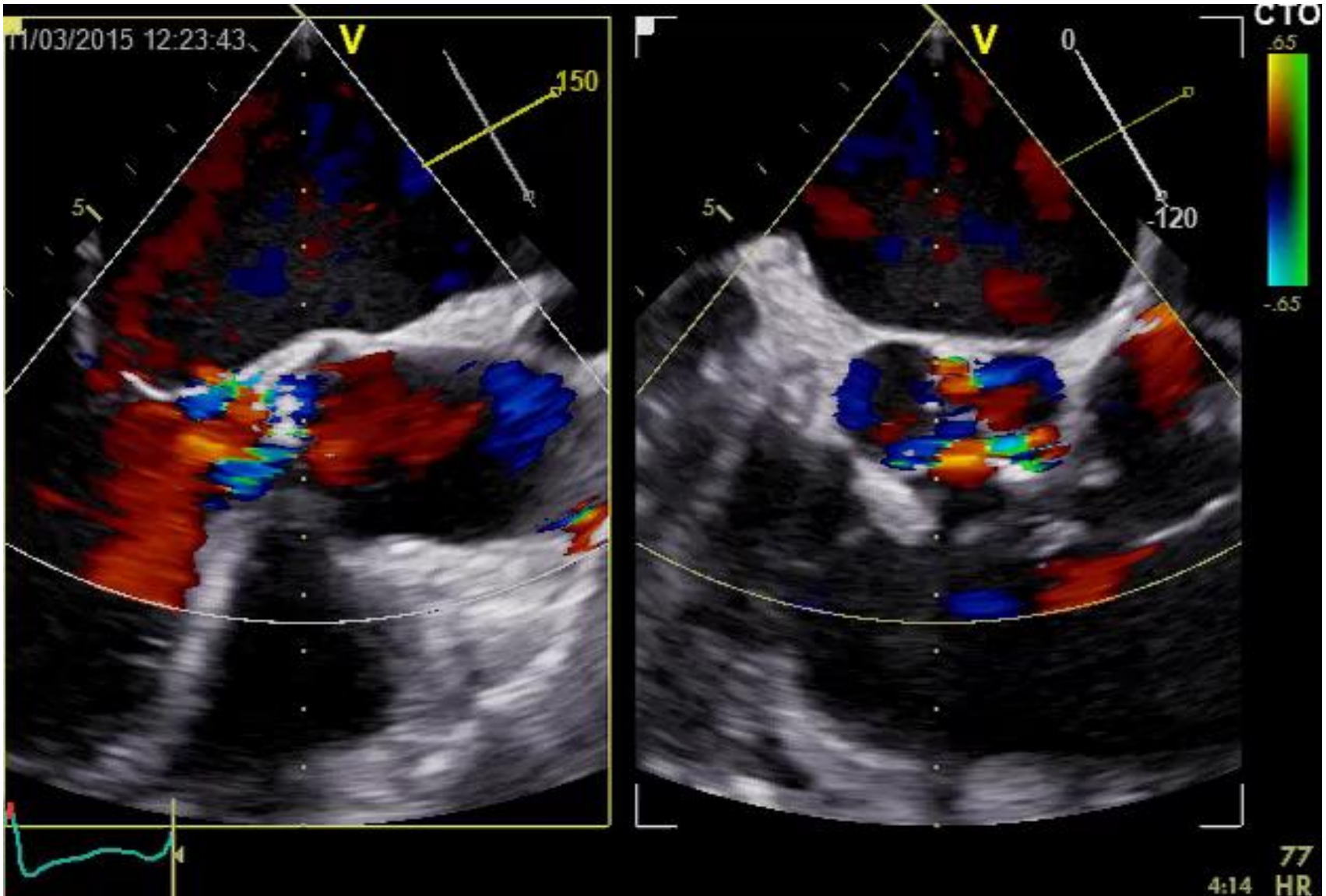




Endocarditis



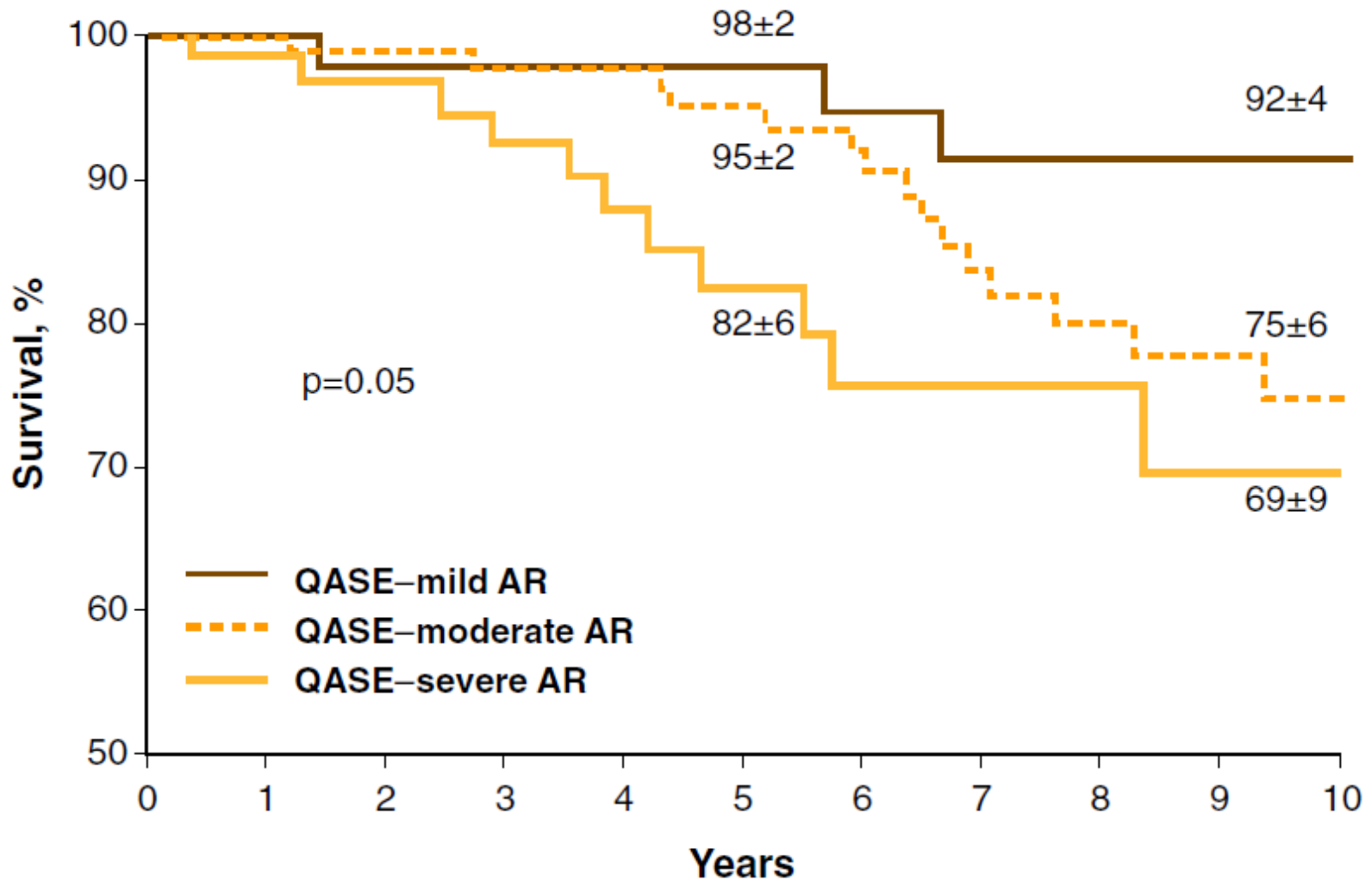
Endocarditis - color



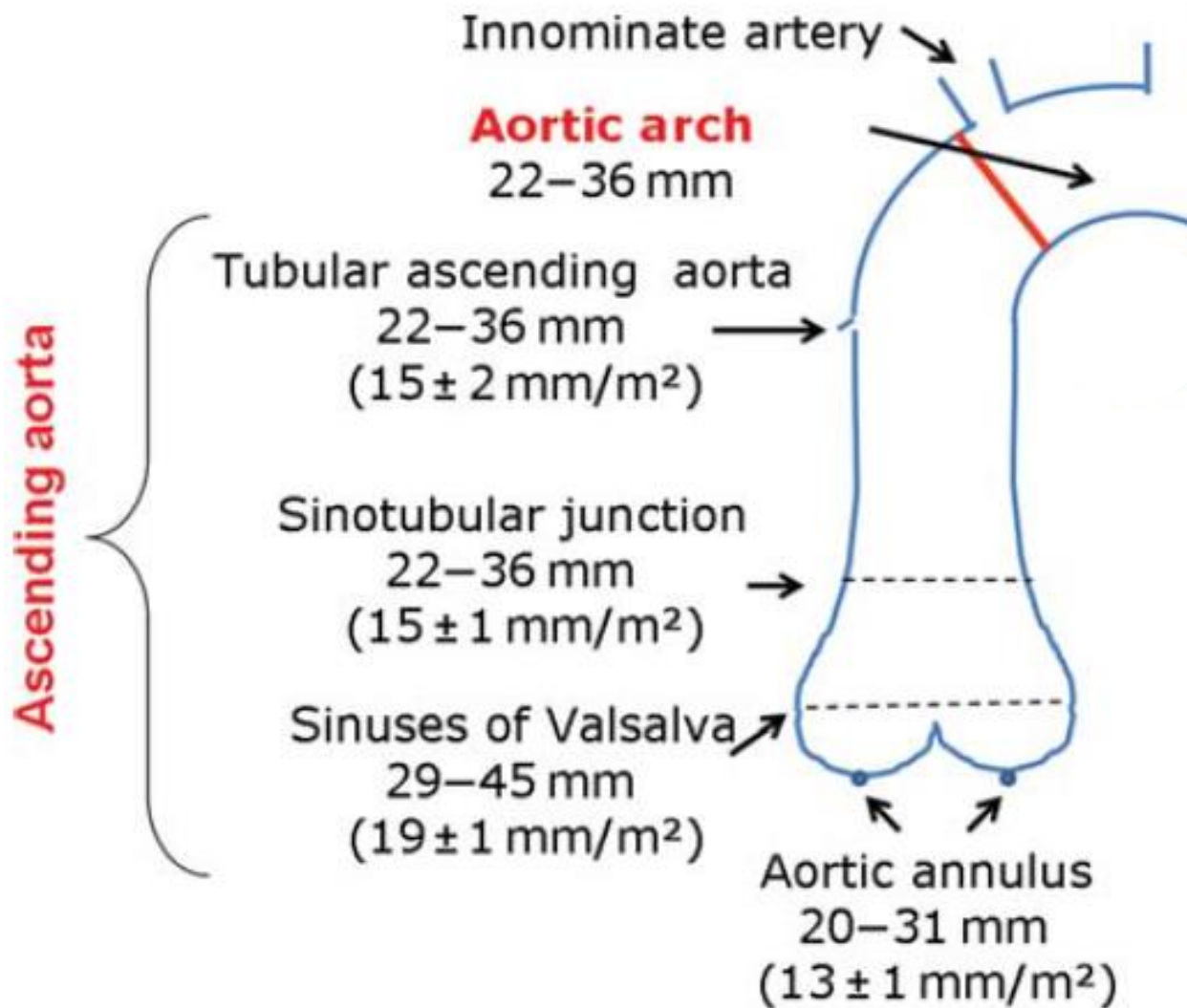


Echo severity determines outcome

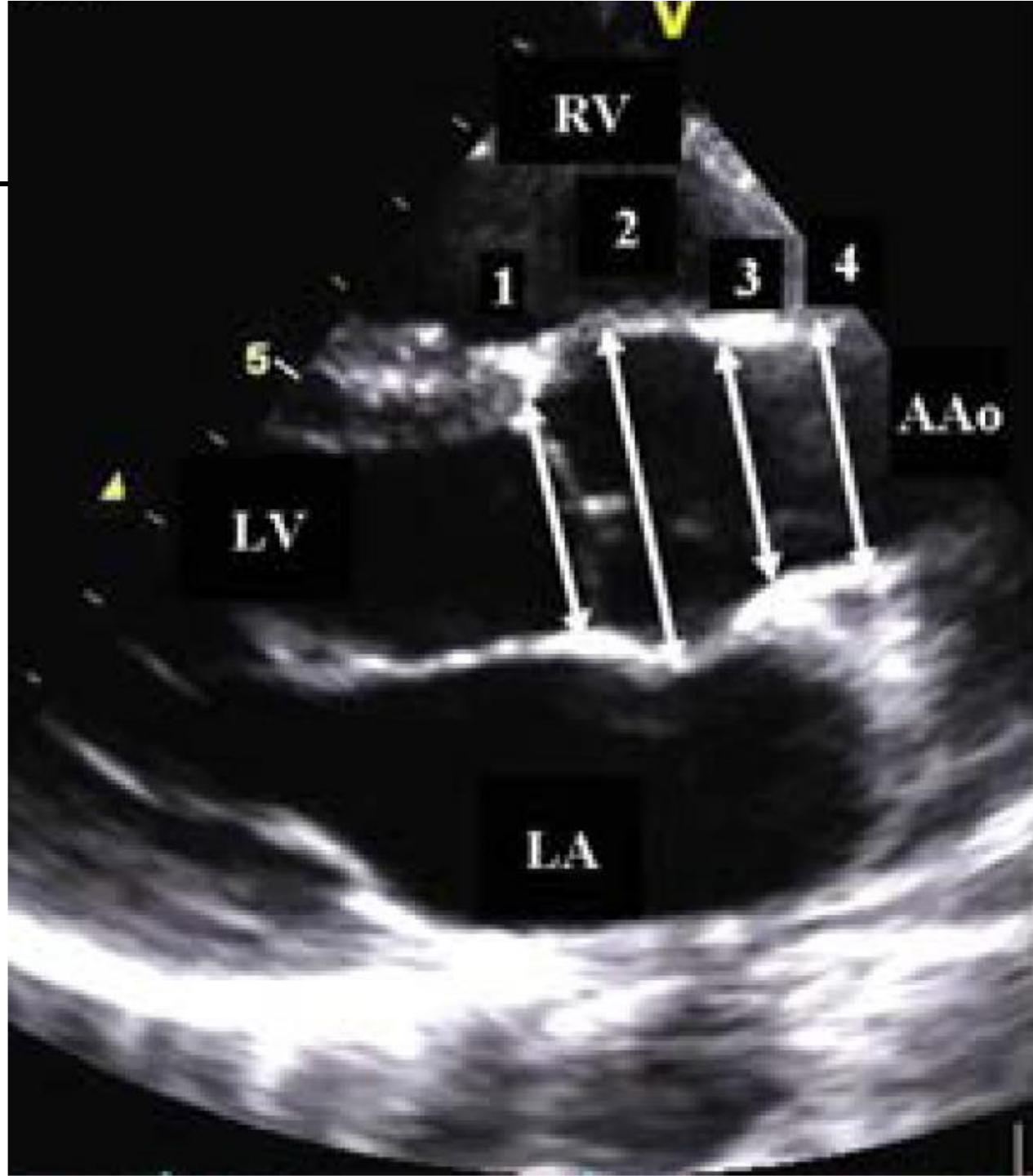
n=251 asymptomatic patients

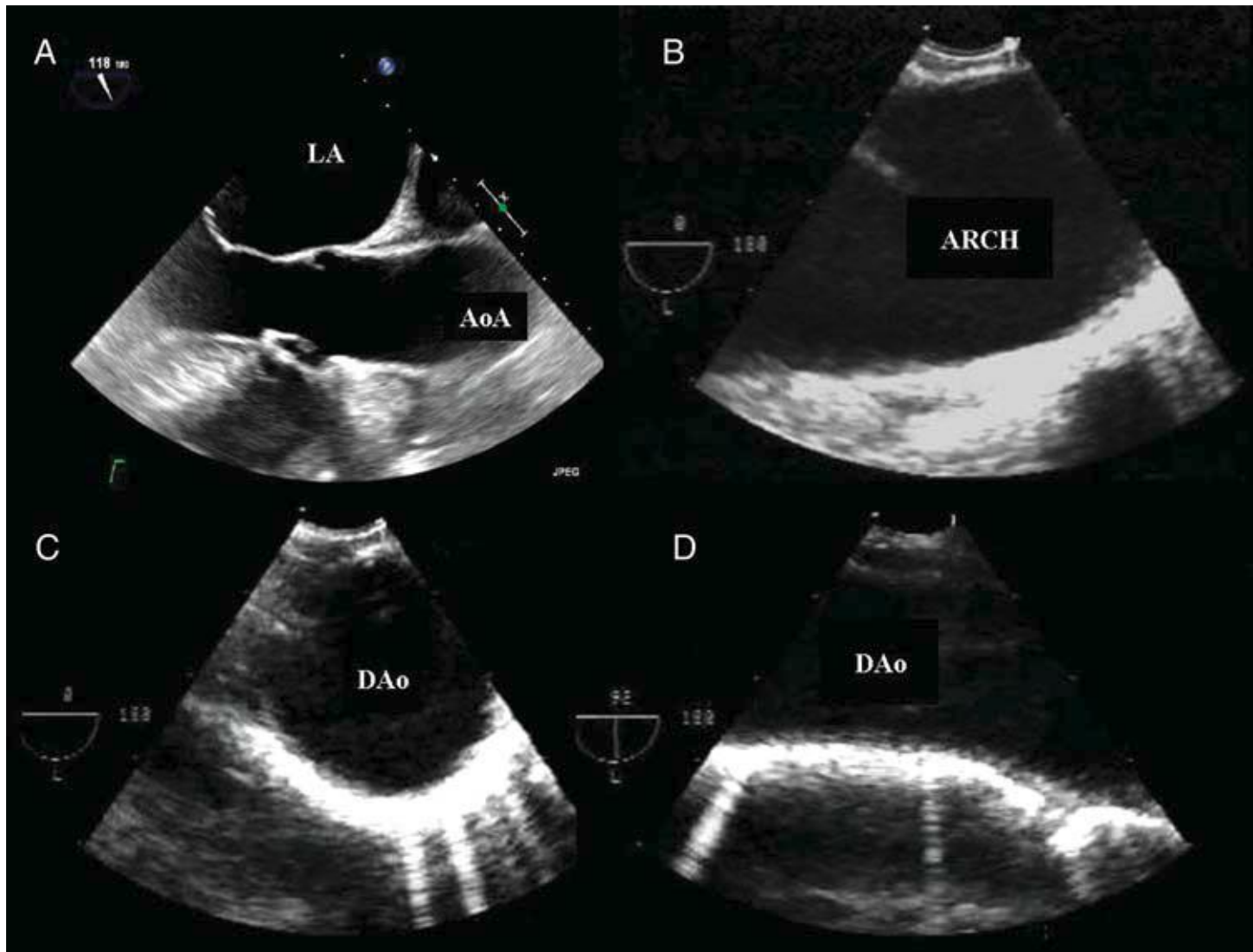


Aortic aneurysm



- 1: outflow tract diameter
- 2: sinuses of Valsava
- 3: sinutubular junction
- 4: tubular ascending aorta







Thank you



Priv.-Doz. Dr. Dr. med. Stephan H. Schirmer

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