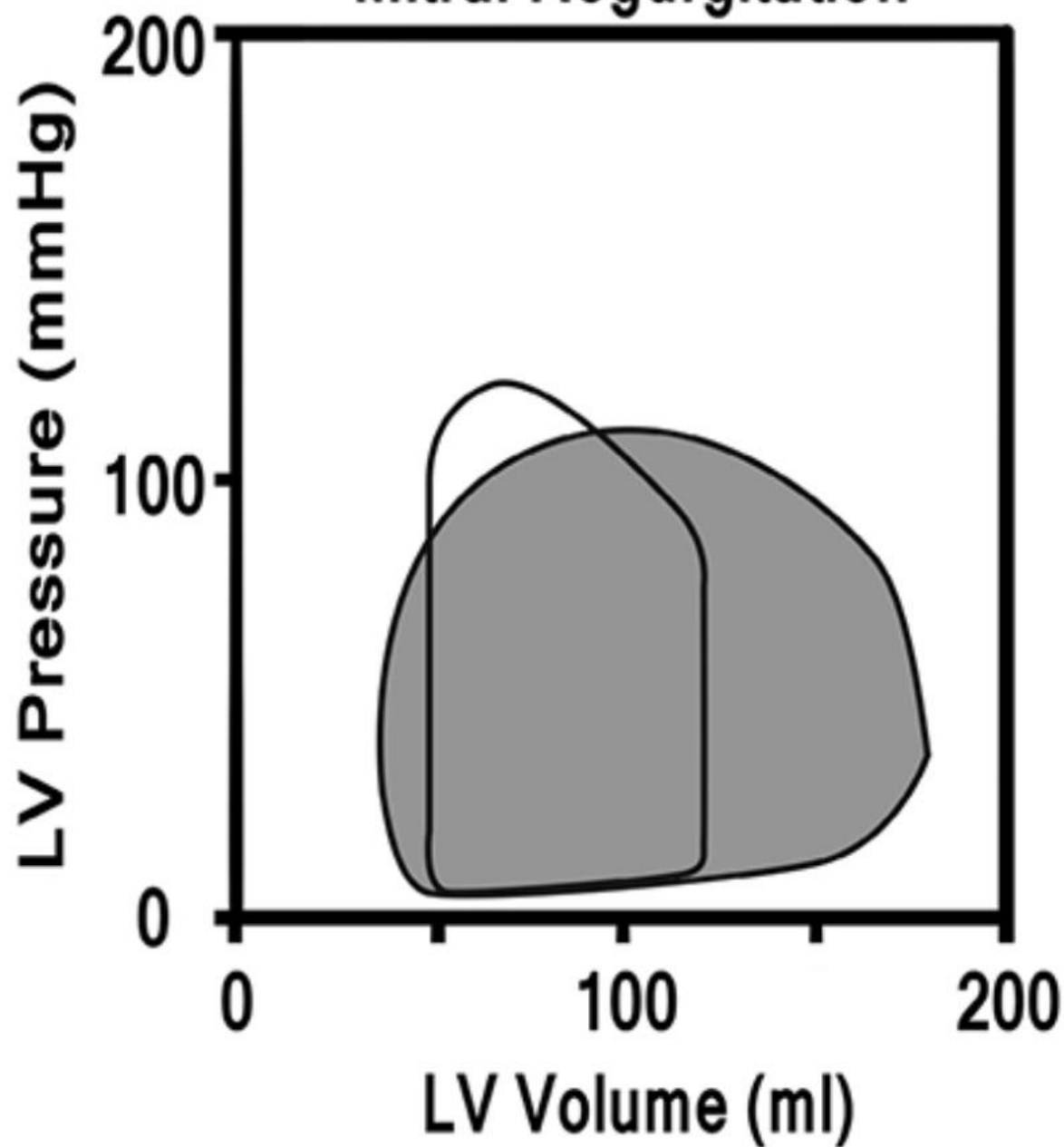


Insufficienza Mitralica secondaria; secondo round: tips and tricks by echo. Dissezioni coronariche spontanee

Webinar del 18 dicembre 2020

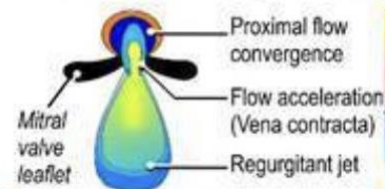
Mitral Regurgitation



Role of 2-D and Doppler Echocardiography:

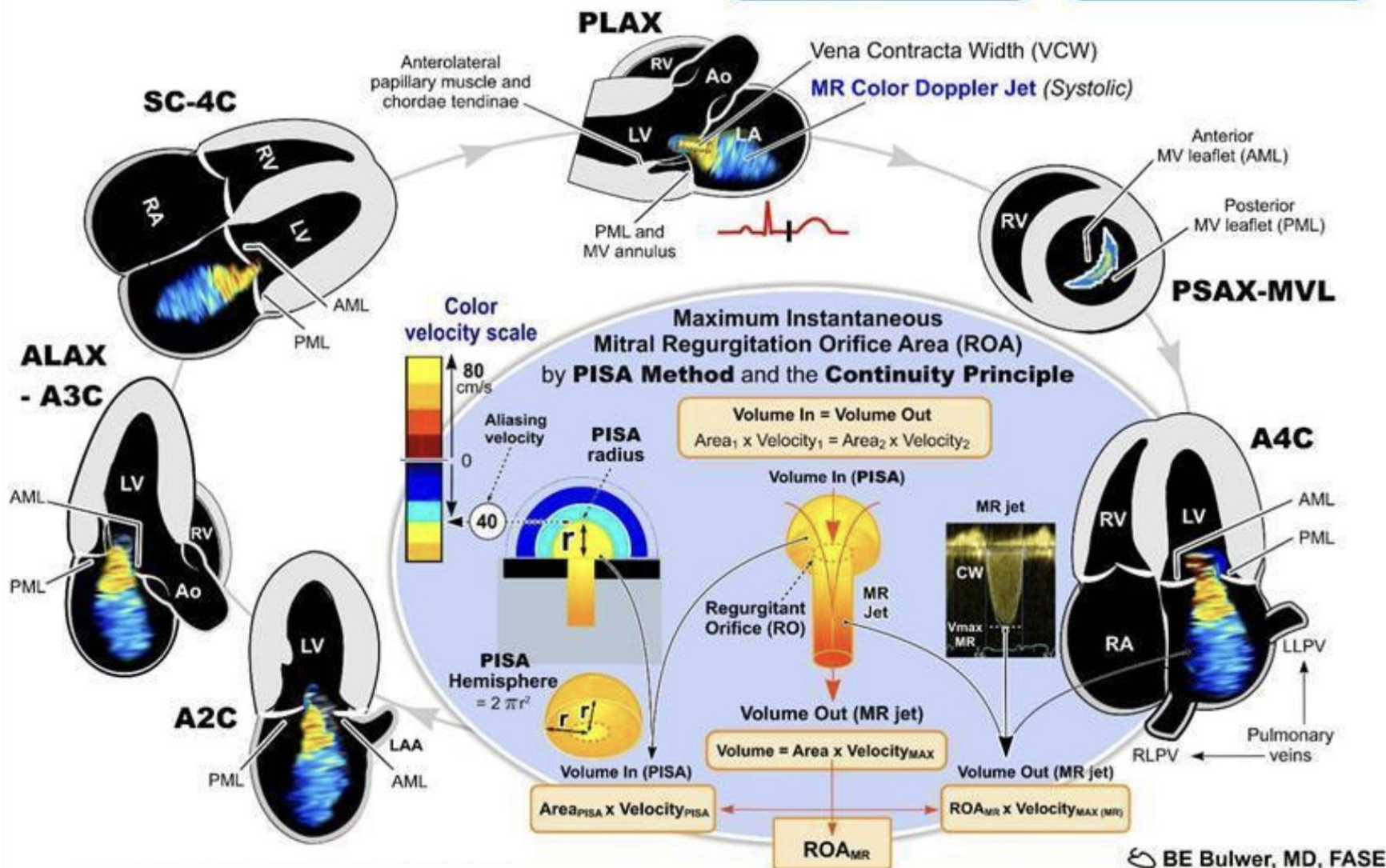
1. Establish the Diagnosis
2. Determine the Etiology
3. Assess MR Severity: *Mild, Moderate, Severe*
4. Assess MR impact on Overall Cardiac (esp. LV) Function
5. Guide to Further Management and Surgical Intervention

MR Color Jet Components



MR-Color Jet Parameters

1. Color jet size / jet areas
2. Vena contracta width (VCW)
3. Jet direction: *central, eccentric*
4. Pulmonary vein flow reversal
5. PISA (Proximal Isovelocity Surface Area)



Etiology: due to any MV Apparatus Component Involvement:

(Leaflets, MV Annulus, Chordae tendinae, Papillary muscles, LV wall)

1. Physiologic or Trace MR in ~ 50% normals
2. Degenerative/structural:
 - Myxomatous: MV prolapse
 - Chordal rupture with MV leaflet flail
 - Papillary muscle dysfunction or rupture
 - Severe MV annular calcification
 - Leaflet perforation
3. Ischemic or Functional:
 - Dilated Ischemic cardiomyopathy +/- Annular dilatation and apical tethering
4. Infective endocarditis: vegetations, perforation
5. Inflammatory: Rheumatic heart disease
 - Connective tissue disorders e.g. SLE, scleroderma

MR Severity Classification Parameters: Mild: **M, Moderate: **Mod** , Severe: **S****

1. Color Doppler Jet Area (cm²): (Nyquist: 50-60 cm/sec)
M < 4 cm² or <20% LA area; **S** > 10 cm² or > 40% LA area
2. Color Doppler Vena Contracta Width (cm):
M < 0.3 cm; **S** > 0.7 cm
3. PISA radius: (Nyquist: 40 cm/sec) **M** < 0.4 cm; **S** > 1.0 cm
4. Regurgitant Volume (ml/beat) **M** < 30; **S** > 60 ml/beat
5. Regurgitant Fraction (%) **M** < 30%; **S** > 50%
6. Regurgitant Orifice Area by PISA (cm²) **M** < 0.2 cm²; **S** > 0.4 cm²
7. Systolic Flow Reversal: Pulmonary Veins **s**
8. Transmitral Inflow (E-wave dominant); **s**
9. CW Doppler shape and signal Intensity
M: parabolic, faint; **S**: triangular, dense
10. dP/dT for LV Systolic Function
11. Left Atrial (LA) Size: **M**: normal size; **S**: dilated LA
12. Left Ventricular (LV) Size, Function
M: normal; **S**: LV dilated/dysfunctional
13. Mitral leaflets and subvalvular structures:
 leaflet flail, ruptured papillary muscles; **s**



From the Echo Stethoscope Academy Project

About the Echo Stethoscope Academy Project

The Echo Stethoscope Academy project is the brainchild of Bernard E. Bulwer, M.D., FASE.

The replacement for the traditional stethoscope

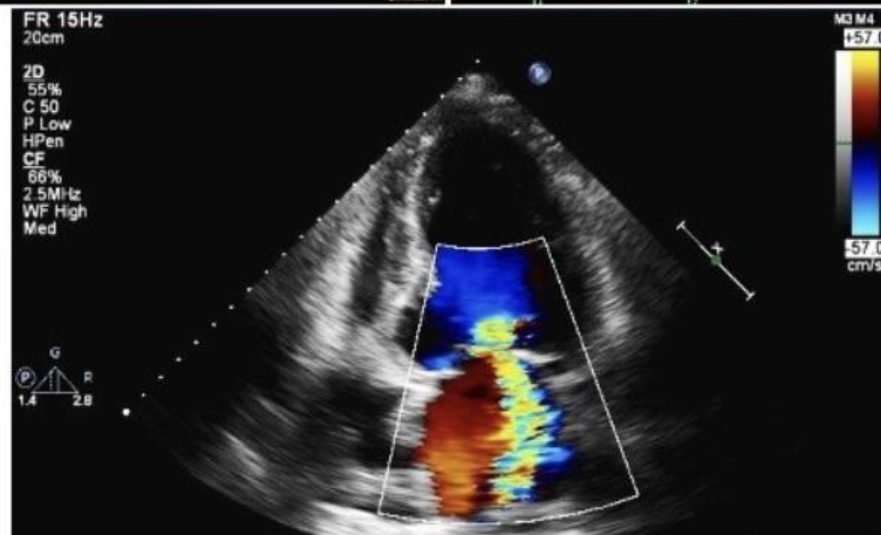
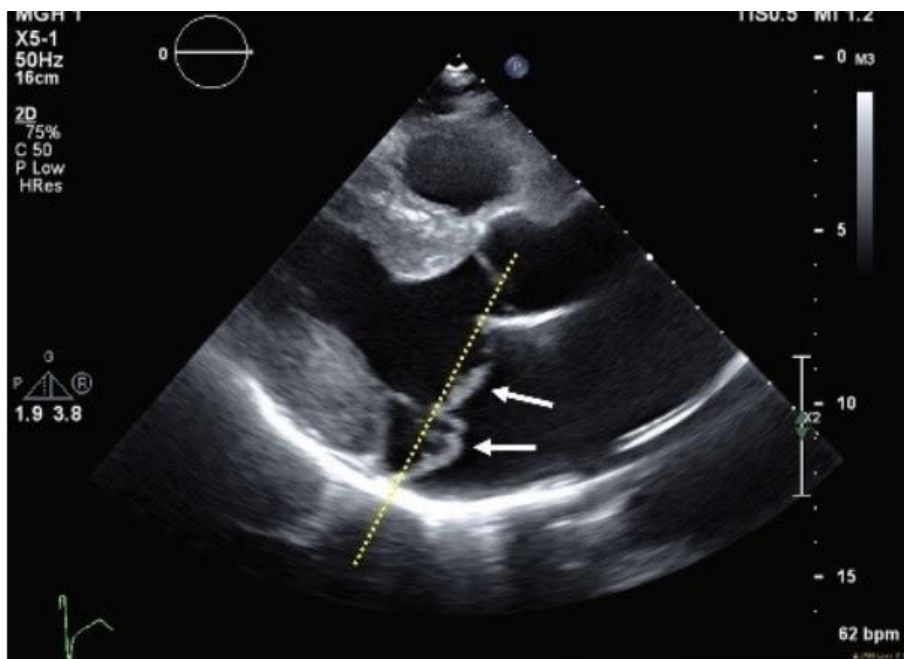
—the 200 year-old status symbol of doctors and healthcare professionals—has arrived.

Today, portable ultrasound stethoscopes fulfil modern medicine's historic quest to instantly, and far more accurately, “scope” the heart. This promises to save time, costs, and lives.

The Echo Stethoscope Academy Project is a solutions-oriented project to help fulfil this promise. Its focus is to *educate and equip* tomorrow's healthcare professionals with the requisites.

For more information,

Contact: info@echoscope.org



Mitral Regurgitation			
	Mild	Moderate	Severe ^a
Qualitative			
Angiographic grade	1+	2+	3–4+
Color Doppler jet area	Small, central jet (<4 cm ² or <20% LA area)	Signs of MR > mild present, but no criteria for severe MR	Vena contracta width > 0.7 cm with large central MR jet (area > 40% of LA area) or with a wall-impinging jet of any size
Doppler vena contracta width (cm)	<0.3	0.3–0.69	≥0.70

Regurgitant
volume
(mL/beat)

mild

<30

moderate

30–59

severe

≥60

Regurgitant
fraction (%)

<30

30–49

≥50

Regurgitant
orifice area
(cm²)

<0.20

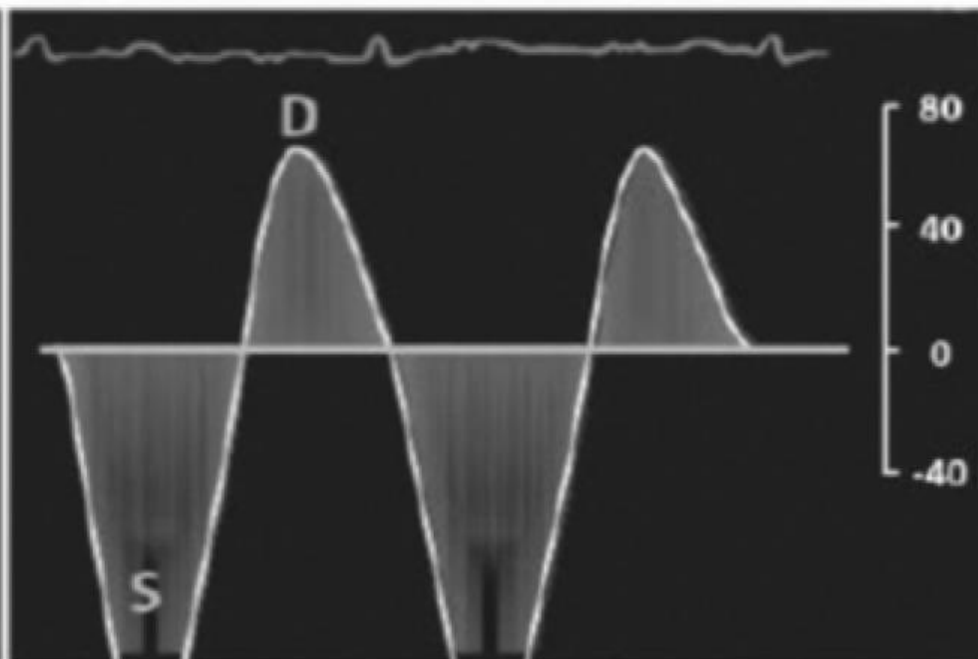
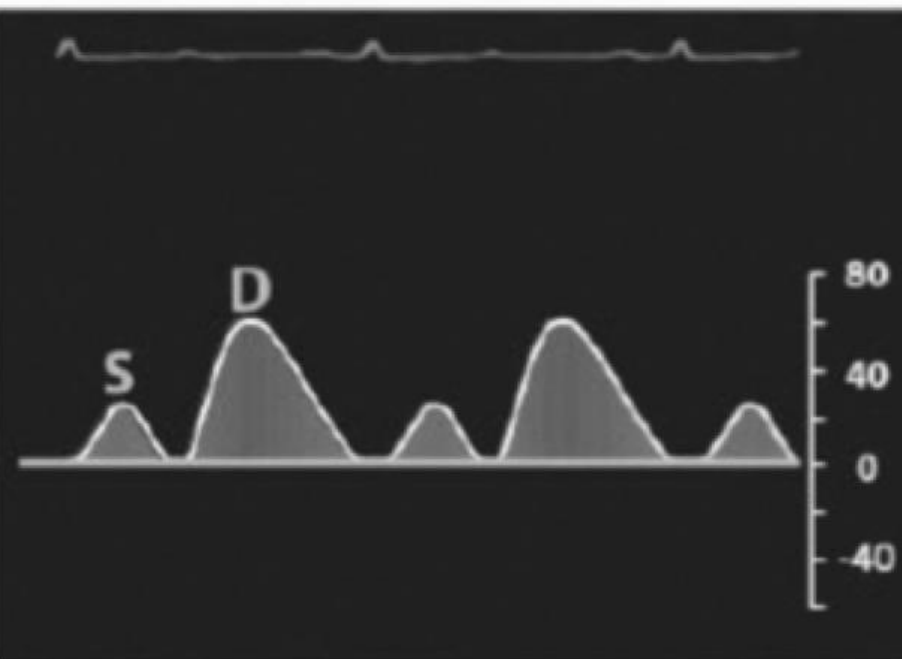
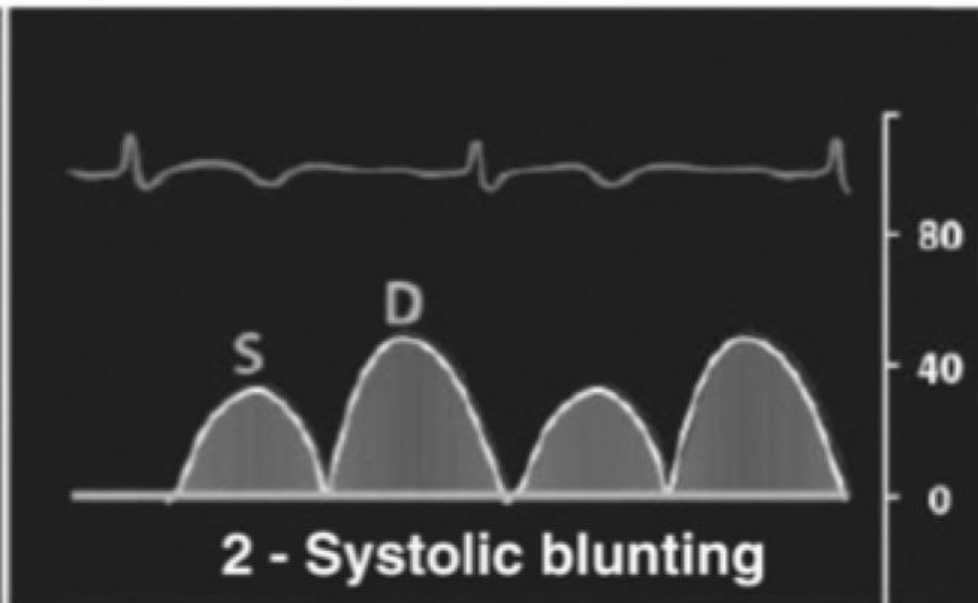
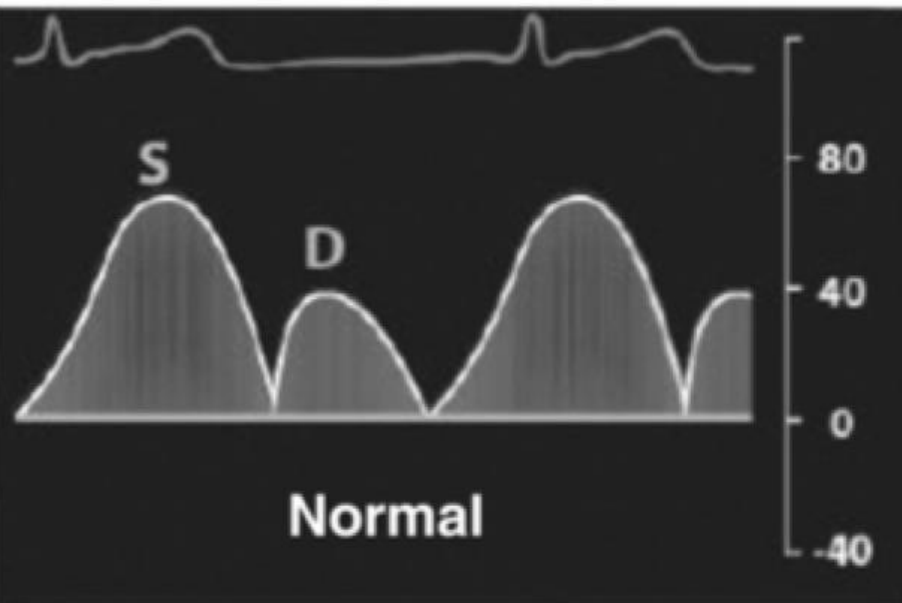
0.2–0.39

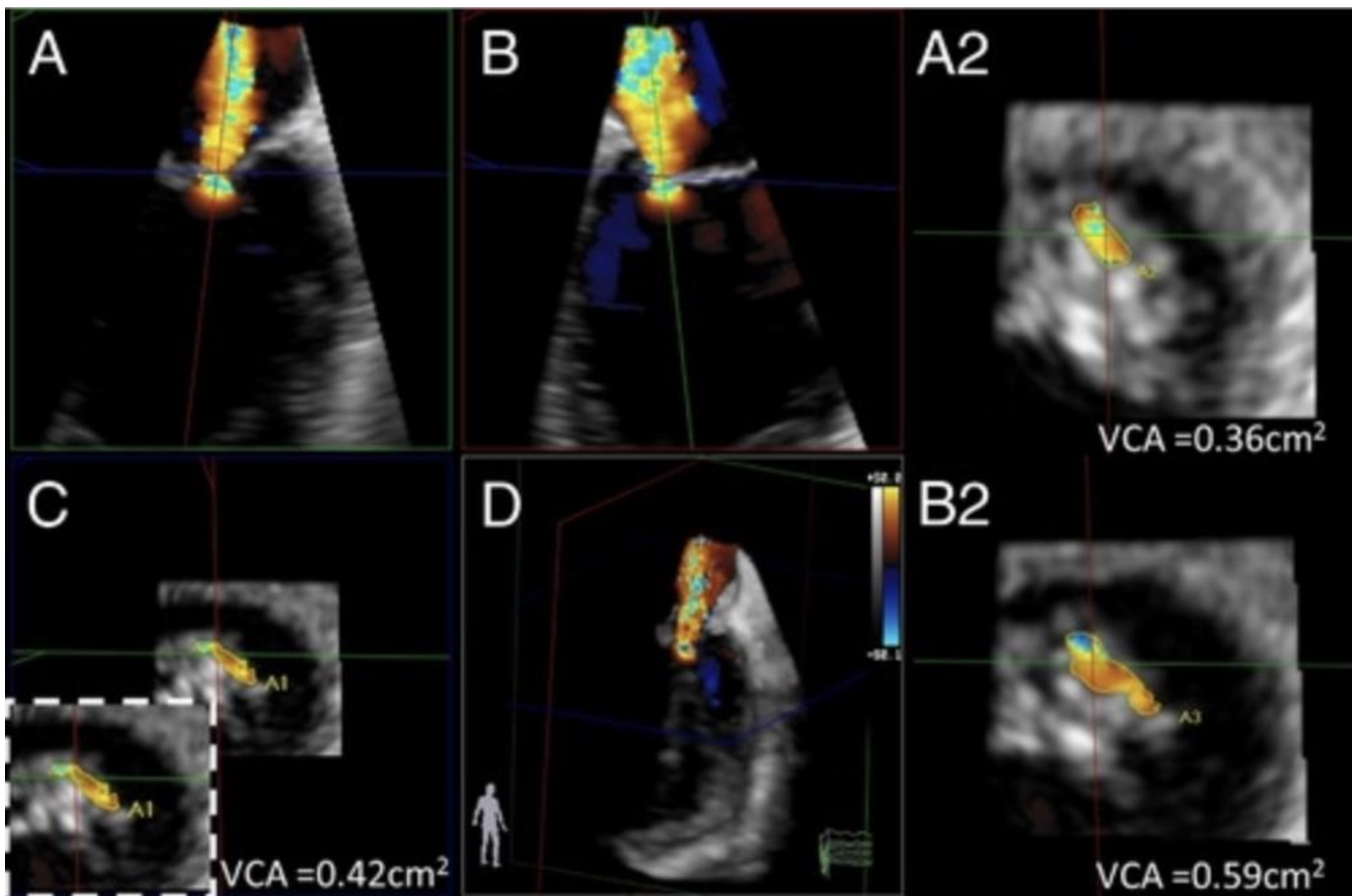
≥0.40

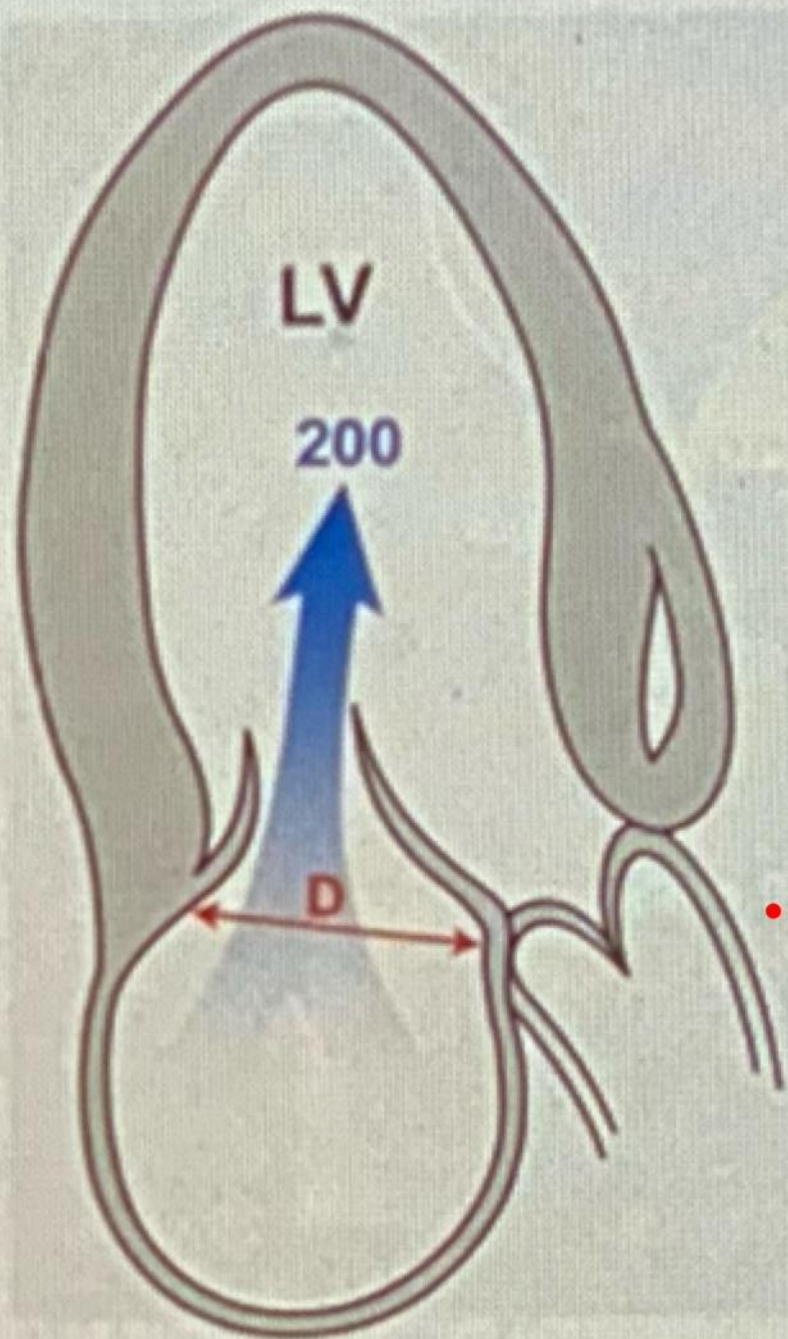
0.20 severe nella CAD

MR, mitral regurgitation; LA, left atrium; LV, left ventricle.

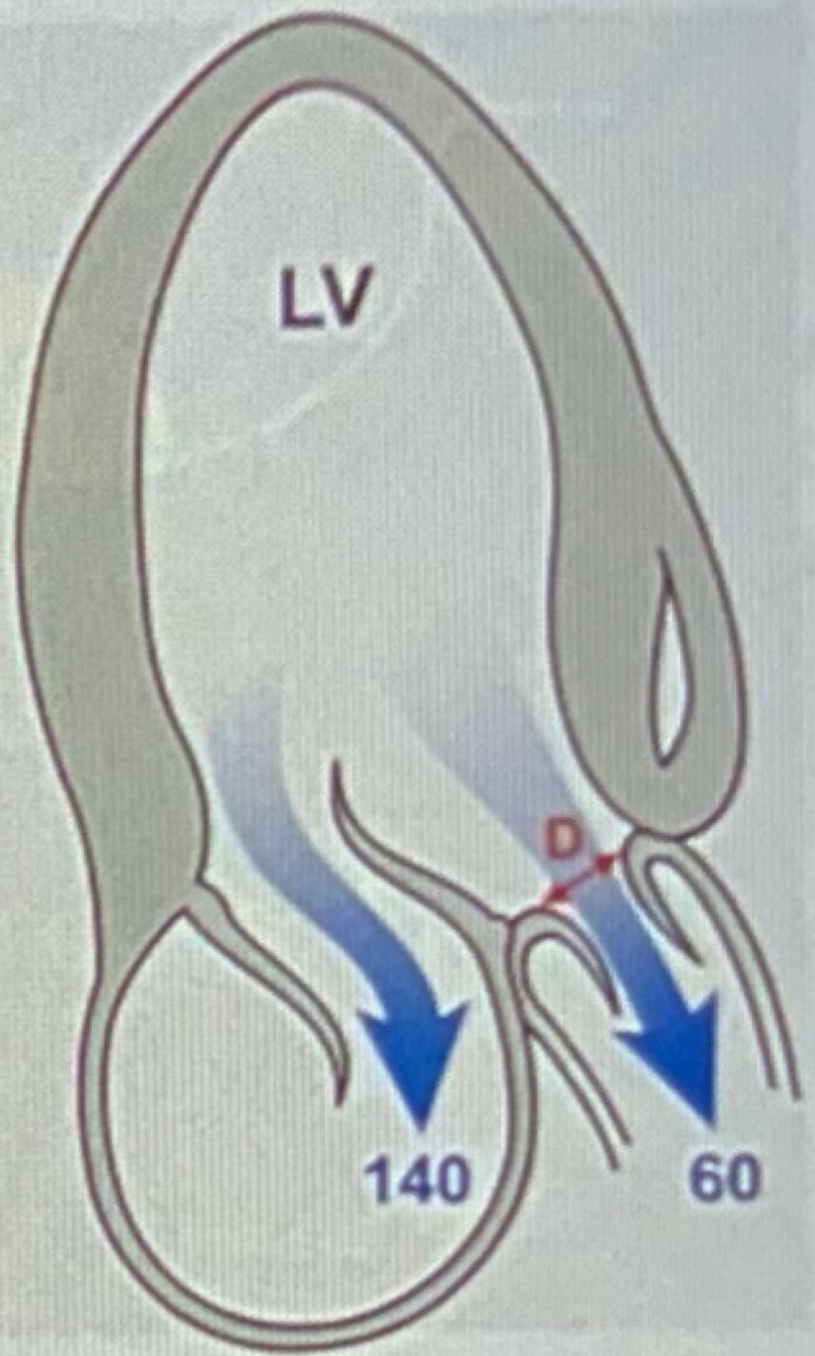
^aIn severe MR, evidence of LA and LV dilation is essential.

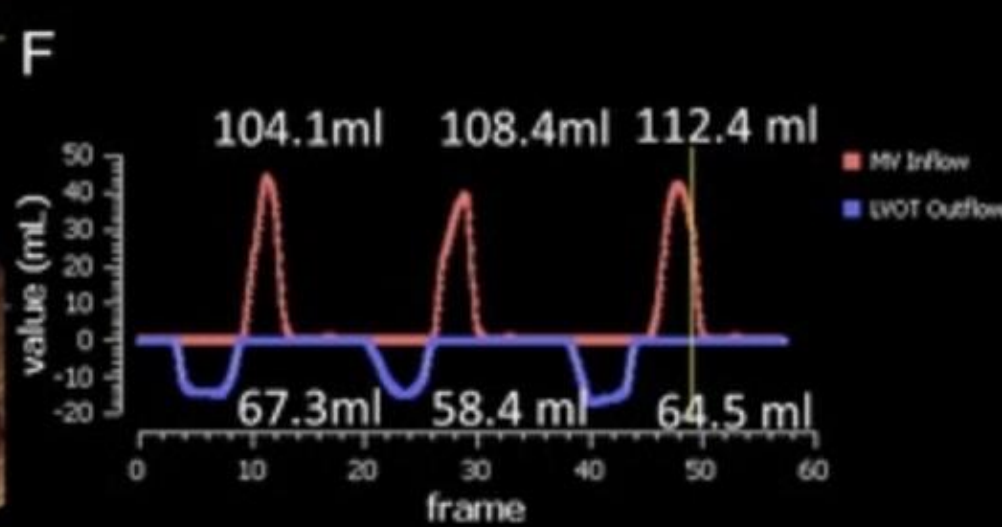
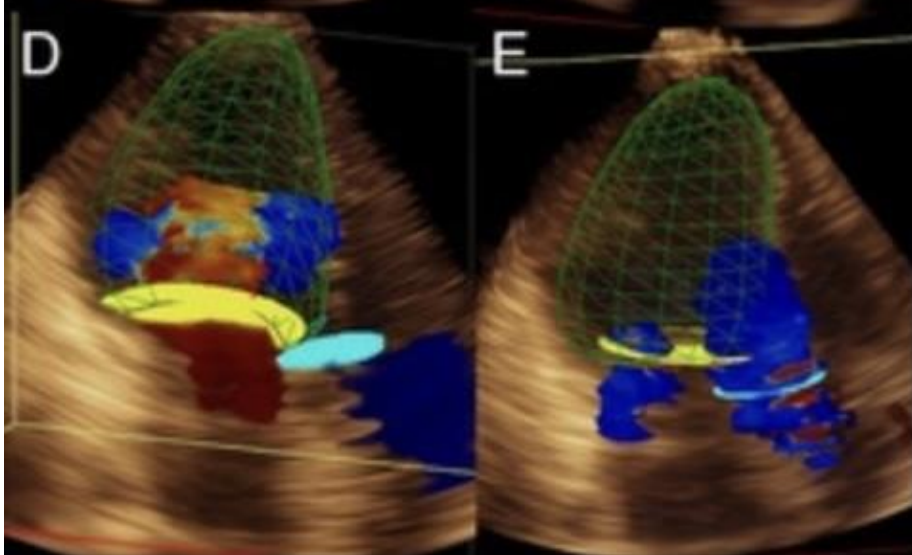
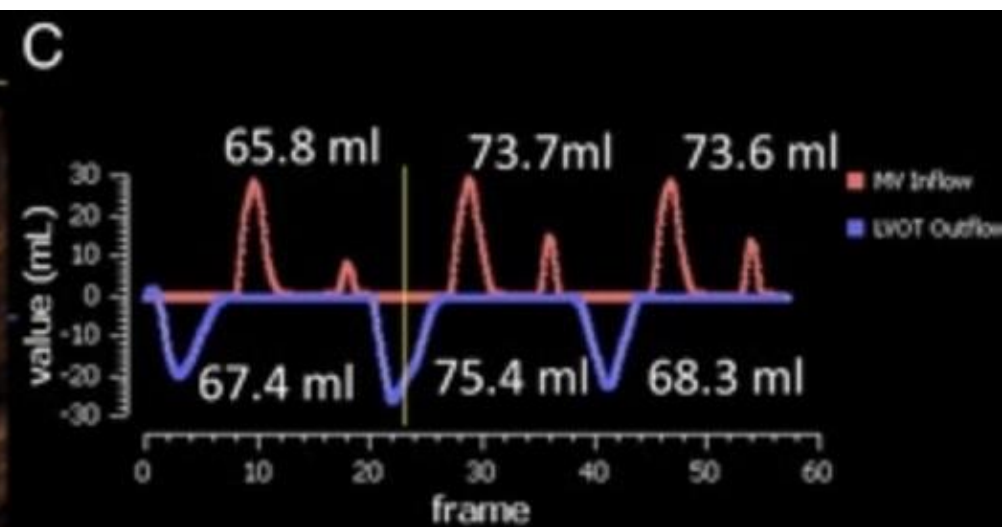
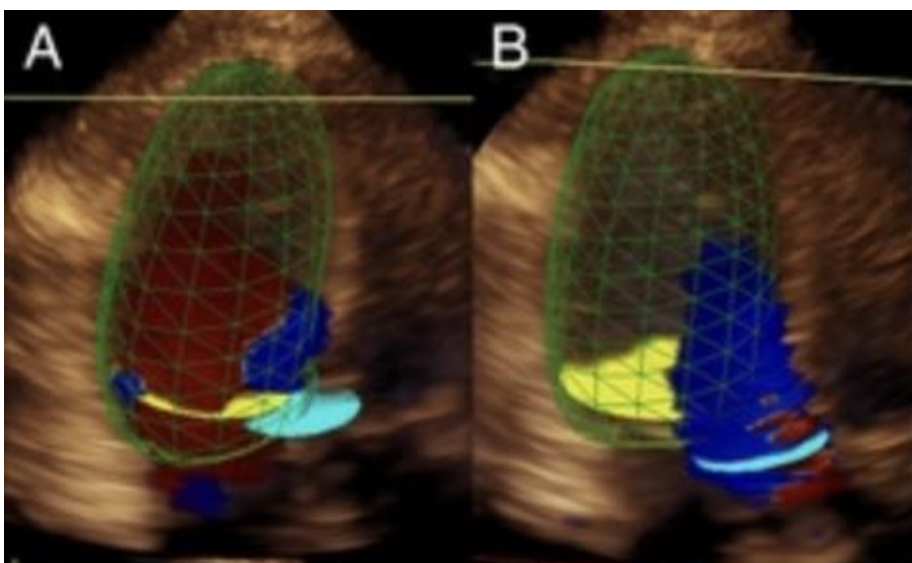


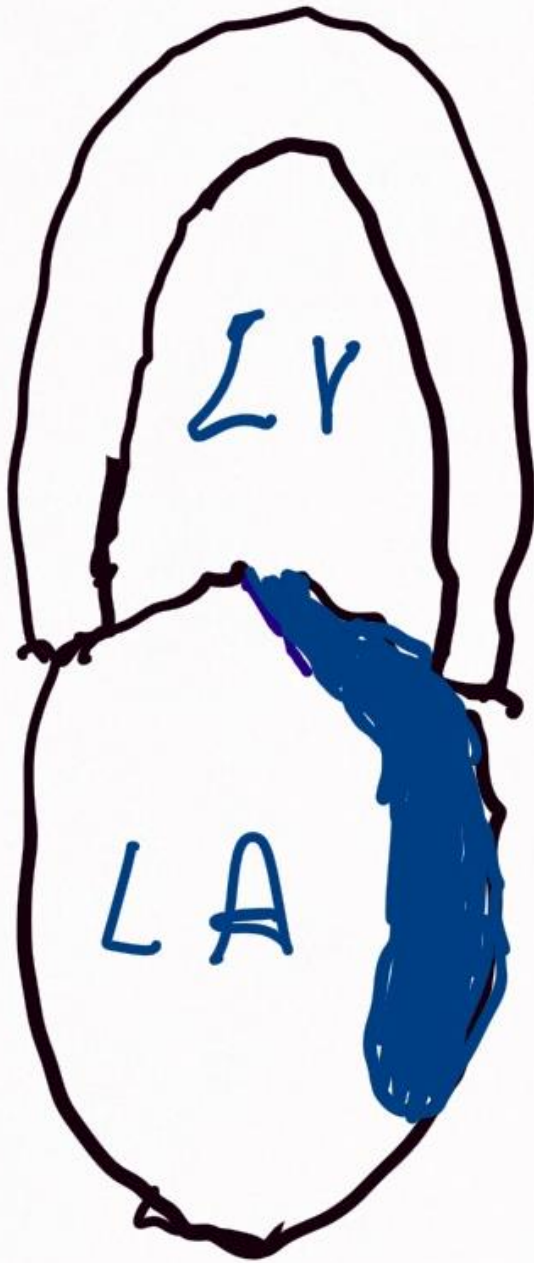




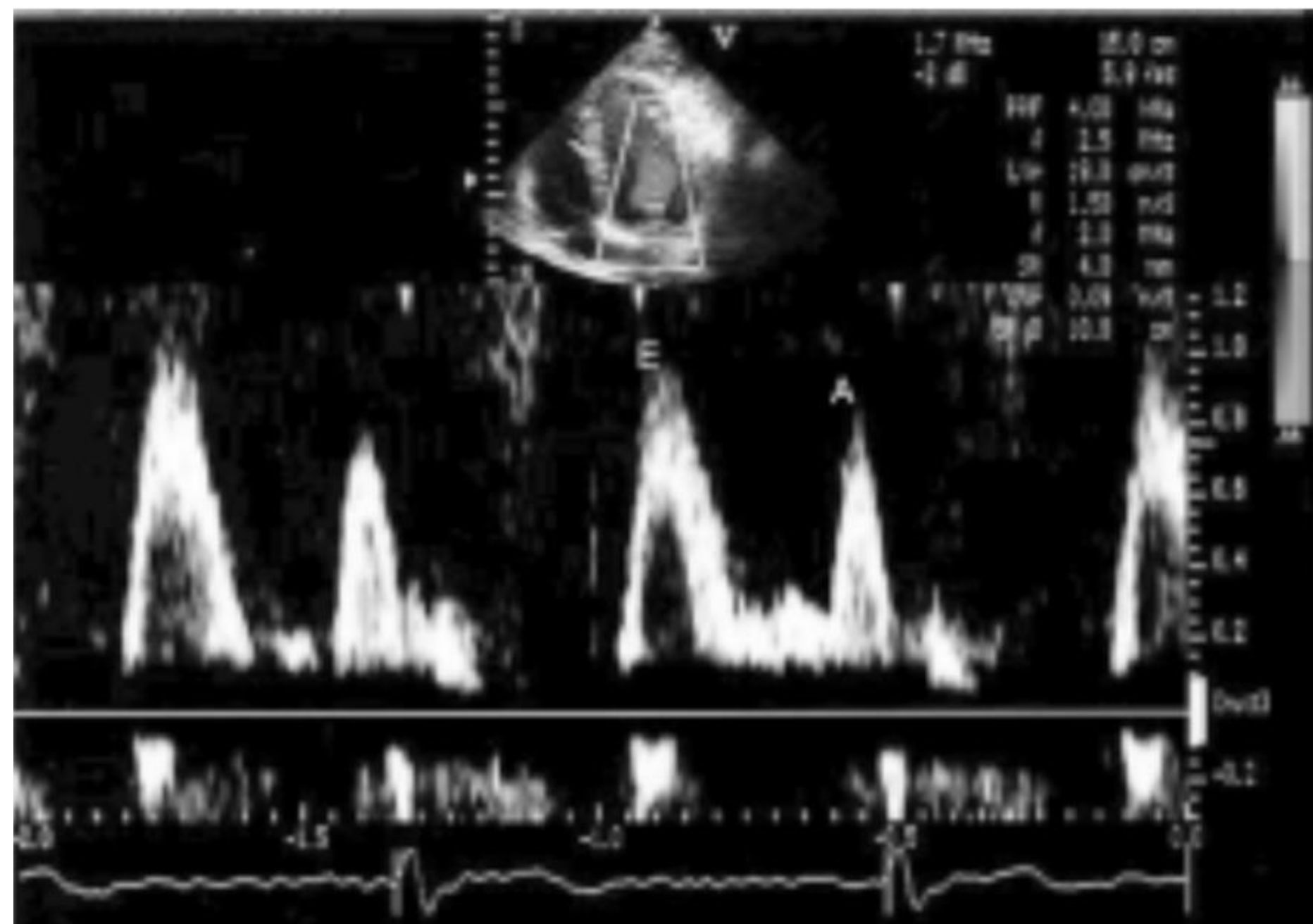
=







COANDA
EFFECT



$$(0.785 = 3.14 : 4)$$

$$SV: \text{Area LVOT} \times VTI (LVOT)$$

$$\boxed{SV_{Ao}} = \left(\underset{Ao}{A} \right)^2 \cdot 0.785 \cdot VTI (LVOT)$$

$$\boxed{SV_{MI}} = \left(\underset{Mitral}{A} \right)^2 \cdot 0.785 \cdot VTI (Mitral)$$

calcolo sulla vel. media

$$\boxed{VOL \text{ PIRIGUAGITO} = SV(MITR) - SV(AO)}$$

FR AZIONE PIRIVRITO

VOL. PIRIVRITO $\times 100$

VOL. MITRALIED

CIDR

VOL MITR - VOL AO $\times 100$

VOL. MITRACIED

CIDE

FRAZIONE DI RIGURGITO

$$\frac{D^2 \cdot 0.785 \cdot VTI (M) - D^3 \cdot 0.785 \cdot VTI (A)}{D^2 \cdot 0.785 \cdot VTI (M)} \times 100$$

TIS0.8 MI 0.9

ECHO PEN

X5-1
25Hz
15cm

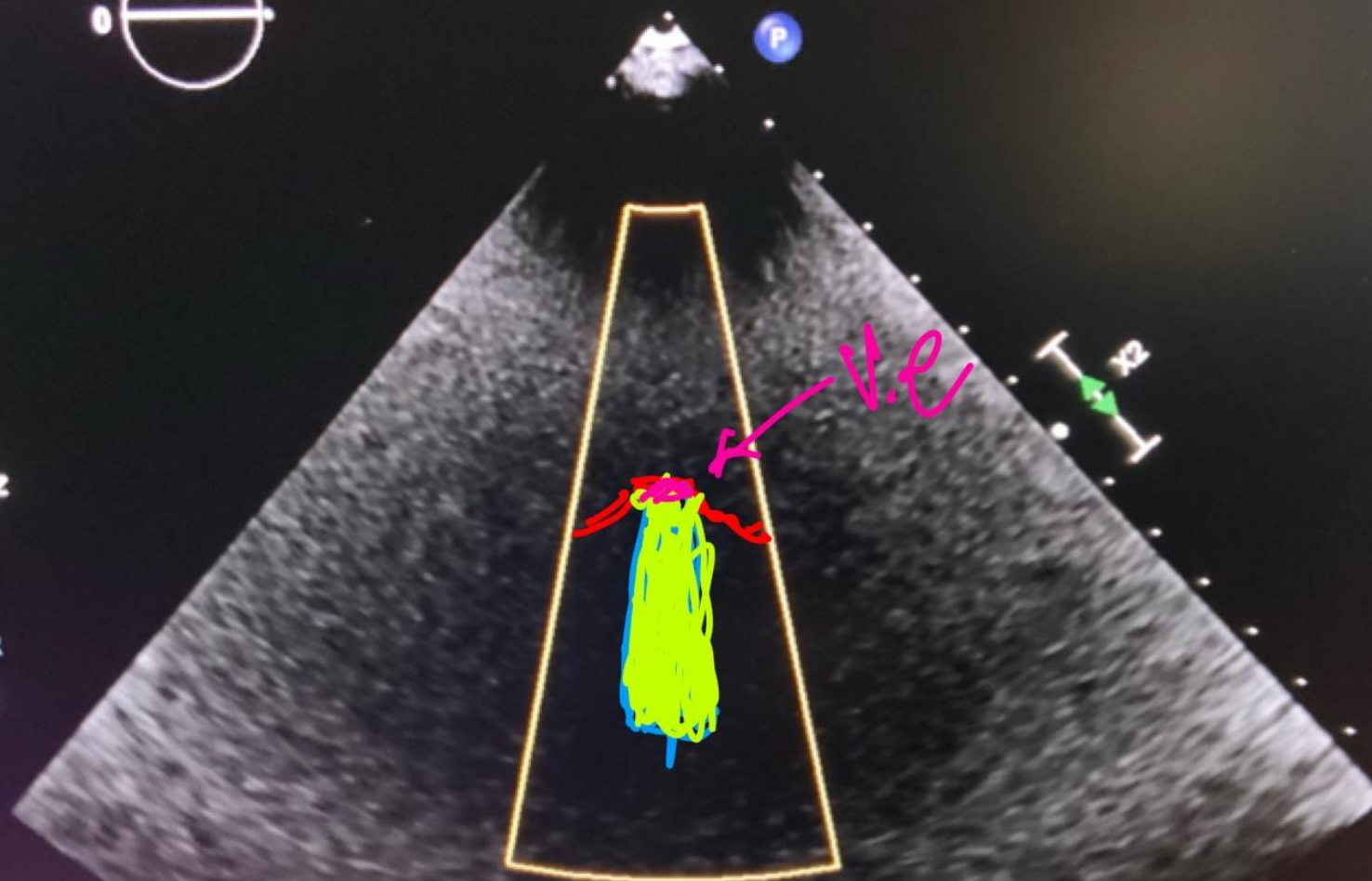


2D
74%
C 50
P Basso
APen

CF
50%
4000Hz
WF 399Hz
2.5MHz

G
P R
1.2 2.4

M1 M4
+61.6



ECHO PEN

X5-1
25Hz
15cm



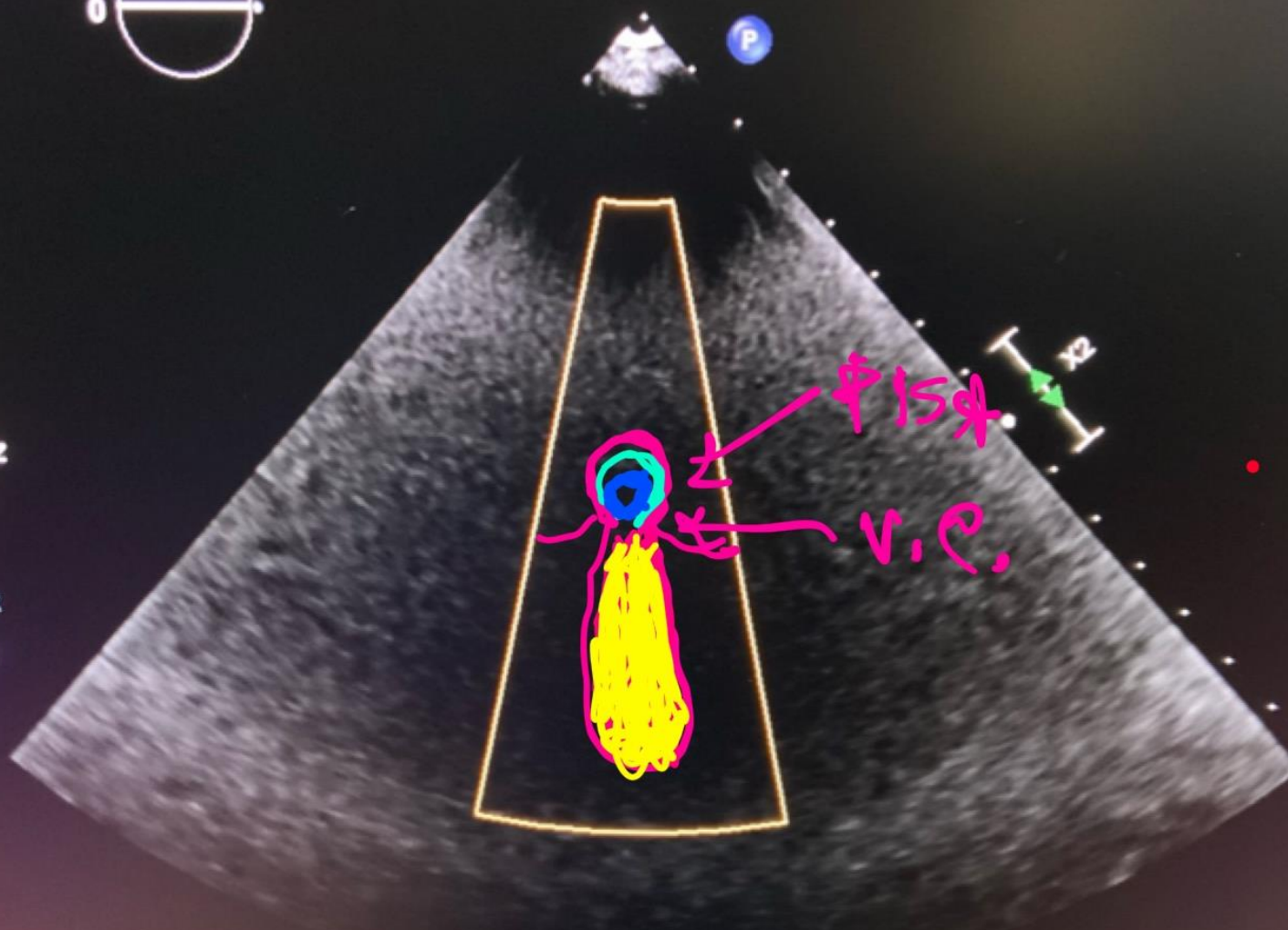
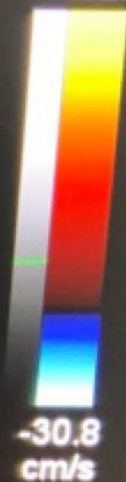
TIS0.8 MI 0.9

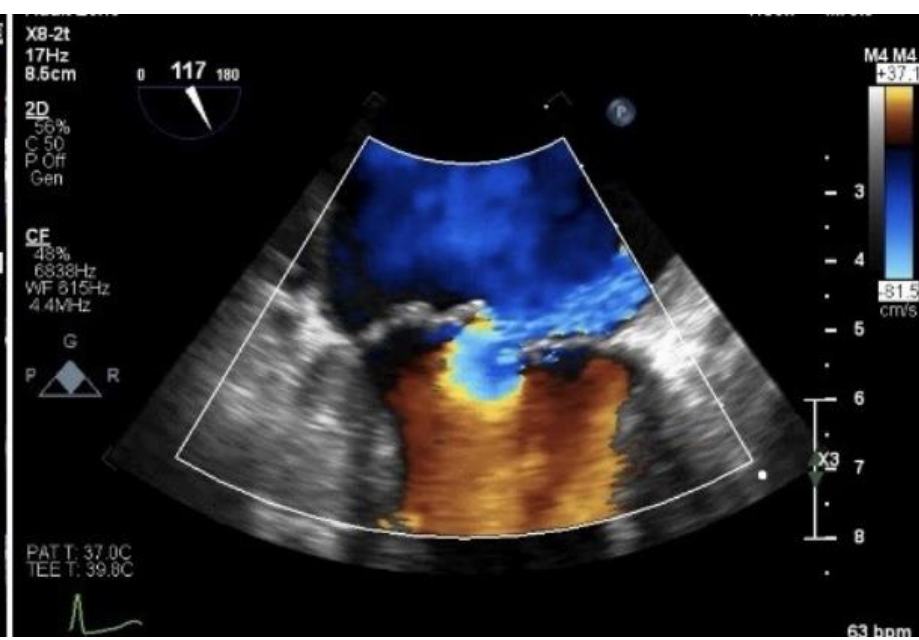
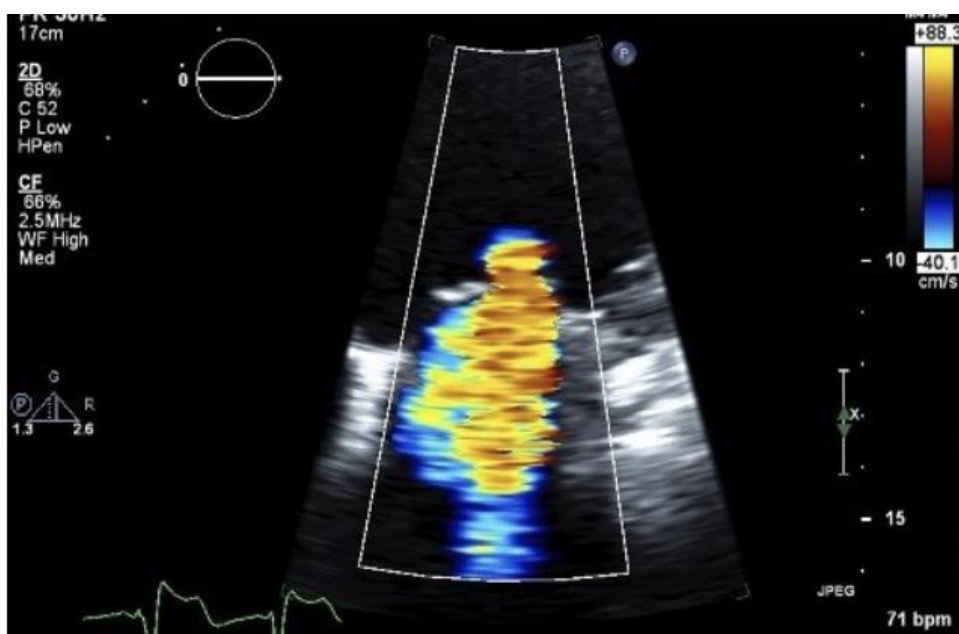
2D
74%
C 50
P Basso
APen

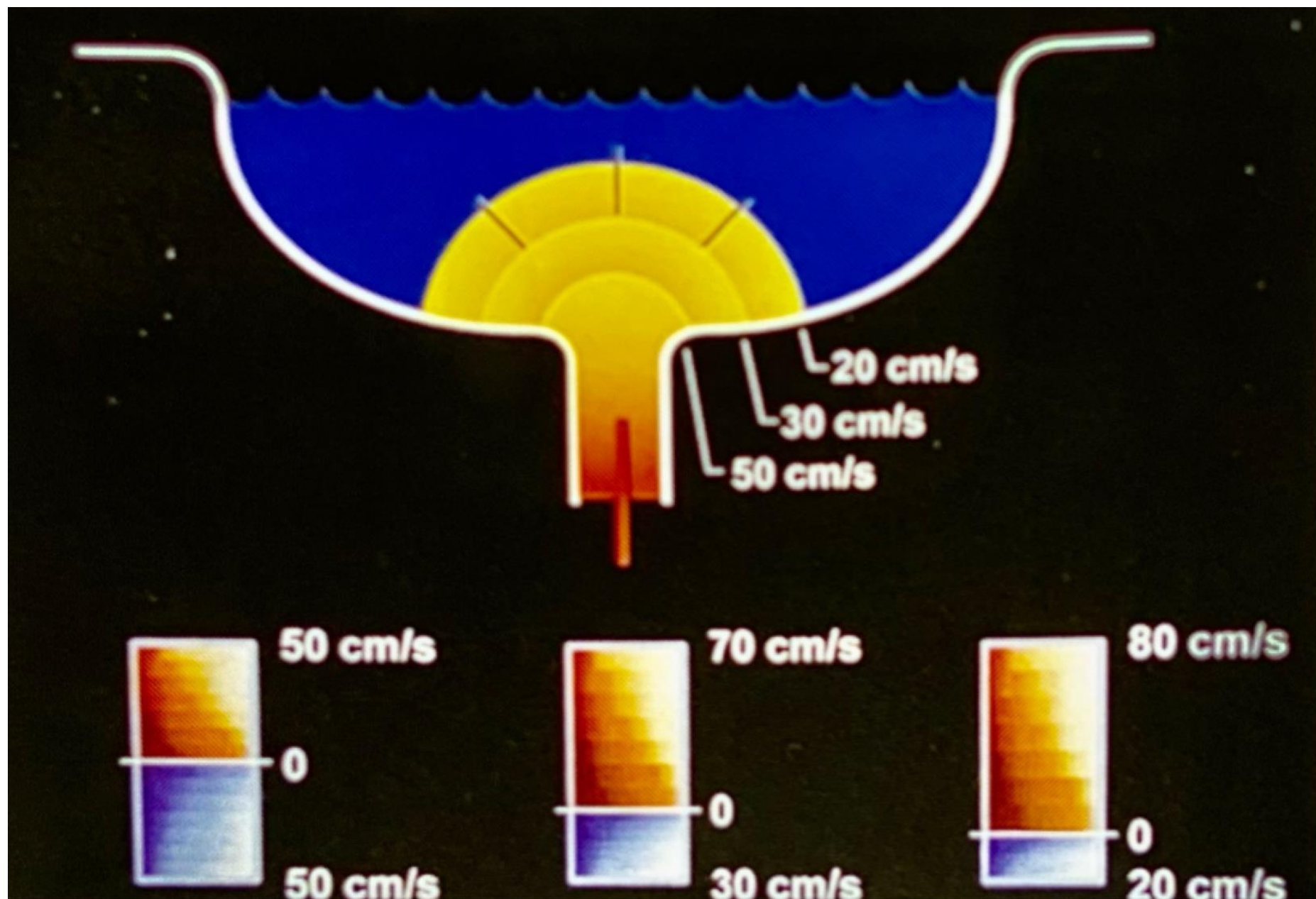
CF
50%
4000Hz
WF 399Hz
2.5MHz

G
P R
1.2 2.4

M1 M4
+92.4







CALCULO ERO

VELOCITA' DI FLUSSO

PICCO VELOCITA' RIGURITO MITA

$6.28 \cdot \pi^2 (\text{PIA}) \cdot \text{VEL. ALIASING}$

PICCO VEL. RIGURITO MITA,

SEMPLIFICATO

SE PICCO VEL. RIGURITO MITA
 $L'CD = 5 \text{ m/sec}$ E ALIASING 40 $\frac{\text{cm}}{\text{sec}}$
 $ERO = \frac{\pi^2}{2}$

$$ERO = \frac{VOL. RIGUAGITO}{VTI RIGUAGITOMITR}$$

EROA by PISA	$\frac{2\pi r^2 \times V_a}{PV_{Reg}}$
Regurgitant Volume	$SV_{LVOT} - SV_{MV}$
Regurgitant Fraction	$\left(\frac{RVol}{VTI_{MV} \times \pi r_{MV}^2} \right) \times 100$