Aurelio Caruso
Casa di cura San Michele
Maddaloni – (Caserta)

L'insufficienza tricuspidale: una valvulopatia spesso trascurata. Come dare al cardiochirurgo tutte le informazioni per decidere l'indicazione operatoria

EcoCardioChirurgia è un marchio che abbiamo registrato molti anni fa per esprimere con una sola parola lo spirito ed i promotori dell'iniziativa.

Abbiamo, infatti, iniziato la nostra attività a Milano nel 2004 coinvolgendo, sia dal primo incontro a carattere locale del 20-21 maggio 2004, cardiologi, cardiochirurghi, cardiorianimatori, medici di medicina d'urgenza, internisti, radiologi che si sono sempre confrontati in uno spazio nel quale gli interessi delle singole specialità sono stati subordinati alla continua ricerca del miglior percorso diagnostico / terapeutico del paziente.

Da sempre ci ha sempre guidato il desiderio di incontrarci per migliorare la qualità del nostro lavoro orientandoci al continuo aggiornamento degli specialisti che si occupano del cardiopatico più delicato: quello destinato alla cardiochirurgia o alle tecniche interventistiche.

Grande è la nostra soddisfazione per aver pensato ad un lavoro in "Heart Team" quando ancora nessuno ne parlava.

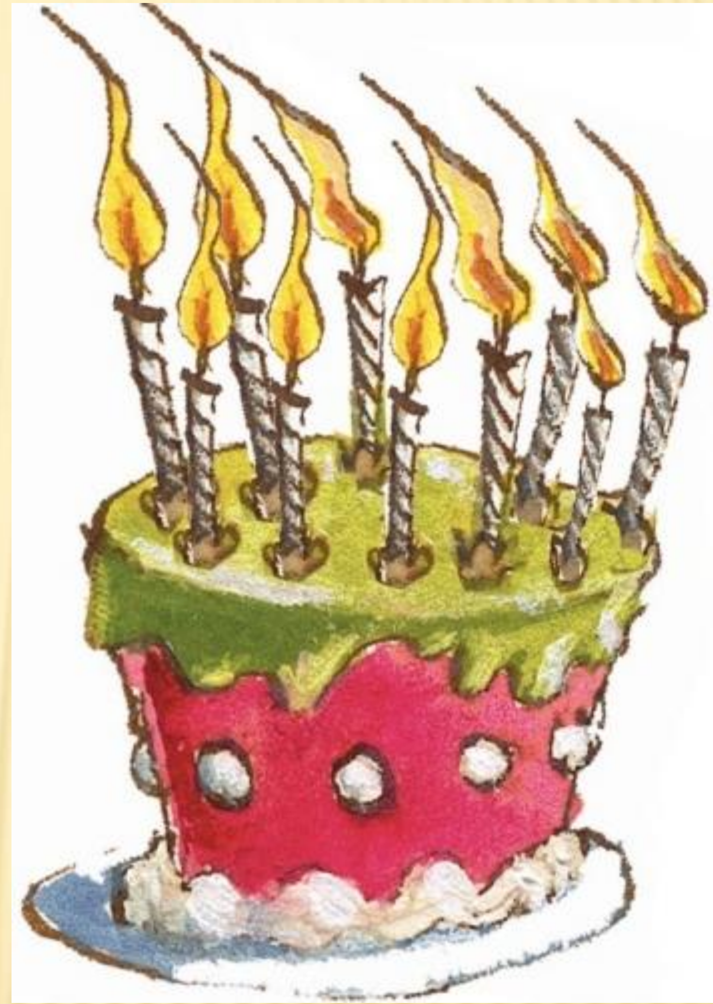
Questo particolare tipo d'impostazione ha riscosso l'interesse dei nostri colleghi ed ora siamo quindi giunti alla VII edizione del Congresso Nazionale, ma che per noi tutti è il "Congresso del X anno di EcoCardioChirurgia".

La formula è quella oramai consueta che ha per obiettivi la formazione continua dei partecipanti e per metodo divulgativo la suddivisione degli argomenti tra quelli di largo target e quelli di nicchia: i primi vengono trattati in auditorium in sedute plenarie ed i secondi in salette a forte interazione discente/docente. Teniamo particolarmente a chiarire che per noi "nicchia" non vuole dire "poco importante". E per testimoniarlo abbiamo sempre coinvolto i maggiori esperti su scala nazionale anche per trattare gli argomenti più particolari.

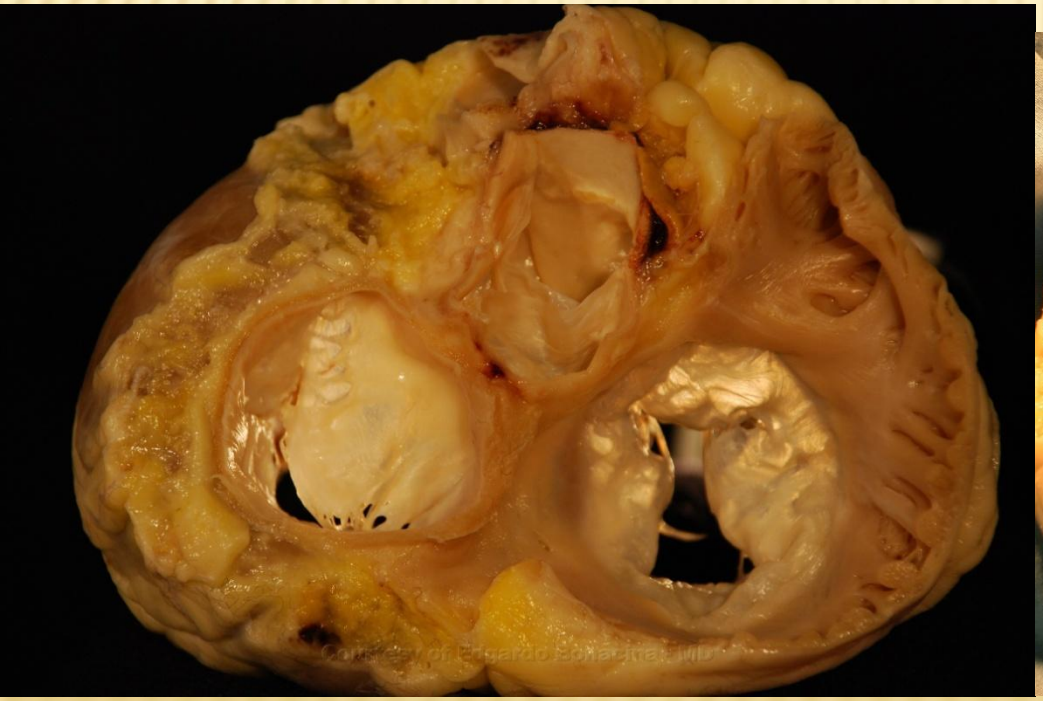
Vi diamo il benvenuto a Milano, pronti ad un'attiva partecipazione e Vi invitiamo sin d'ora ad iscriverVi alla nostra comunità scientifica come "fellow" di EcoCardioChirurgia registrandoVi nel sito: www.ecocardiochirurgia.it

Antonio Mantero   Giuseppe Tarelli

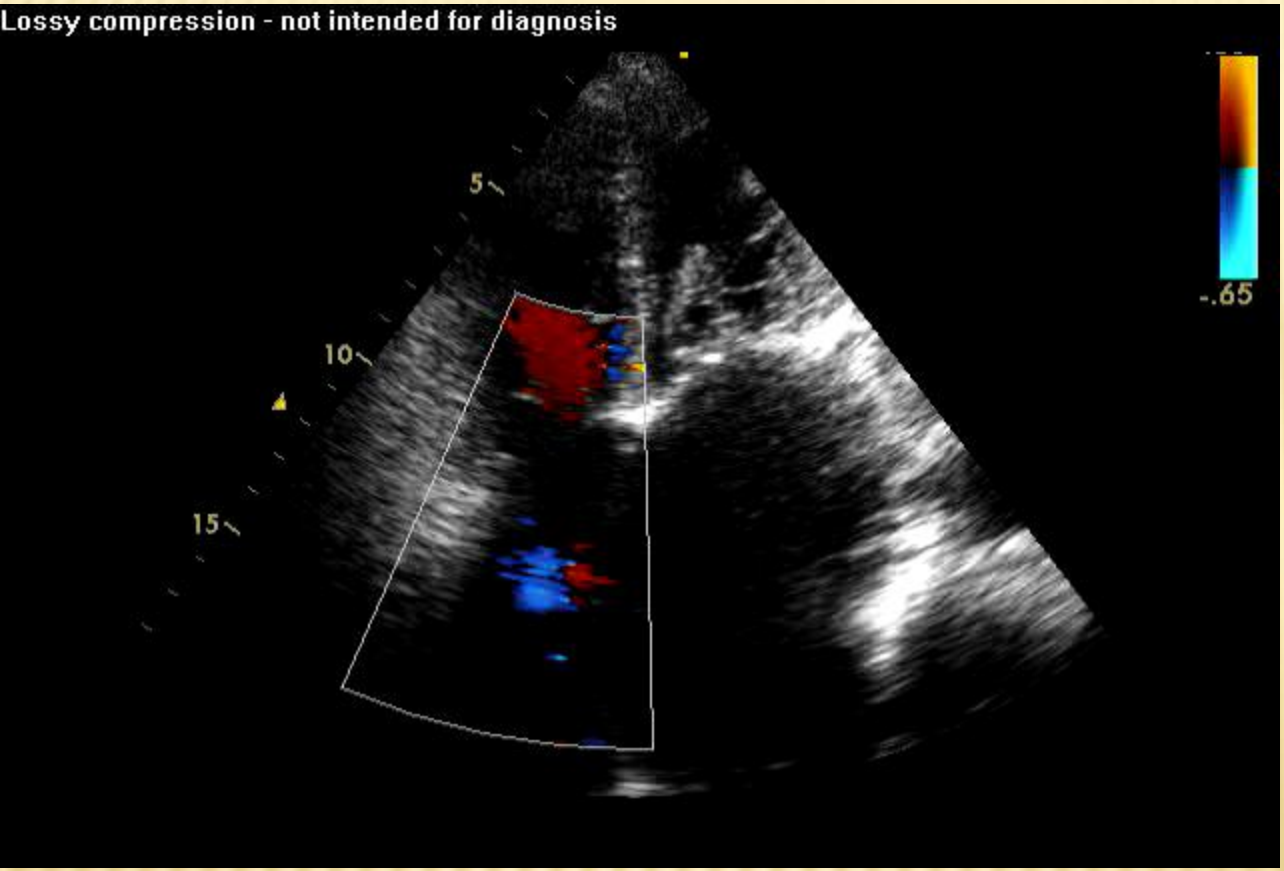
VII CONGRESSO DI **ECOCARDIOCHIRURGIA**

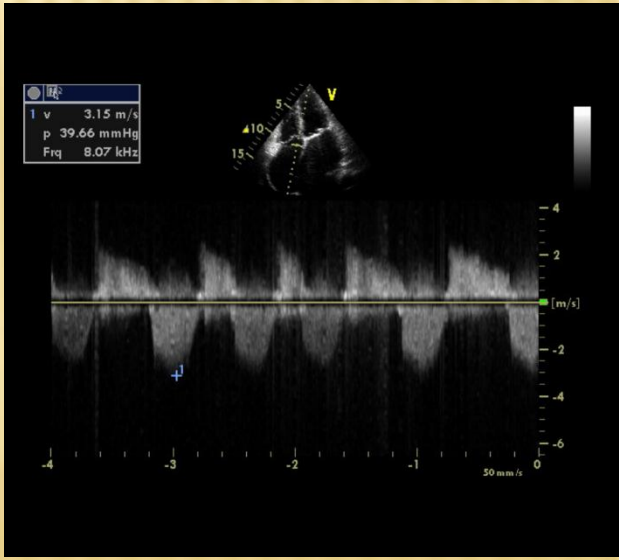


La tricuspide…questa cenerentola



PER L'ECOCARDIOGRAFISTA.....





PER IL CARDIOCHIRURGO.....

- Aumento del rischio operatorio ?
- Riparazione spesso deludente
- Sostituzione problematica
- Criteri di indicazione non sempre condivisi

.....ma non per intervento contemporaneo a chirurgia sul cuore sinistro

Recidiva a 5 anni:
20-35% per De Vega
10% per anello protesico

Esc 2012

Table 16 Indications for tricuspid valve surgery

	Class [a]	Level [b]
Surgery is indicated in symptomatic patients with severe TS.[c]	I	C
Surgery is indicated in patients with severe TS undergoing left-sided valve intervention.[d]	I	C
Surgery is indicated in patients with severe primary or secondary TR undergoing left-sided valve surgery.	I	C
Surgery is indicated in symptomatic patients with severe isolated primary TR without severe right ventricular dysfunction.	I	C
Surgery should be considered in patients with moderate primary TR undergoing left-sided valve surgery.	IIa	C
Surgery should be considered in patients with mild or moderate secondary TR with dilated annulus (≥40 mm or >21 mm/m²) undergoing left-sided valve surgery.	IIa	C
Surgery should be considered in asymptomatic or mildly symptomatic patients with severe isolated primary TR and progressive right ventricular dilatation or deterioration of right ventricular function.	IIa	C
After left-sided valve surgery, surgery should be considered in patients with severe TR who are symptomatic or have progressive right ventricular dilatation/dysfunction, *in the absence* of left-sided valve dysfunction, severe right or left ventricular dysfunction, and severe pulmonary vascular disease.	IIa	C

Table 2 Levels of evidence

Level of evidence A	**Data derived from multiple randomized clinical trials or meta-analyses.**
Level of evidence B	**Data derived from a single randomized clinical trial or large non-randomized studies.**
Level of evidence C	**Consensus of opinion of the experts and/or small studies, retrospective studies, registries.**

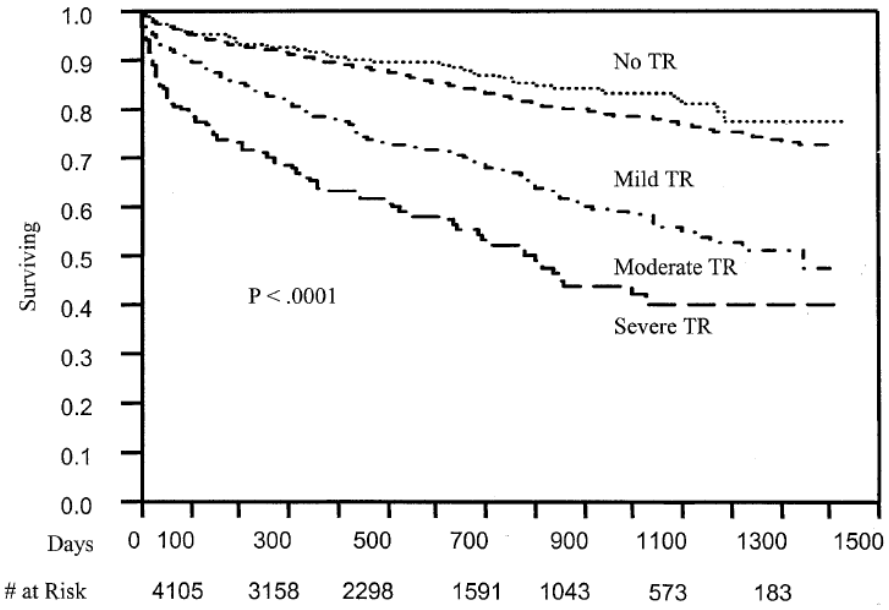


Figure 1. Kaplan-Meier survival curves for all patients with tricuspid regurgitation (TR). Survival is significantly worse in patients with moderate and severe TR.

Nath et al. JACC 2004;43:405-9

Shiran and Sagie, JACC 2009;53:401-8

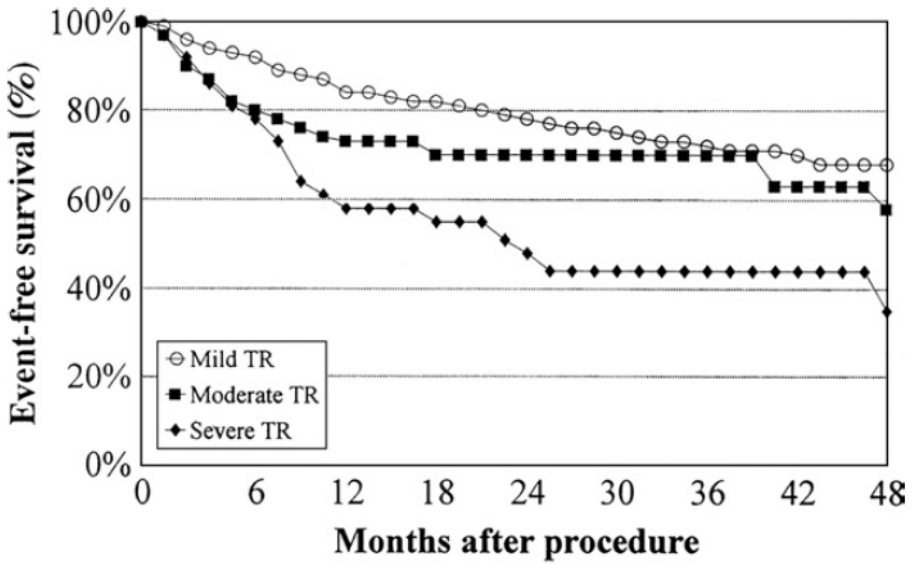
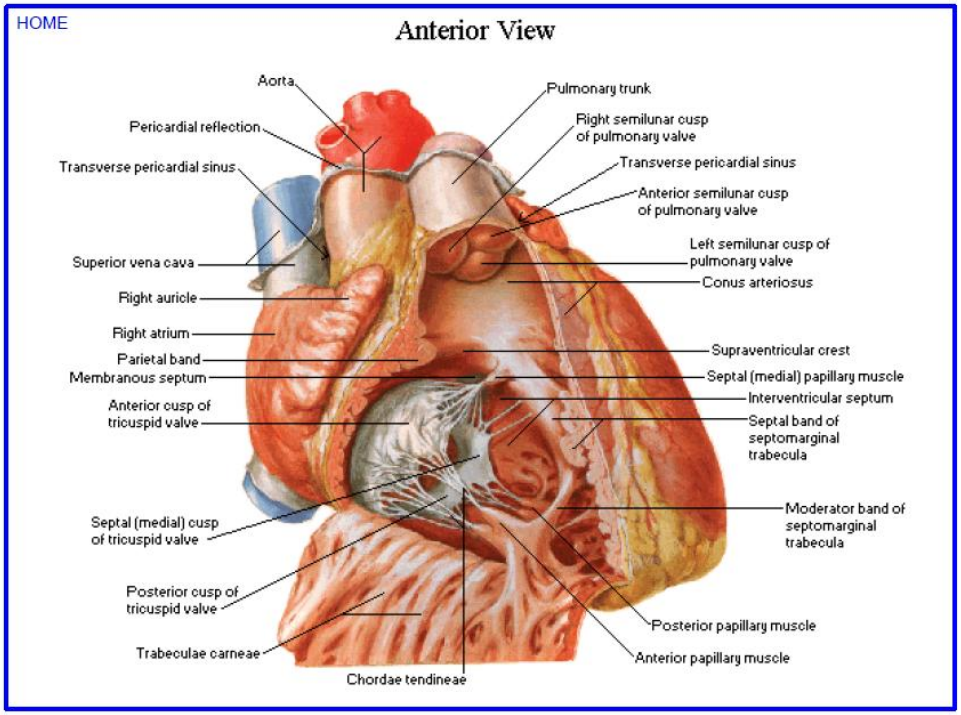
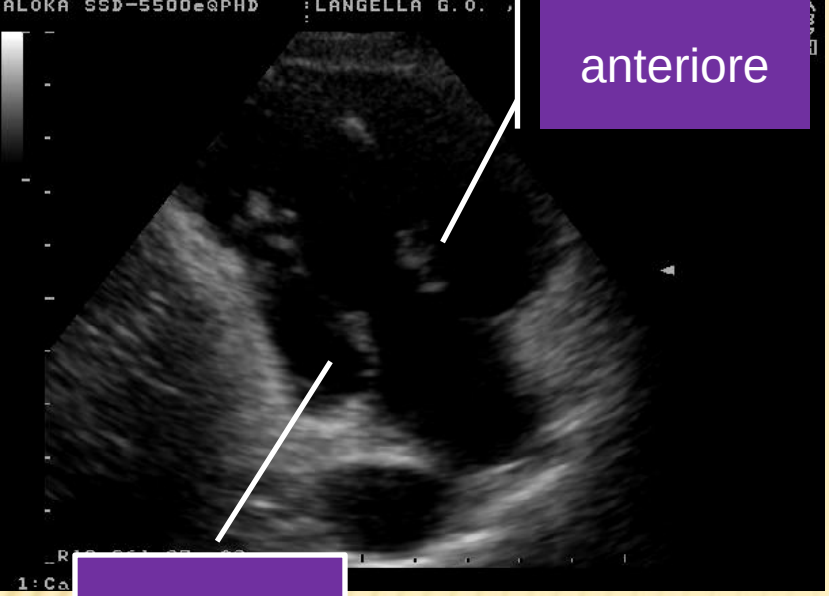


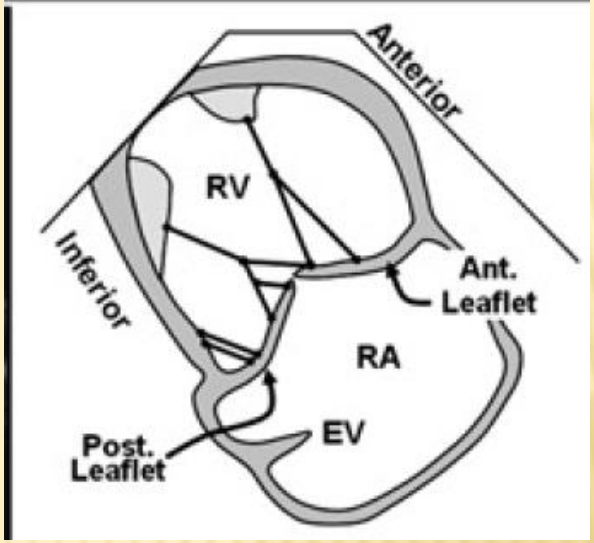
Figure 2 Event-Free Survival After Balloon Mitral Valvotomy by TR Severity

studiare la tricuspide da diversi “punti di vista”

4camere apicale

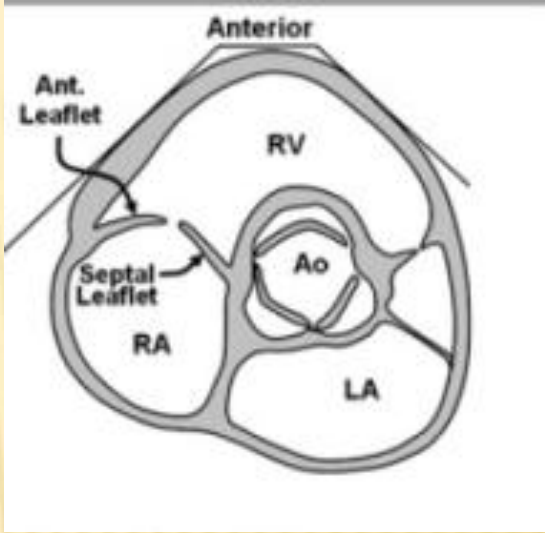




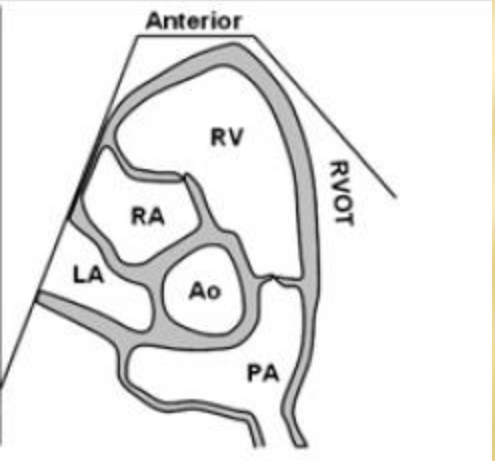


parasternale
long-axis
afflusso dx

parasternale short-axis

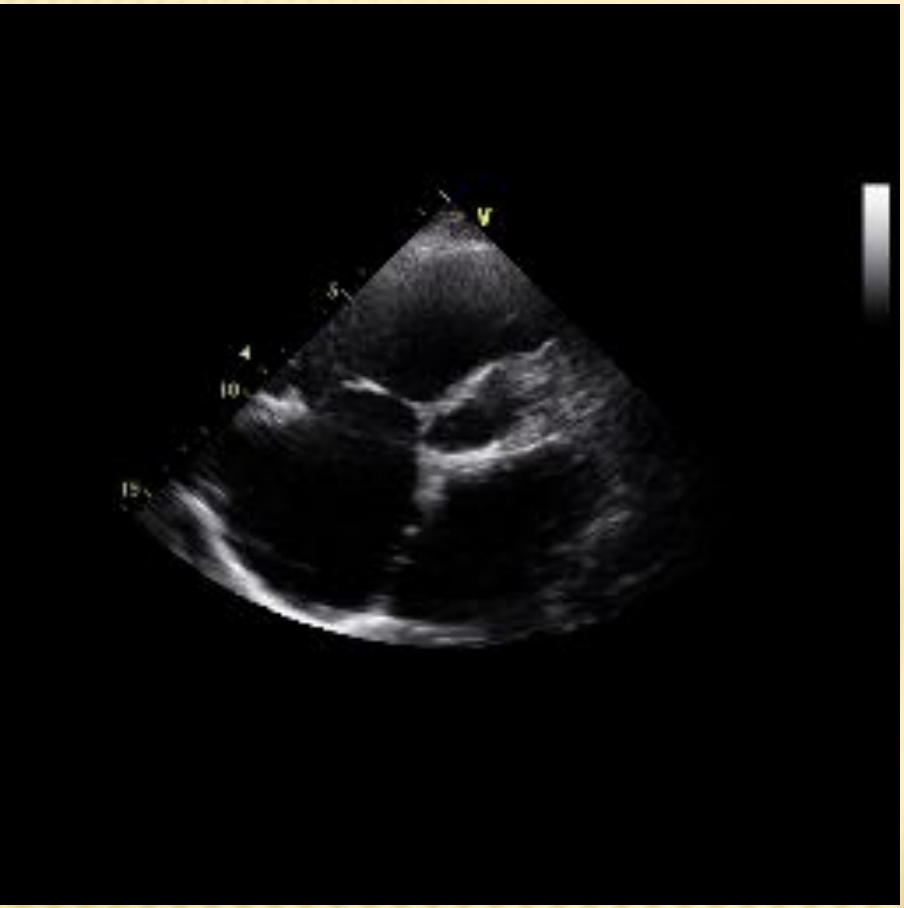


sottocostale

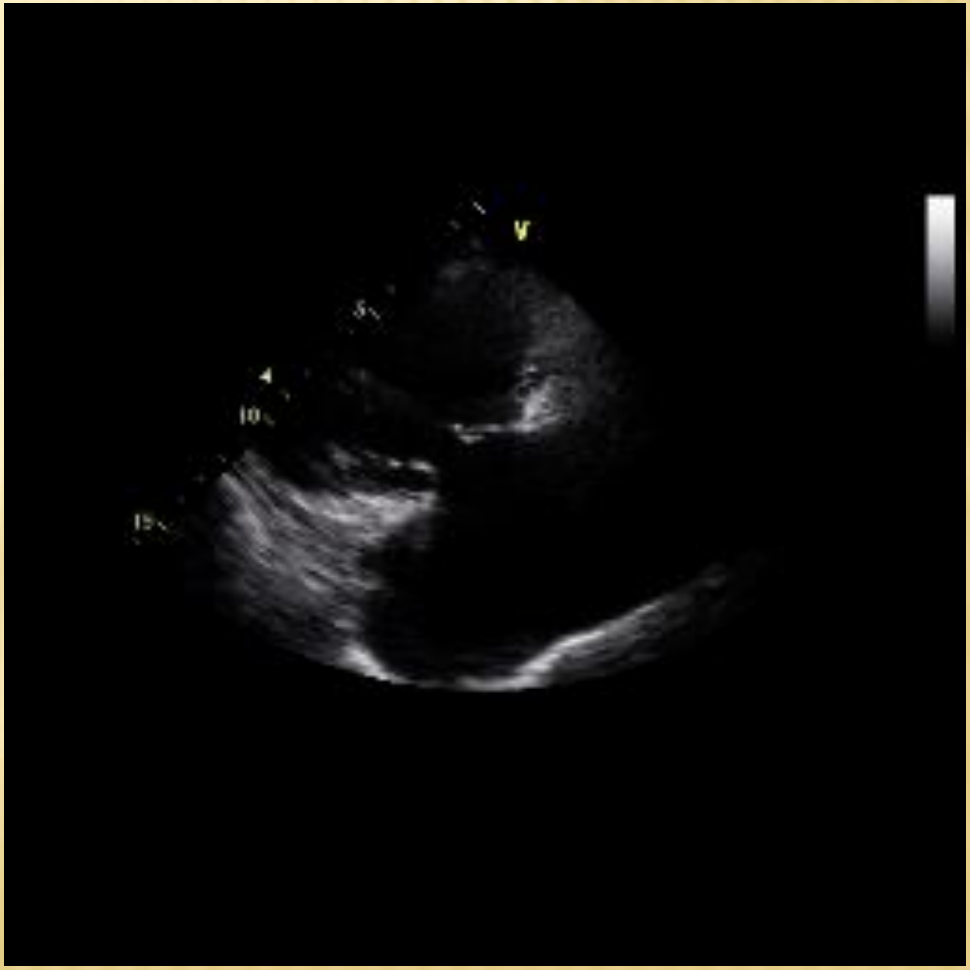


sottocostale
short-axis

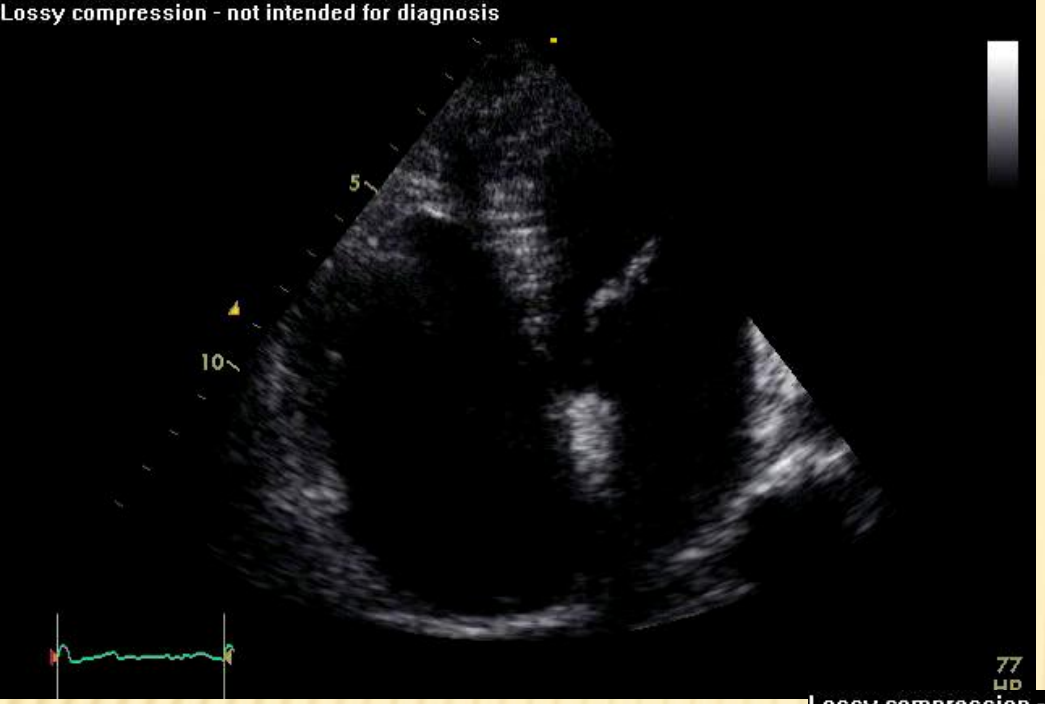
e si scopre che…….



4camere apicale

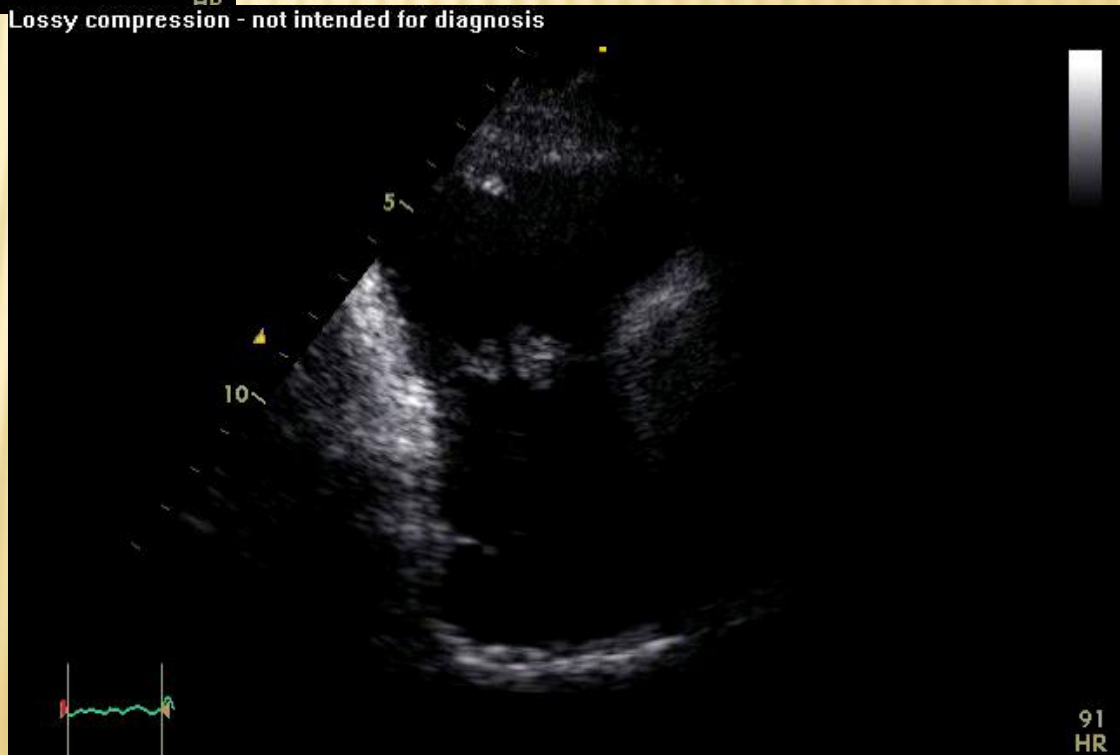


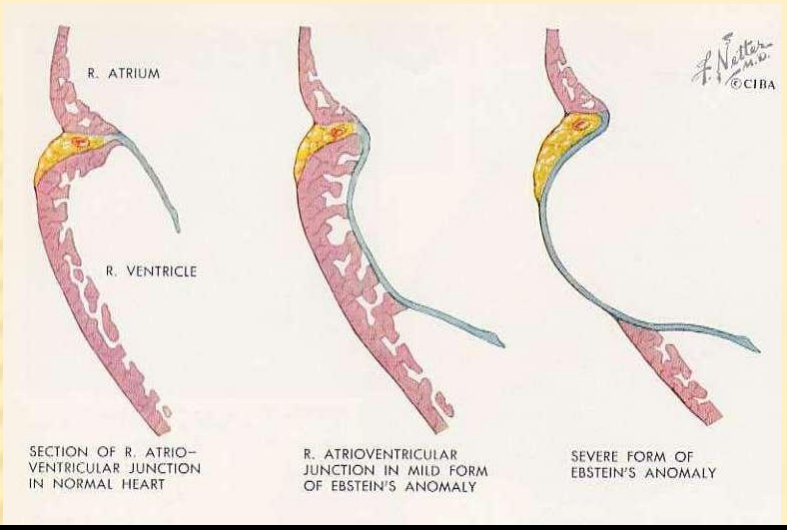
parasternale long-axis afflusso dx

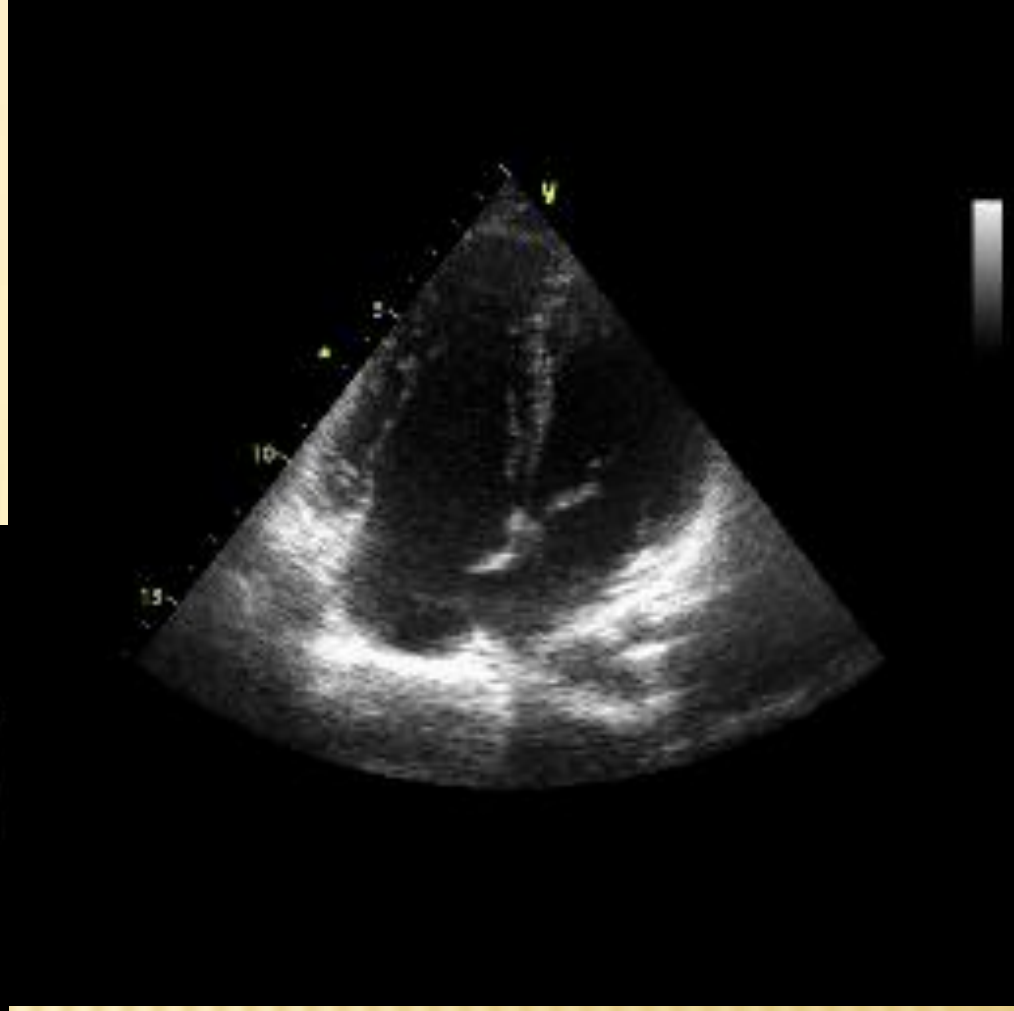


4camere apicale

parasternale long-axis afflusso dx

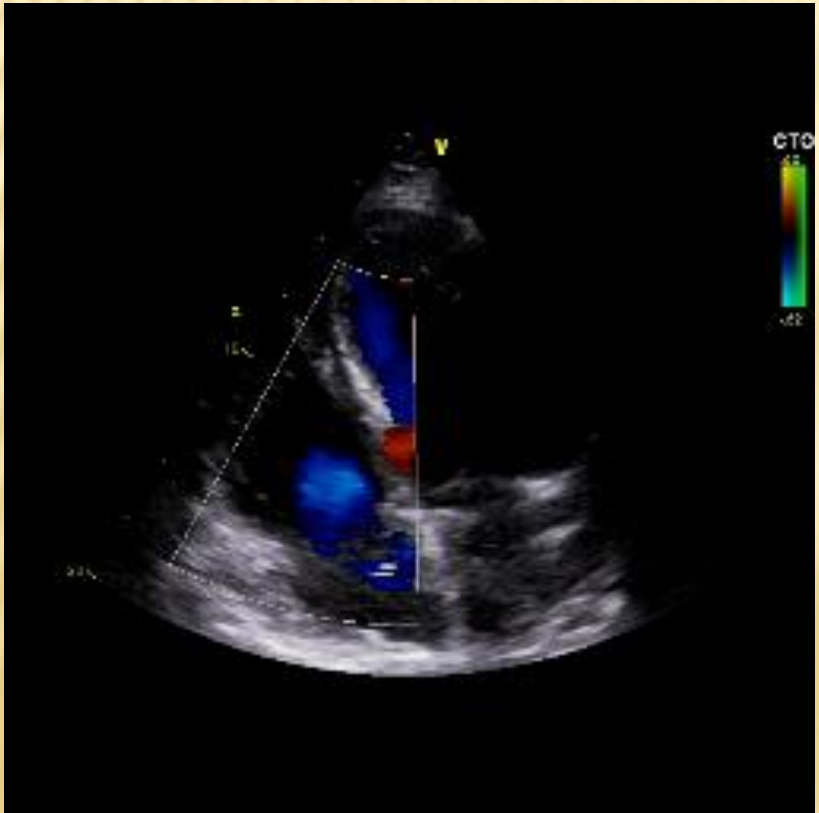


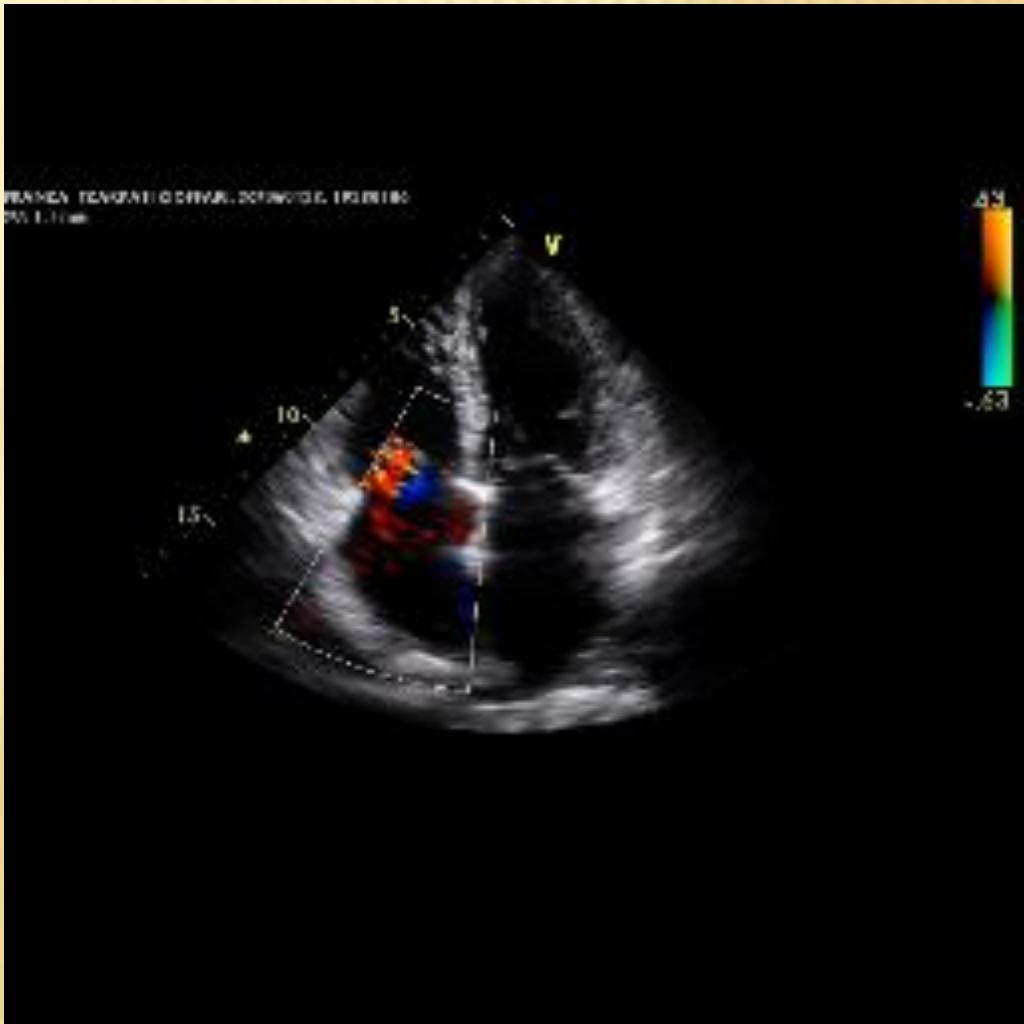




…..fino ad ora senza color!

Insufficienza tricuspidale





INSUFFICIENZA TRICUSPIDALE

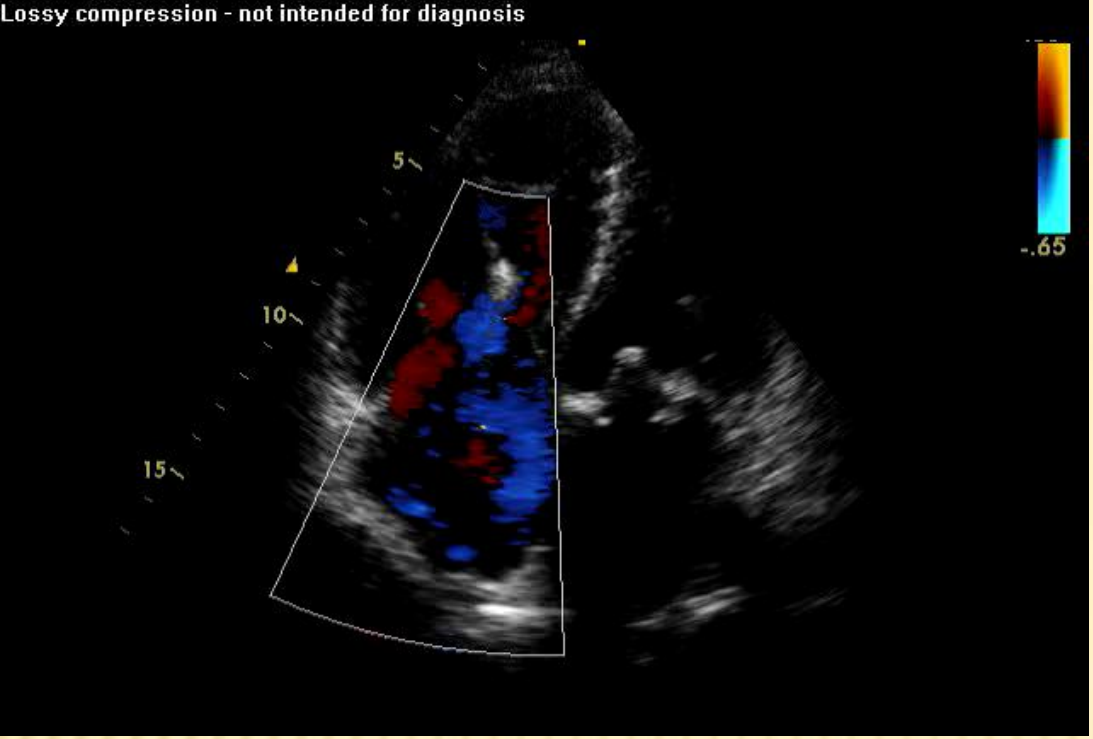
Primitiva (più rara)

- Reumatica
- Endocardite
- Prolasso
- Carcinoide
- Ebstein
- Rottura traumatica

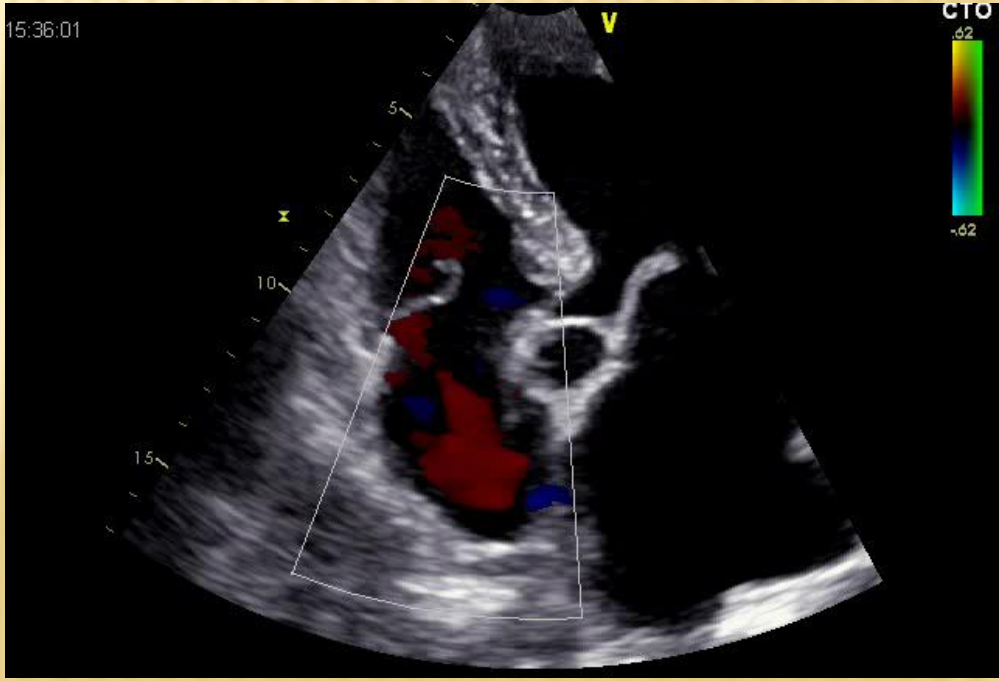
Secondaria (più frequente) (dilatazione anulare e tethering dei lembi)

- Sovraccarico di pressione
  - Patologia cuore sx
  - Cuore polmonare
  - Ipertensione polm. primitiva
- Sovraccarico volume VDx:
  - Difetto interatriale
  - Disfunzione ventricolare dx

- pace maker
- fibrillazione atriale
- età avanzata



Come valutarla?

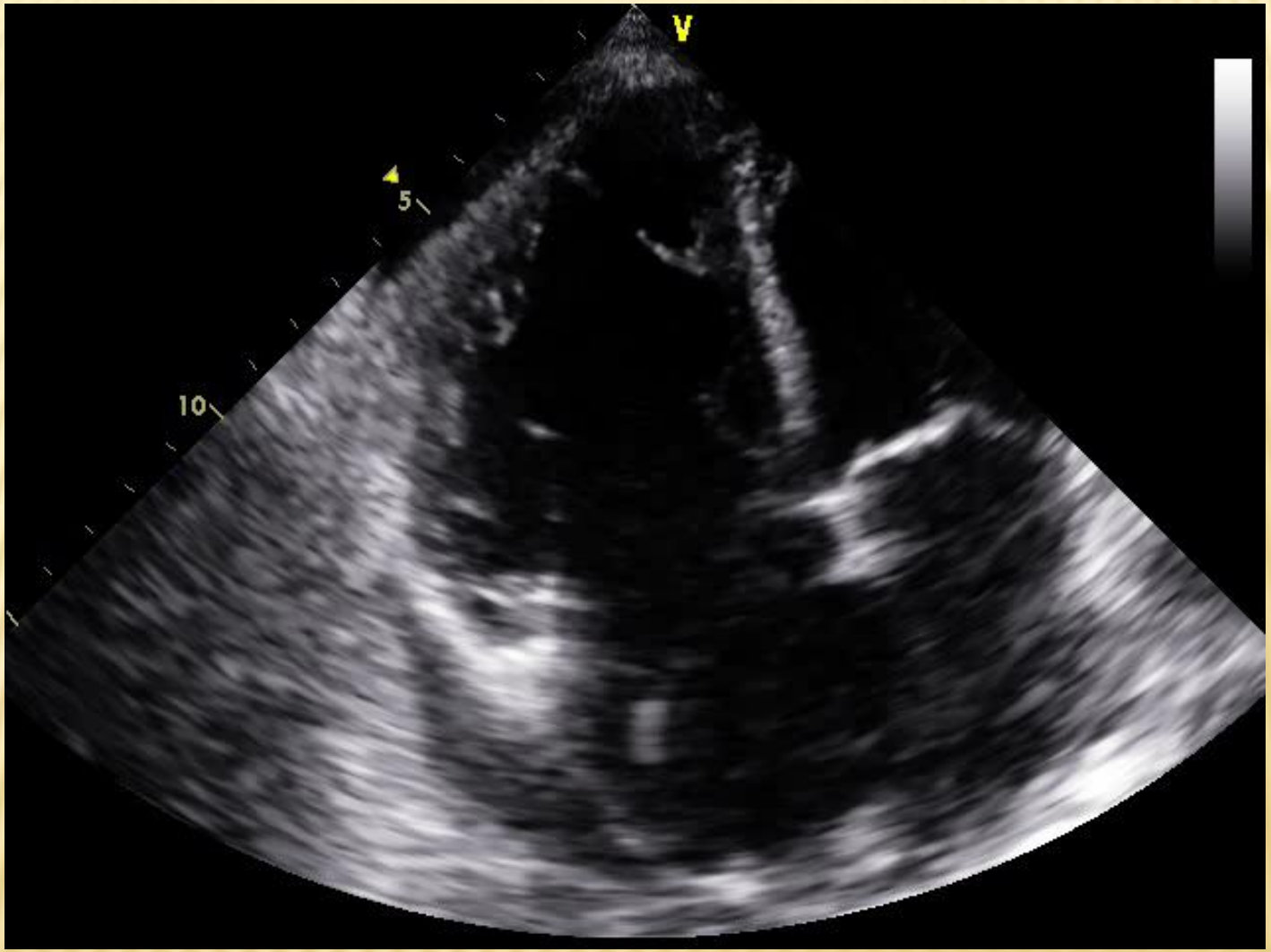


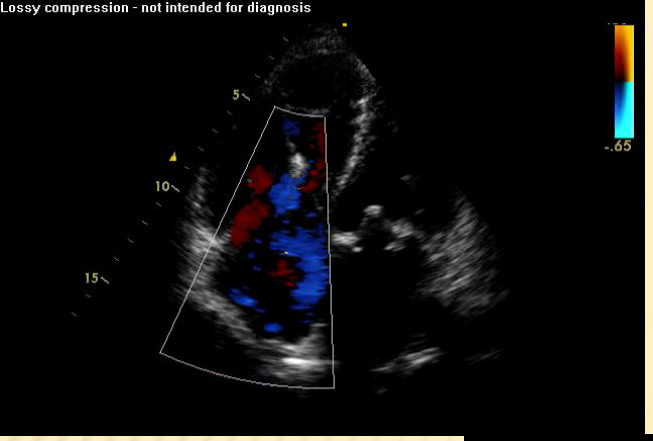
European Journal of Echocardiography (2010) **11**, 307–332
doi:10.1093/ejechocard/jeq031

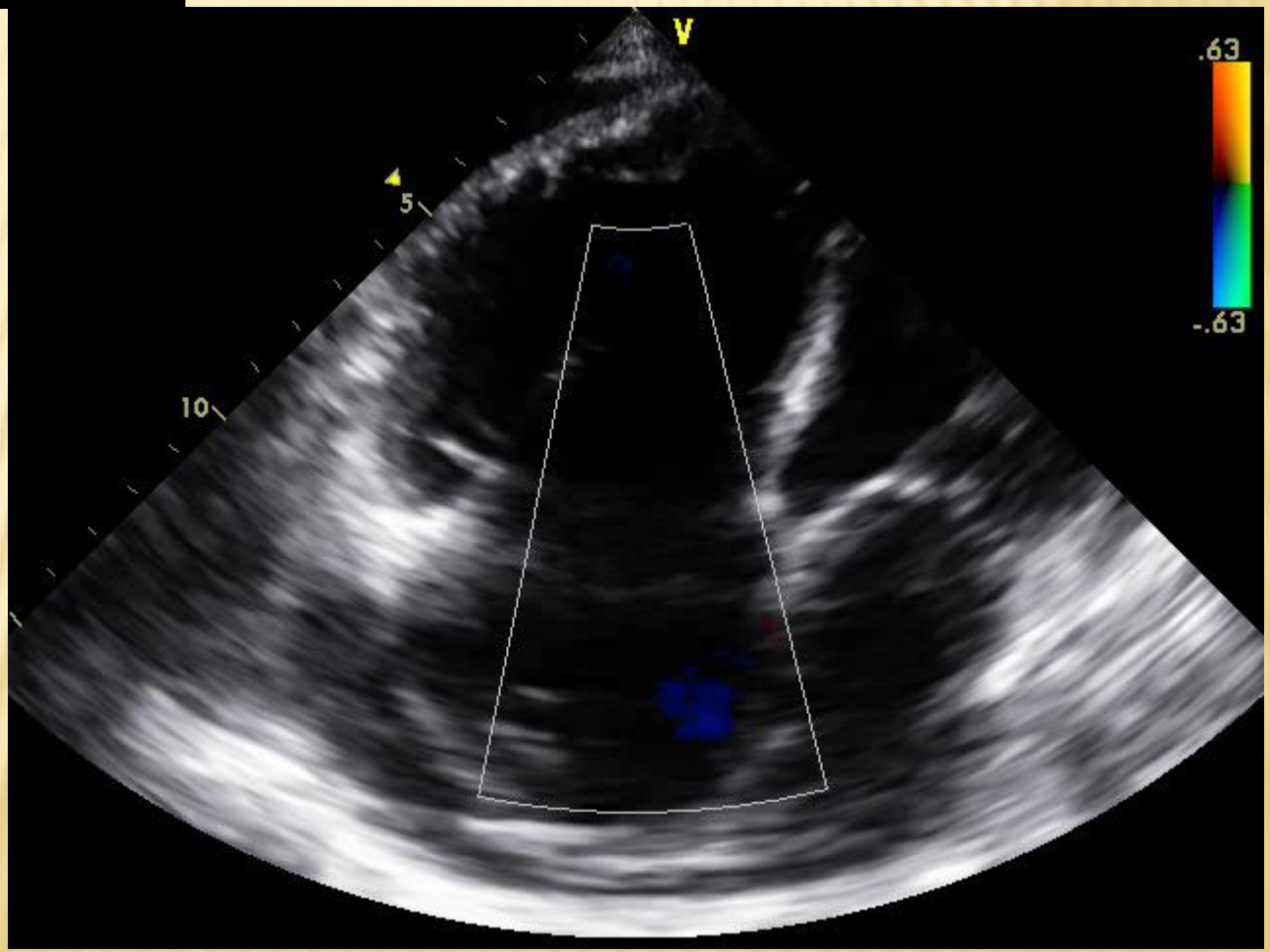
European Association of Echocardiography recommendations for the assessment of valvular regurgitation. Part 2: mitral and tricuspid regurgitation (native valve disease)

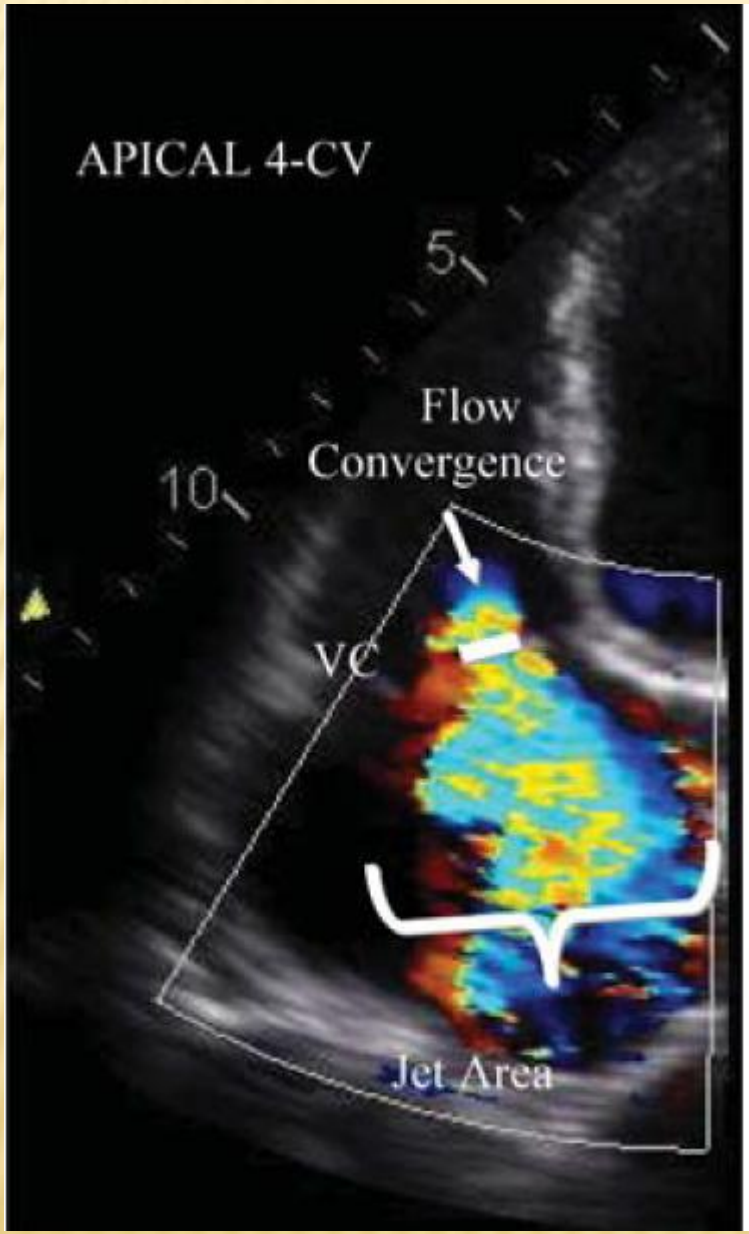
Patrizio Lancellotti (Chair)[1]*, Luis Moura[2], Luc A. Pierard[1], Eustachio Agricola[3], Bogdan A. Popescu[4], Christophe Tribouilloy[5], Andreas Hagendorff[6], Jean-Luc Monin[7], Luigi Badano[8], and Jose L. Zamorano[9] on behalf of the European Association of Echocardiography

The colour flow area of the regurgitant jet is not recommended to quantify the severity of TR. The colour flow imaging should only be used for diagnosing TR. A more quantitative approach is required when more than a small central TR jet is observed.

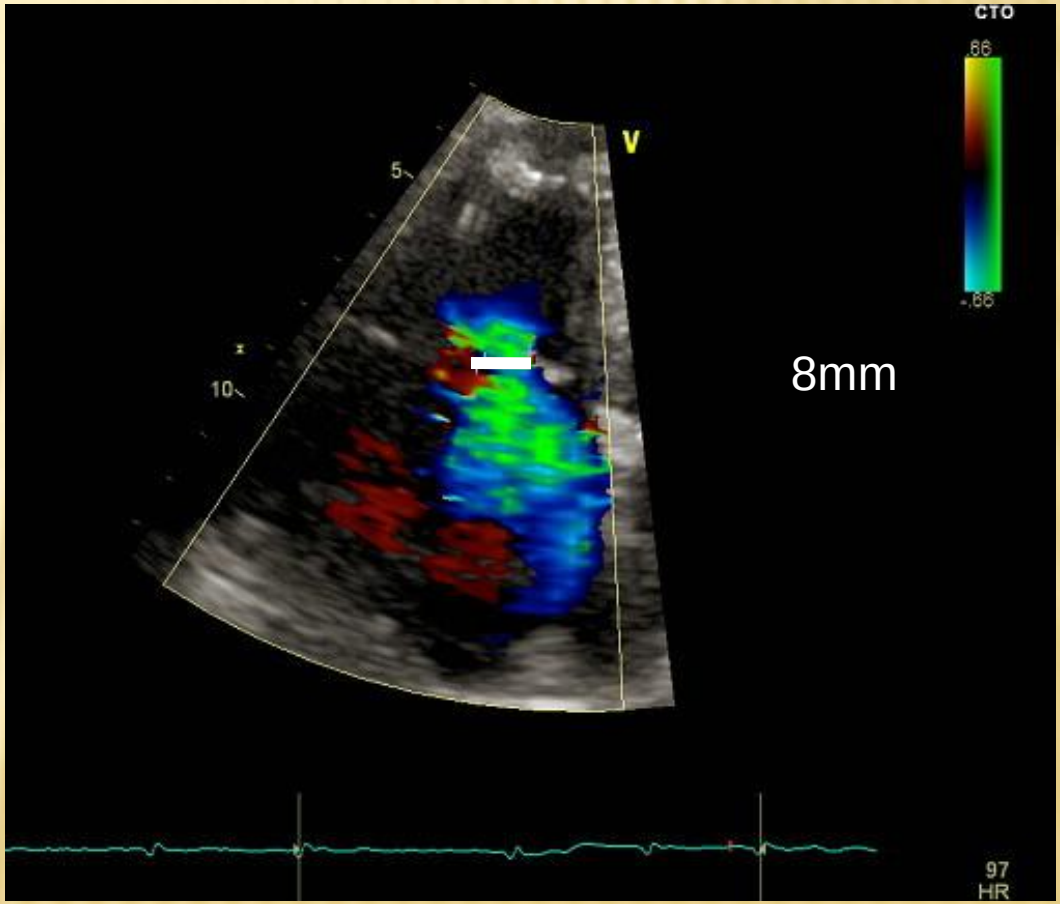

V
5
10


Lossy compression - not intended for diagnosis
5
10
15
.65


V
5
10
.63
-.63



Vena contracta
≥ 7 mm: IT severa
< 6 mm: IT moderata o lieve



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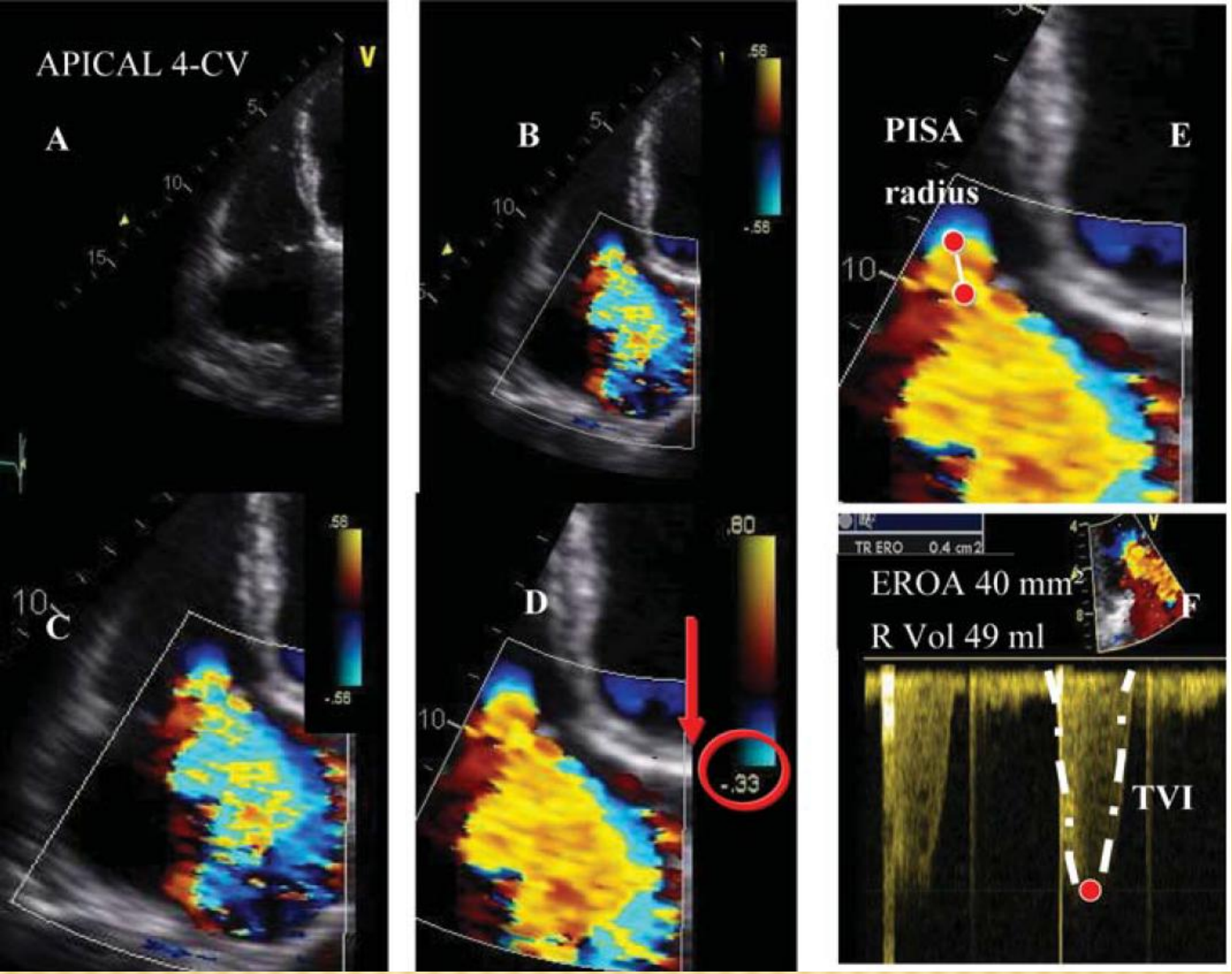
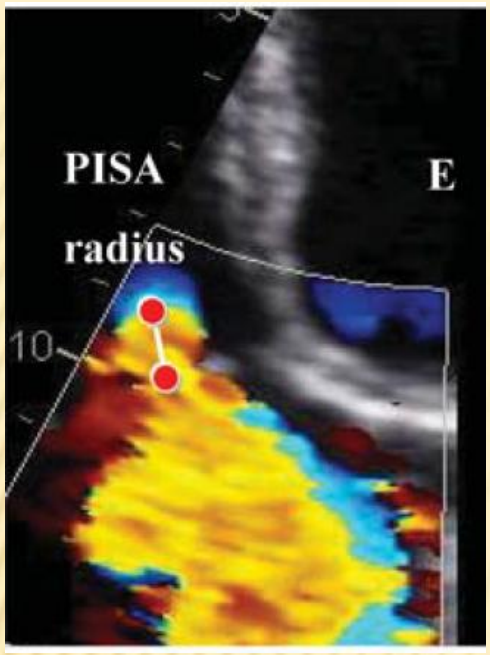


PISA

ERO ≥ 40 mm^2
Vol R≥ 45 ml
x IT severa

ESC 2010



raggio PISA (a 28 cm/s Nyquist)

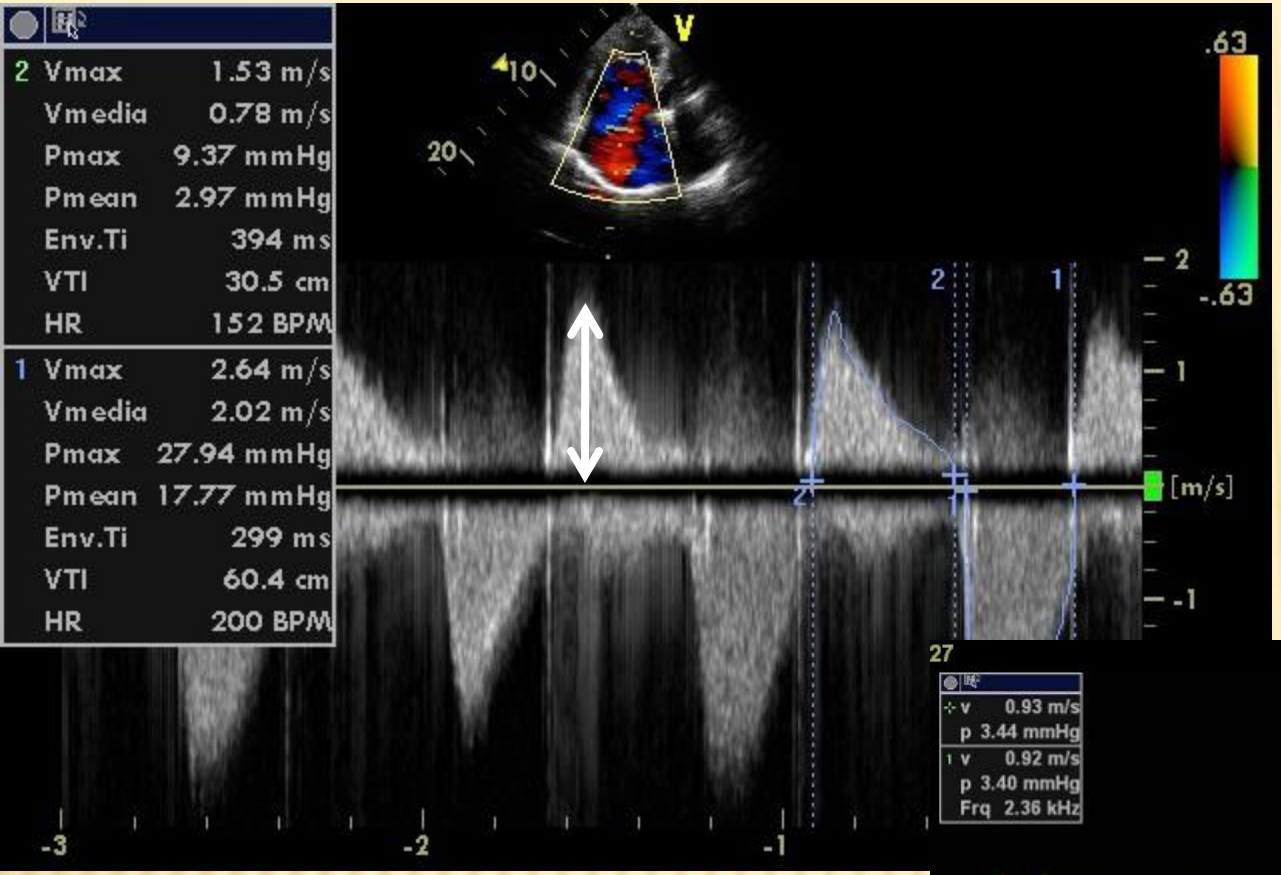
> 9 mm

IT severa

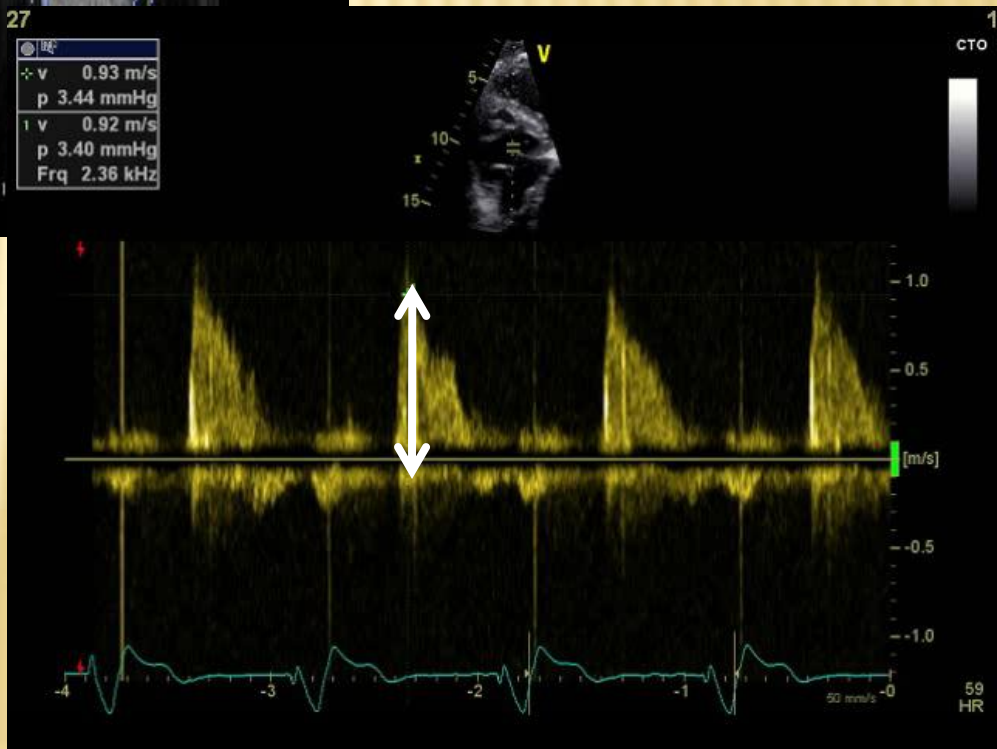
< 5 mm

IT lieve

ESC 2010



Onda E ≥ 1m/s:
IT severa



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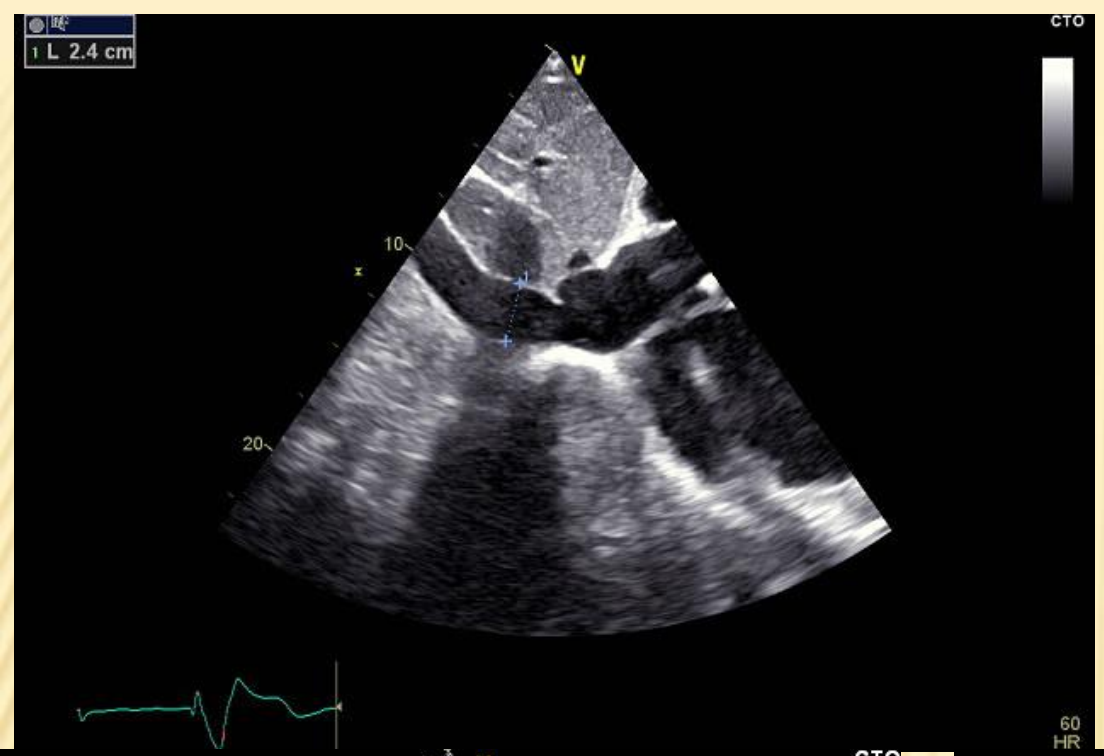
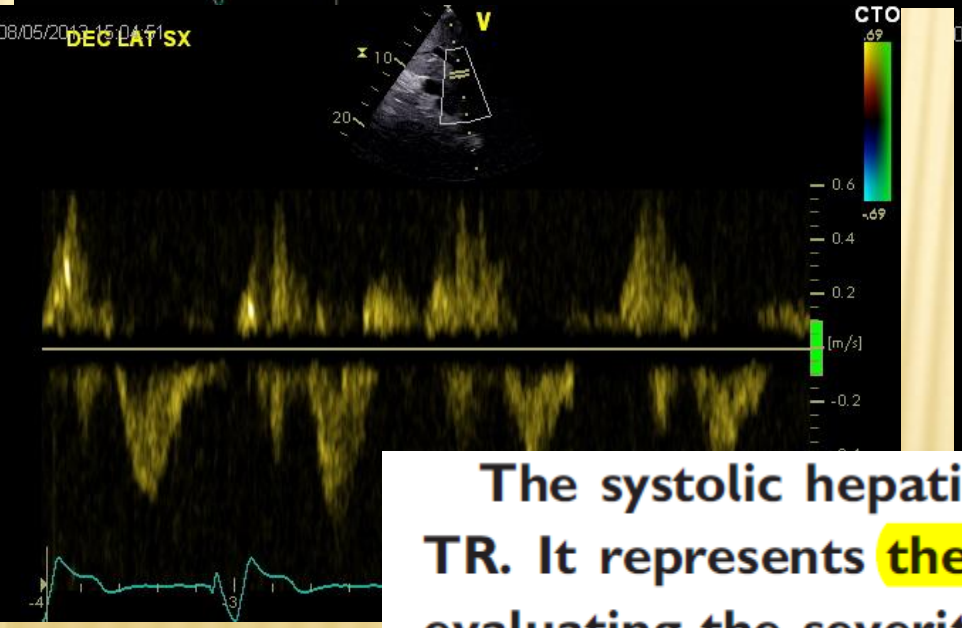
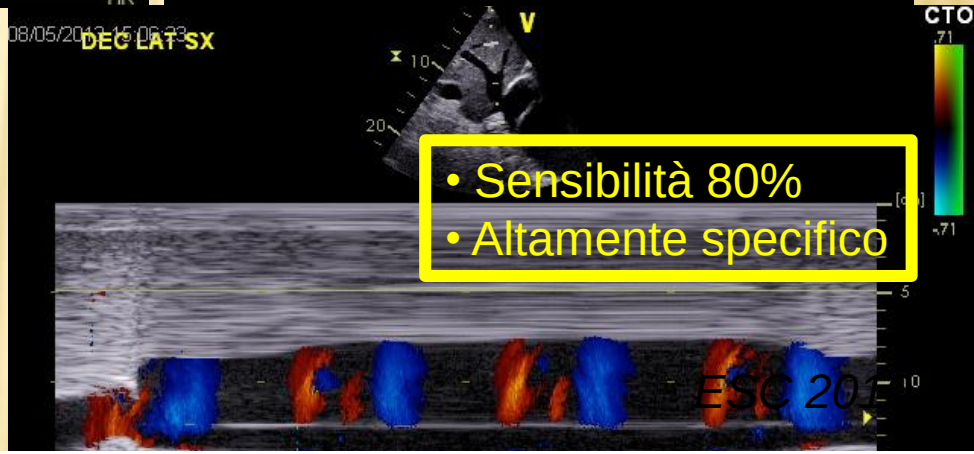




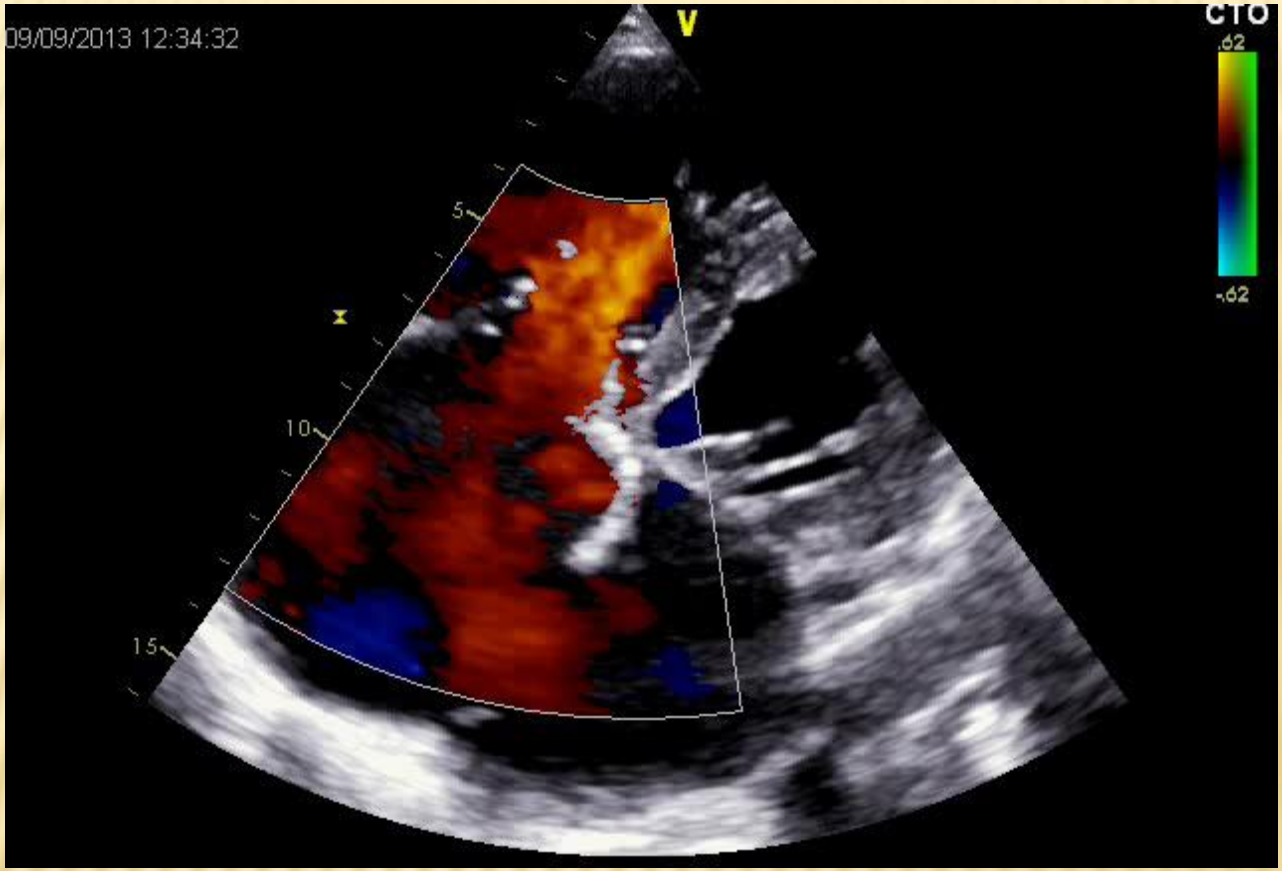


- Sensibilità 80%
- Altamente specifico

ESC 201

The systolic hepatic flow reversal is specific for severe TR. It represents **the strongest** additional parameter for evaluating the severity of TR.

CONTRO I TRANELLI DEL COLOR.....



4 camere

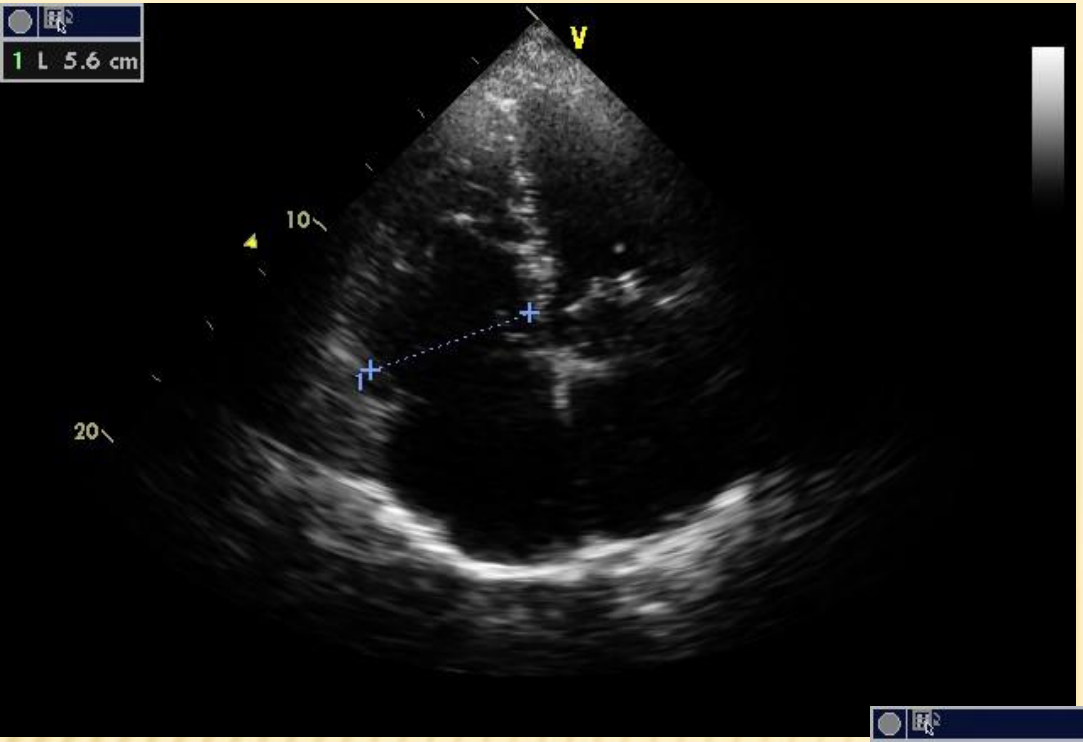
parasternale
afflusso dx

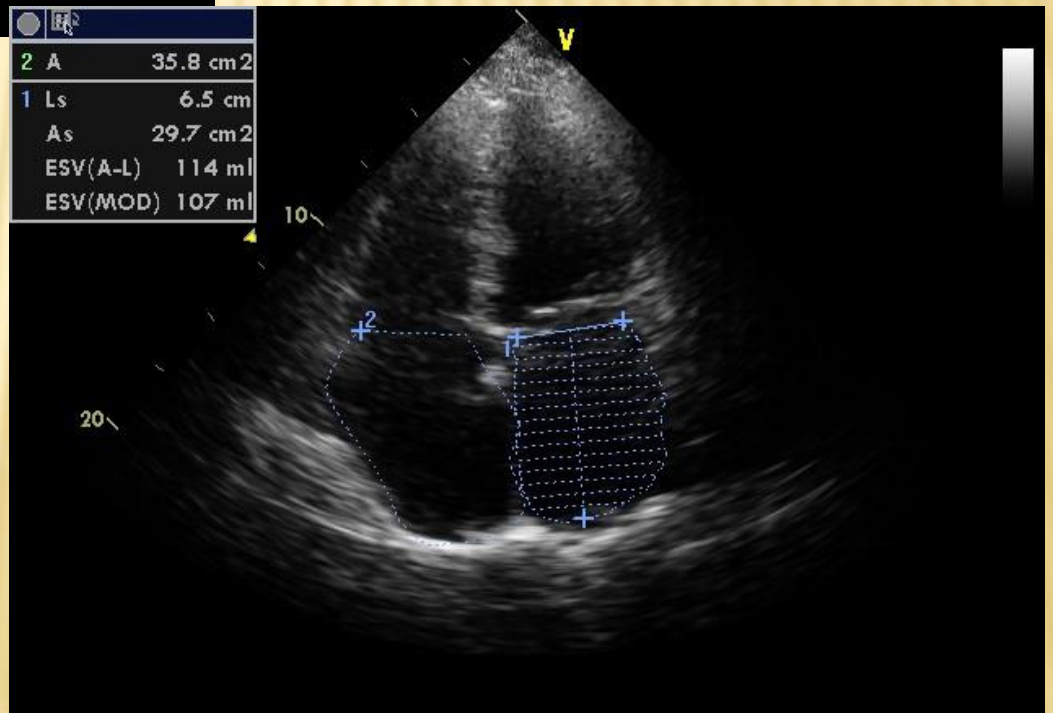
...IL SOCCORSO DI CLINICA

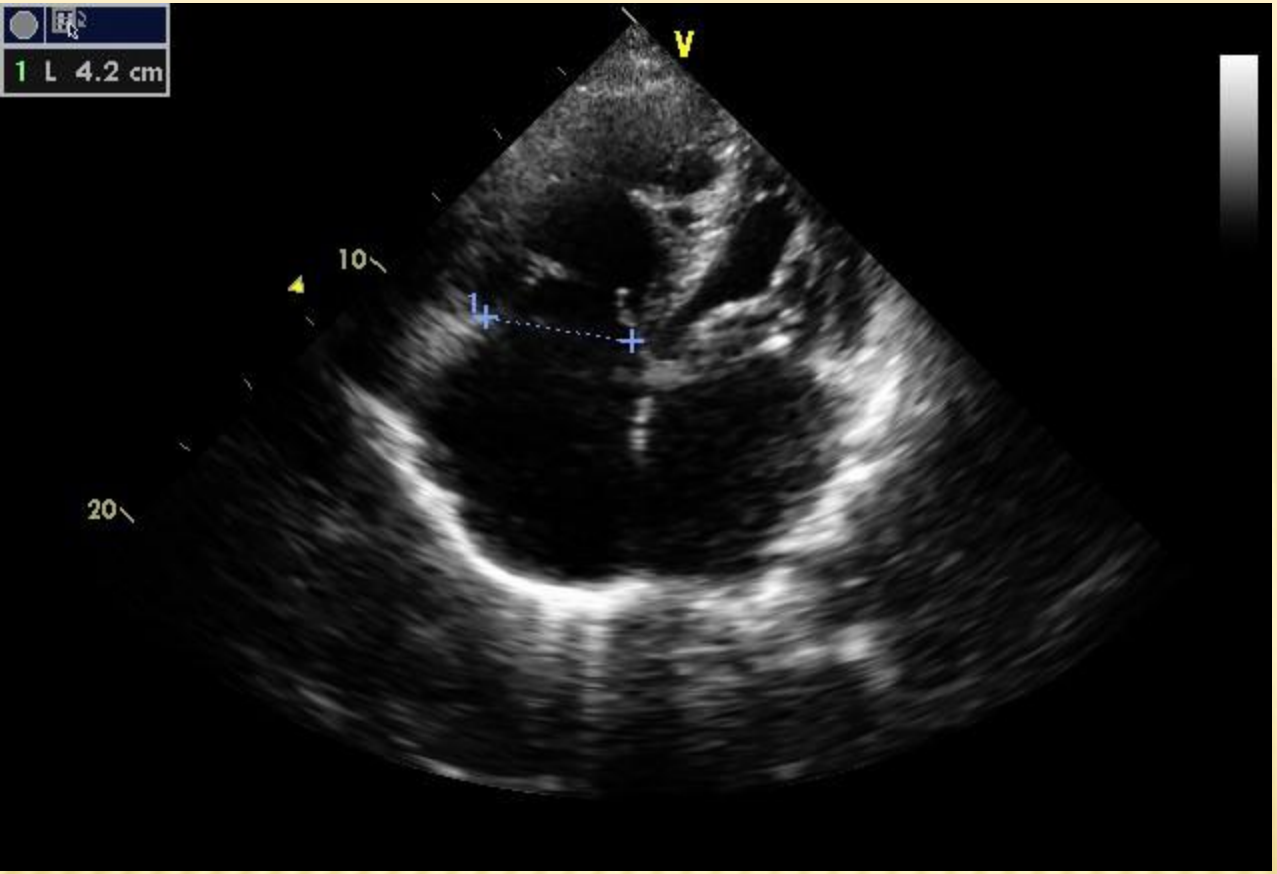
epatomegalia pulsante

... E VALUTAZIONE POLIPARAMETRICA

ESC 2012
ESC 2010


1 L 5.6 cm
V
10
20
1


2 A 35.8 cm2
1 Ls 6.5 cm
As 29.7 cm2
ESV(A-L) 114 ml
ESV(MOD) 107 ml
V
10
20
2
1

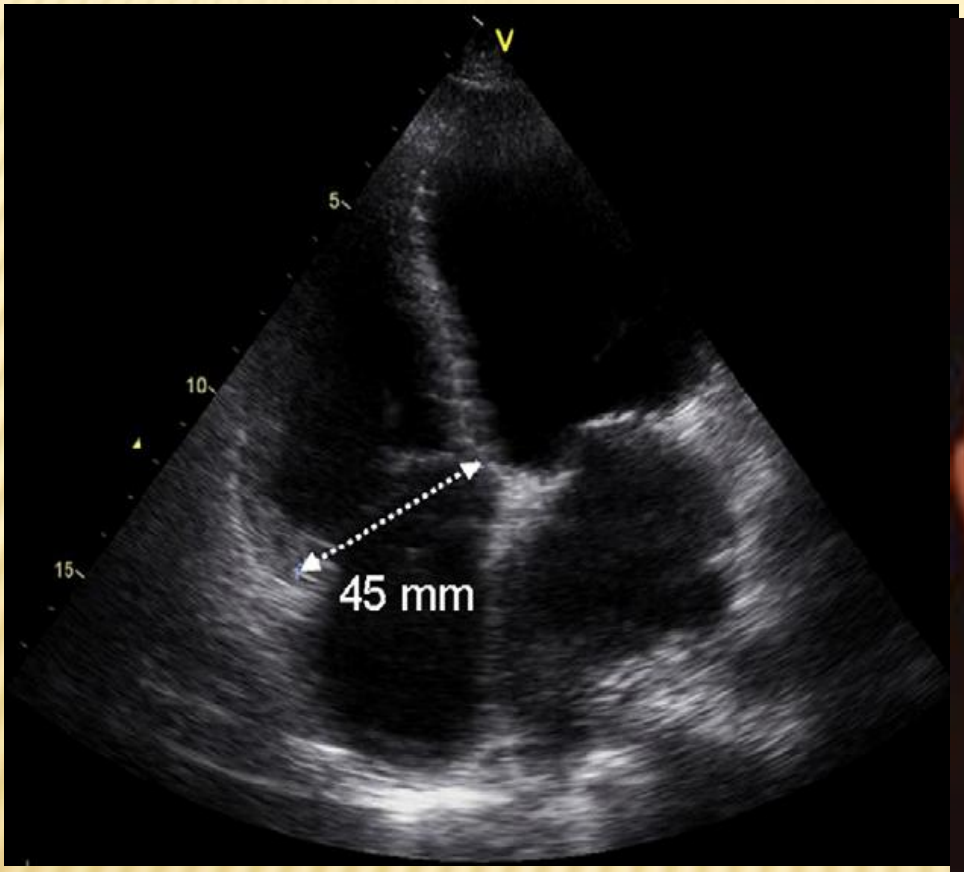


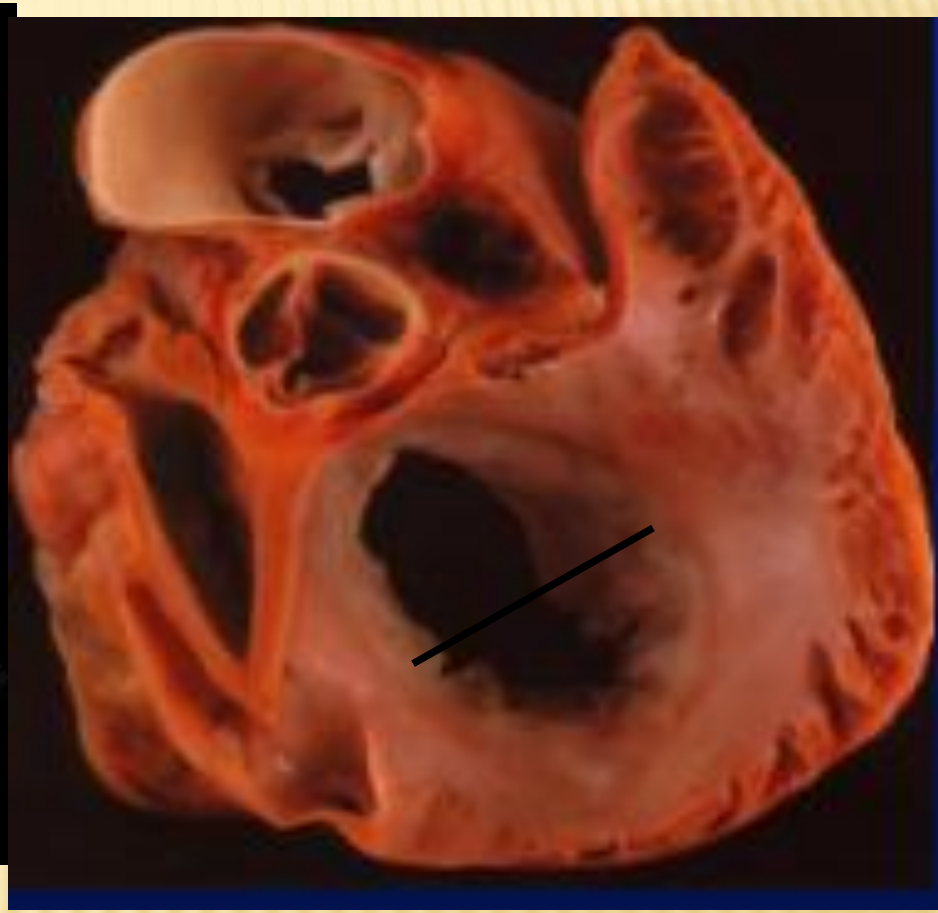
- Anulus tricuspidale : v.n. 28 mm ± 5
- La sua area si riduce in sistole del 25%

- Dilatazione significativa: > 35 mm o 21 mm/m^2BSA

ESC 2010

Surgical view





≥ 4 cm or 21 mm/m2

septal to anterior leaflet distance

Table 16 Indications for tricuspid valve surgery

	Class [a]	Level [b]
Surgery is indicated in symptomatic patients with severe TS.[c]	I	C
Surgery is indicated in patients with severe TS undergoing left-sided valve intervention.[d]	I	C
Surgery is indicated in patients with severe primary or secondary TR undergoing left-sided valve surgery.	I	C
Surgery is indicated in symptomatic patients		
Surgery should be considered in patients with mild or moderate secondary TR with dilated annulus (≥40 mm or >21 mm/m²) undergoing left-sided valve surgery.	IIa	C
Surgery should be considered in asymptomatic or mildly symptomatic patients with severe isolated primary TR and progressive right ventricular dilatation or deterioration of right ventricular function.	IIa	C
After left-sided valve surgery, surgery should be considered in patients with severe TR who are symptomatic or have progressive right ventricular dilatation/dysfunction, *in the absence* of left-sided valve dysfunction, severe right or left ventricular dysfunction, and severe pulmonary vascular disease.	IIa	C

ESC valvulopatie 2012

Table 5 **Grading the severity of TR**

Parameters	Mild	Moderate	Severe
Qualitative			
Tricuspid valve morphology	Normal/abnormal	Normal/abnormal	Abnormal/flail/large coaptation defect
Colour flow TR jet[a]	Small, central	Intermediate	Very large central jet or eccentric wall impinging jet
CW signal of TR jet	Faint/Parabolic	Dense/Parabolic	Dense/Triangular with early peaking (peak <2 m/s in massive TR)
Semi-quantitative			
VC width (mm)[a]	Not defined	<7	≥ 7
PISA radius (mm)[b]	≤ 5	6–9	>9
Hepatic vein flow[c]	Systolic dominance	Systolic blunting	Systolic flow reversal
Tricuspid inflow	Normal	Normal	*E* wave dominant (≥ 1 cm/s)[d]
Quantitative			
EROA (mm^2)	Not defined	Not defined	≥ 40
R Vol (mL)	Not defined	Not defined	≥ 45
+ RA/RV/IVC dimension[e]			

ESC 2010

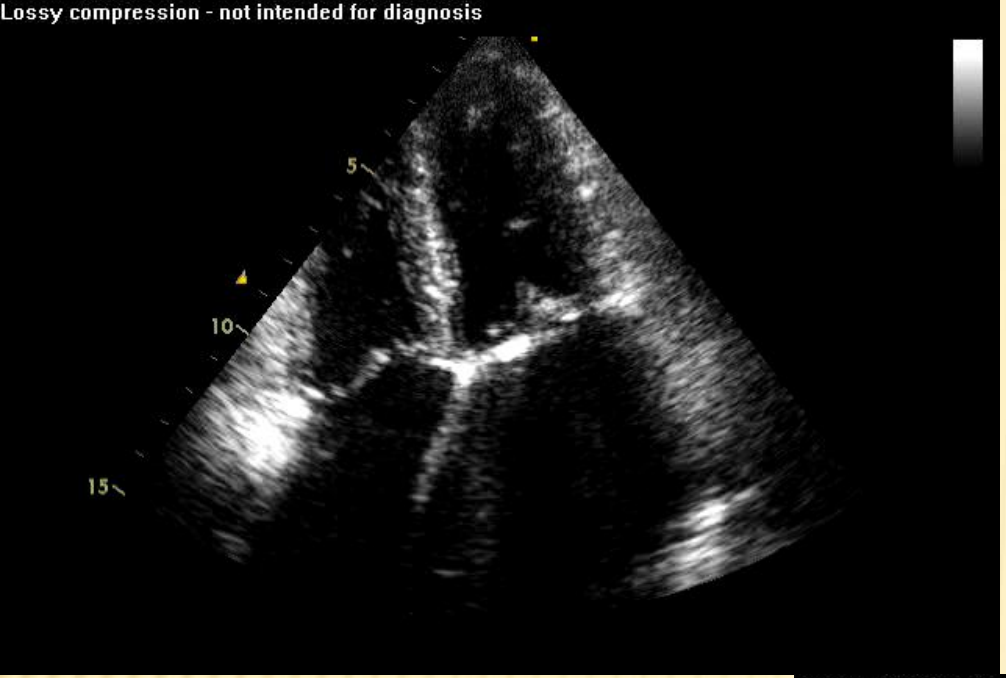
Table 6 Echocardiographic parameters used to quantify tricuspid regurgitation severity: recordings, advantages, and lim

Table 6 Echocardiographic parameters used to quantify tricuspid regurgitation severity: recordings, advantages, and limitations

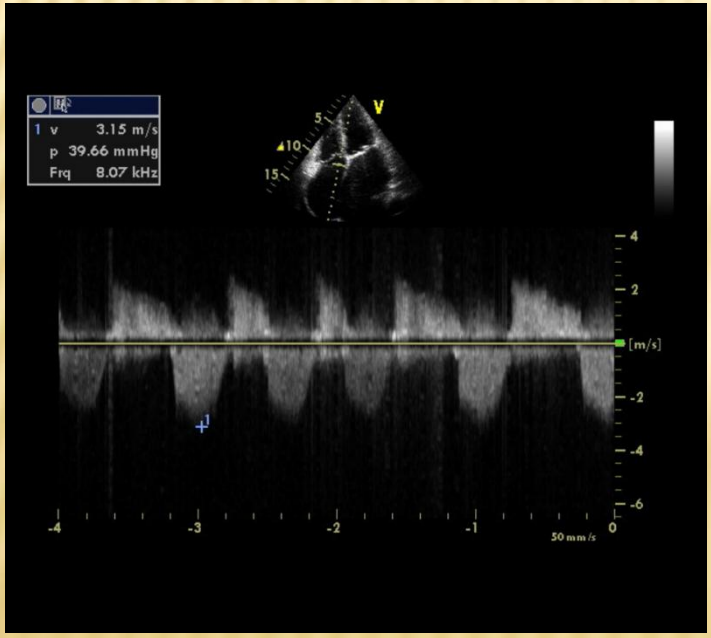
Parameters	Recordings	Usefulness/advantages	Limitations
Tricuspid valve morphology	• Visual assessment • Multiple views	• Flail valve is specific for significant TR	• Other abnormalities are non-specific of significant TR
Tricuspid annulus diameter	• Apical four-chamber view • Lateral inner edge to septal inner edge	• Dilatation sensitive for severe TR	• Dilatation seen in other conditions • Need to be confirmed in further studies
Colour flow TR jet	• Optimize colour gain/scale • Evaluate in two views • Need blood pressure evaluation	• Ease of use • Evaluates the spatial orientation of TR jet • Good screening test for mild vs. severe TR	• Can be inaccurate for estimation of TR severity • Influenced by technical and haemodynamic factors • Underestimates eccentric jet adhering the RA wall (Coanda effect)
	valve • Decrease the Nyquist limit (colour flow zero baseline) • With the cine mode select the best PISA • Display the colour off and on to visualize the TR orifice • Measure the PISA radius at mid-systole using the first aliasing and along the direction of the ultrasound beam • Measure TR peak velocity and TVI (CW) • Calculate flow rate, EROA, R Vol	• Quantitative: estimate lesion severity (EROA) and volume overload (R Vol) • Large flow convergence at 28 cm/s alerts to significant TR	– by systolic changes in regurgitant flow – by adjacent structures (flow constrainment) • Errors in PISA radius measurement are squared • Inter-observer variability • Validated in only few studies
CW TR jet profile	• Apical four-chamber	• Simple, easily available	• Qualitative, Complementary finding • Complete signal difficult to obtain in eccentric jet
Hepatic vein flow	• Subcostal view • Sample volume of PW places into the hepatic vein	• Simple • Systolic flow reversal is specific for severe TR	• Affected by RA pressure, atrial fibrillation
Peak *E* velocity	• Apical four-chamber • Sample volume of PW places at tricuspid leaflet tips	• Simple, easily available • Usually increased in severe TR	• Affected by RA pressure, atrial fibrillation, RV relaxation • Complementary finding

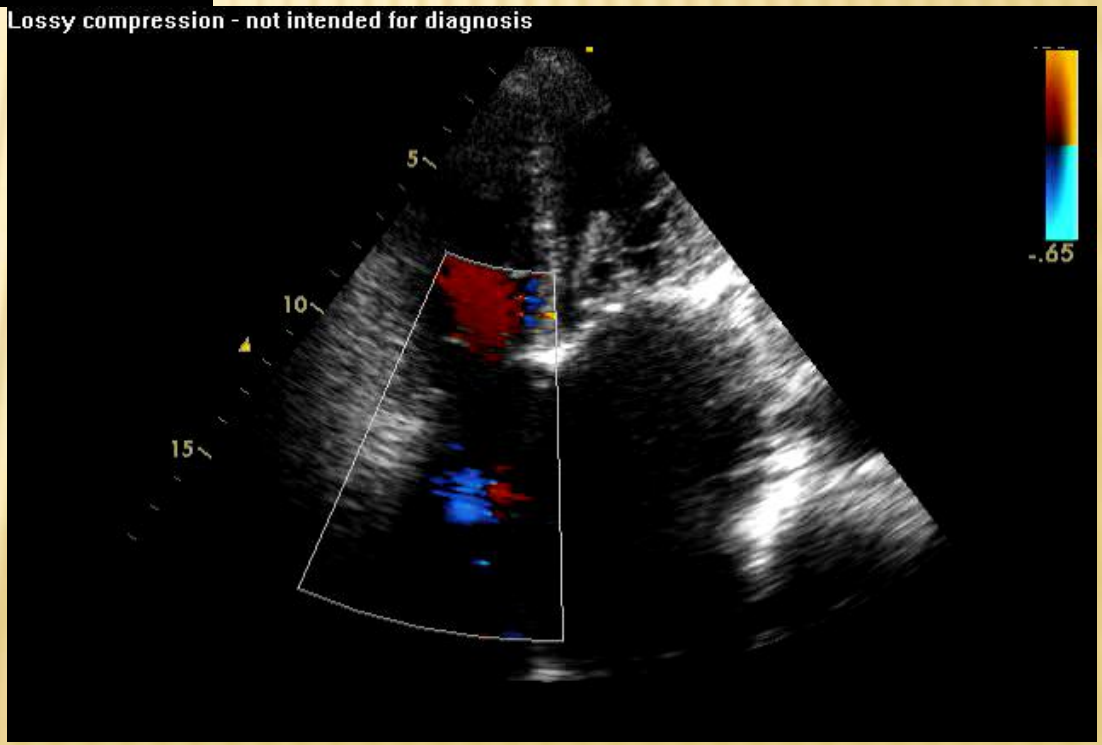
Continued

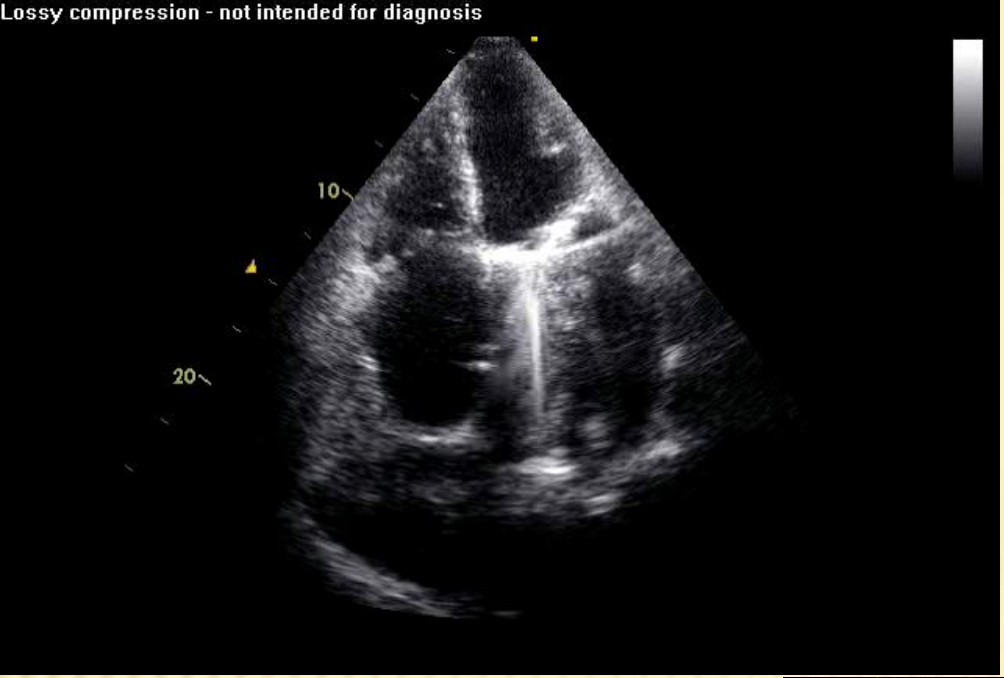
ESC 2010



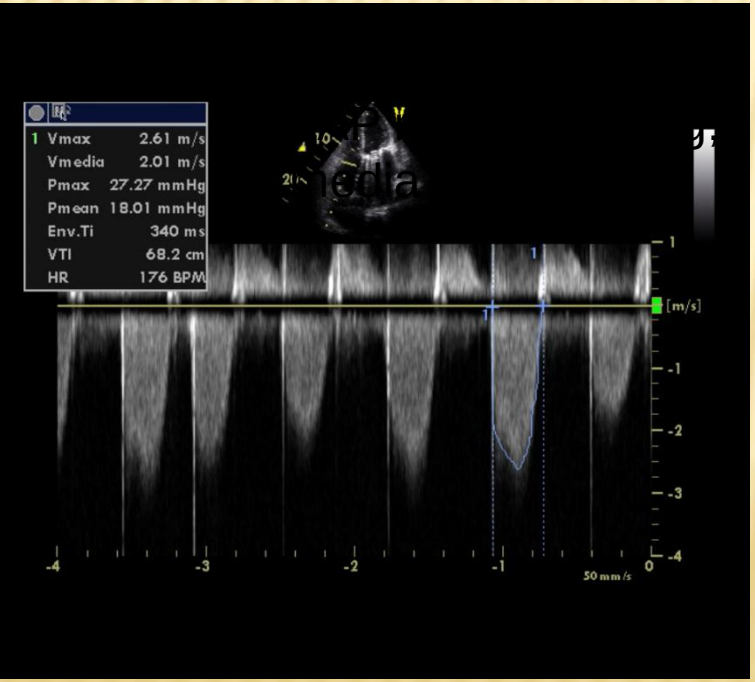
F
67 anni
Valvulopatia reumatica

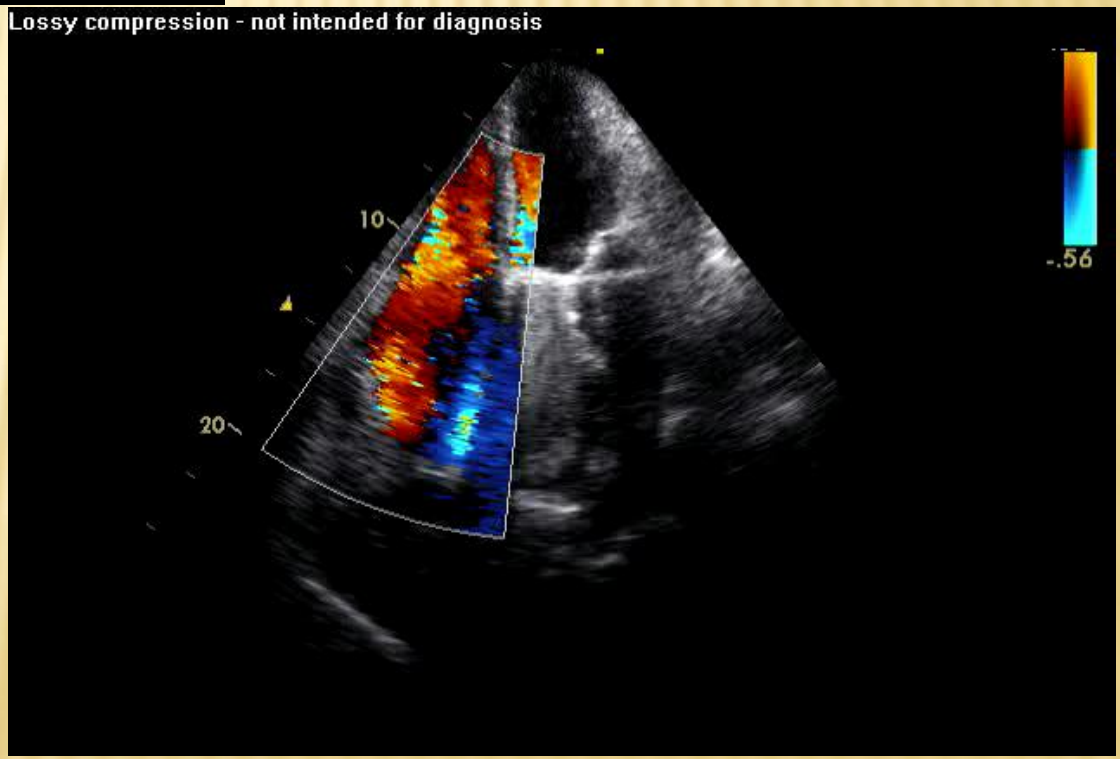


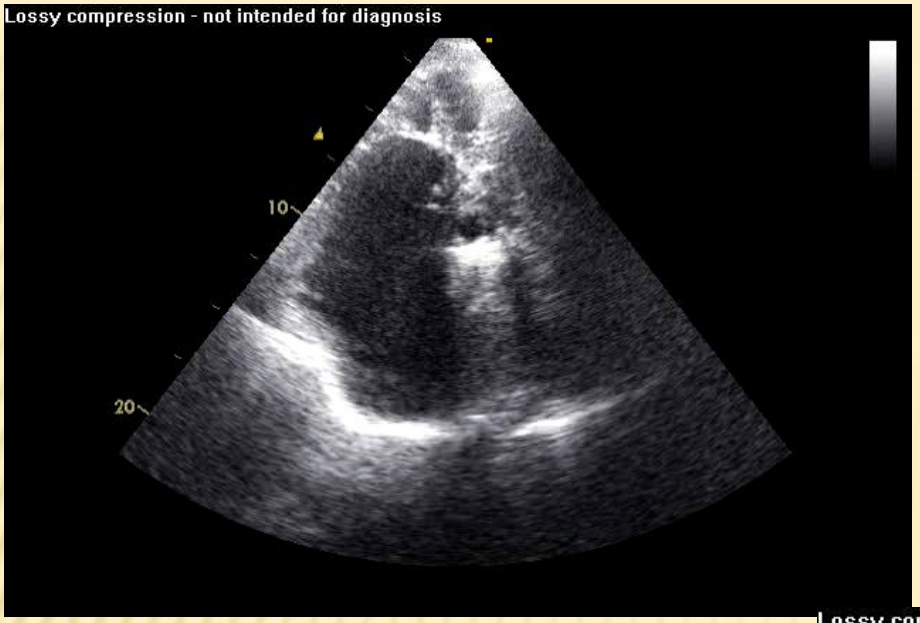




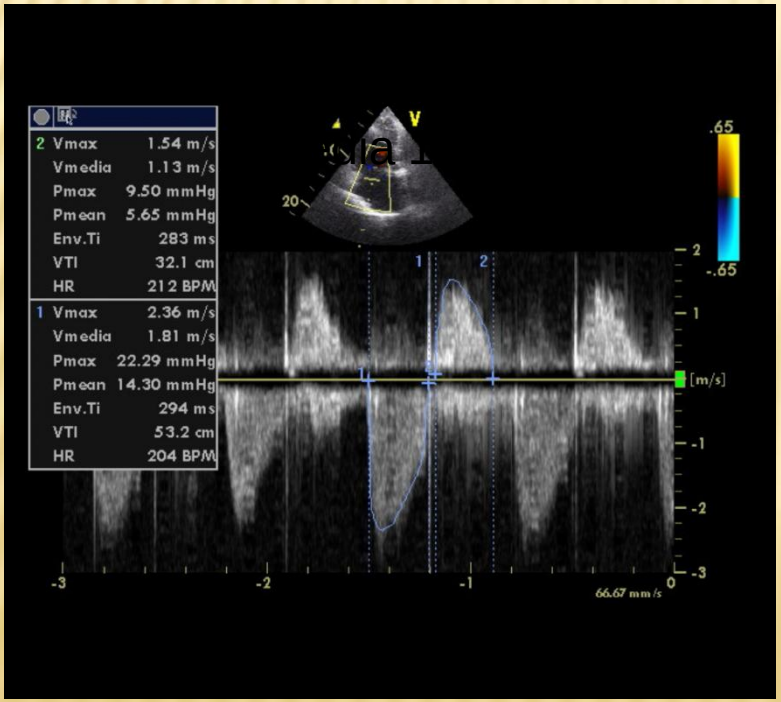
Sostituzione mitralica con S.Jude 29 mm

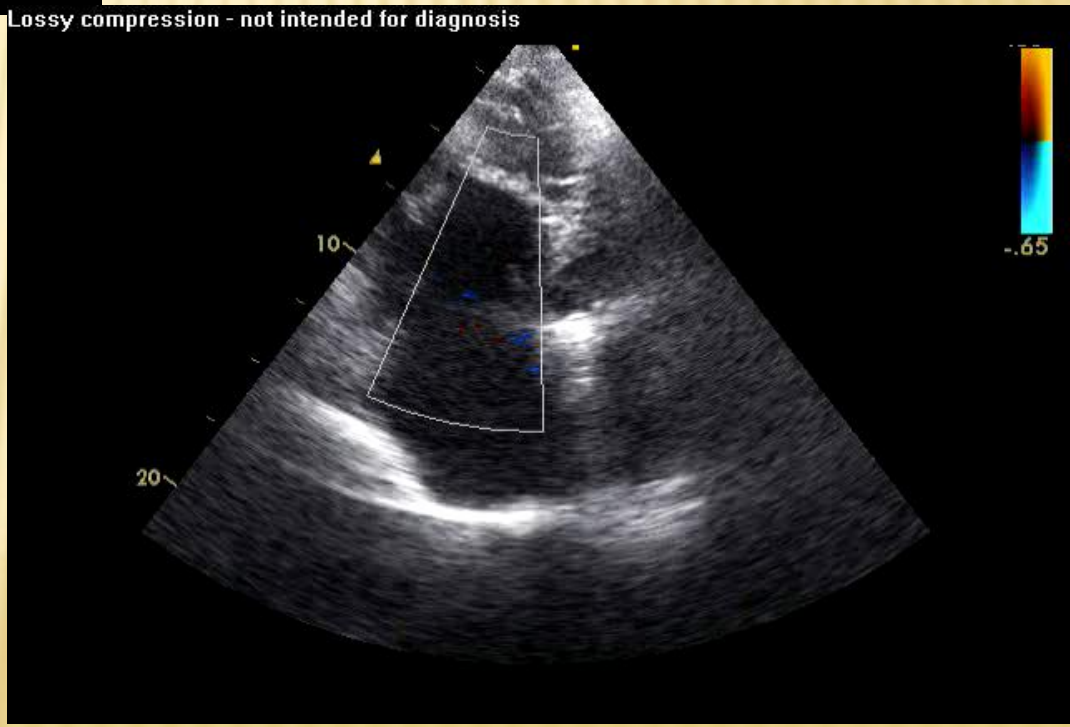




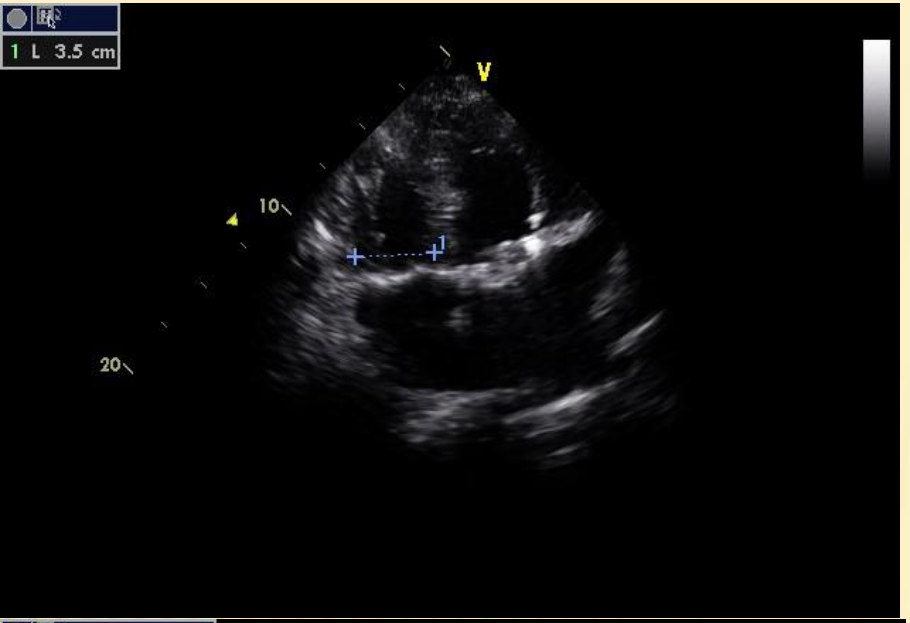


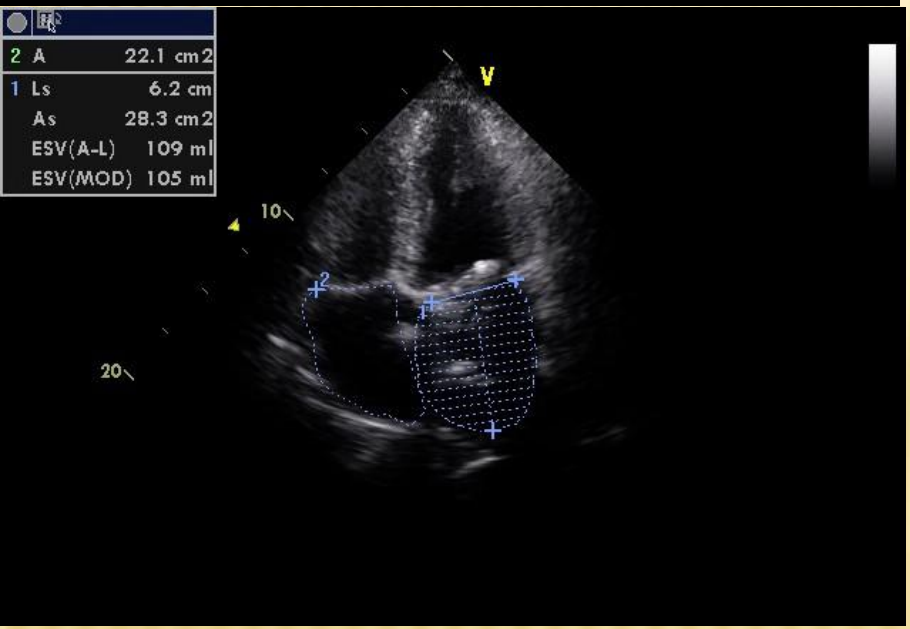
- M
- 68 anni
- Commissurotomia M + Sorin 23 Ao 24 anni fa
- IT moderata 10 anni fa
- scompenso congestizio da alcuni mesi
- ascite





Reintervento:
- Anello TR Edwards MC3 n.30
- Protesi mitralica s. Jude 29
- Asintomatico

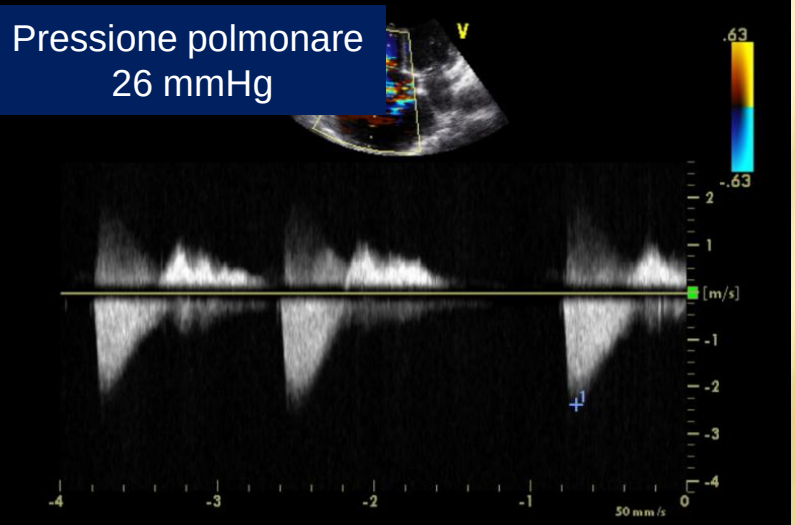


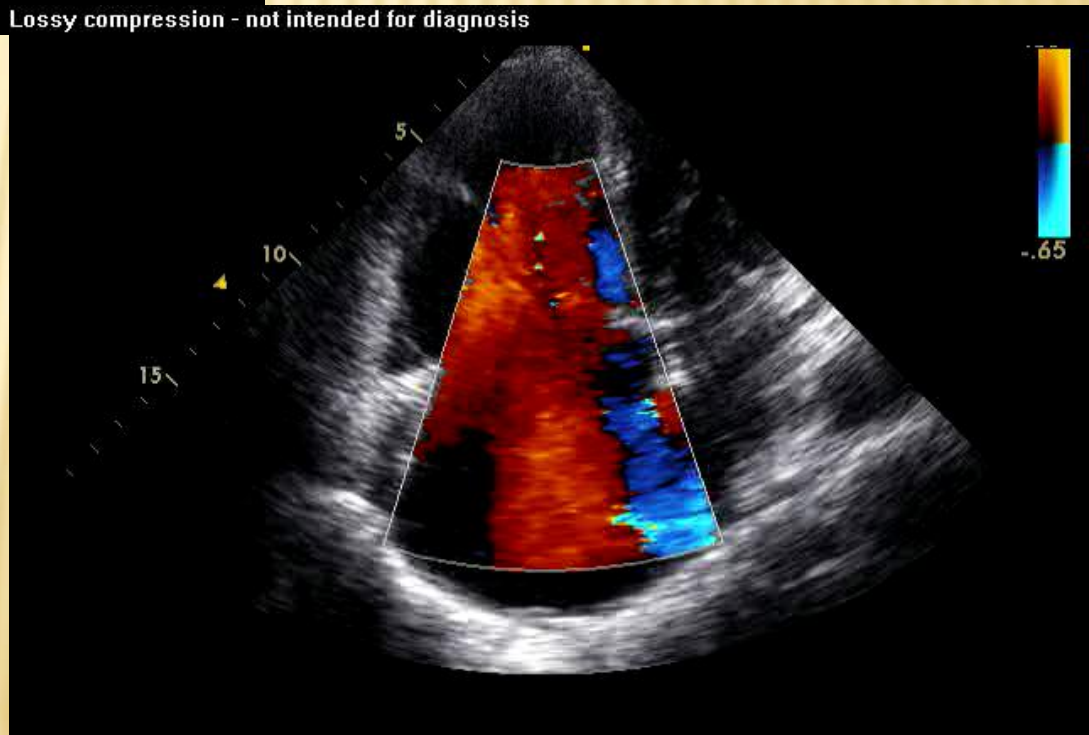


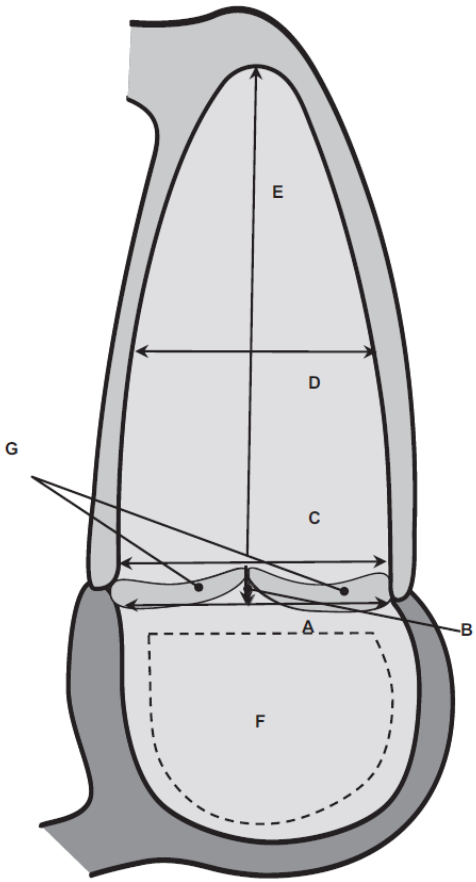
- F
- 74 anni
- Fibrillazione atriale cronica
- Scompenso con ascite e versamento pleurico bilaterale

?

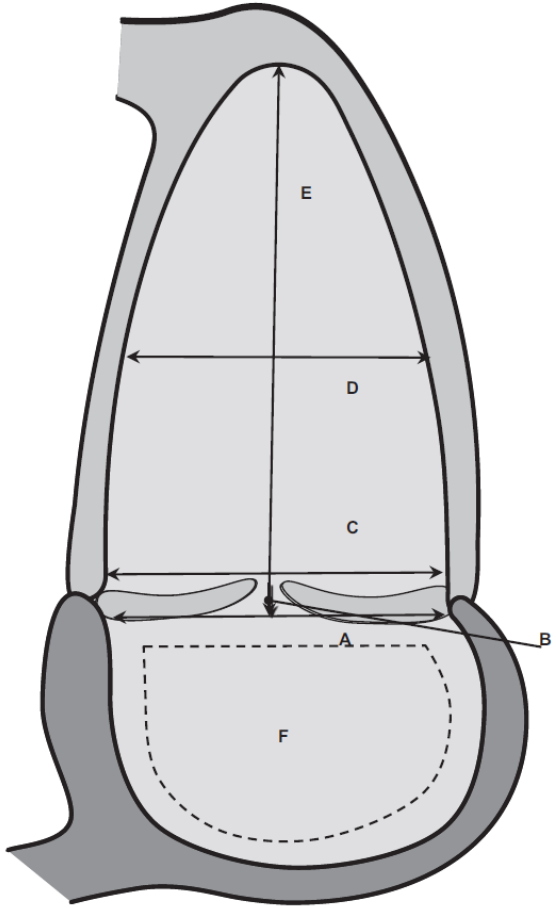
Pressione polmonare 26 mmHg



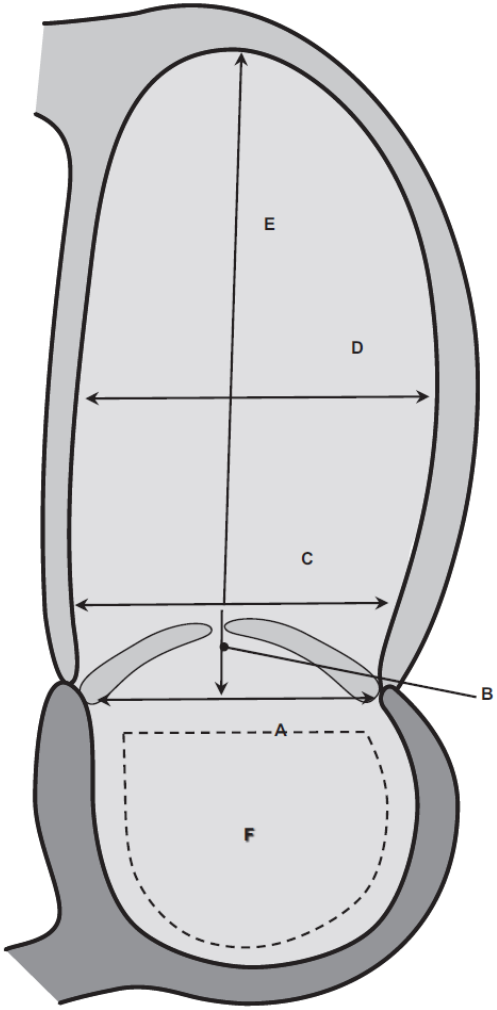




Controls



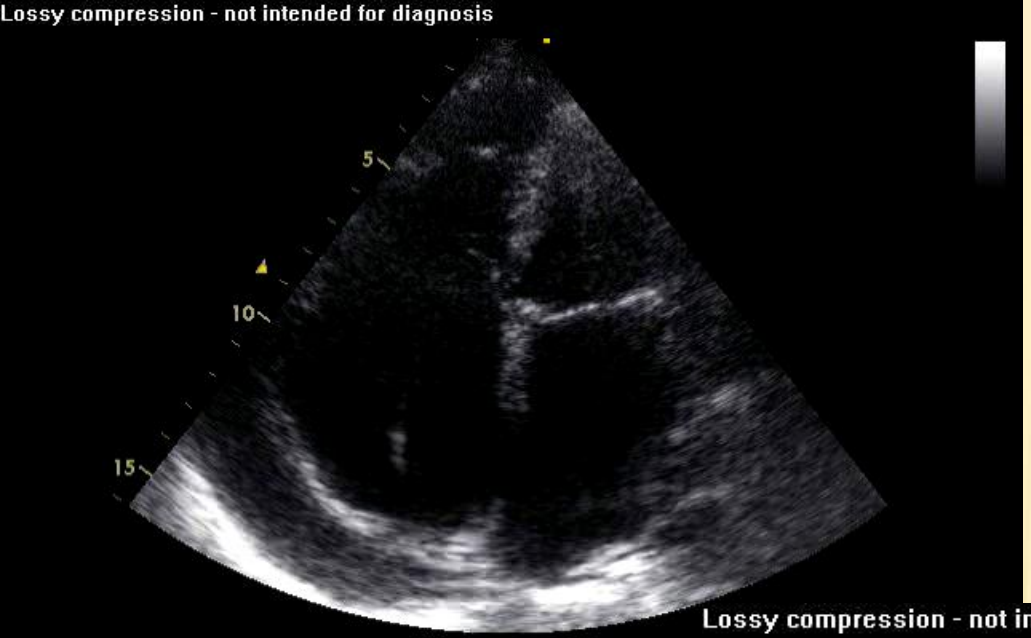
IT "idiopatica" associata a f.a. ed età avanzata

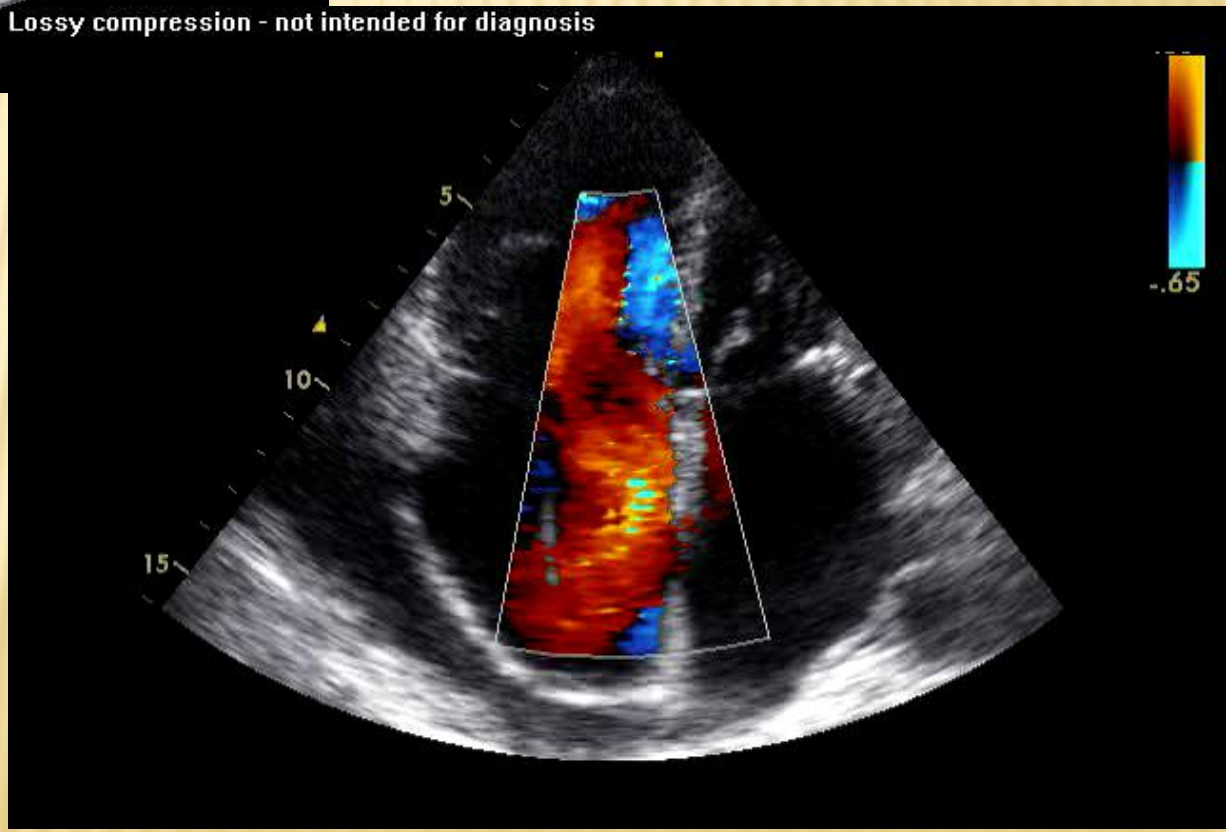


IT da Ipertensione polmonare

Topilsky et al. Circ Cardiovasc Imaging 2012;5:314-323

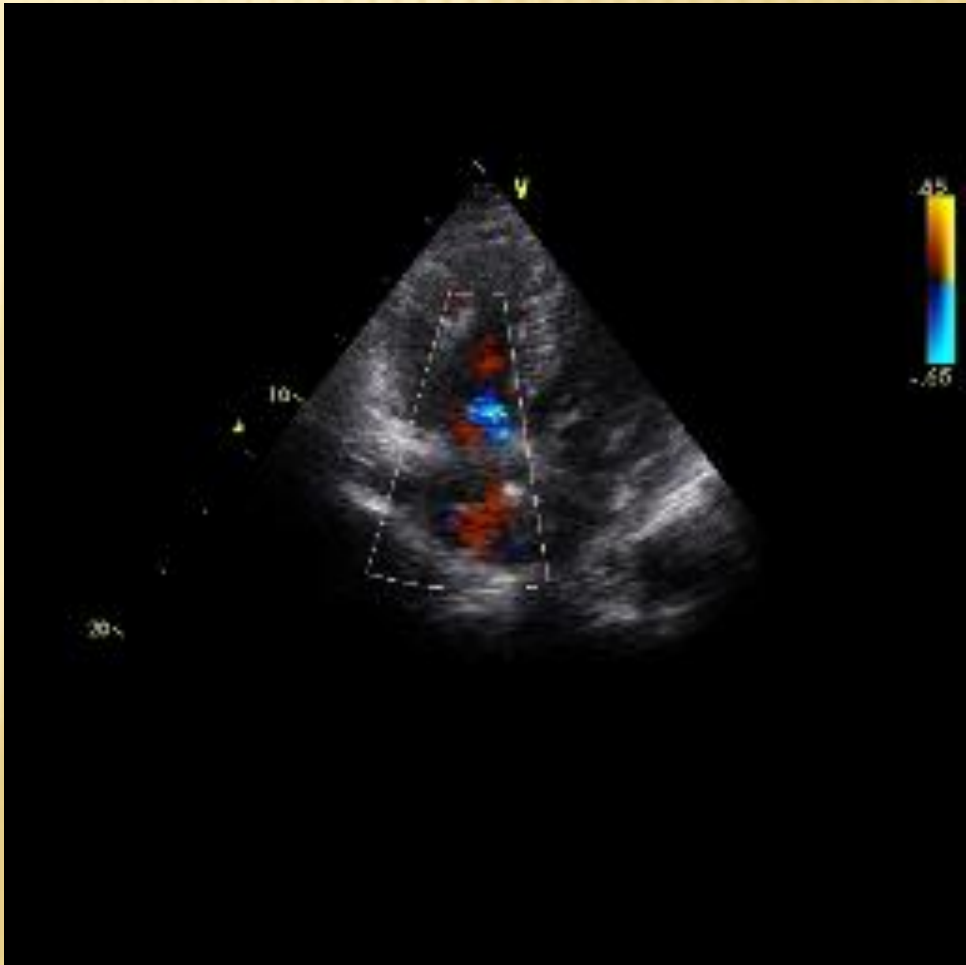
F
82 anni
PM endocavitario
Ripetuti episodi di scompenso

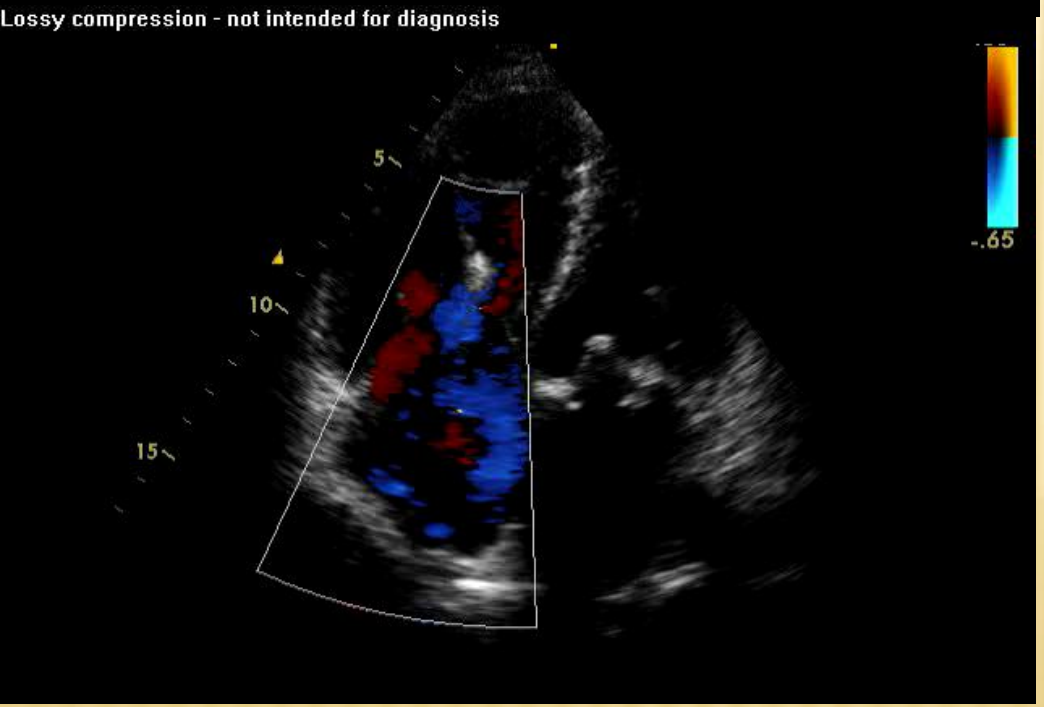




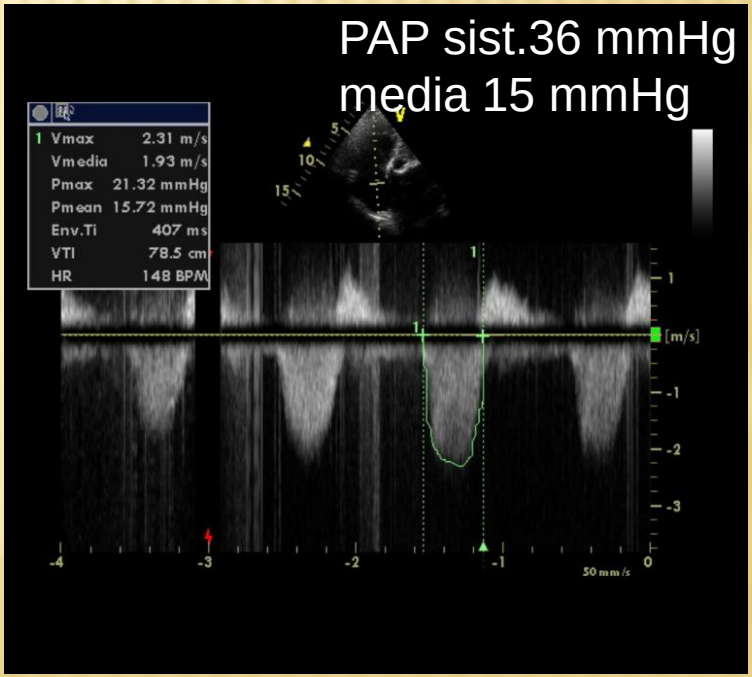
Interferenza del catetere stimolatore???

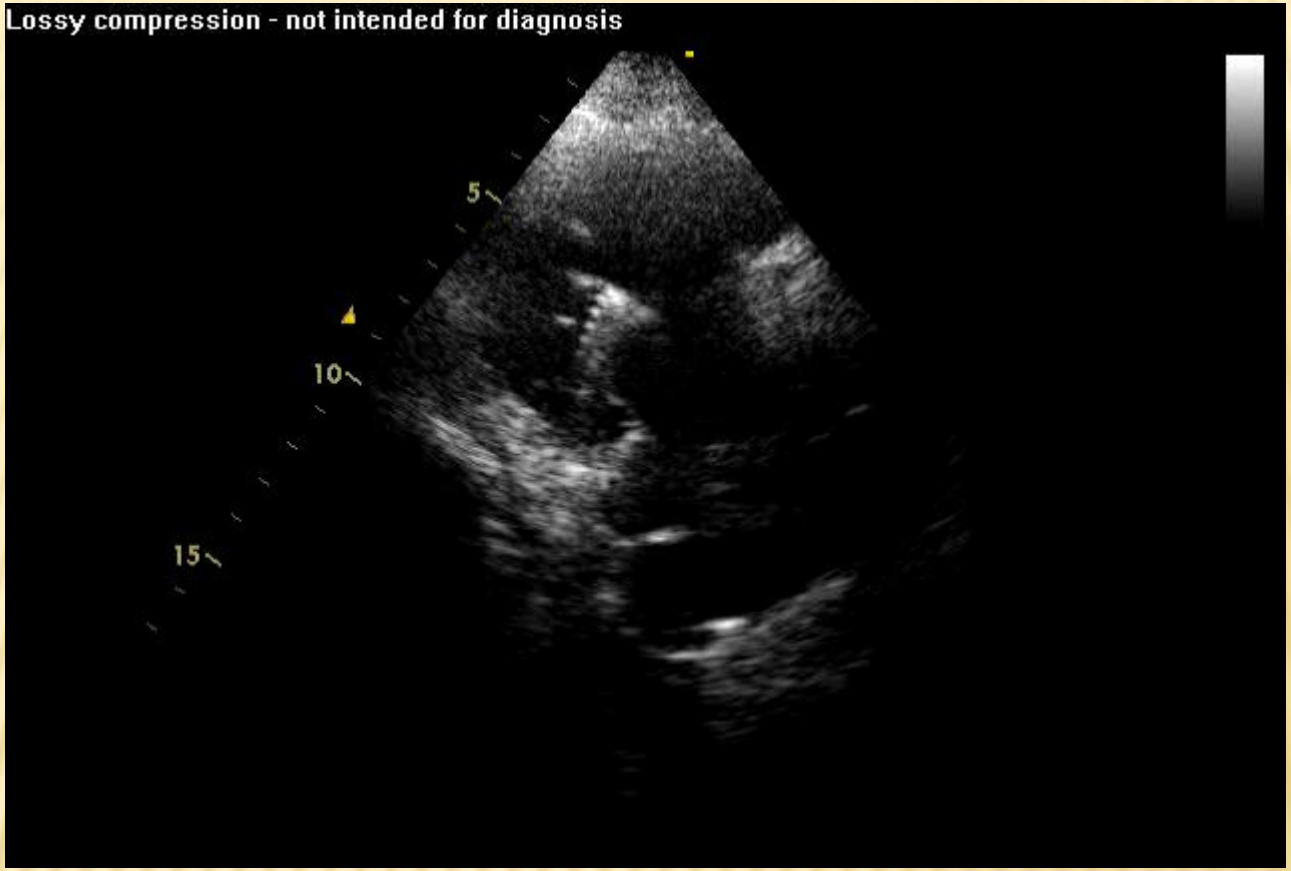
- F
- 69 anni
- PM endocavitario da un anno
- ECG: RS- BAV I° grado
- Stenosi Ao e M serrate





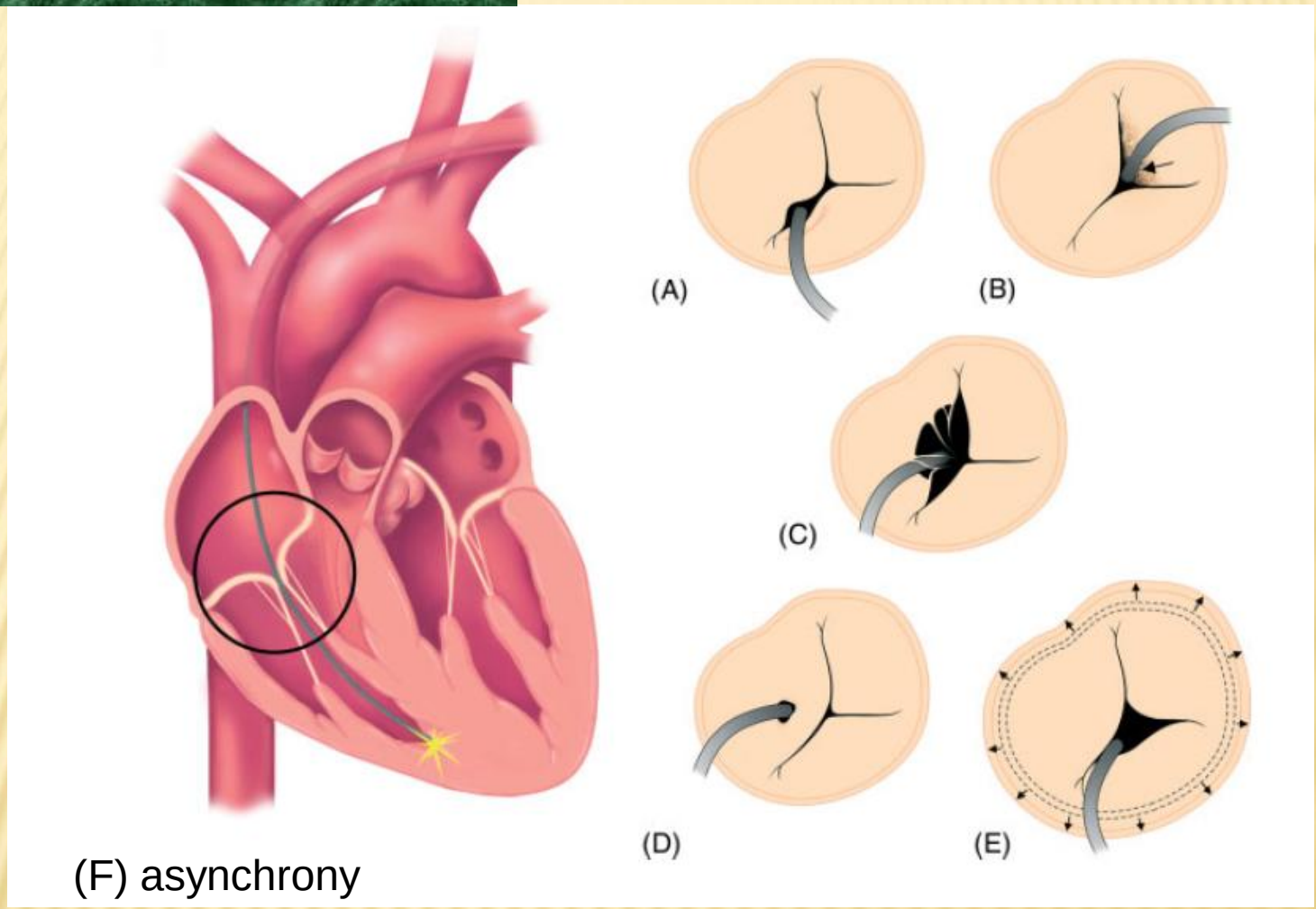
….dopo un anno da impianto di bioprotesi Ao e M
Epatomegalia pulsante
ECG: fibrillazione atriale





Interferenza del catetere stimolatore???
Fibrillazione atriale?

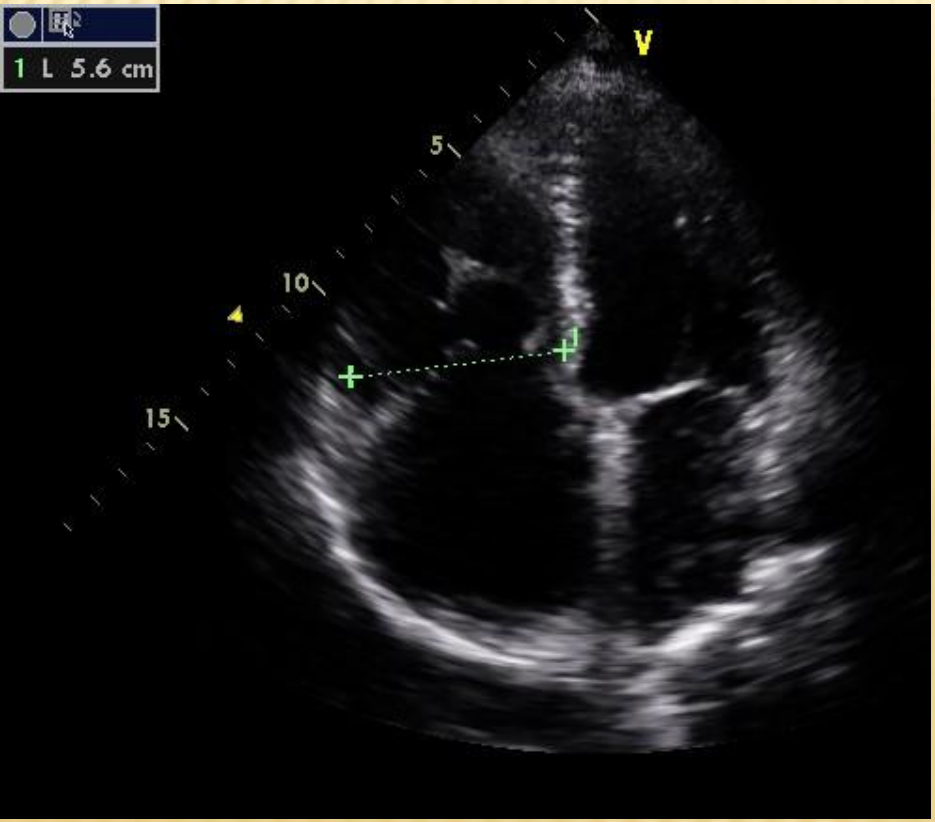
25-29% dei pz con PM o ICD

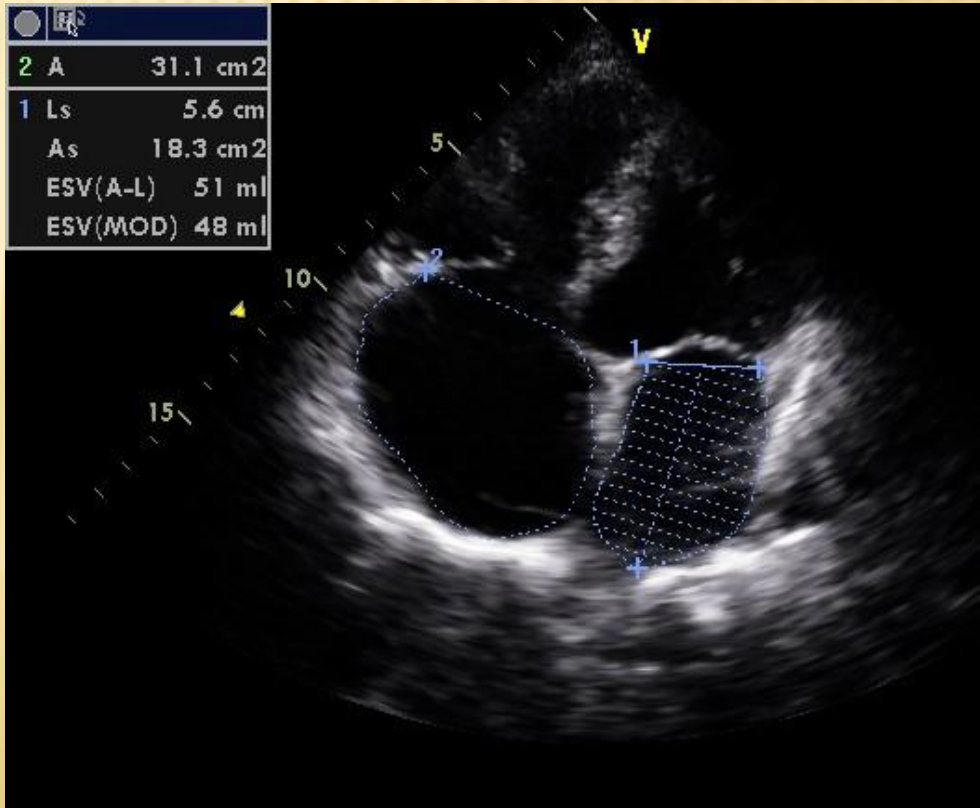


(F) asynchrony

Al-Bawardy et. Clin. Cardiol. 2013;36:249-254

- M
- 65 anni
- Iperteso
- Resezione intestinale per neoplasia imprecisata 20 anni prima
- anoressizzanti per 2 mesi a 15 anni di età
- recente scompenso congestizio






V
5
10
15


V
5
10
15

Acido 5 idrossiindolacetico nelle urine indosabile per eccesso di quantità

CARCINOIDE

CONCLUSIONI
VALUTAZIONE ECOCARDIOGRAFICA DELLA TRICUSPIDE:

Omnicomprensiva e poliparametrica

- Lembi
- Anulus
- Cavità dx
- VCI e sovraepatiche
- Dati color e doppler multipli e integrati


grazie