

Valutazione dell'ecocardiografia transtoracica nel portatore di LVAD

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**GIORNATE
CARDIOLOGICHE
TORINESI**

**TURIN,
October
25th-27th
2018**

Starhotels Majestic

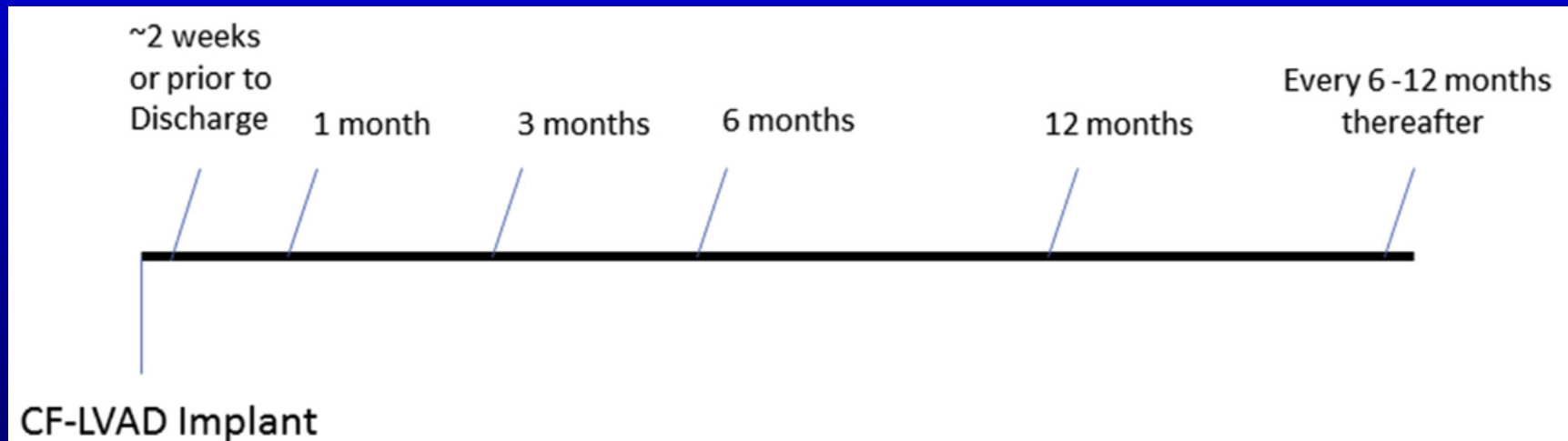


Maria Luisa GIORGIS

L'ecocardiogramma è un esame fondamentale nel portatore di LVAD da eseguire contemporaneamente alla valutazione clinica.

Consente la valutazione morfologica e funzionale delle cavità ventricolari e degli apparati valvolari e la valutazione emodinamica delle pressioni di riempimento.

Permette l'ottimizzazione della terapia medica, del pump setting e la risoluzione di problemi correlati al Device.



EcoTT: Inflow cannula

PHILIPS

MI 1,3
TIS 0,4

Eco adulti
S5-1
40Hz
15,0cm

2D

AGen.
Guad. 50
C 51
3/2/0
75 mm/s



PHILIPS

MI 1,3
TIS 0,4

Eco adulti
S5-1
32Hz
16,0cm

2D

AGen.
Guad. 50
C 51
3/2/0
75 mm/s



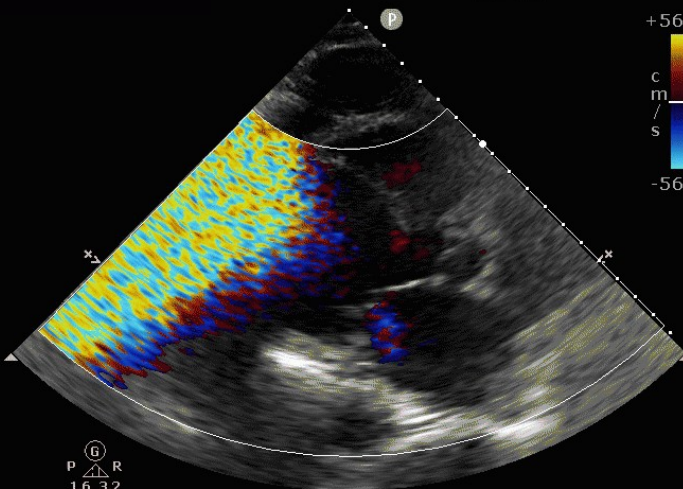
Eco adulti
S5-1
8Hz
19,0cm

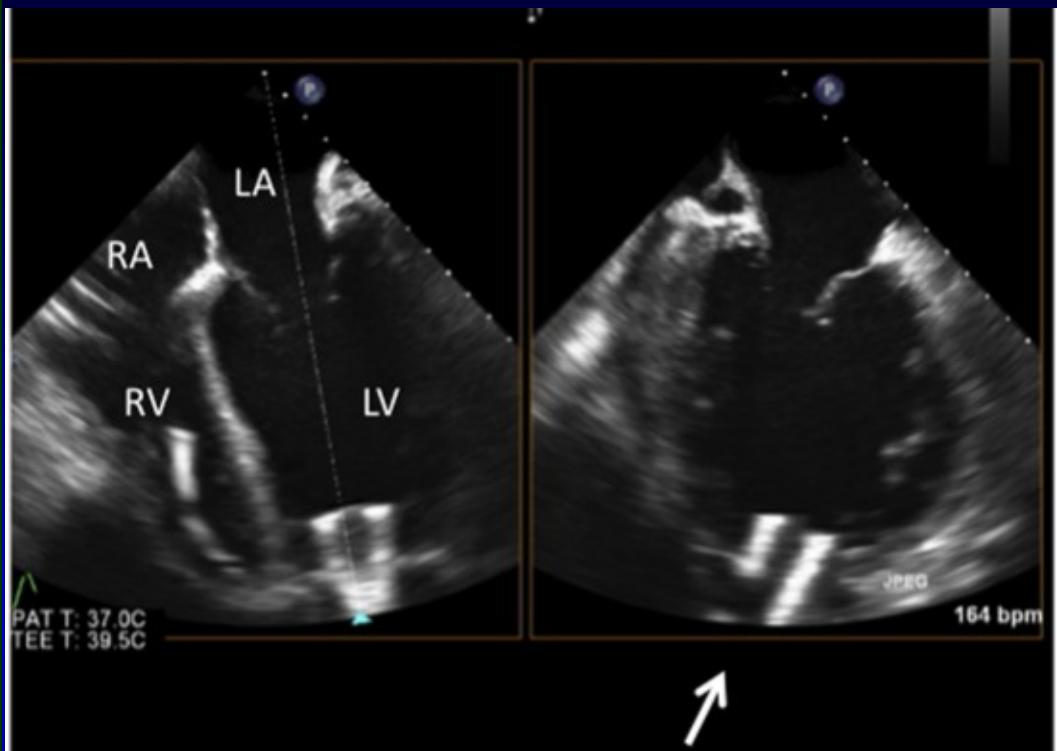
2D

AGen.
Guad. 60
C 50
3/2/0
75 mm/s

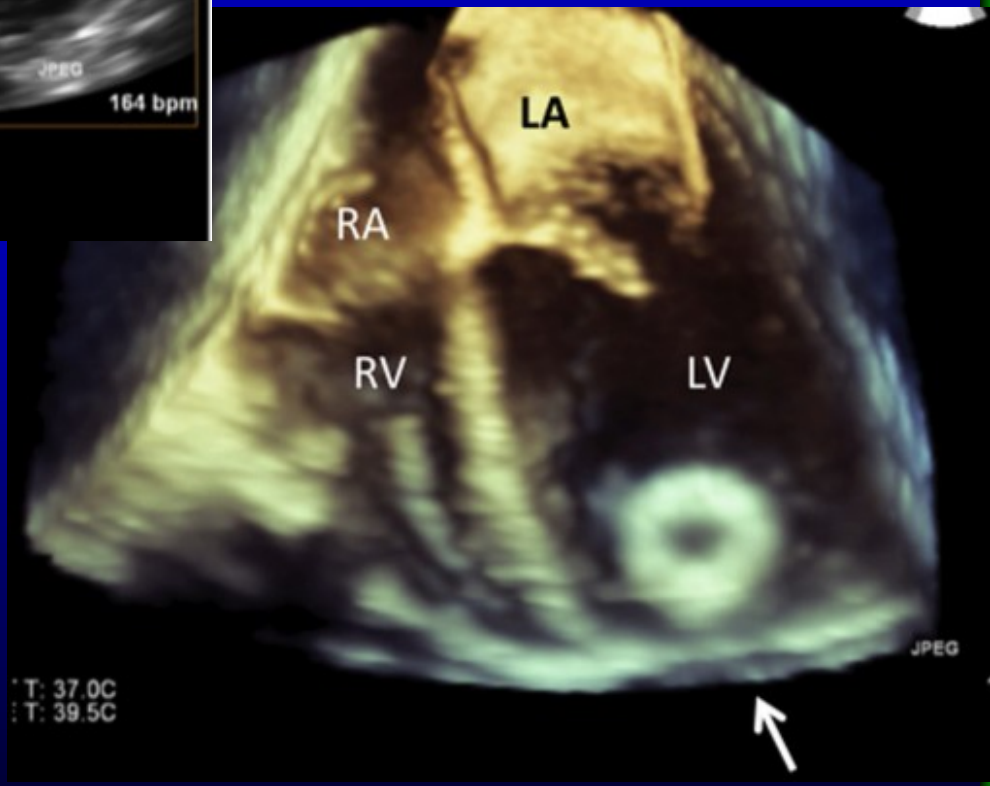
Colore

2,5 MHz
Guad. 60
4/5/0
Filt. Elevat



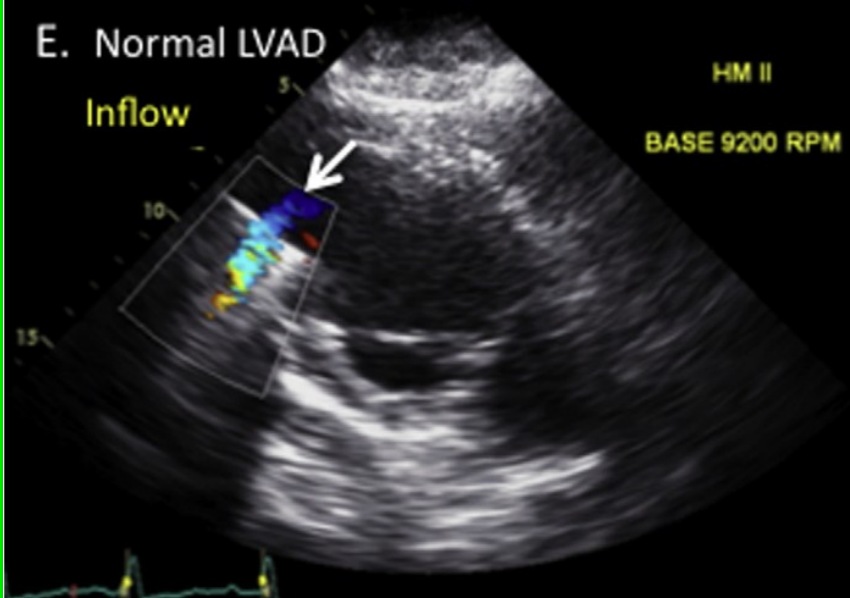


EcoTE: inflow cannula

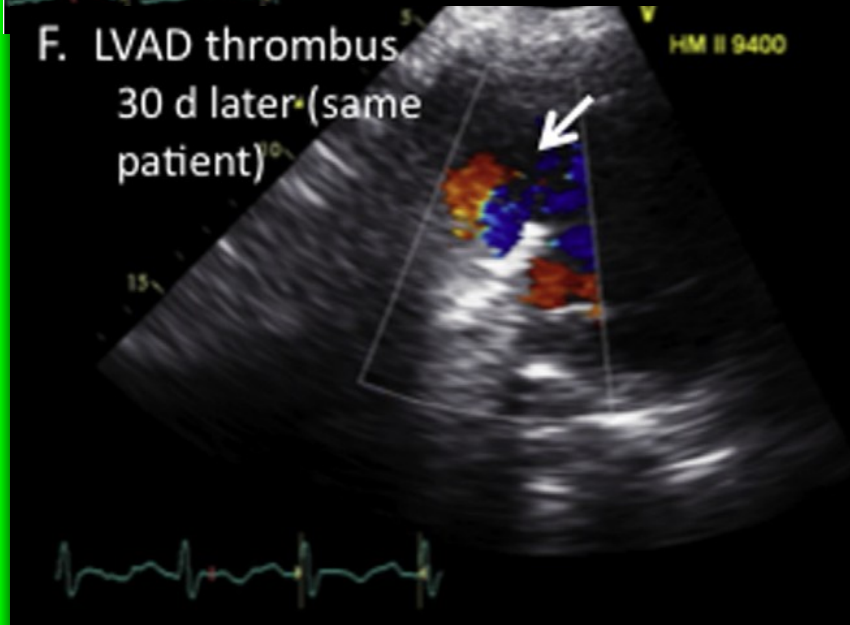


Inflow cannula

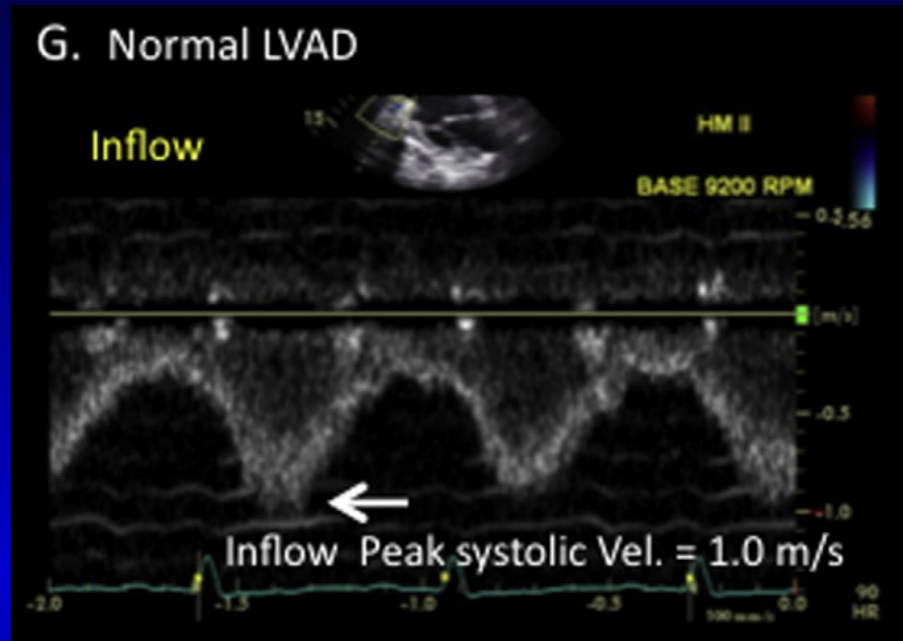
E. Normal LVAD



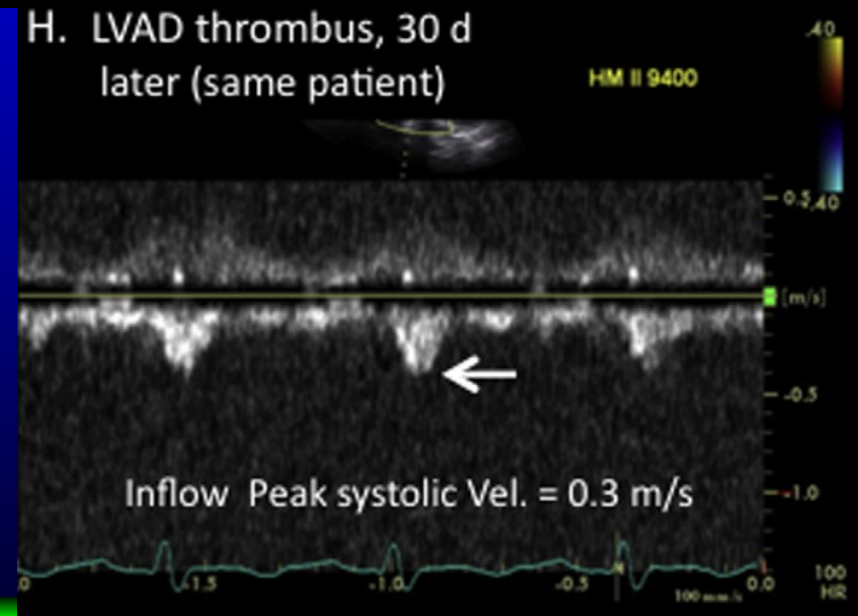
F. LVAD thrombus
30 d later (same patient)



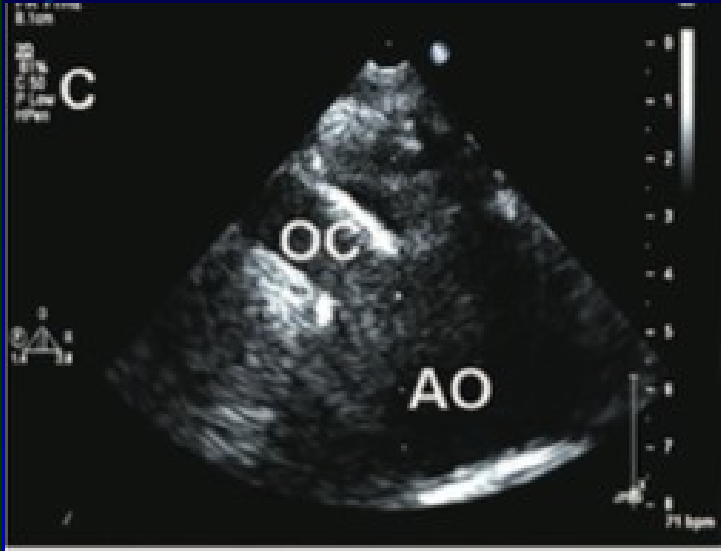
G. Normal LVAD



H. LVAD thrombus, 30 d later (same patient)

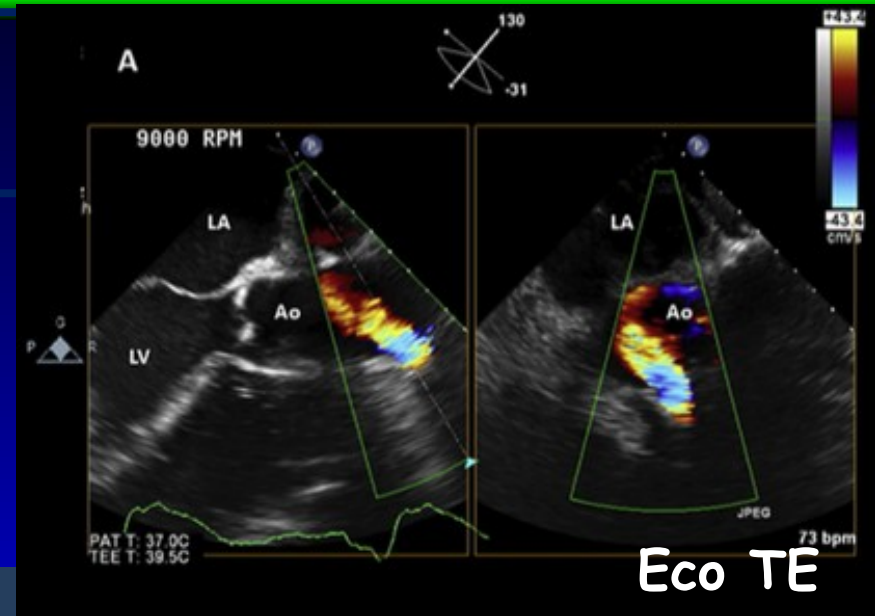


EcoTT: Outflow cannula



Parasternale asse
lungo alta

Proiezioni parasternali
destre

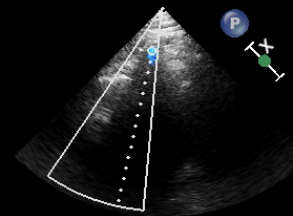


PHILIPS

Cardiologia | Prof. Gaita S5-1/Adulti

FR 17Hz
19cm

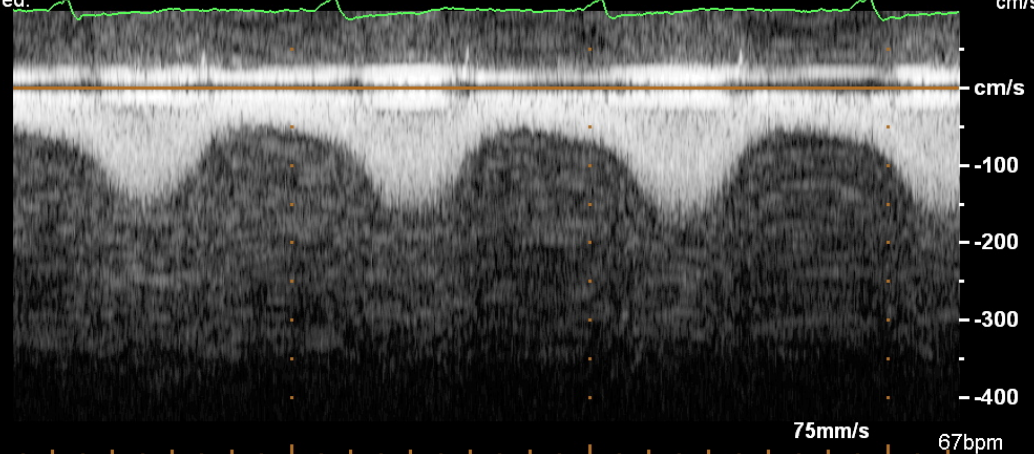
2D
71%
C 50
P Bassa
AGen
CF
66%
2.5MHz
WF Alto
Med.



Outflow cannula

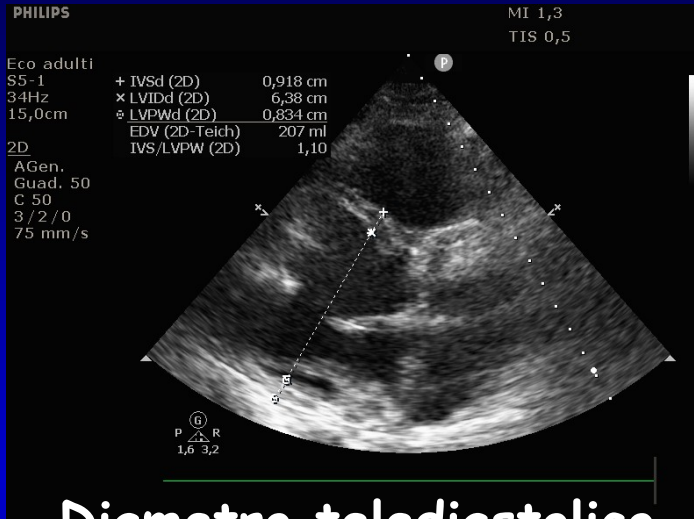
CW
50%
1.8MHz
WF 225Hz

M3 M4
+57.5
-57.5
cm/s

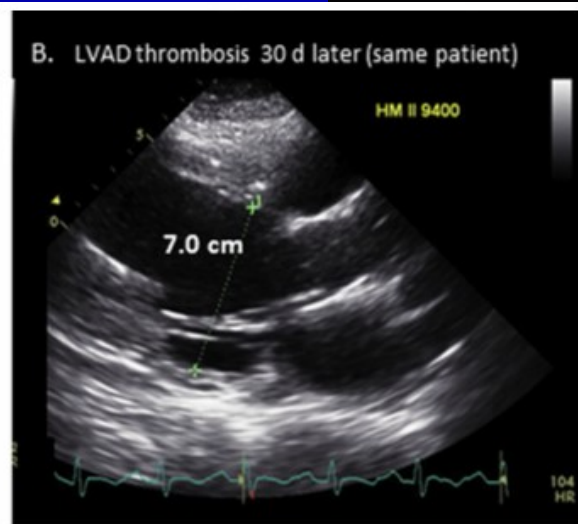
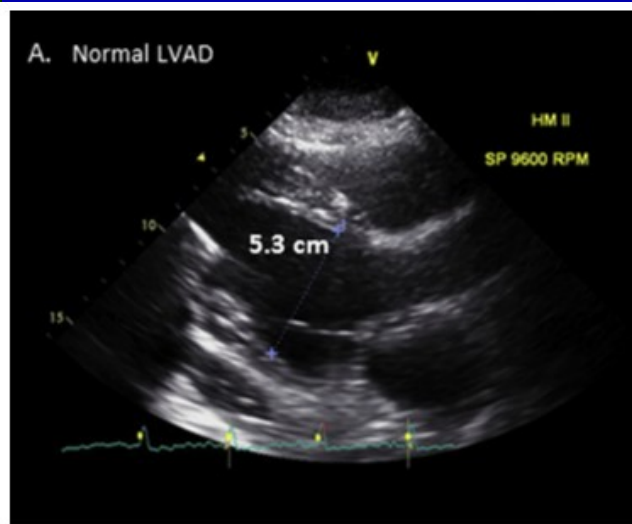
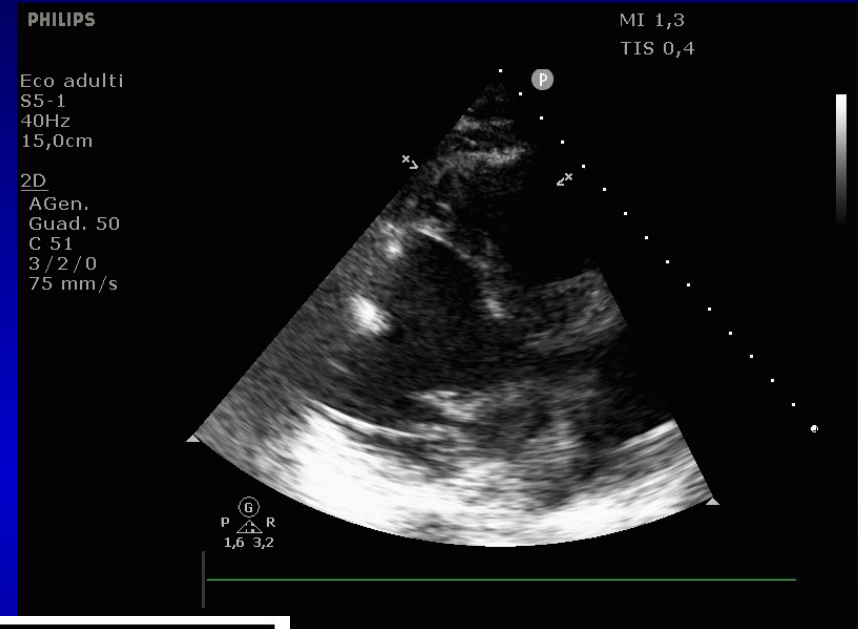


EcoTT: Ventricolo sinistro

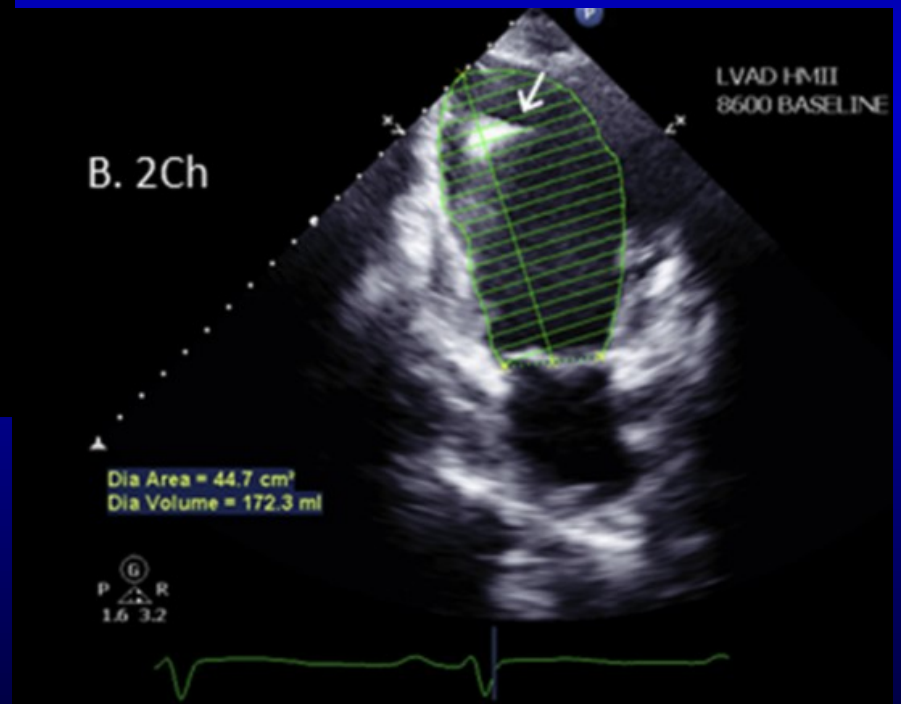
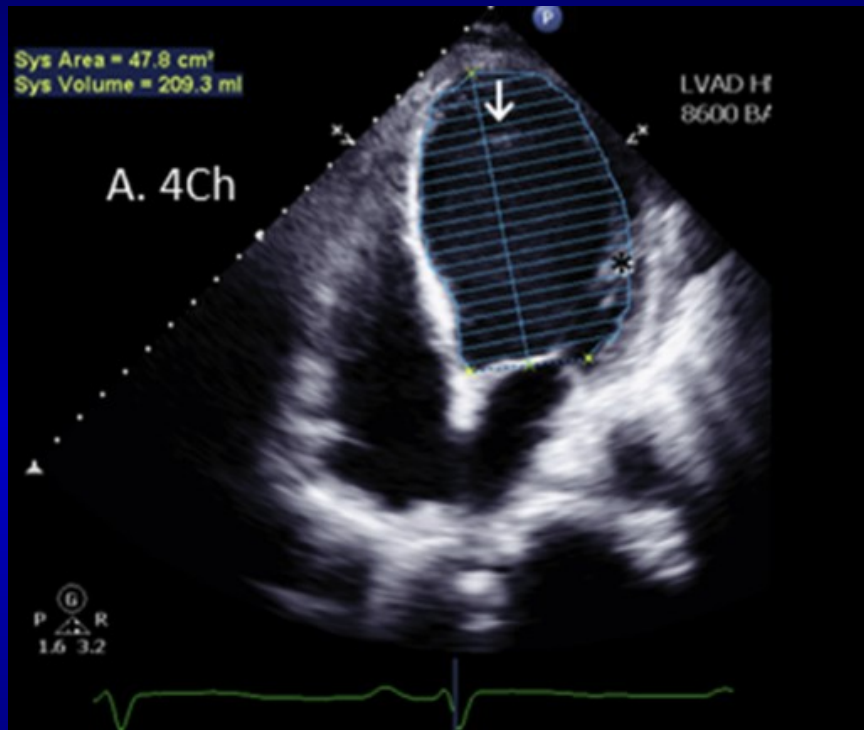
Aspetto morfologico



Diametro telediastolico
Misura più riproducibile



EcoTT: Ventricolo sinistro EF



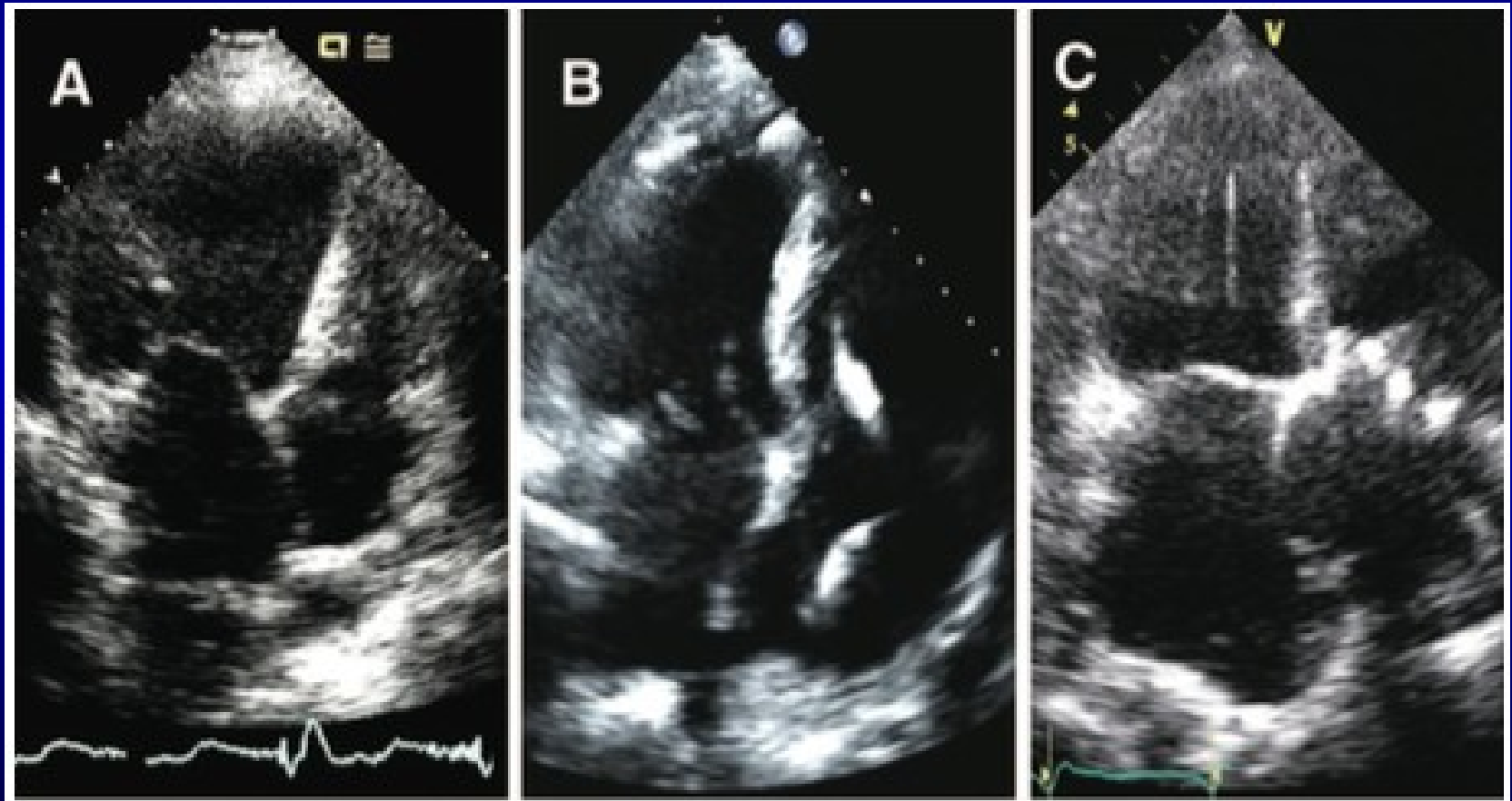
EcoTT: Ventricolo sinistro

Aspetto morfologico del SIV

Inefficient LV unloading

Markedly unloaded LV

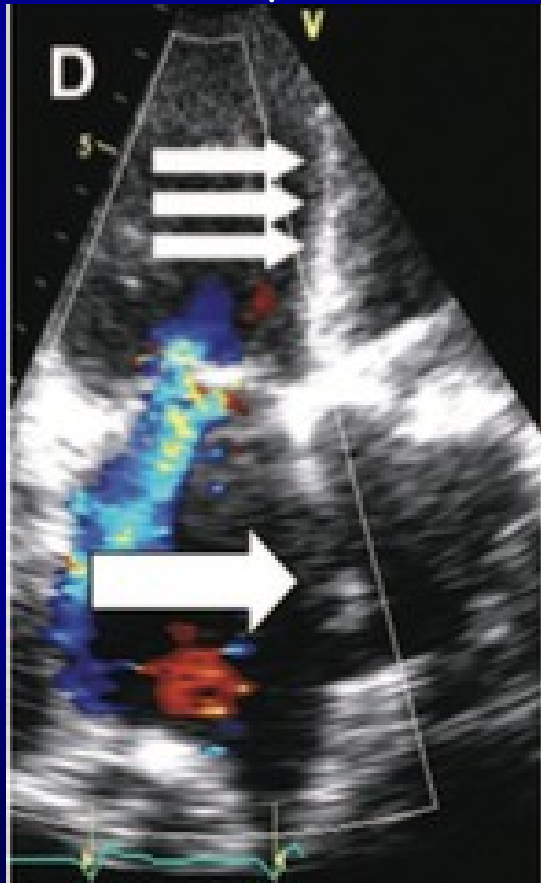
Efficient LV decompression



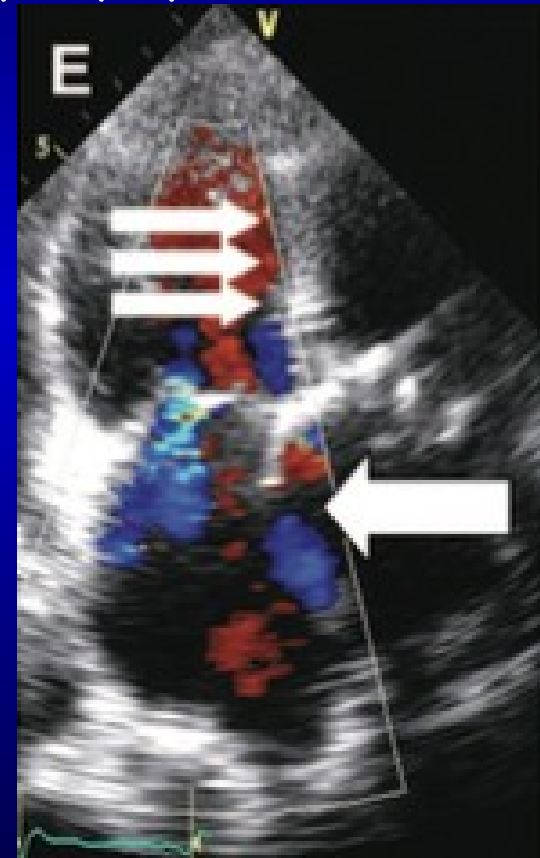
EcoTT: Ventricolo sinistro

Aspetto morfologico del SIV

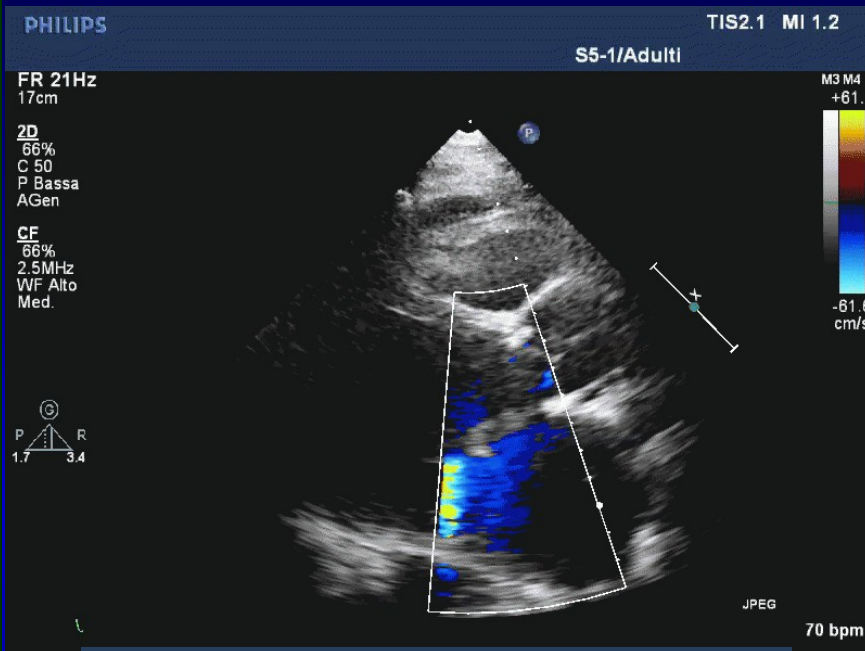
Paziente con segni di
scompenso



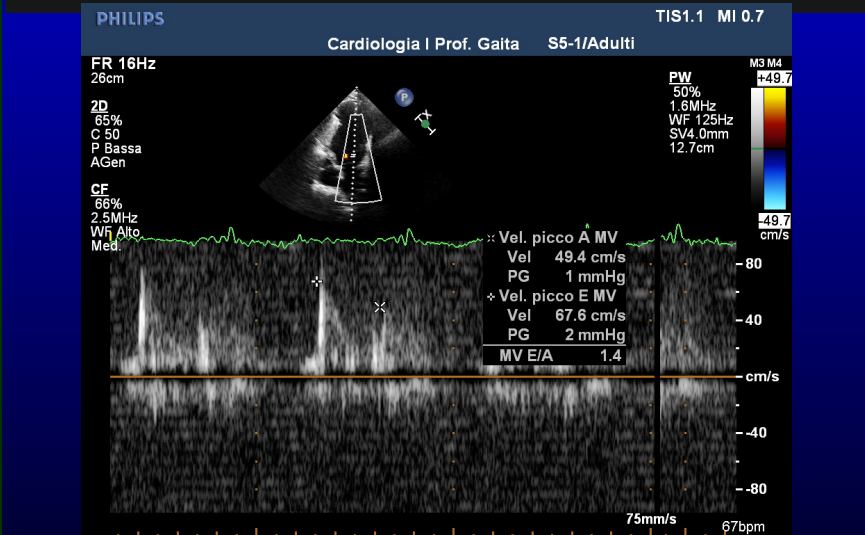
Ottimizzazione della
pump speed



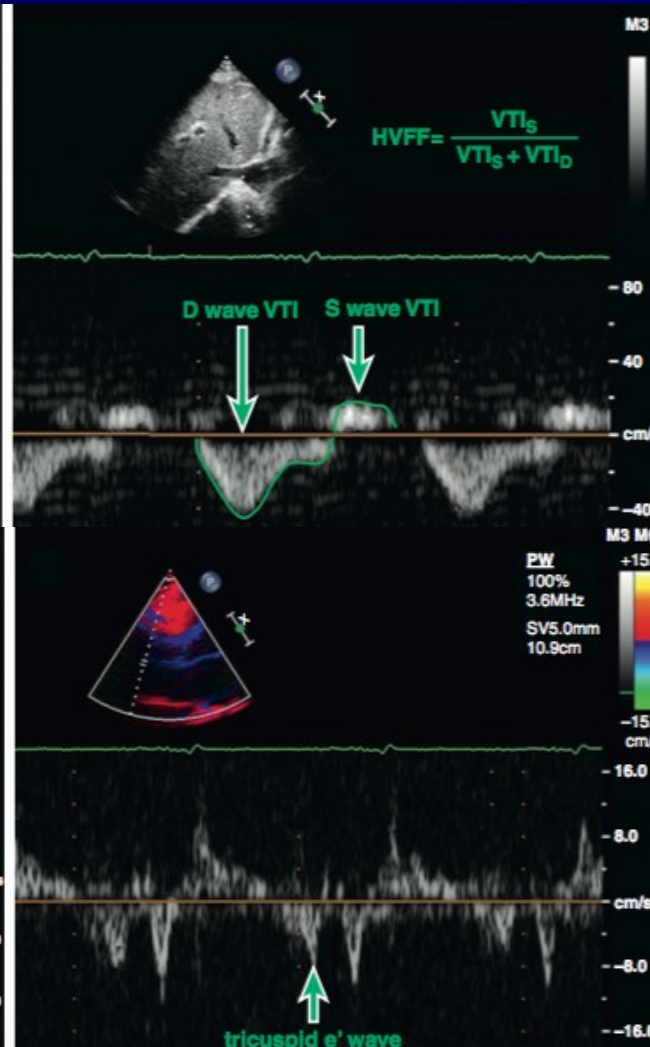
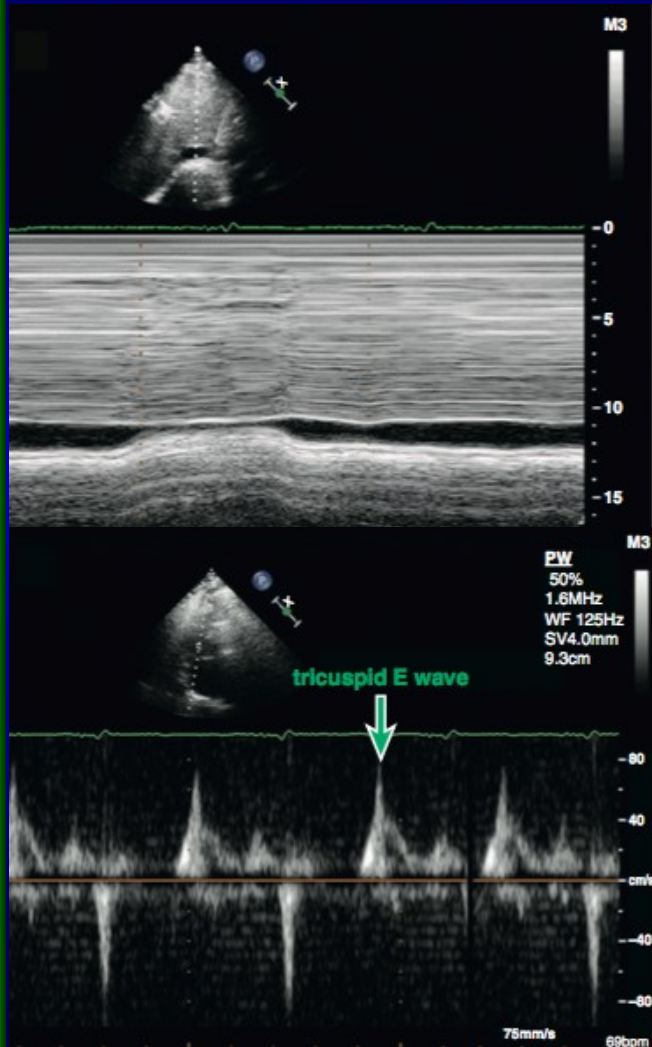
Pattern diastolico e valutazione della pressione endoatriale sx (LAP)



E/A
 Deceleration time
 Mitral deceleration index MDI
 E/E'
 Grado insuff mitralica
 Posizione del SIA



La valutazione multiparametrica della pressione atriale destra RAP presenta alta correlazione con la misura invasiva al cateterismo

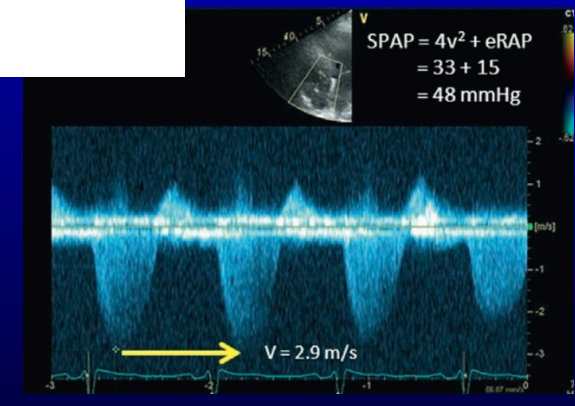
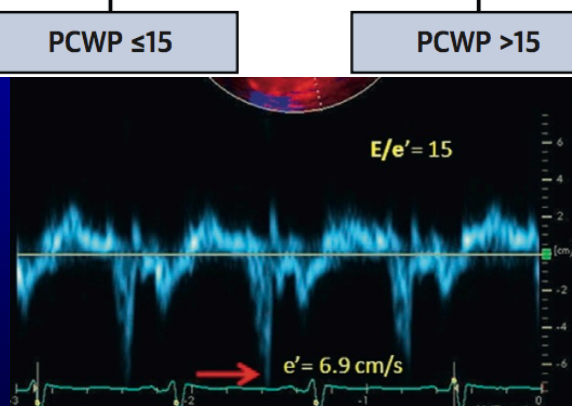
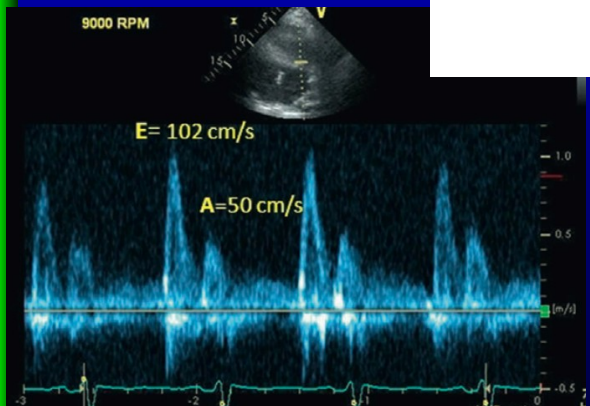
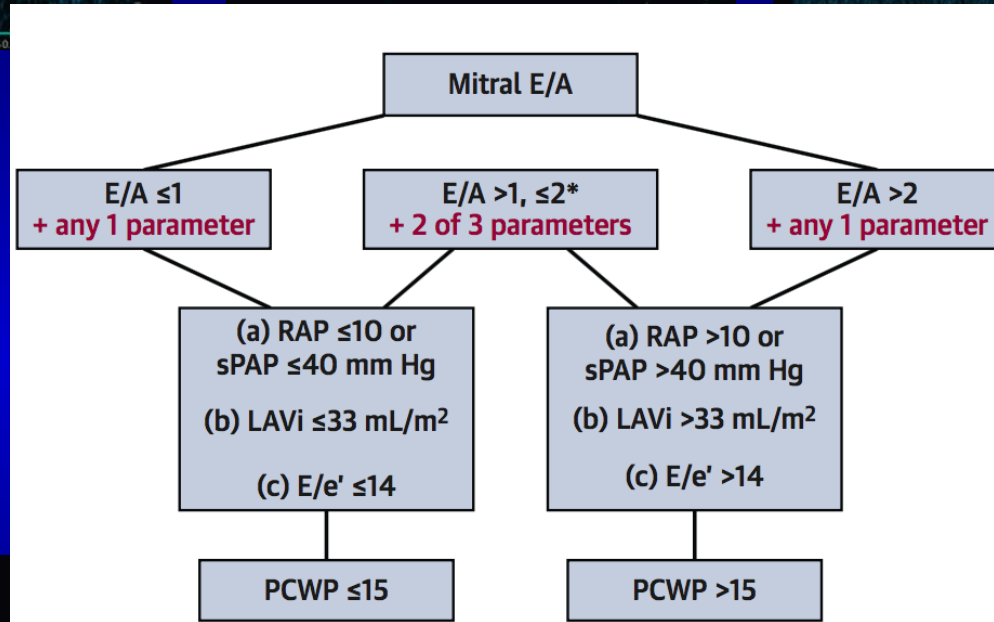
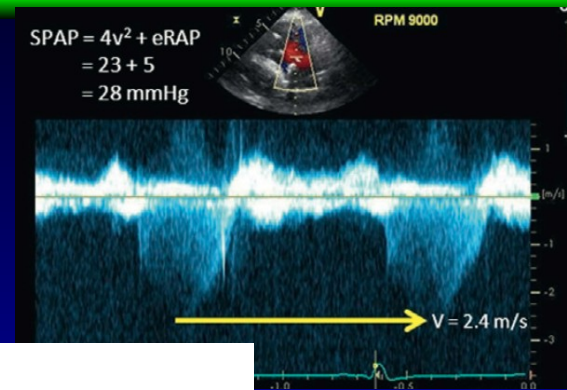
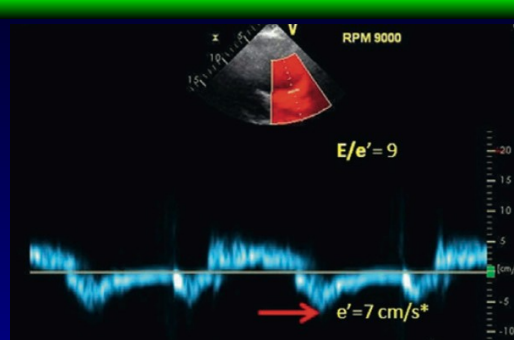
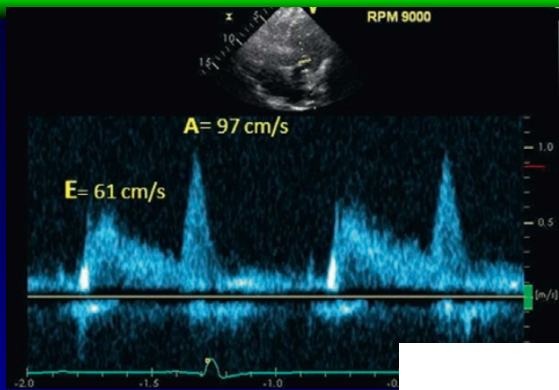


$$HVFF = \frac{VTI_S}{VTI_S + VTI_D}$$

Vena cava: diametro e collasso inspiratorio

Pattern di flusso delle vene sovraepatiche Vs/Vd e HVFF (hepatic Venous filling fraction)

E/E' tricuspidalico



A

$$eRAP = (eRAP_{IVC} + eRAP_{HVFF} + eRAP_{right\ E/e'})/3^*$$

* or mean of available values

	$eRAP_{IVC}$	$eRAP_{HVFF}$	$eRAP_{right\ E/e'}$
20 mm Hg	IVC > 21 mm without collapse	$V_S < V_D$ and HVFF < 45% or Vs reverse	> 8
15 mm Hg	IVC > 21 mm with < 50% collapse	$V_S < V_D$ and HVFF < 55%	> 6
10 mm Hg	IVC > 21 mm with > 50% collapse OR IVC ≤ 21 mm with < 50% collapse	$V_S < V_D$ and HVFF < 55%	> 4
5 mm Hg	IVC ≤ 21 mm with ≥ 50% collapse	$V_S > V_D$	≤ 4

eRAP: estimated right atrial pressure; IVC: inferior vena cava; HVFF: hepatic vein filling fraction ($VT_{IS}/(VT_{IS} + VT_{ID})$).**B**

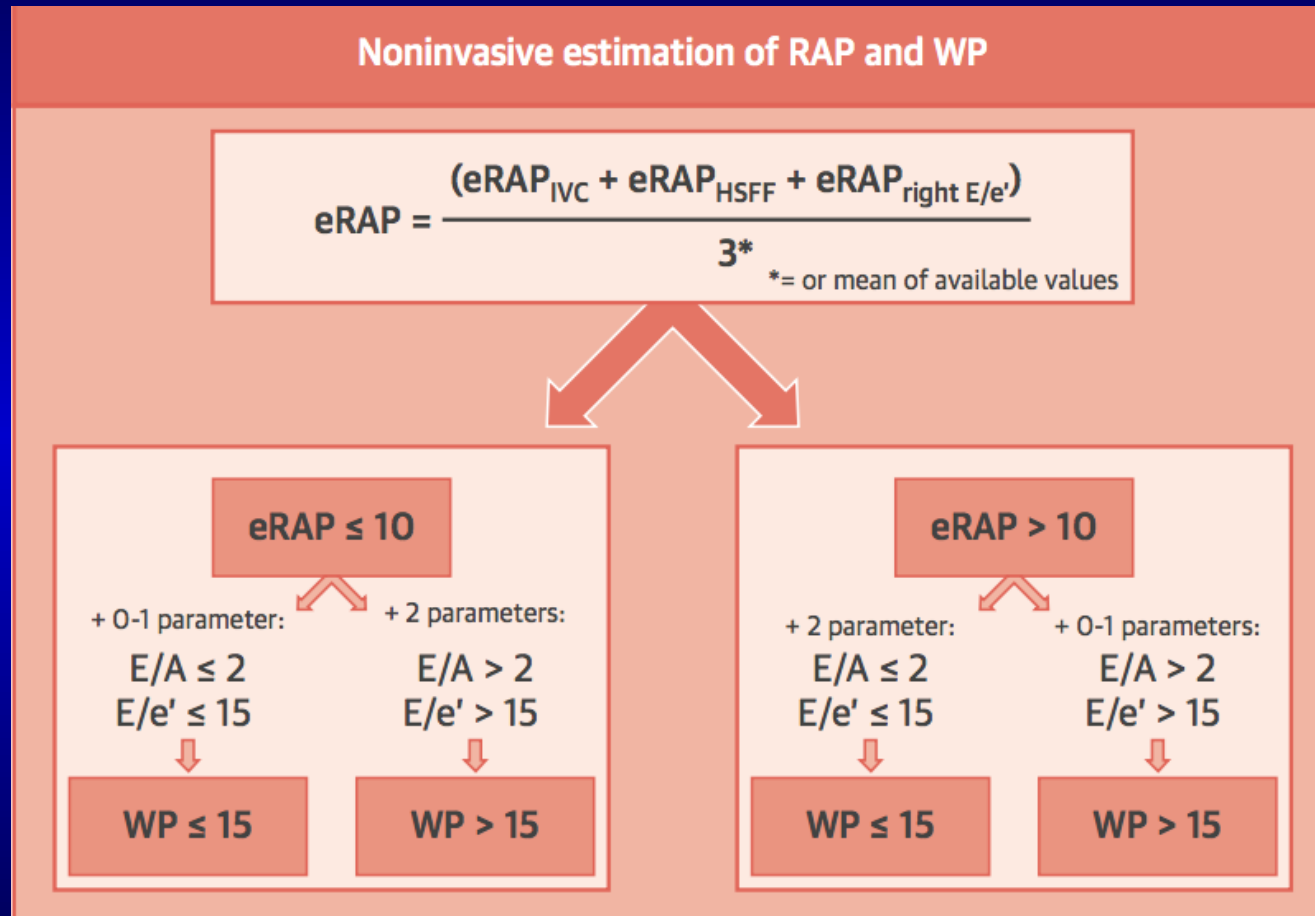
$$eLAP_2 = (eLAP_{E/A} + eLAP_{MDI} + eLAP_{septal\ E/e'} + eLAP_{MR})/4^*$$

* or mean of available values

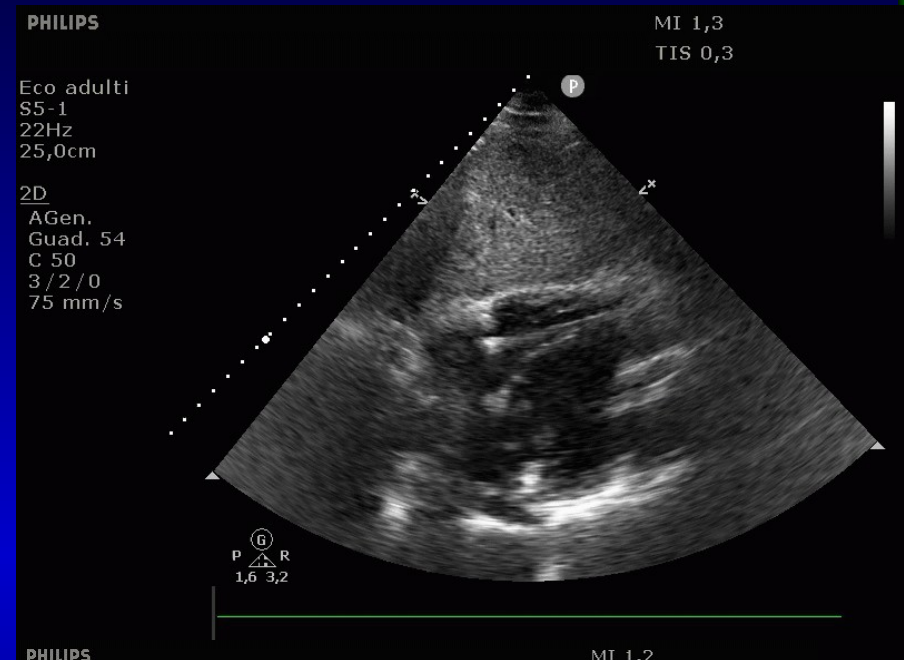
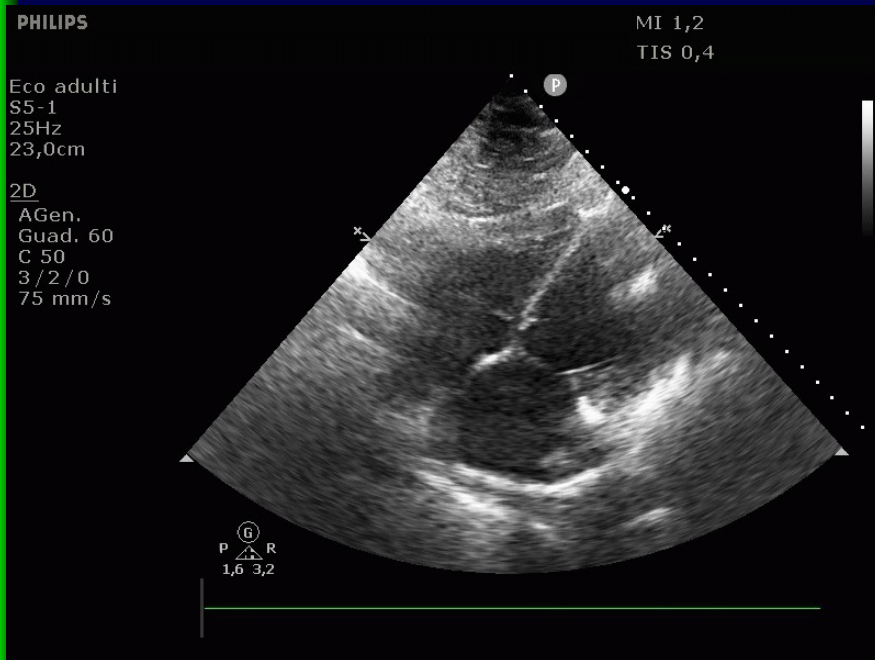
	$eLAP_{E/A}$	$eLAP_{MDI}$	$eLAP_{septal\ E/e'}$	$eLAP_{MR}$
20 mm Hg	Restrictive (DT < 125 ms)	< 1.5	≥ 20	4+/4+
15 mm Hg	Restrictive (DT 125-160 ms)	< 2	≥ 15	3+/4+
10 mm Hg	Pseudonormal	> 2	≥ 8	2+/4+
5 mm Hg	Impaired relaxation	> 3	< 8	1+/4+

eLAP: estimated left atrial pressure; E/A: diastolic pattern; MDI: mitral deceleration index; MR: mitral regurgitation.

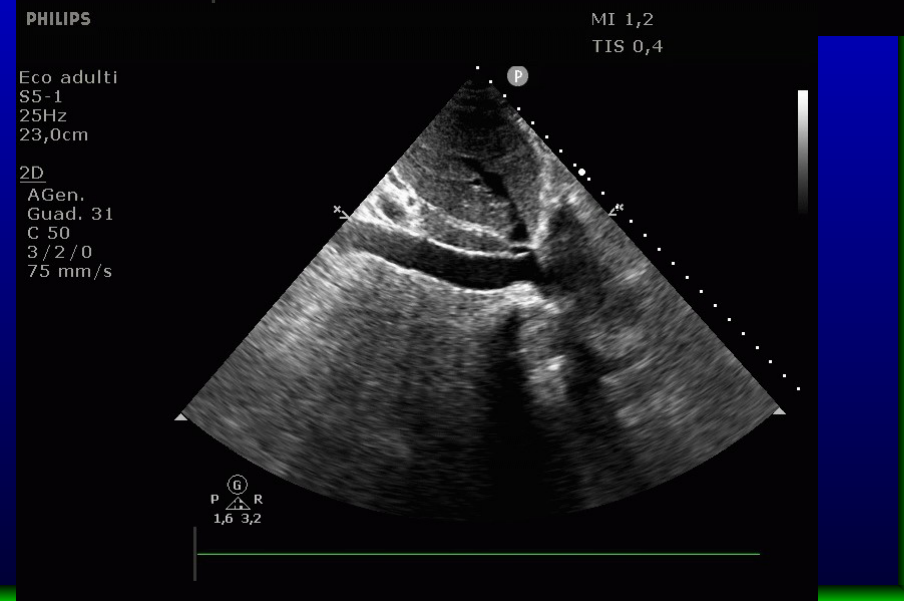
Protocollo ecocardiografico per la valutazione non invasiva emodinamica del portatore di VAD



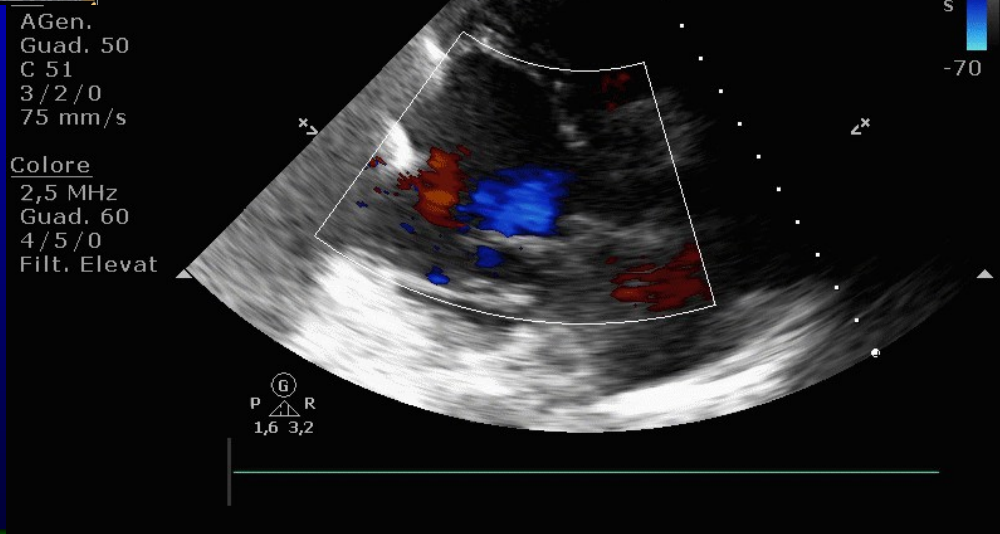
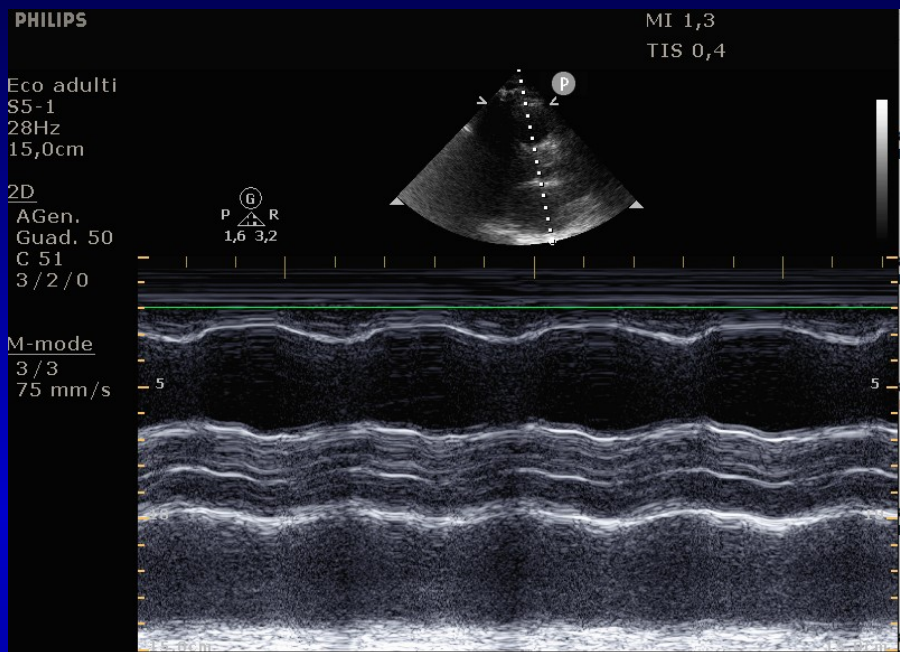
Ventricolo destro



- Aspetto morfologico: forma triangolare
- FAC accorciamento frazionale delle aree
- E/E' tricuspidalico
- PAPs
- VENA CAVA diametro e collasso inspiratorio > 50%



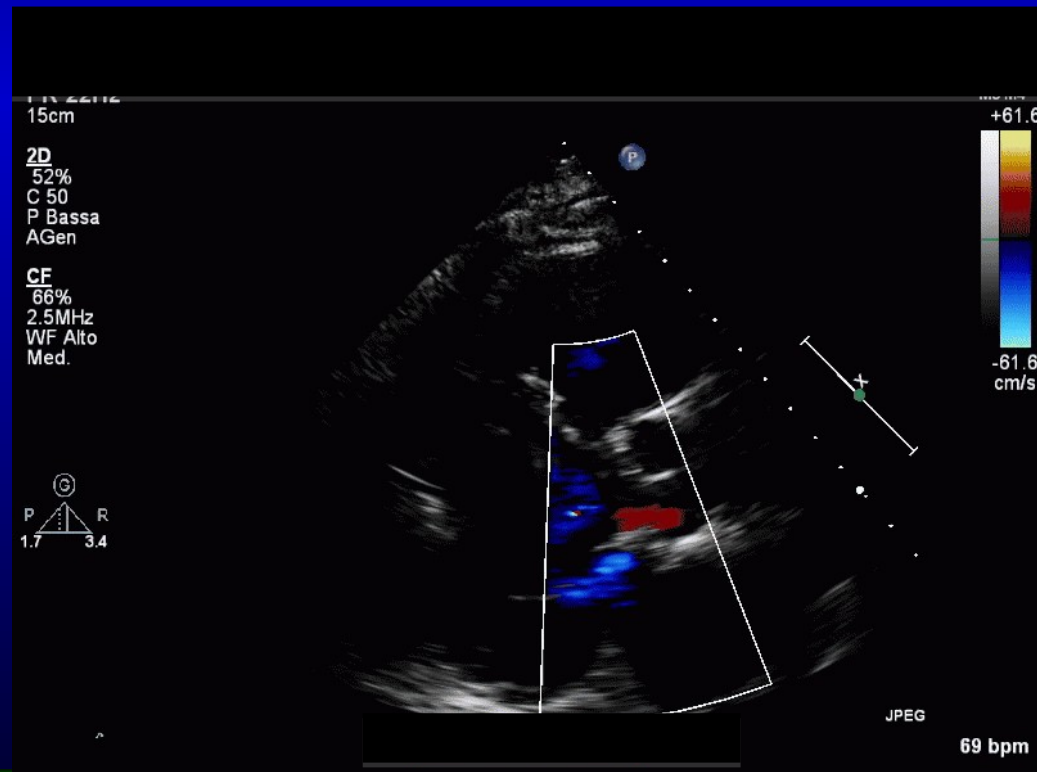
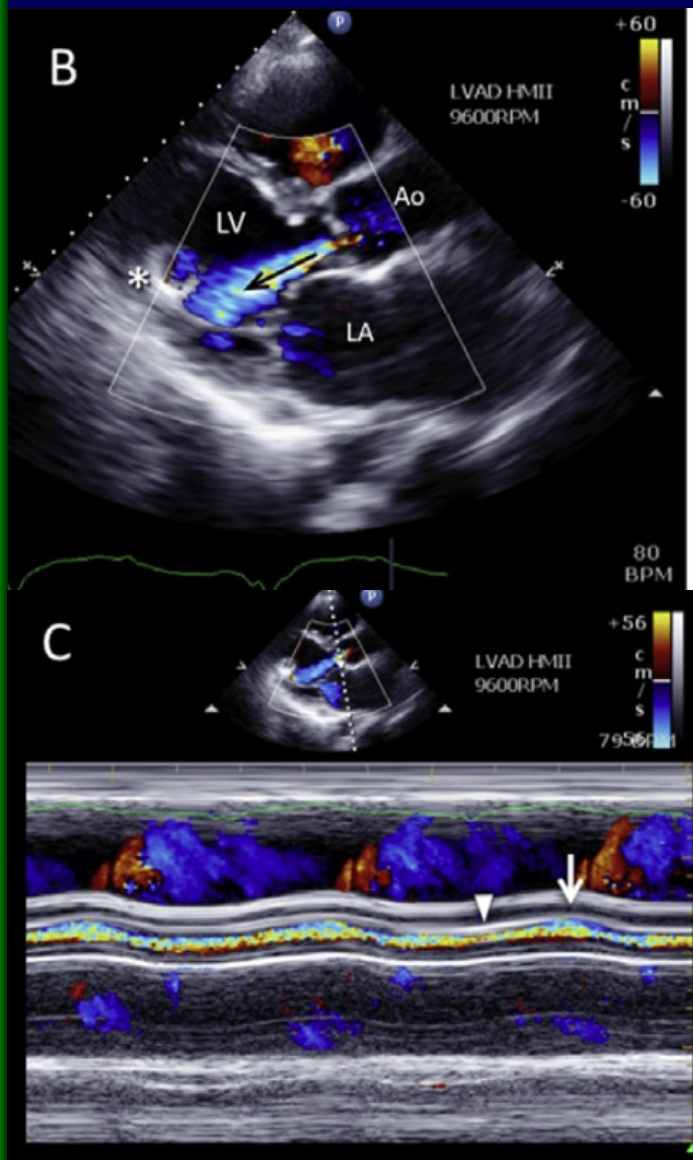
EcoTT: valvola aortica



AR de novo 25-30% a 12 mesi dall'impianto del VAD

MECCANISMO MULTIFATORIALE
rimodellamento delle cuspidi
fusione commisurale

Trombosi della radice aortica
5% J Heart Lung Transplant 2018



CONCLUSIONI

L'ecografia transtoracica è un esame accurato e riproducibile per la stima dei parametri emodinamici del paziente portatore di LVAD sovrapponibile al cateterismo, ripetibile e non invasiva.

GRAZIE....