ECOCARDIOCHIRURGIA®
ECO-RM-TC CHIRURGIA-INTERVENTISTICA

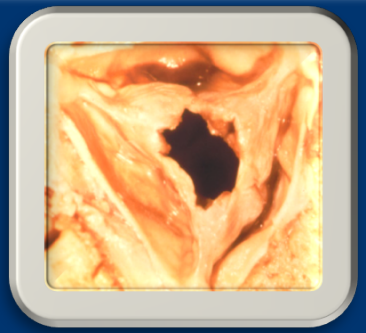
LA DIAGNOSI DI STENOSI VALVOLARE AORTICA SEVERA.

Puo' essere facile quando il gradiente medio e' critico. e' invece meno facile districarsi nella stenosi aortica low flow/low gradient

Dott.ssa Chiara Bencini

OSPEDALE SAN PAOLO - Milano

VALUTAZIONE DI SEVERITA' DELLA STENOSI AORTICA



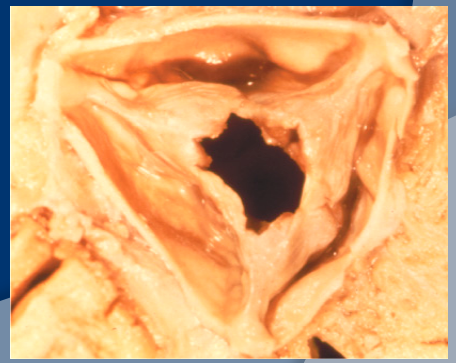
Aspetto della valvola

- cuspidi molto ispessite
- estese calcificazioni
- cuspidi immobili

Suggeriscono stenosi aortica severa

BICUSPIDE

STENOSI DEGENERATIVA

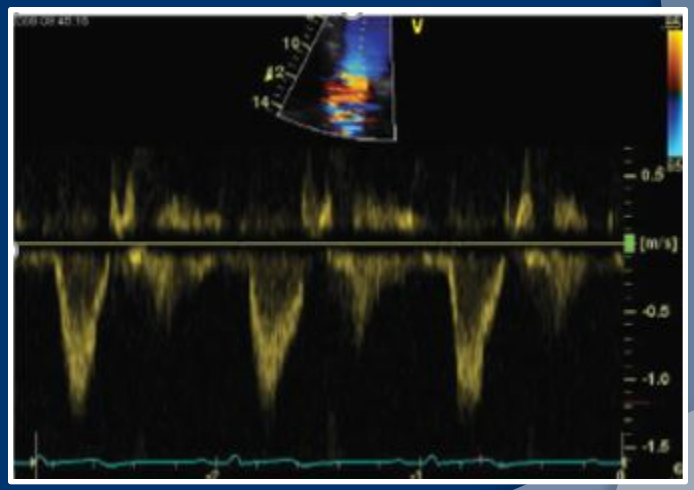


STENOSI REUMATICA

VALUTAZIONE DI SEVERITA' DELLA STENOSI AORTICA

L'area valvolare aortica si deriva con l'equazione di continuità: importante perché relativamente indipendente dal flusso

$$AVA = 3.14 \times (D/2)^2 \times VTI_{TEVS} / VTI_{AO}$$

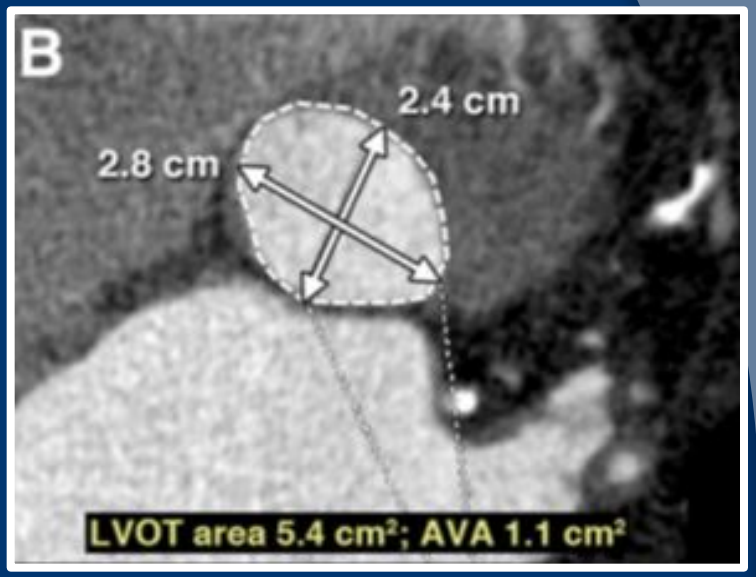


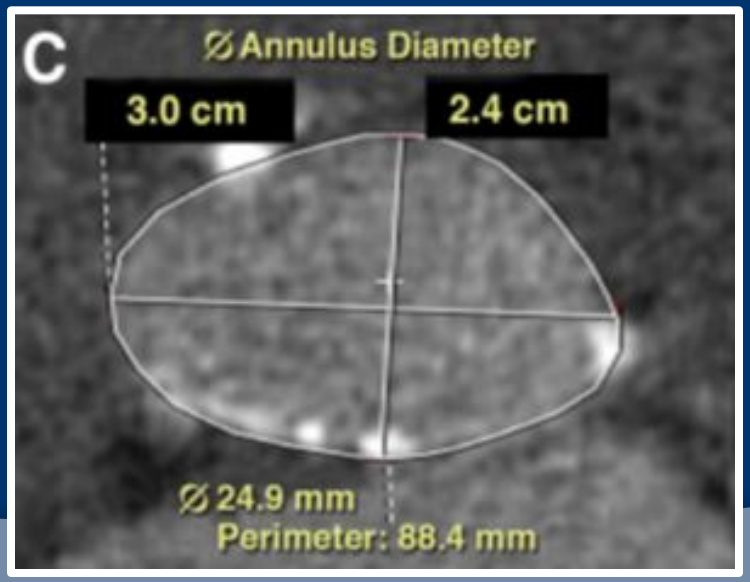
ILTEVS si misura a valvola aperta

Media di almeno 3 misurazioni -
5 misurazioni se in corso di fibrillazione atriale

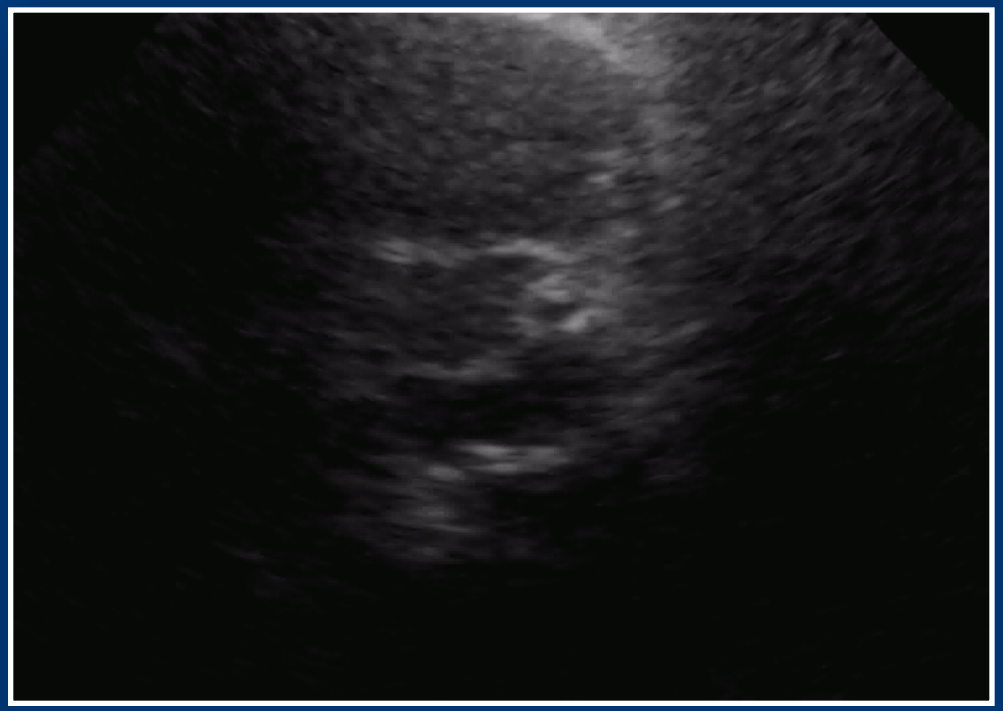
ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

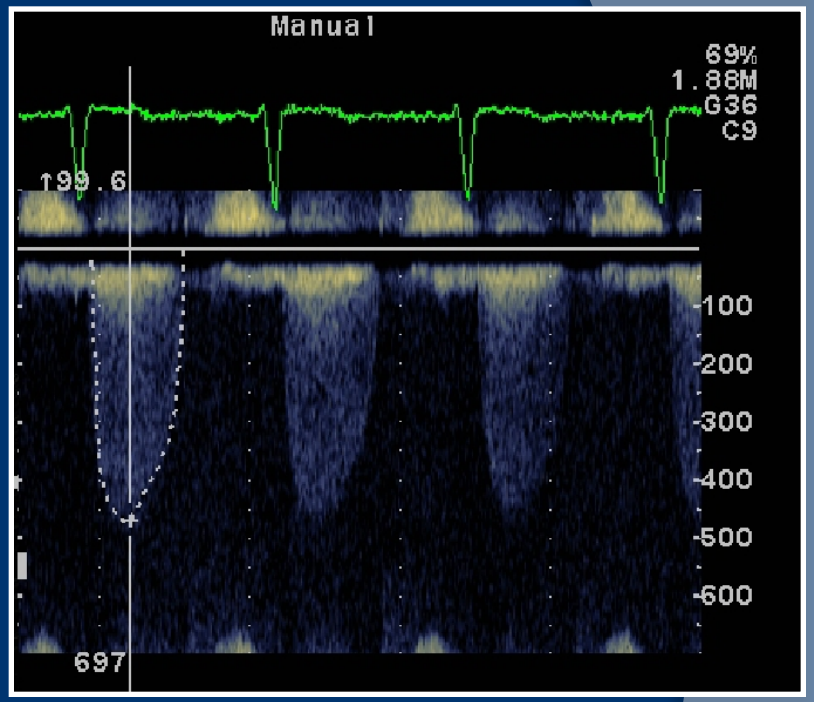
VALUTAZIONE DI SEVERITA' DELLA STENOSI AORTICA





STENOSI AORTICA SEVERA HIGH GRADIENT





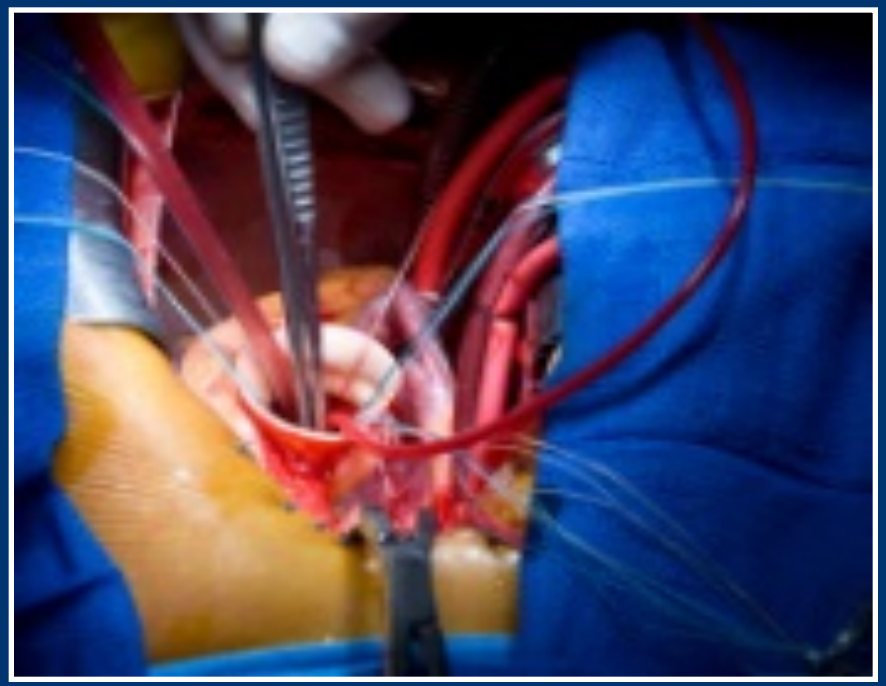
Area valvolare < 1 cm2
(< 0,6 cm2/m2)

Gradiente medio > 40 mmHg

ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

STENOSI AORTICA HIGH GRADIENT

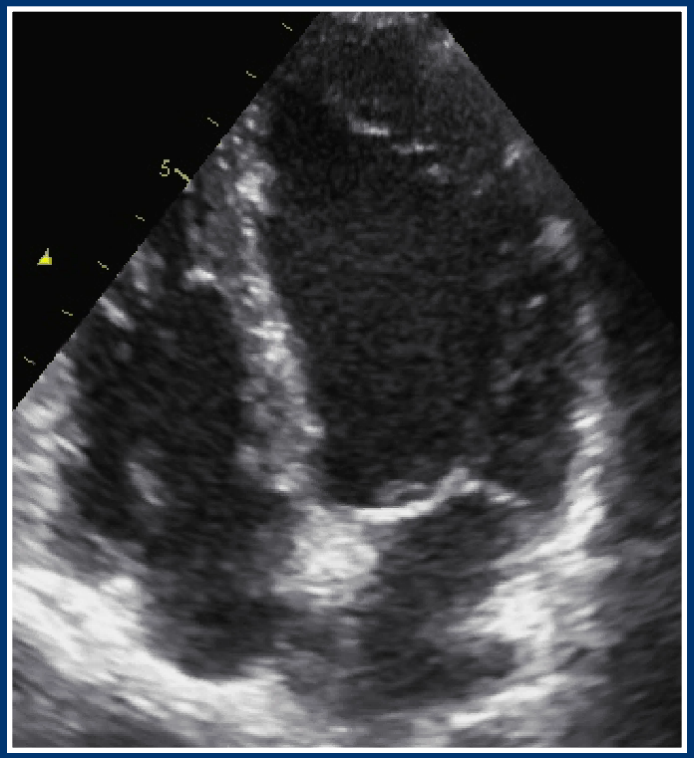
Se il paziente è sintomatico…

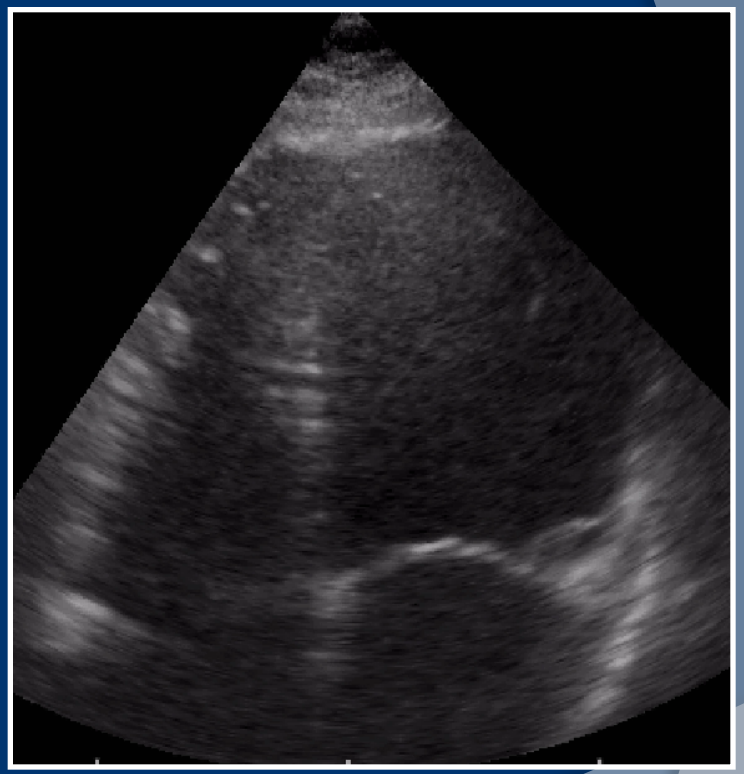


ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

STENOSI AORTICA HIGH GRADIENT

Se il paziente è ASINTOMATICO…

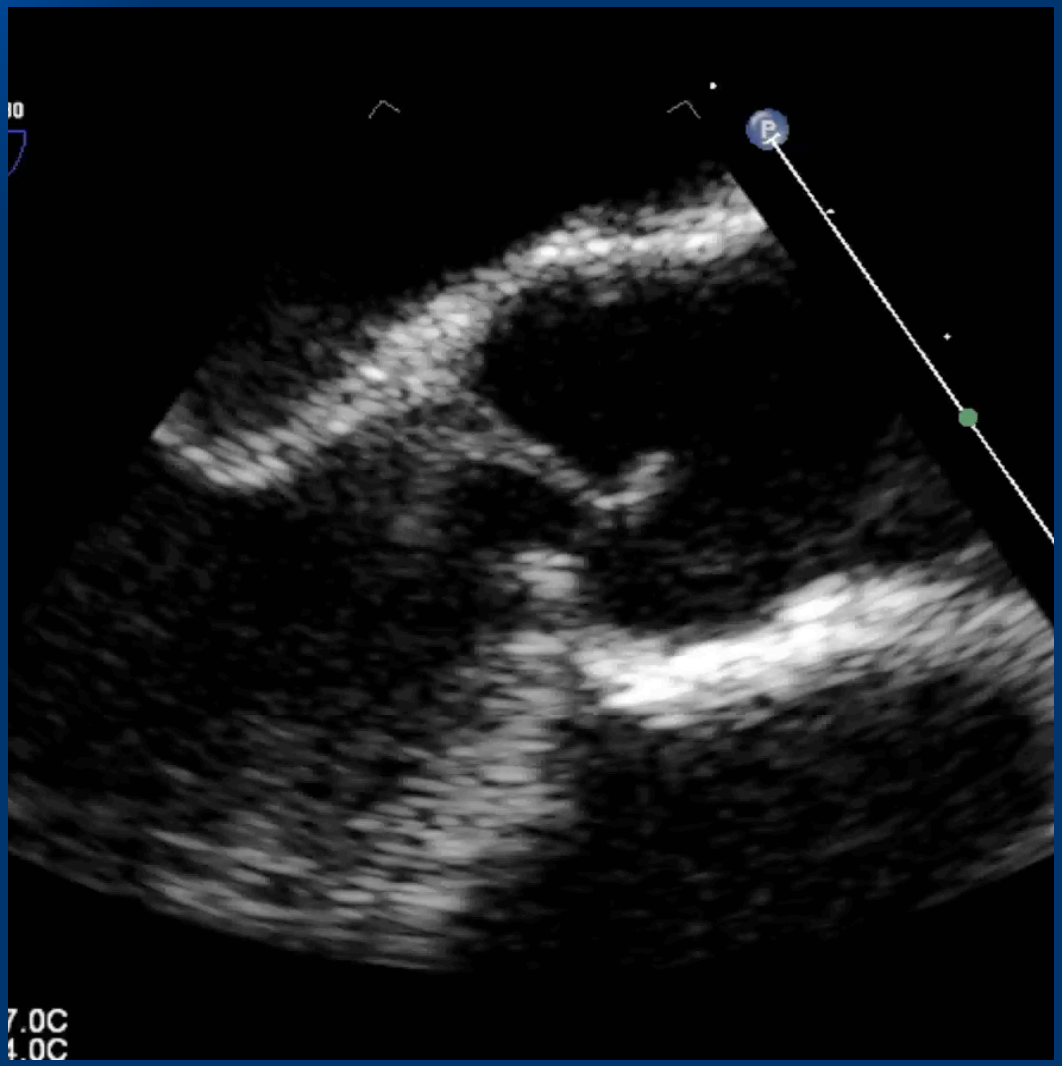


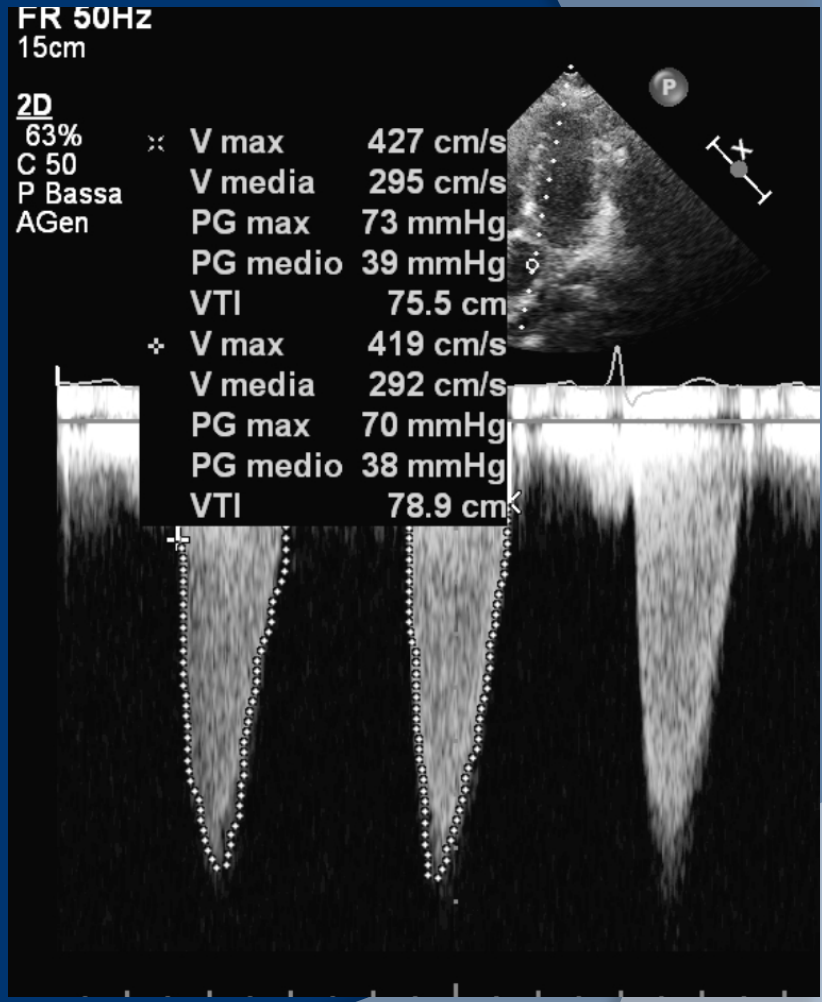


FOLLOW UP (test ergometrico?)

intervento

EcoCardioChirurgia®
Eco-RM-TC
Chirurgia-Interventistica





ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

LE DIFFICOLTA'…

DISCORDANZA AREA/GRADIENTE

- ERRORE DI MISURAZIONE / MANCATA INDICIZZAZIONE
- LOW FLOW /LOW GRADIENT AS
- INCONGRUENZA DELLE LINEE GUIDA

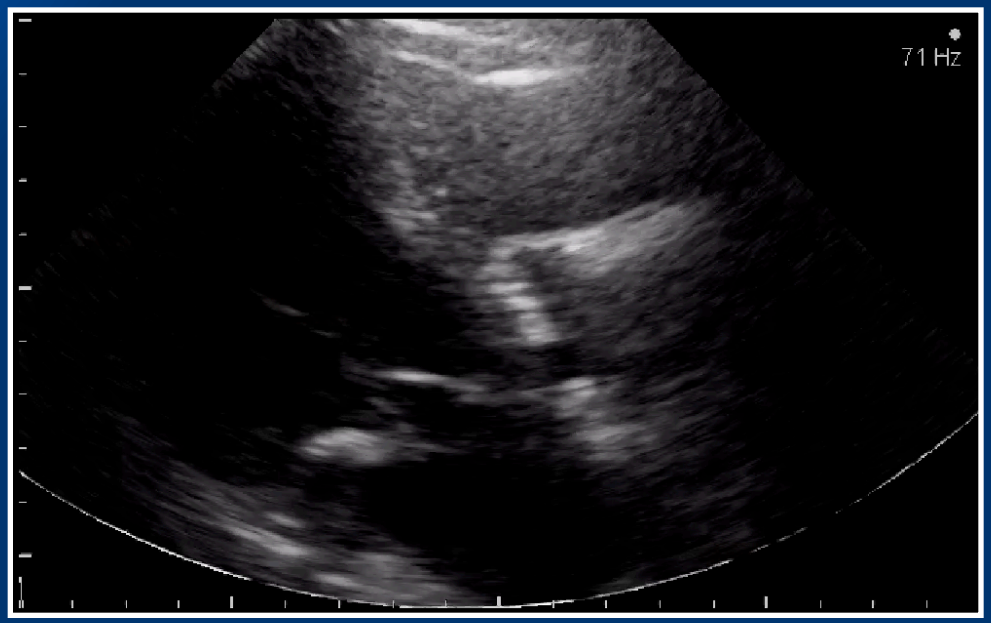
ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

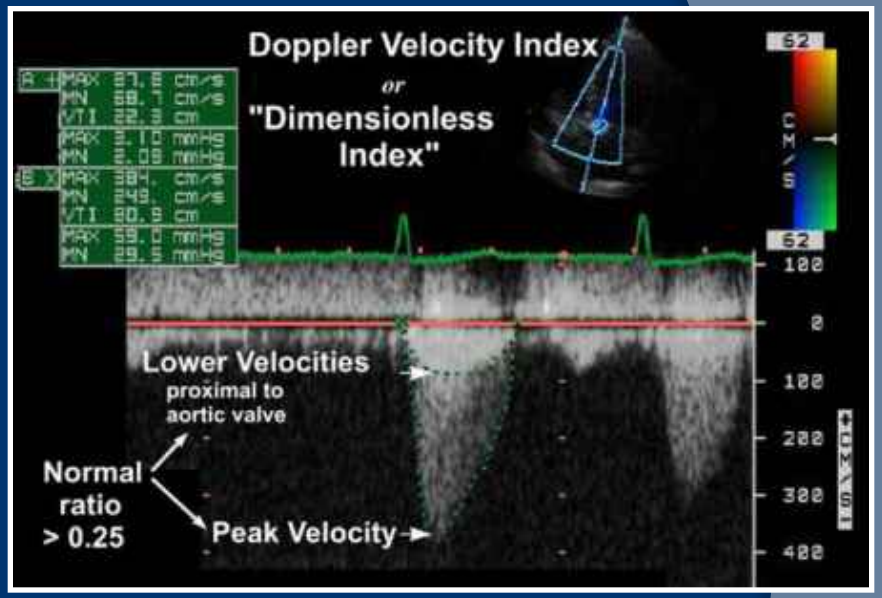
LE DIFFICOLTA'..

DISCORDANZA AREA/GRADIENTE

- ERRORE DI MISURAZIONE / MANCATA INDICIZZAZIONE
- LOW FLOW /LOW GRADIENT AS
- INCONGRUENZA DELLE LINEE GUIDA

ERRORE DI MISURAZIONE - COSA CI PUO' AIUTARE?





DOPPLER VELOCITY INDEX < 0,25

AVA < 1 cm2 con DVI > 0.30 → VEROSIMILE ERRORE di misurazione

ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

ERRORE DI MISURAZIONE - COSA CI PUO' AIUTARE?

INDICIZZARE L'AREA VALVOLARE PER SUPERFICIE CORPOREA!

EcoCardioChirurgia®
Eco-RM-TC
Chirurgia-Interventistica

LE DIFFICOLTA'..

DISCORDANZA AREA/GRADIENTE

- ERRORE DI MISURAZIONE / MANCATA INDICIZZAZIONE
- LOW FLOW /LOW GRADIENT AS
- INCONGRUENZA DELLE LINEE GUIDA

ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

INCONGRUENZA DELLE LINEE GUIDA

La valvola appare severamente stenotica ma i gradienti non sono critici in presenza di conservata FE (> 50%).
Stroke volume index > 35 ml/m2

un paziente con SV normale e AVA 0.8 -1 cm2 sviluppa un gradiente medio di 30 – 35 mmHg.
AVA < 0.8 cm2 → gradiente medio > 40 mmHg

LE DIFFICOLTA'..

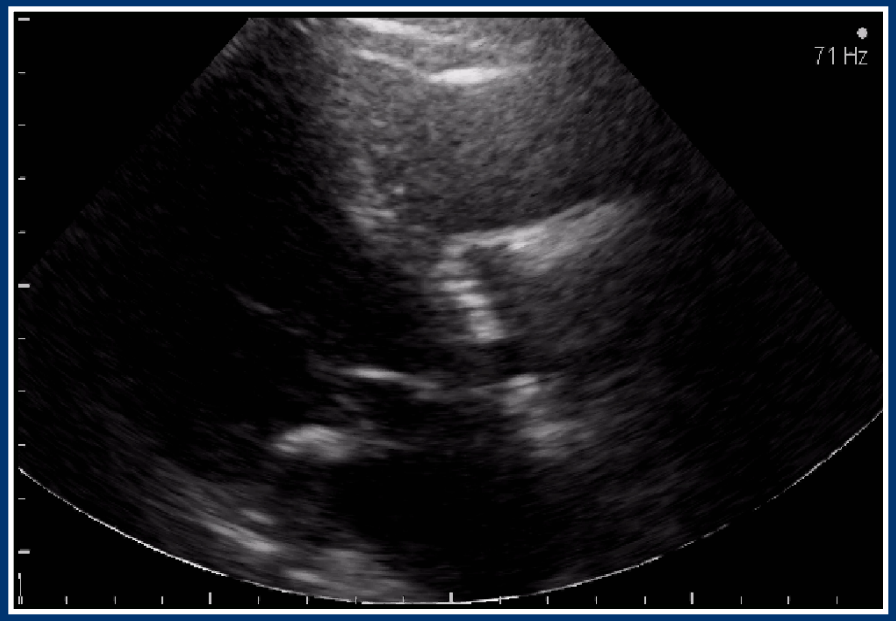
DISCORDANZA AREA/GRADIENTE

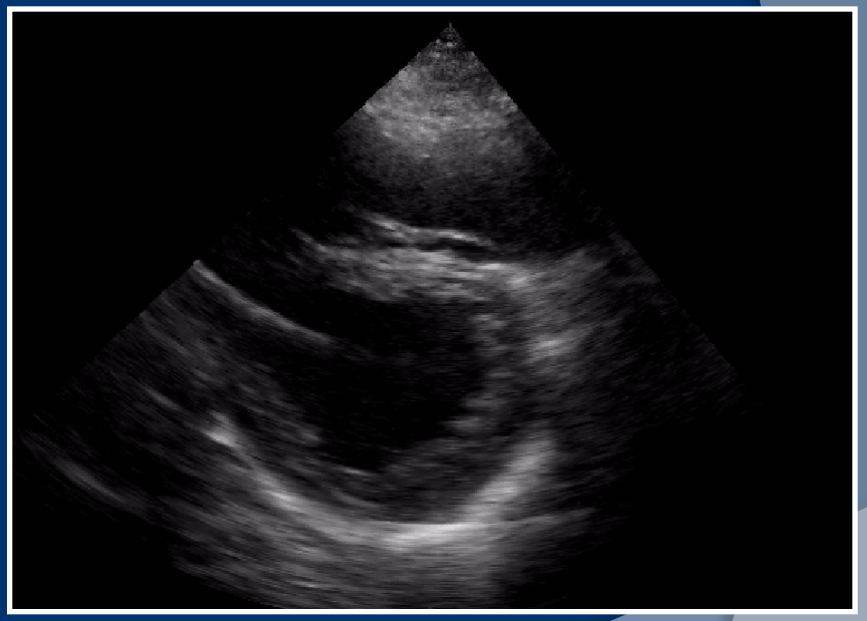
- ERRORE DI MISURAZIONE / MANCATA INDICIZZAZIONE
- LOW FLOW /LOW GRADIENT AS
- INCONGRUENZA DELLE LINEE GUIDA

ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

LOW FLOW - LOW GRADIENT AORTIC STENOSIS (FE < 50%)

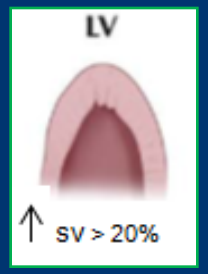
La stenosi è ispettivamente severa ma i gradienti transvalvolari non sono critici e la funzione sistolica globale del ventricolo sinistro è compromessa (FE < 50%)

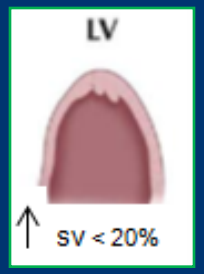




LA VALVOLA E' STENOTICA O SI APRE POCO PERCHE' E' RIDOTTA LA FUNZIONE SISTOLICA GLOBALE?
COME MI ORIENTO?

LOW FLOW - LOW GRADIENT AORTIC STENOSIS (FE < 50%)





STRESS DOBUTAMINA
5 -10- 20 Y / kg / min

SI riserva contrattile

NO riserva contrattile

AVA ≤ 1 cm2/
Gradiente medio ≥
40 mmHg

Stenosi aortica severa vera

AVA > 1 cm2/
Gradiente medio
< 40 mmHg

Stenosi aortica pseudosevera

?

Indeterminata → **TC?**

Echocardiographic Assessment of Valve Stenosis: EAE/ASE Recommendations for Clinical Practice

ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

PARADOXICAL LOW GRADIENT SEVERE AORTIC STENOSIS (FE > 50%)

La valvola appare severamente stenotica ma i gradienti non sono critici in presenza di conservata FE (> 50%)

-AVA $\leq$ 1.0 cm2/ Indexed AVA $\leq$ 0.6 cm2/m2

- Aortic Vmax <4 m/s or mean DP <40 mm Hg

-**Stroke volume index <35 mL/m2**, measured when patient is normotensive (systolic BP < 140 mmHg)

PARADOXICAL LOW GRADIENT SEVERE AORTIC STENOSIS

D: Symptomatic severe AS

D1	Symptomatic severe high-gradient AS	• Severe leaflet calcification or congenital stenosis with severely reduced leaflet	• Aortic V_{max} ≥4 m/s or mean ΔP ≥40 mm Hg • AVA typically <1.0 cm^2	• LV diastolic dysfunction • LV hypertrophy • Pulmonary hypertension may be present	• Exertional dyspnea or decreased exercise tolerance • Exertional angina • Exertional syncope or presyncope
D2				• LV diastolic dysfunction • LV hypertrophy • LVEF <50%	• HF • Angina • Syncope or presyncope
D3			• Stroke volume index <35 mL/m² • Measured when patient is normotensive (systolic BP <140 mm Hg)	• Increased LV relative wall thickness • Small LV chamber with low stroke volume • Restrictive diastolic filling • LVEF ≥50%	• HF • Angina • Syncope or presyncope

D3 Symptomatic severe low-gradient AS with normal LVEF or paradoxical low-flow severe AS

AR indicates aortic regurgitation; AS, aortic stenosis; AVA, aortic valve area; AVAI, aortic valve area indexed to body surface area; BP, blood pressure; HF, heart failure; LV, left ventricular; LVEF, left ventricular ejection fraction; ΔP, pressure gradient; and V_{max}, maximum aortic velocity.

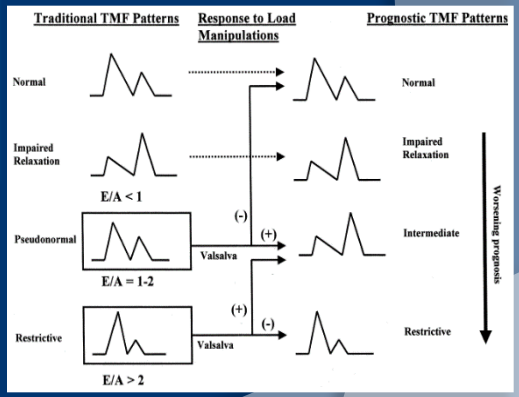
PRACTICE GUIDELINE - 2014 AHA/ACC Guideline for the Management of Patients With Valvular Heart Disease

ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

PARADOXICAL LOW GRADIENT SEVERE AORTIC STENOSIS

CARATTERISTICHE

- ✓donne anziane ipertese
- ✓ventricolo sinistro di piccole dimensioni
- ✓rimodellamento concentrico del VS
- ✓ disfunzione diastolica moderato-severa
- ✓fibrosi subendocardica diffusa
- ✓disfunzione sistolica latente (global longitudinal strain)
- ✓Incremento dei valori di valvulo-arterial impedance

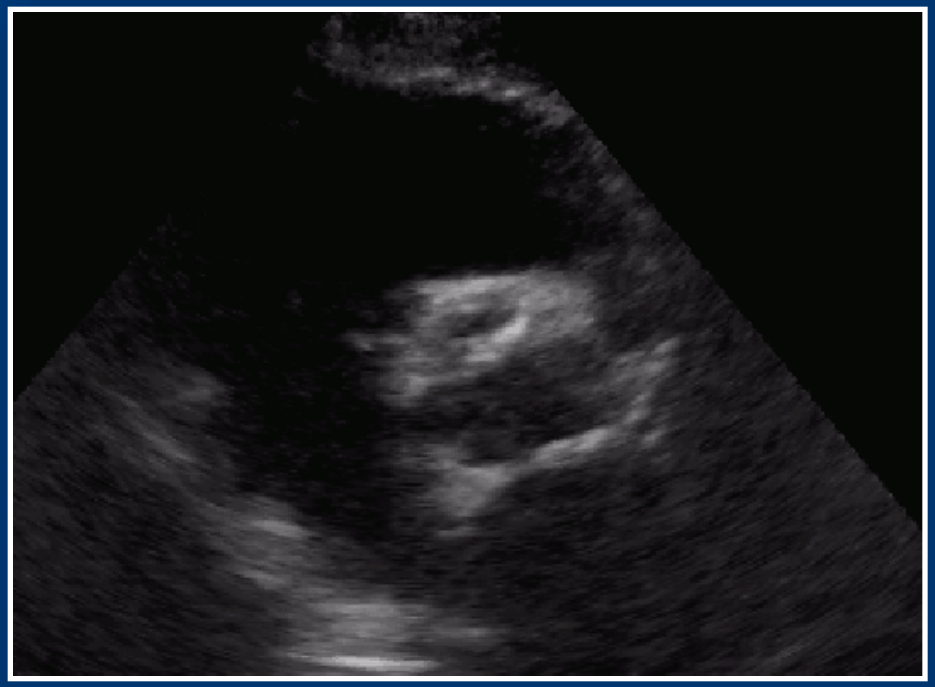


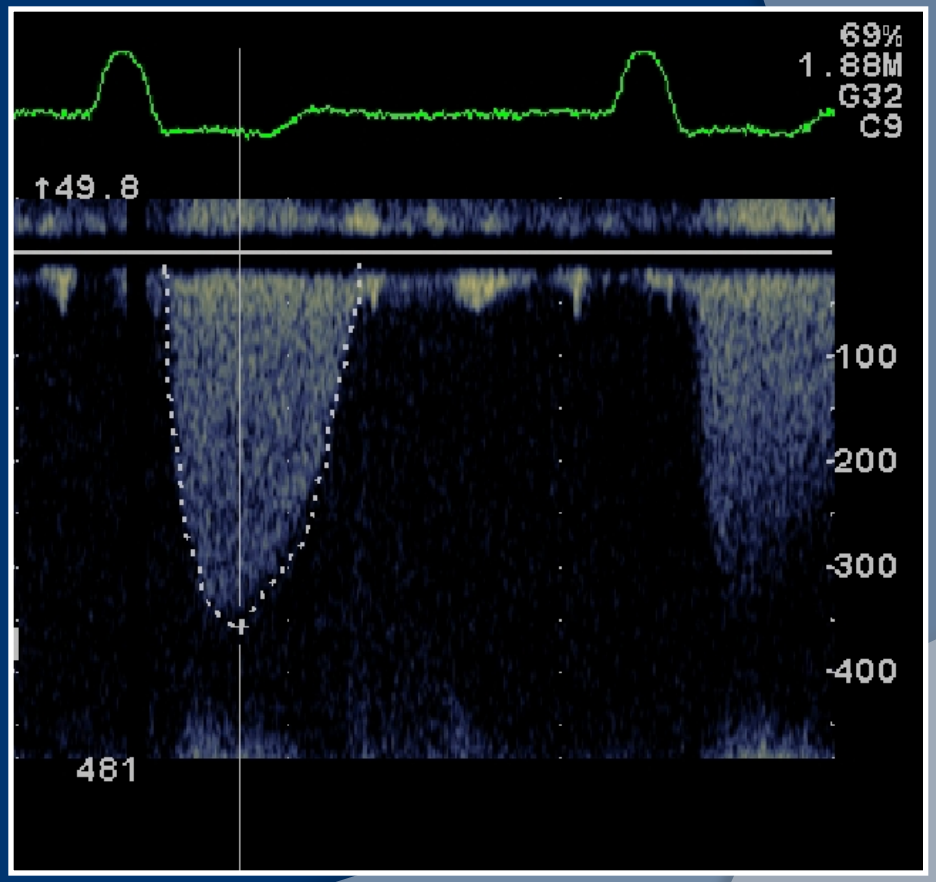
IL RIDOTTO GRADIENTE E' SECONDARIO ALLA RIDUZIONE DI STROKE VOLUME!

→ stroke volume index **< 35ml/m²**

ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

PARADOXICAL LOW GRADIENT SEVERE AORTIC STENOSIS

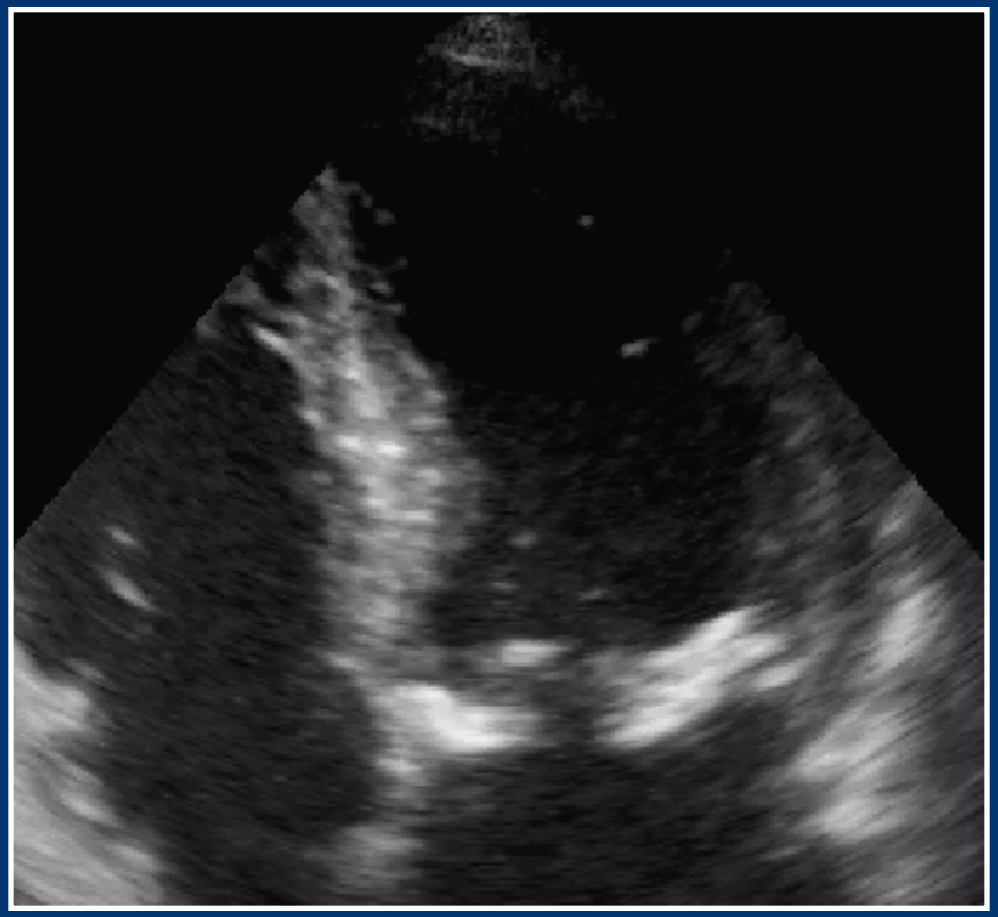




AVA 0.4 cm2/m2

ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

PARADOXICAL LOW GRADIENT SEVERE AORTIC STENOSIS



SVi 27 ml/m2
DVI 0.16

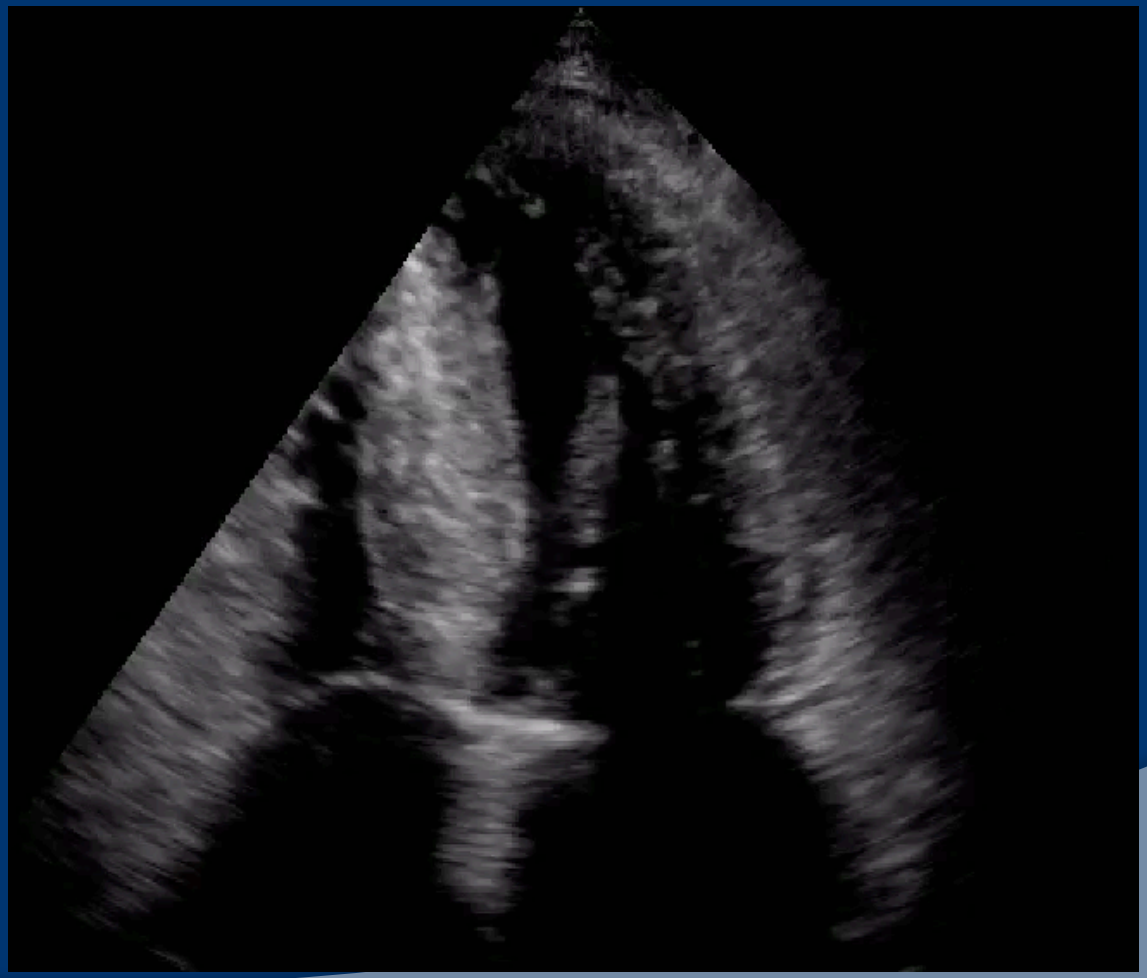
EcoCardioChirurgia®
Eco-RM-TC
Chirurgia-Interventistica

PERCHE' LO SV E' RIDOTTO?

DISFUNZIONE DIASTOLICA
(+ disfunzione sistolica)

PERCHE' LO SV E' RIDOTTO?

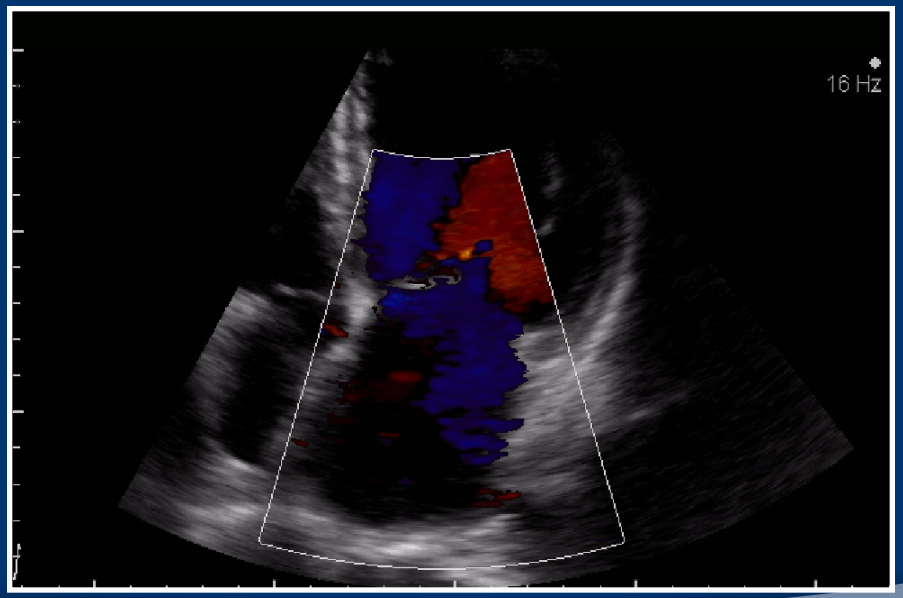
DISFUNZIONE DIASTOLICA
(+ disfunzione sistolica)

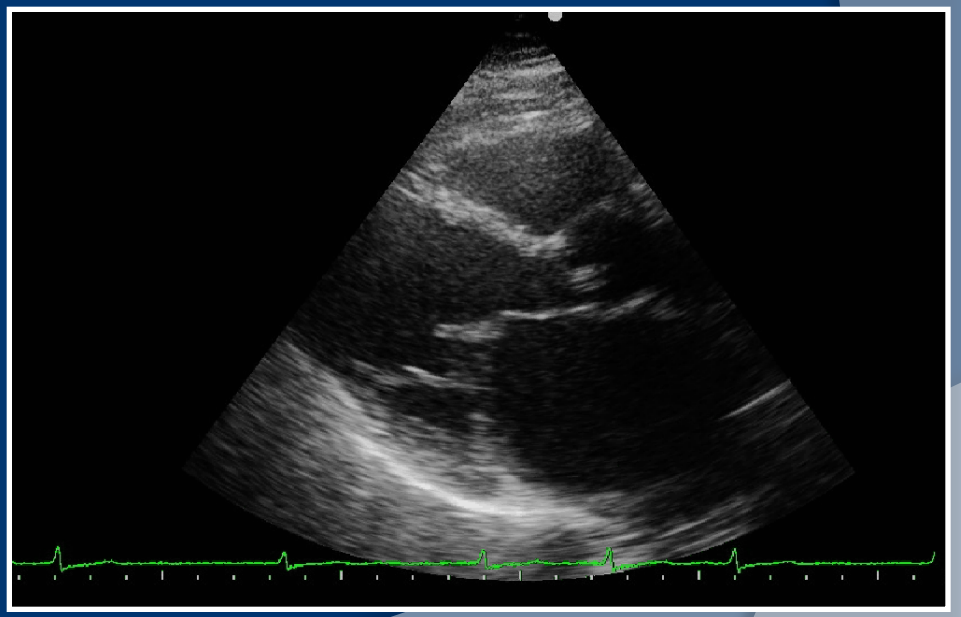


Dahl et al, Heart 2015; 101: 1015-1023

PERCHE' LO SV E' RIDOTTO?

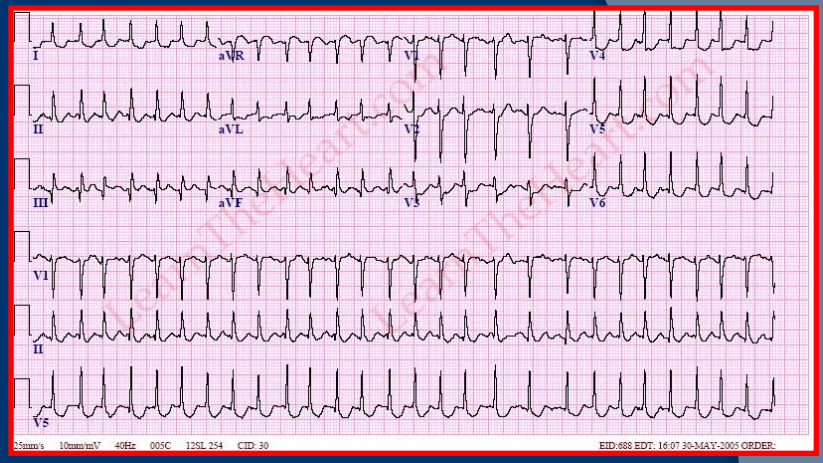
- ✓IPERTENSIONE ARTERIOSA NON CONTROLLATA
- ✓STENOSI MITRALICA
- ✓INSUFFICIENZA MITRALICA

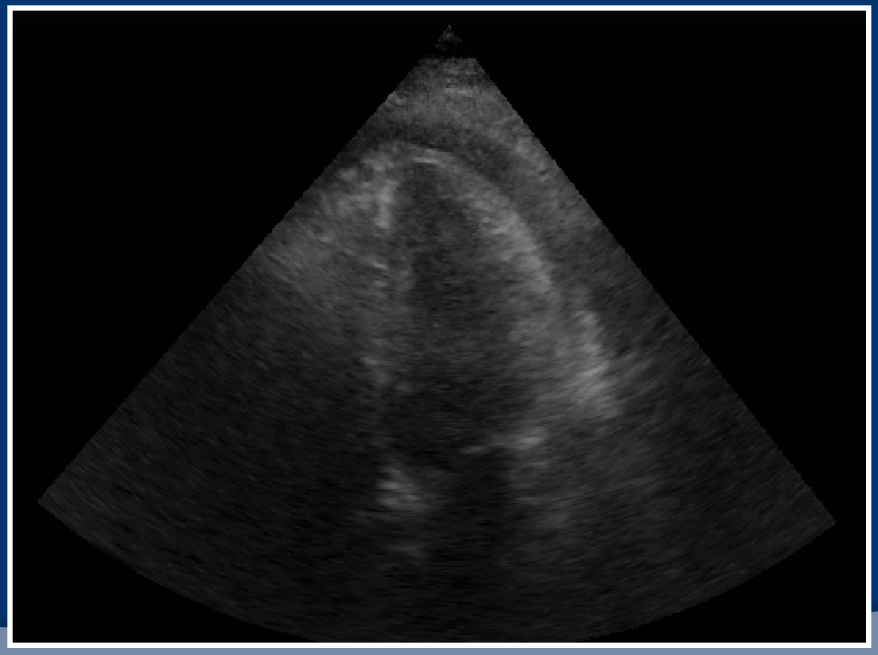


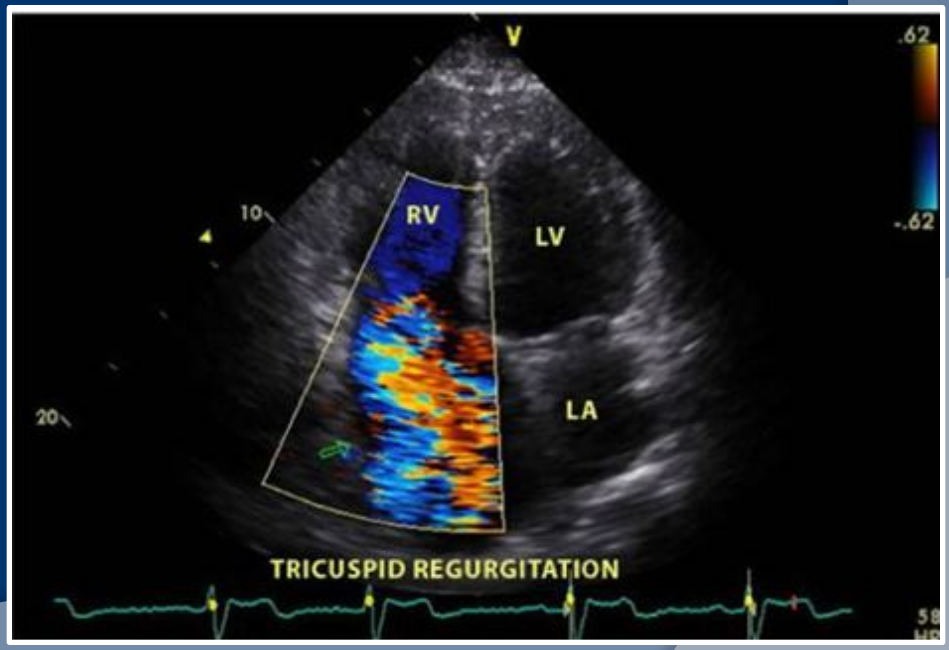


PERCHE' LO SV E' RIDOTTO?

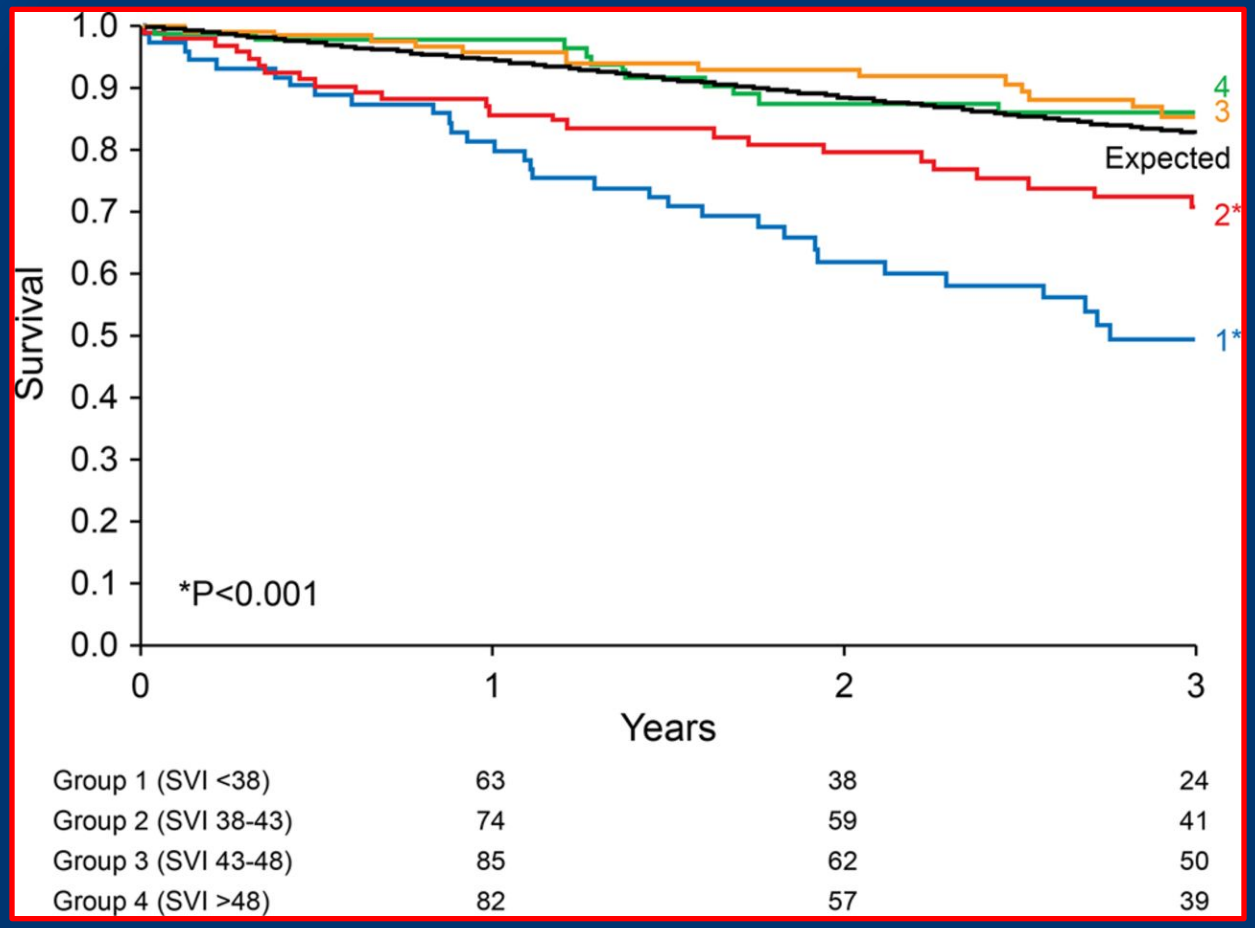
- ✓FIBRILLAZIONE ATRIALE
- ✓PERICARDITE COSTRITTIVA
- ✓INSUFFICIENZA TRICUSPIDALE







CAMBIAMO I NOSTRI REFERTI…



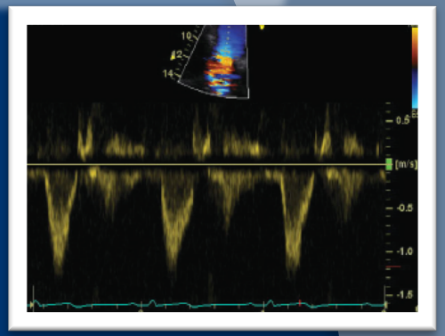
SVi!

Stroke volume index (SVI) quartiles and adjusted survival.

NON E' SOLO UNA MALATTIA DELLA VALVOLA…

Mackram F Eleid et al. Heart 2015;101:23-29

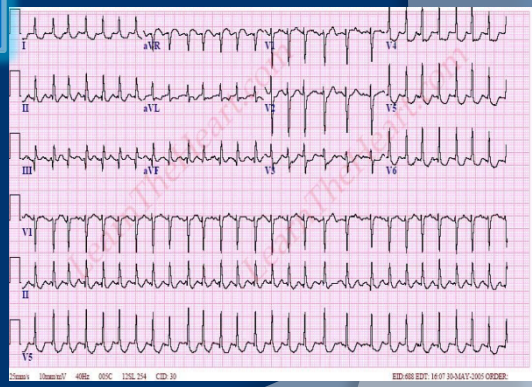
Paradoxical low gradient severe AS
SIAMO SICURI?



IL GRADIENTE MEDIO E' DAVVERO RIDOTTO?

LO SVi E' DAVVERO RIDOTTO? (attenzione a dove misuro LVOT e a dove posiziono il PW – utilizzare più metodi)

LA FUNZIONE SISTOLICA E' DAVVERO CONSERVATA?



SONO RIUSCITO AD IDENTIFICARE UNA CAUSA DI RIDUZIONE DELLO SVi?

HO ELIMINATO TUTTI I POSSIBILI FATTORI CONFONDENTI?

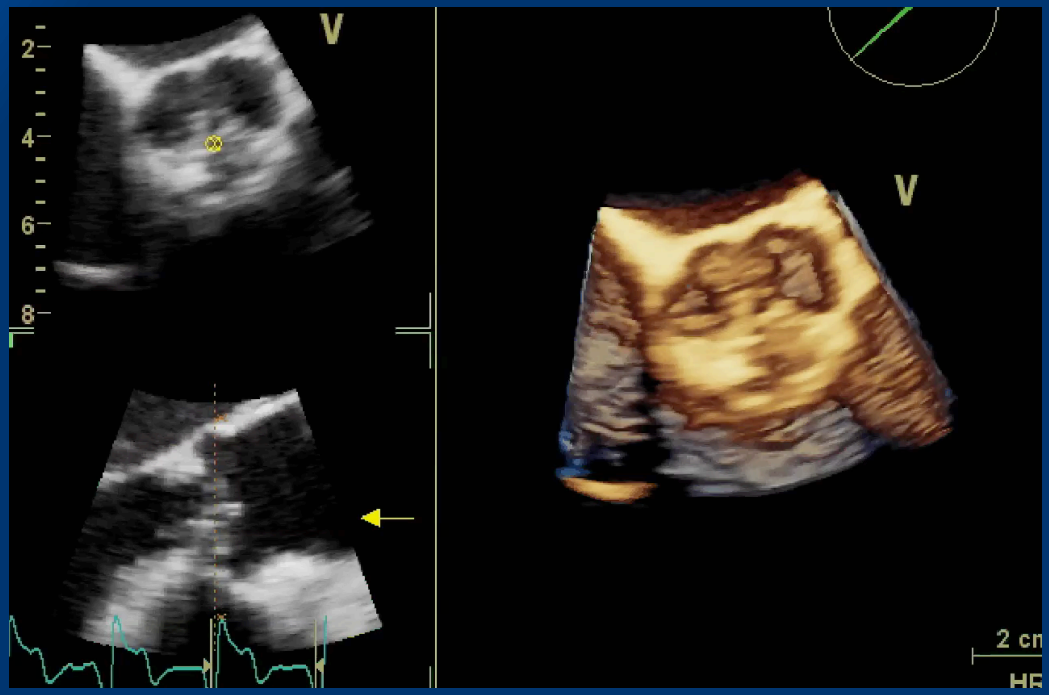
ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

PARADOXICAL LOW GRADIENT SEVERE AORTIC STENOSIS

DIAGNOSI IMPROBABILE SE:

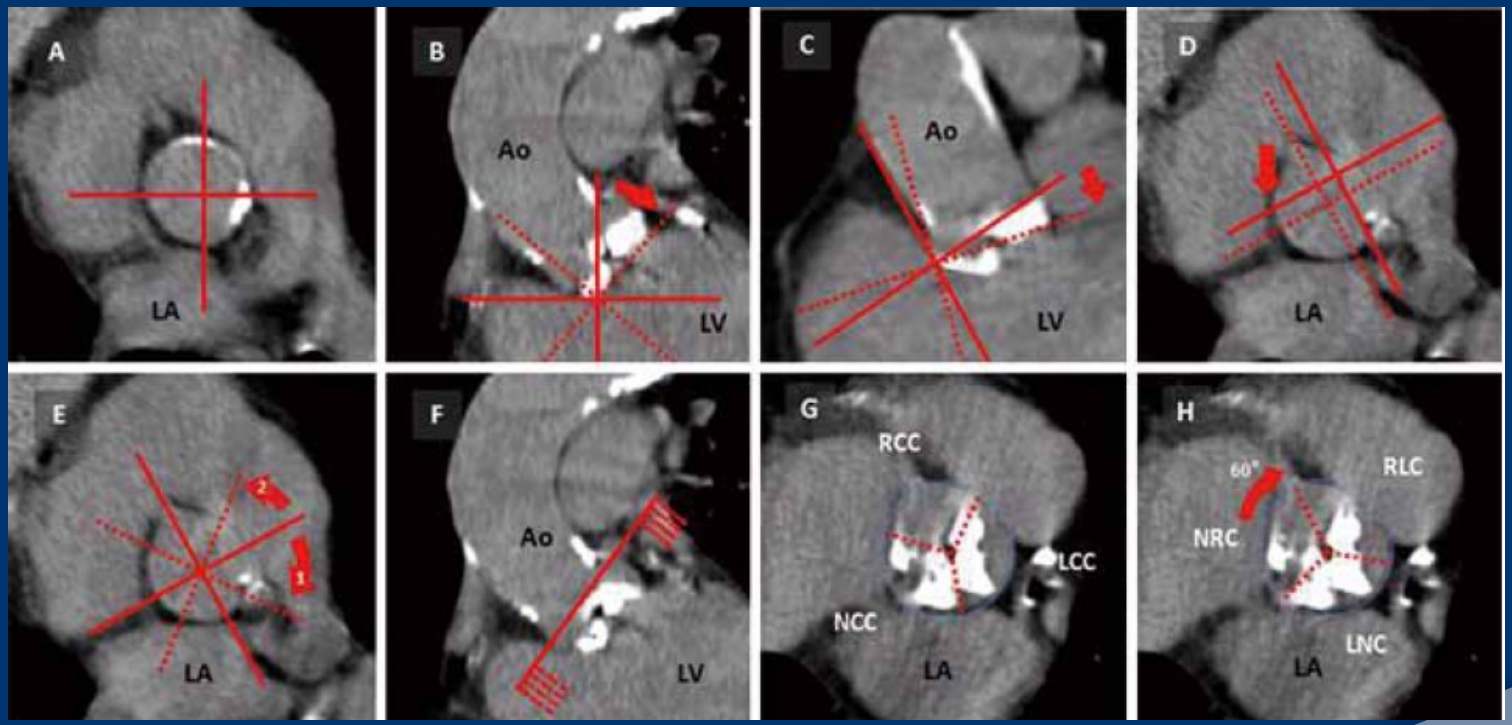
- **V max < 3 m/sec**
- **GRADIENTE MEDIO < 20 mmHg**
- **DOPPLER VELOCITY INDEX > 0,30**

E SE FOSSE UNA PSEUDO SEVERA? (30%!)



E SE FOSSE UNA PSEUDO SEVERA? (30%!)

MULTISLICE CT
(AVC – aortic valve calcification)



Classe IIA

Clavel et al, JACC 2013; 62: 2329-38

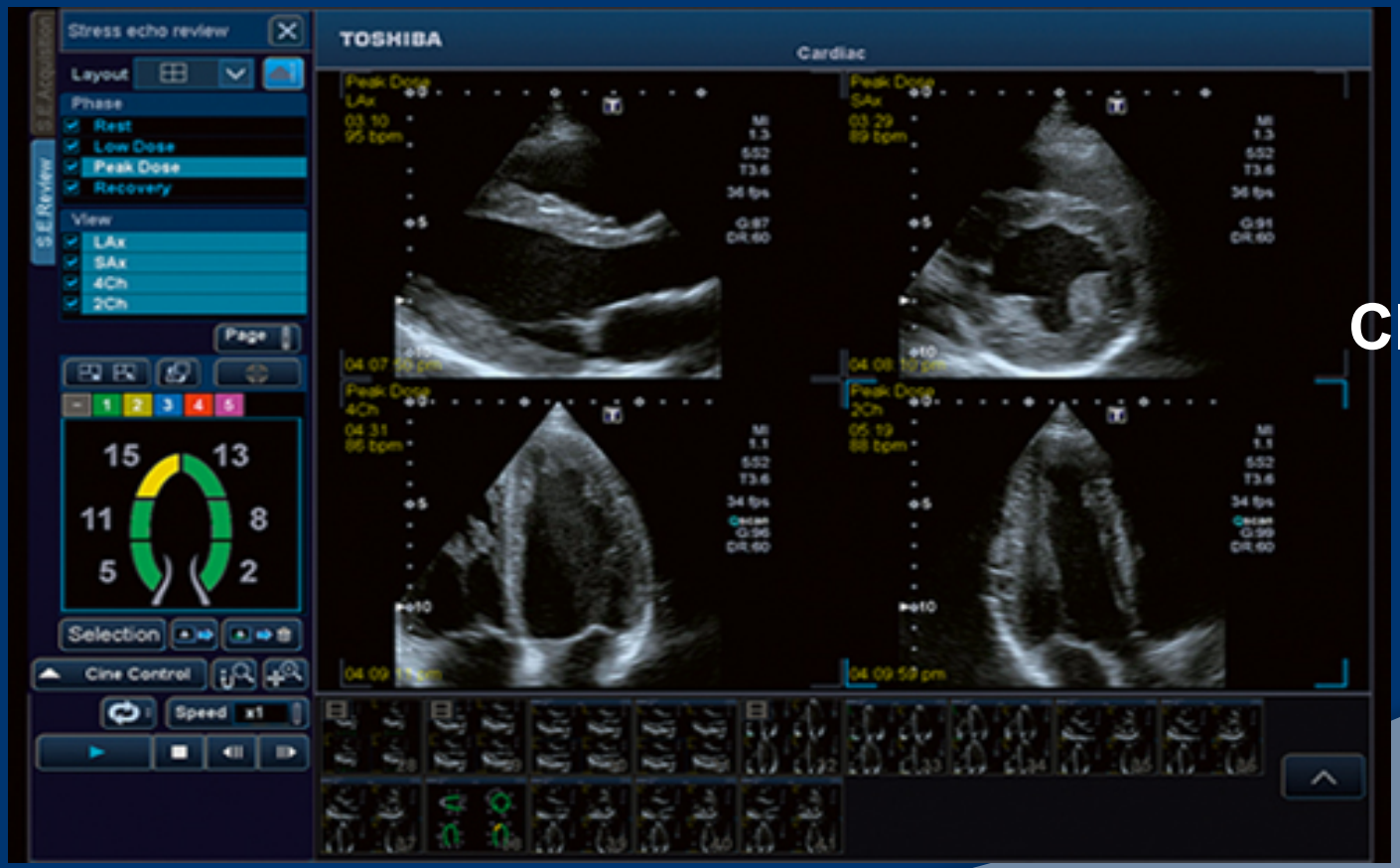
EcoCardioChirurgia®
Eco-RM-TC
Chirurgia-Interventistica

E SE FOSSE UNA PSEUDO SEVERA? (30%!)

STRESS ECO

Calcolo di projected AVA (flow rate 250 ml/sec)

Clavel et al. JACC. CARDIOVASCULAR IMAGING. VOL 6 N 2, 2013



Classe IIB

ECOCARDIOCHIRURGIA®
ECO-RM-TC
CHIRURGIA-INTERVENTISTICA

LE LINEE GUIDA

AVR is reasonable in symptomatic patients with low-flow/low- gradient severe AS (stage D3) with an LVEF 50% or greater, a calcified aortic valve with significantly reduced leaflet motion, and a valve area 1.0 cm2 or less only if clinical, hemodynamic, and anatomic data support valve obstruction as the most likely cause of symptoms and data recorded when the patient is normotensive (systolic BP <140 mm Hg)

CLASSE IIa

GRAZIE PER L’ATTENZIONE!