

10° CONGRESSO NAZIONALE



*Quello che le Linee
Guida Non Dicono*

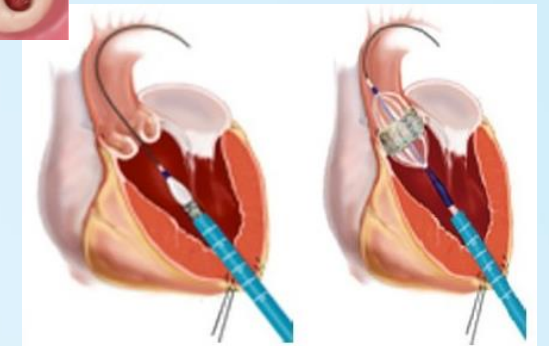
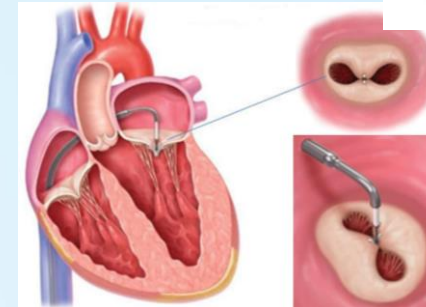
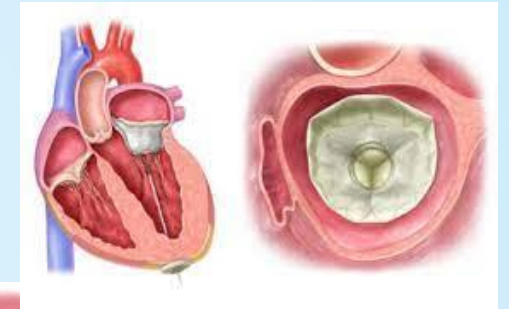
Napoli
Hotel Excelsior
14-15 aprile 2023

*Ecocardiografia nelle procedure interventistiche strutturali – Evidenze
scientifiche*

Ilaria Caso


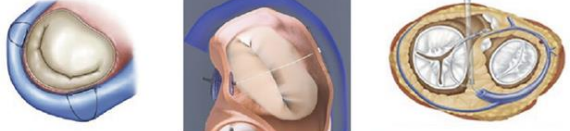
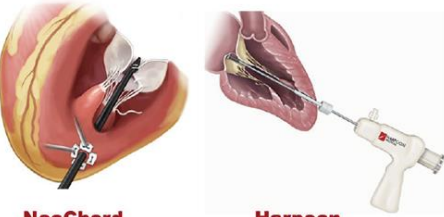
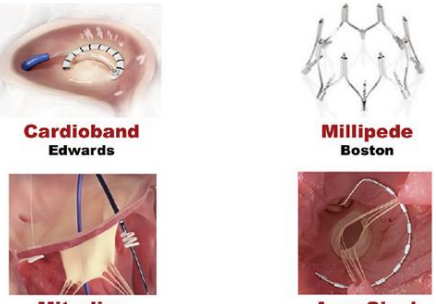
Road Map





















- 1. Selezione del paziente**
- 2. Guida intraprocedurale**
- 3. Gestione complicanze**



Device delle tecniche percutanee

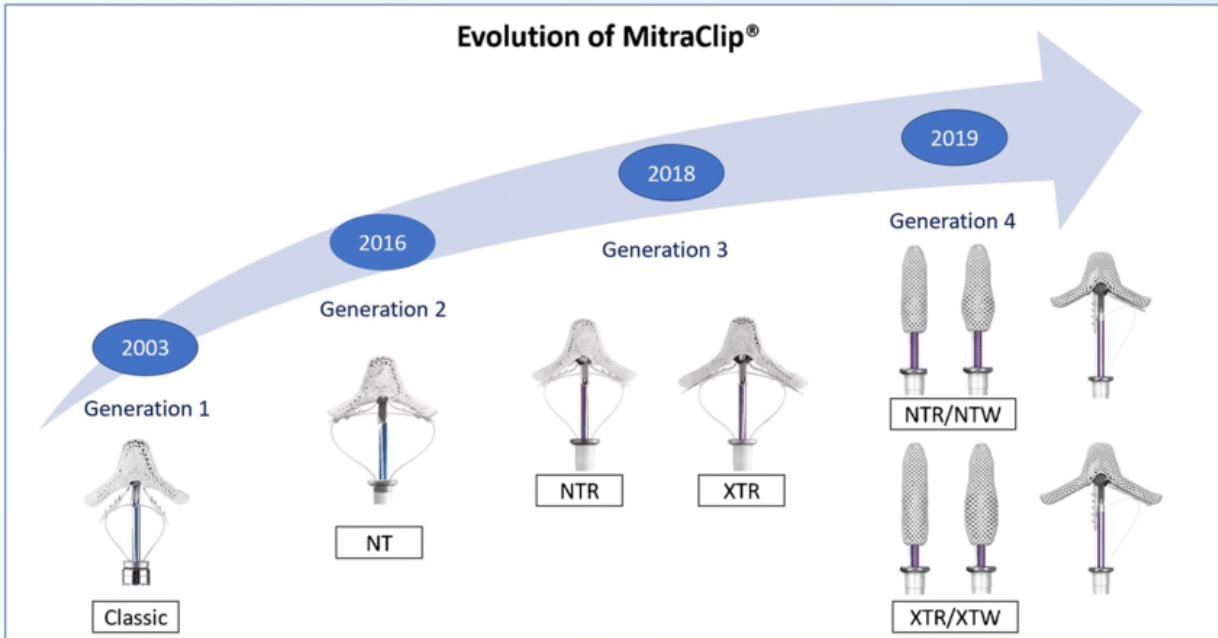
Valvola mitrale

<p>Edge-to-Edge</p>  <p>MitraClip Abbott</p> <p>Pascal Edwards</p>		<p>Indirect Annuloplasty</p>  <p>Carillon Cardiac Dimension</p> <p>ARTO MVRx</p> <p>Mitral Loop Cerclage Tau-PNU Medical Company</p>		
<p>Chordal Repair</p>  <p>NeoChord NeoChord</p> <p>Harpoon Edwards</p>		<p>Direct Annuloplasty</p>  <p>Cardioband Edwards</p> <p>Millipede Boston</p> <p>Mitralign Mitralign</p> <p>AccuCinch ANCORA Heart</p>		

 CardioValve Valtech (Edwards)	 CardiaQ Edwards	 EVOQUE Edwards	 Sapien M3 Edwards	 Fortis Edwards	 EPYGON Affluent Medical	 AccuFit SINOMED
 MValve Mvalve Tech	 Tiara Neovasc	 HighLife HighLife Medical	 Mi-thos Shanghai NewMed	 Caisson Livanoval	 Corona Valcare	 PermaValve Micro Interventional
 SATURN InnovHeart	 Intrepid Medtronic	 AltaValve 4C Medical	 CEPHEA Abbott	 Tendyne Abbott	 NaviGate NCSI	

Others: - Braile - Direct Flow - MitrAssist - MitralHeal - ValveXchange - Transcat. Tech. - Lutter - Mehr - Mitralix - MitralTech - Mitracath - Mitralix - Nakostech - St George ATLAS - Venus - Verso - Transmural Systems

Evolution of MitraClip®

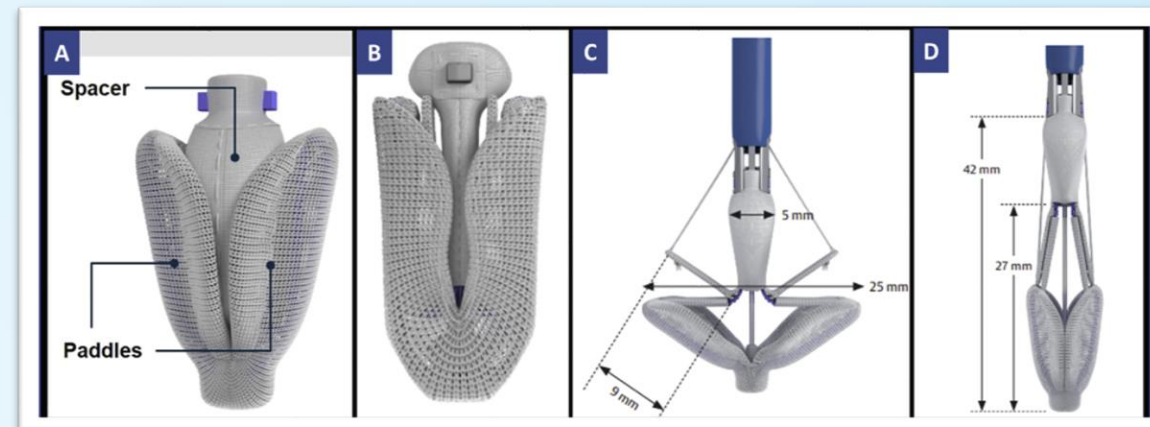


	Generation 1	Generation 2	Generation 3		Generation 4			
	Classic	NT	NTR	XTR	NT	NTW	XT	XTW

Technical details

Arm length	9 mm	9 mm	9 mm	12 mm	9 mm	9 mm	12 mm	12 mm
Arm width	4 mm	5 mm	5 mm	5 mm	4 mm	6 mm	4 mm	6 mm
Fictional elements	4	4	4	6	4	4	6	6
Catheter outer diameter	24 F	24 F	24 F	24 F	25 F	25 F	25 F	25 F
Novel device features added to reduce complications	<ul style="list-style-type: none"> Change from suture to gripper plate with 4 frictional elements and stainless arms Z lock to L lock 	<ul style="list-style-type: none"> Gripper material change from Elgiloy to Nitinol Steerable sleeve enhancements Gripper lowering to leaflet improved 	<ul style="list-style-type: none"> 2 sizes available for TEER (elongated arms 9 to 12 mm XTR with 2 more frictional elements) Improved catheter delivery system with a stiffer and 1.5-cm longer shaft Ability to open and close arms without a locking device 	<ul style="list-style-type: none"> 4 sizes available for TEER (with 4 to 6 mm, arm length spans 15 to 18 mm), pressure line Dual or separate independent grasping Continuous left atrial pressure monitoring Precise and predictable steering Simplified system preparation and deployment 				

Dispositivi di correzione percutanea EtoE



Utilizzo eco transesofageo 3D nell'impianto di Clip mitralica

STATE-OF-THE-ART PAPER

3D TEE During Catheter-Based Interventions

Francesco Fulvio Faletta, MD, Giovanni Pedrazzini, MD, Elena Pasotti, MD, Stefano Muzzarelli, MD, Maria Cristina Dequarti, MD, Romina Murzilli, MD, Susanne Anna Schlossbauer, MD, Iveta Petrova Slater, MD, Tiziano Mocceca, MD
Lugano, Switzerland

JACC: CARDIOVASCULAR IMAGING, VOL. 7, NO. 1, JANUARY 2015



Mayo Clin Proc. ■ January 2019;94(1):89-102

SPECIAL ARTICLE

Check for updates

Percutaneous Transcatheter Edge-to-Edge MitraClip Technique: A Practical "Step-by-Step" 3-Dimensional Transesophageal Echocardiography Guide

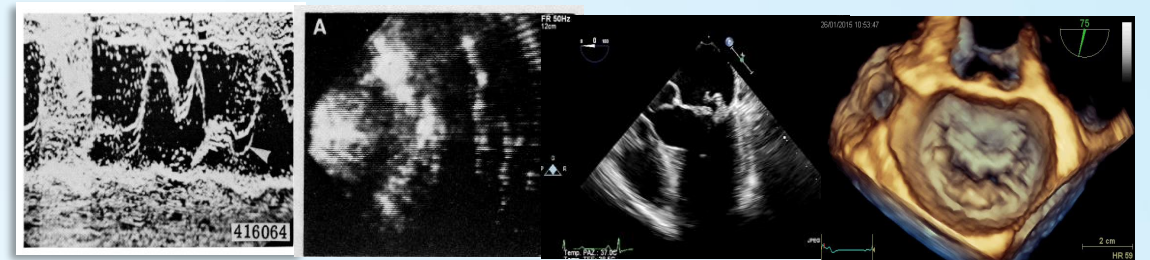
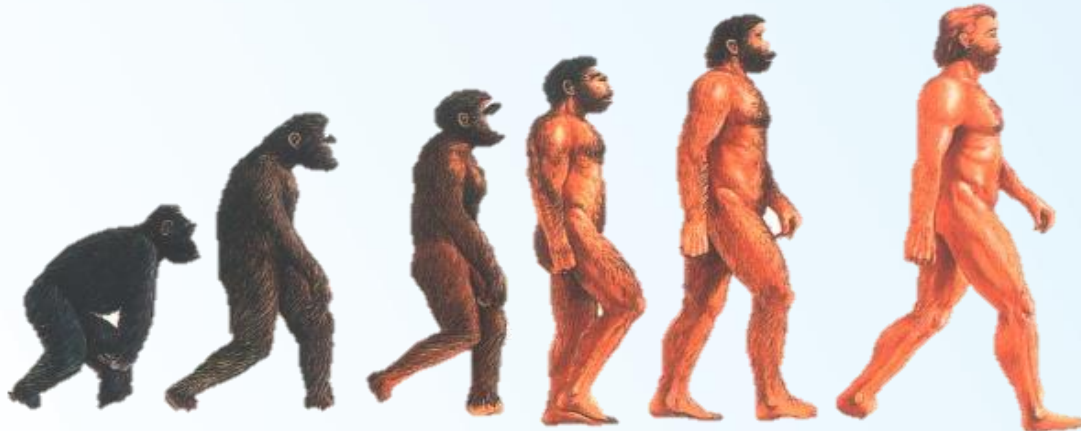
Limor Ilan Bushari, MD; Guy S. Reeder, MD; Mackram F. Eleid, MD; Krishnaswamy Chandrasekaran, MD; Maurice Enriquez-Sarano, MD; Charanjit S. Rihal, MD; and Joseph F. Maalouf, MD

REVIEW

Guidance of the MitraClip® procedure by 2D and 3D imaging

Plantation du Mitraclip® sous contrôle échographique en imagerie 2D et 3D

Louis Labrousse*, Marina Dijos, Lionel Leroux, Pierre Oses, Benjamin Seguy, Muriel Markof, Stéphane Lafitte
Journal of Cardiovascular Disease (2018) 111, 432-440



1. Selezione

Valutazione pre-procedura di Mitraclip

Definizione anatomico-patologica

- ✓ Degenerativa
- ✓ Funzionale

Step 1

Studio dell'apparato sottovalvolare

- ✓ Anello mitralico

Step 2

Studio dei lembi

- ✓ Coaptazione
- ✓ Lunghezza
- ✓ Flail

Step 3

Localizzazione jet rigurgito

- ✓ Singolo
- ✓ Multipli

Step 4

Setto interatriale

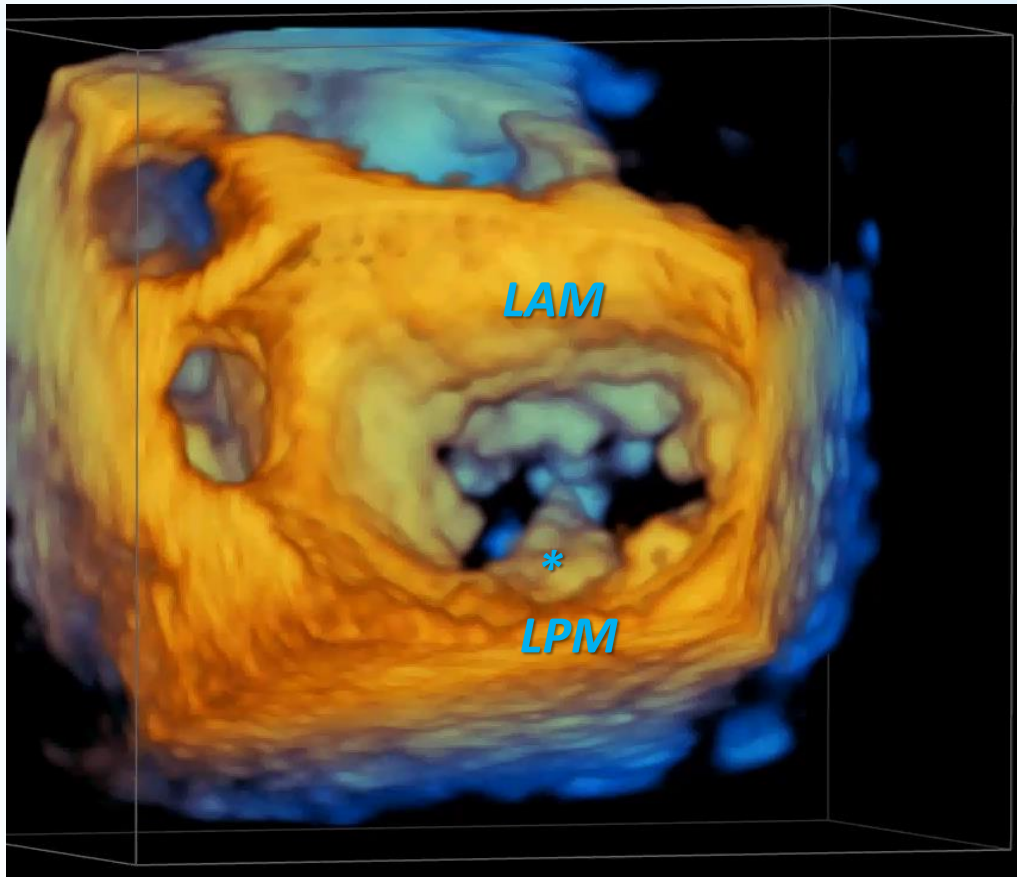
- ✓ Forame ovale

Step 5

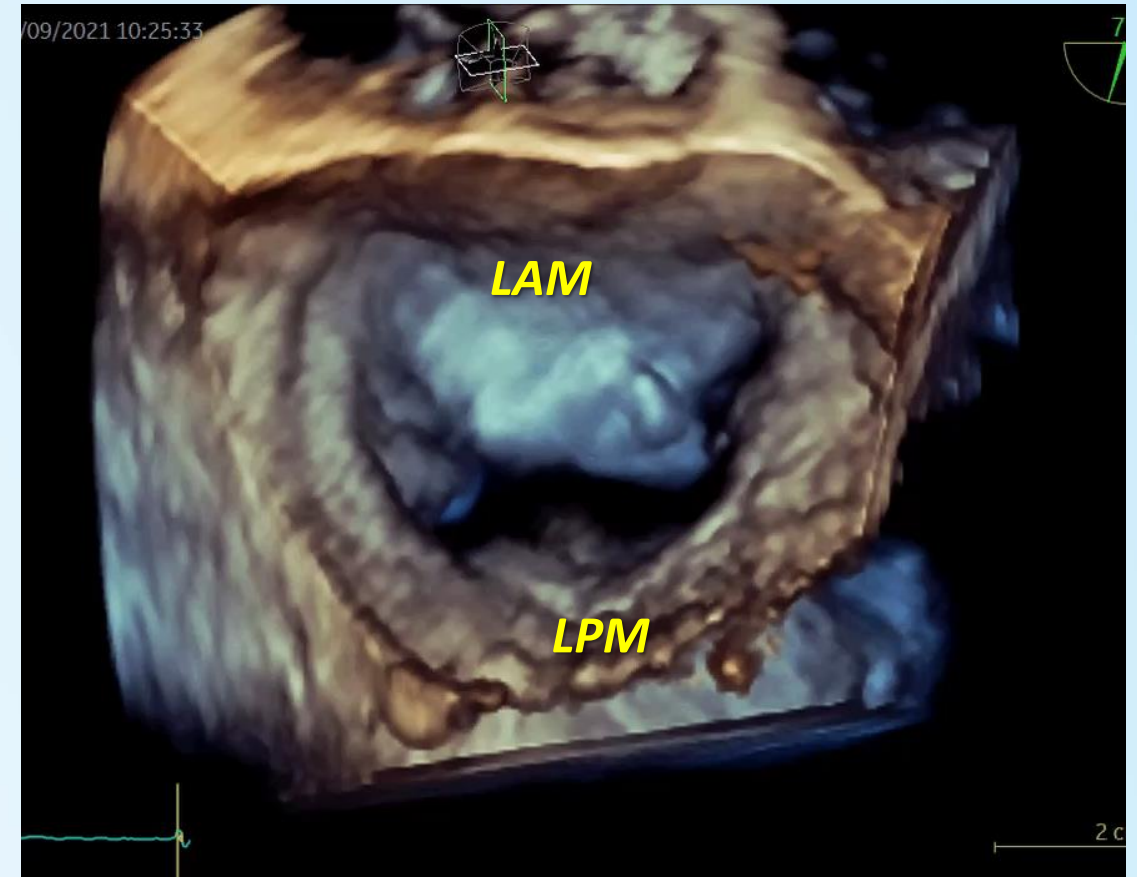
Pianificazione dell'intervento

Step 1

Definizione anatomopatologica e morfologia valvolare



Degenerativa



Funzionale

Definizione anatomopatologica *Degenerativa*

Deficienza fibro-elastica

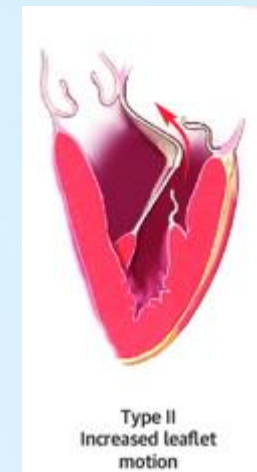
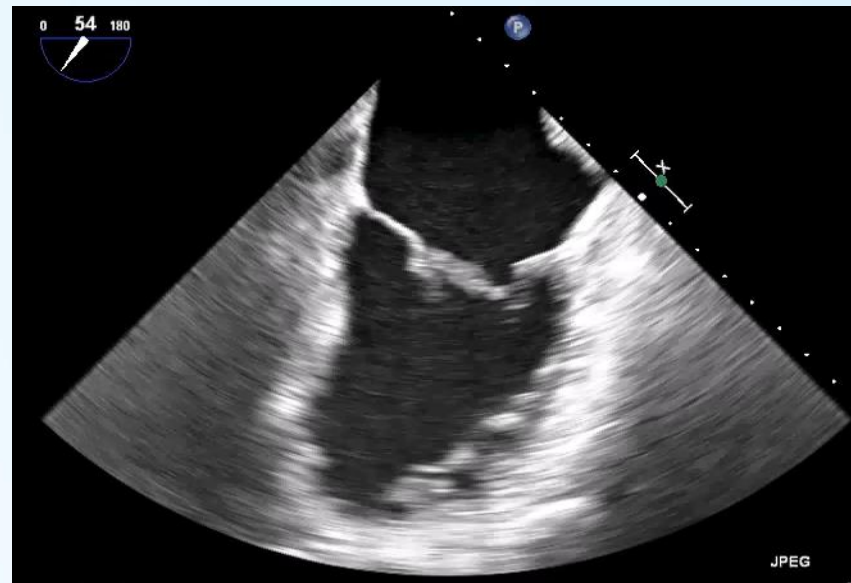
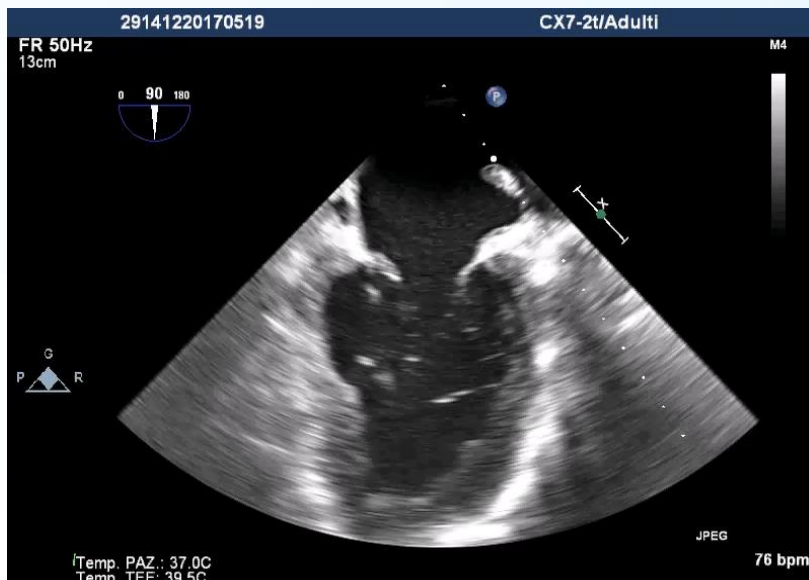
- Lembi e corde tendinee sottili
- Prolasso spesso isolato P2
- Eccesso di tessuto solo del segmento prolassante
- No billowing o calcificazioni
- Dilatazione anello solo lieve-moderata

Degenerazione mixomatosa

- Lembi eccessivamente mobili e ridondanti
- Lembi ispessiti che si assottigliano in sistole (per flaccidità dei tessuti, >3mm)
- Allungamento delle corde

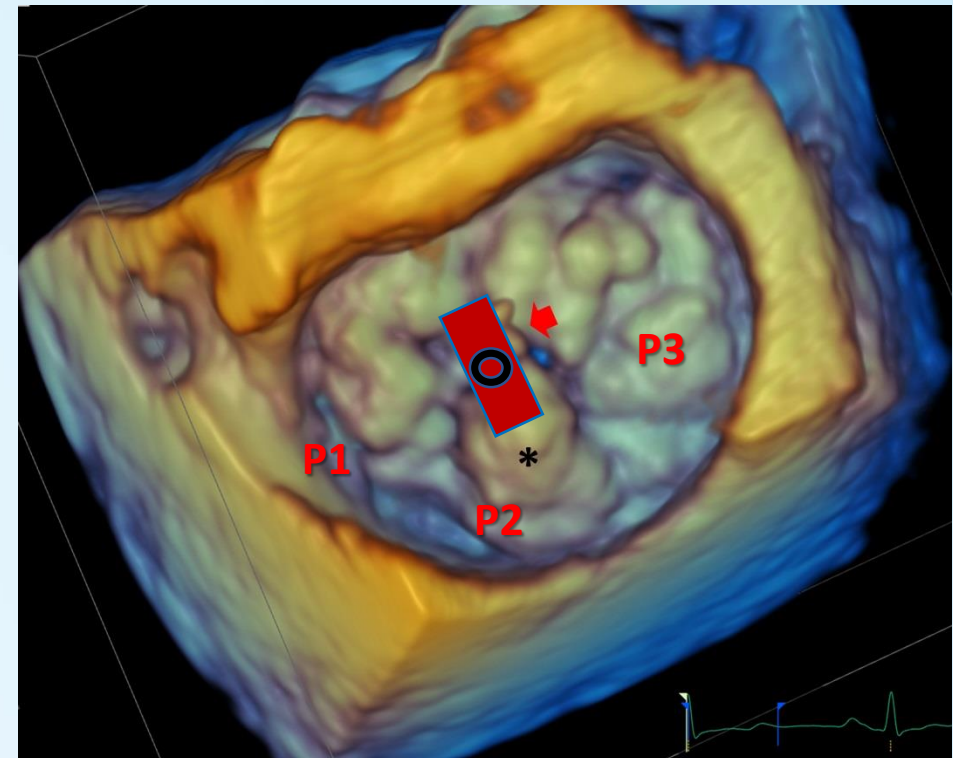
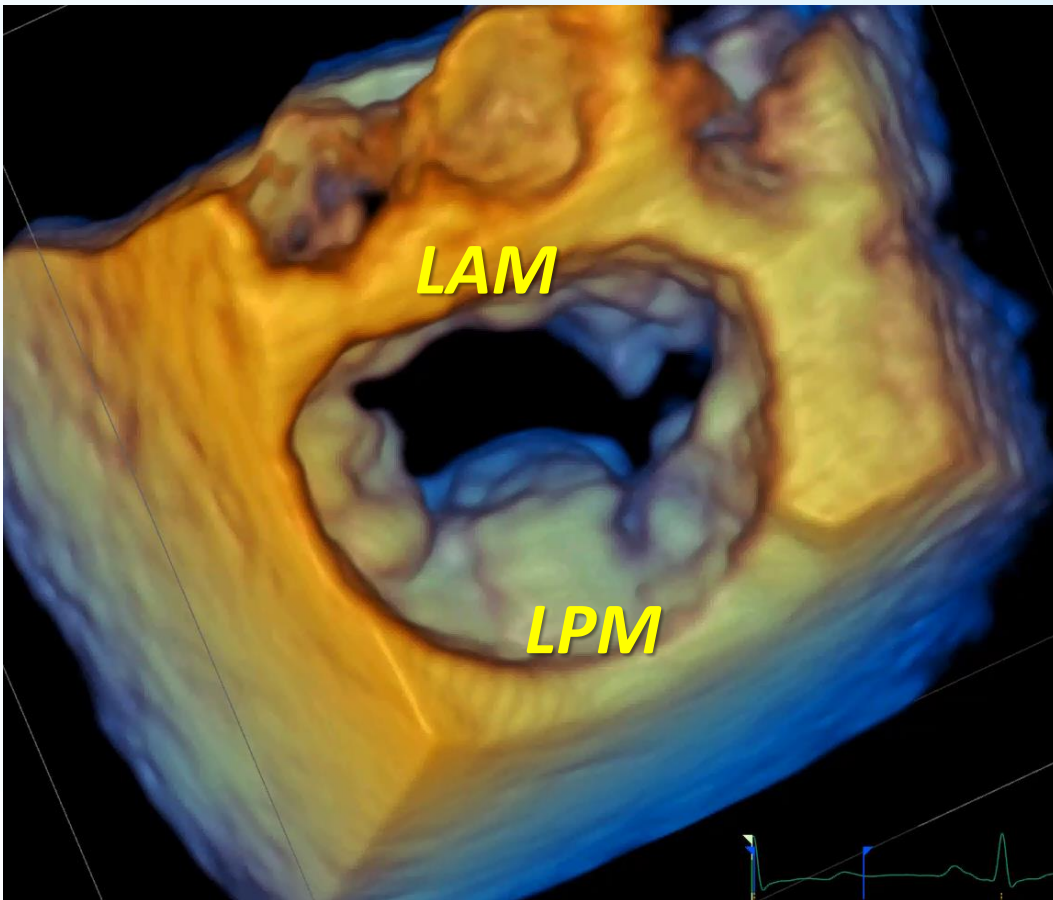
Degenerazione mixomatosa M. Barlow

- Marcata dilatazione annulare spesso con calcificazioni
- Valvola gigante con eccesso di tessuto
- Prolassi multipli scallop e bilembo
- Allungamento delle corde che possono essere assottigliate e fuse con calcificazioni
- Pseudo-dislocazione dell'impianto del LPM in atrio, distaccato dall'annulus reale (disjunction)



Studio del prolasso/flail

Degenerativa – pianificazione procedura



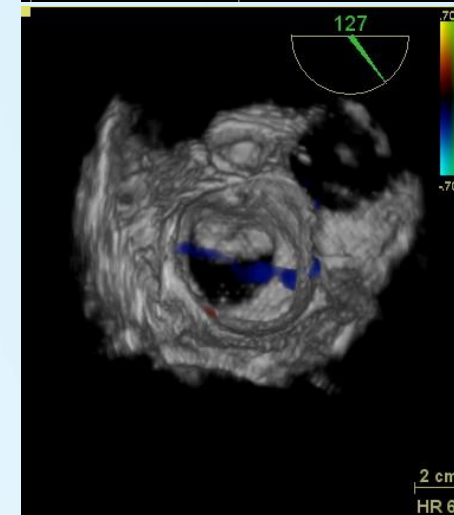
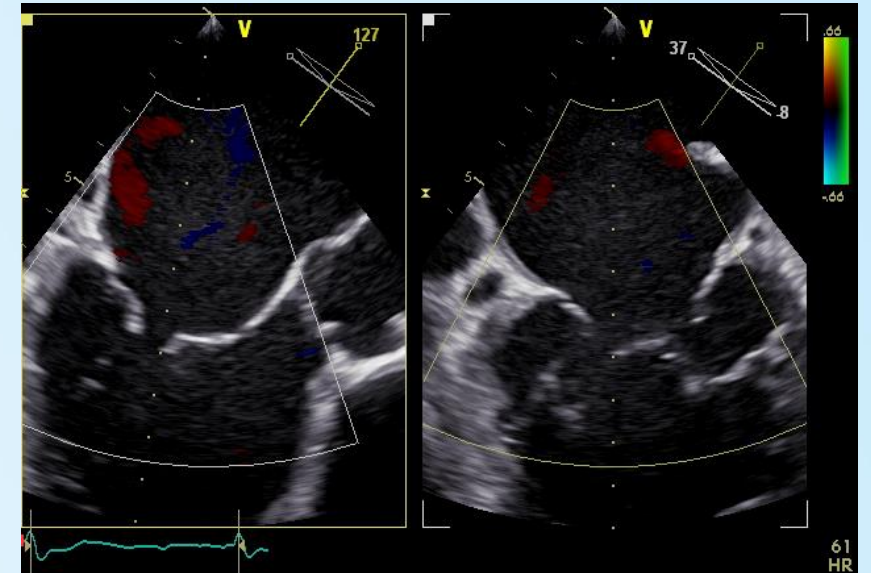
Insufficienza mitralica funzionale *Ischemica*

Tethering dei lembi

- ✓ simmetrico
- ✓ asimmetrico

Simmetrico

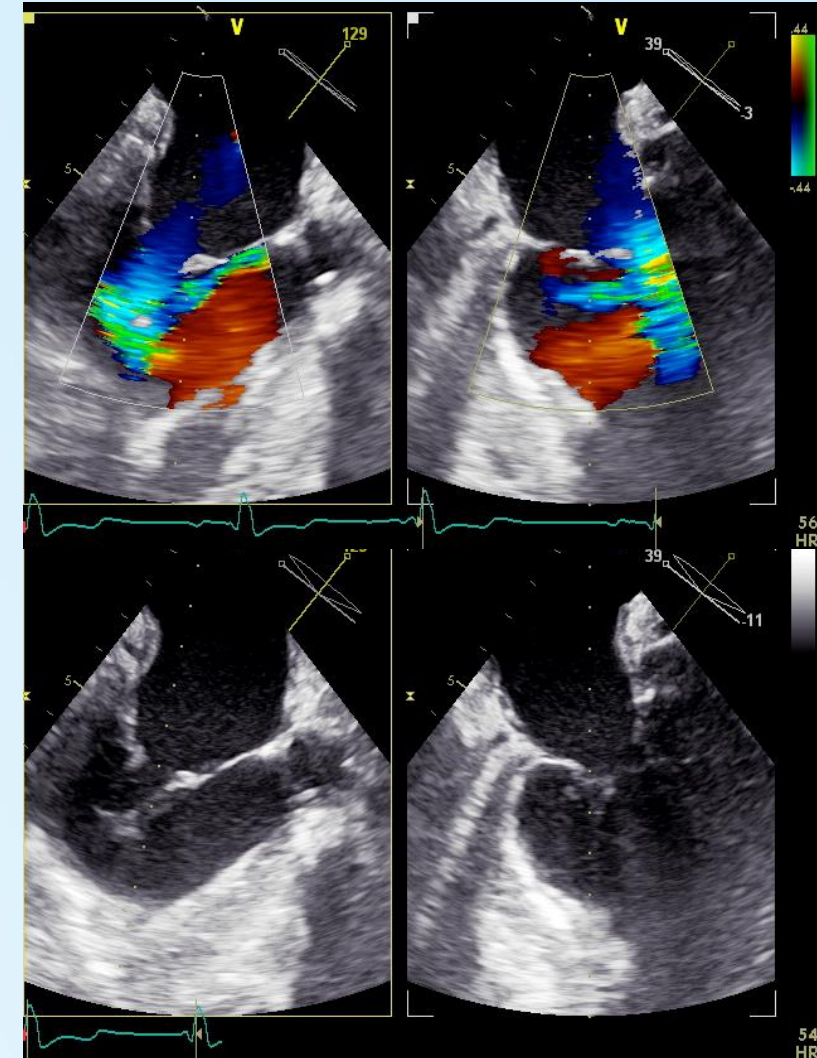
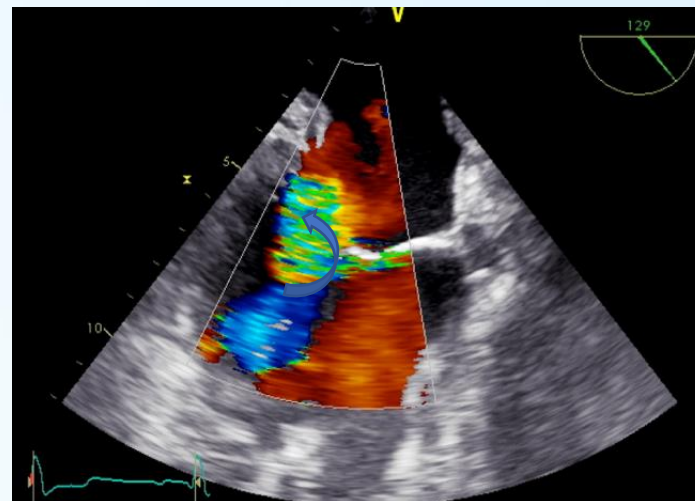
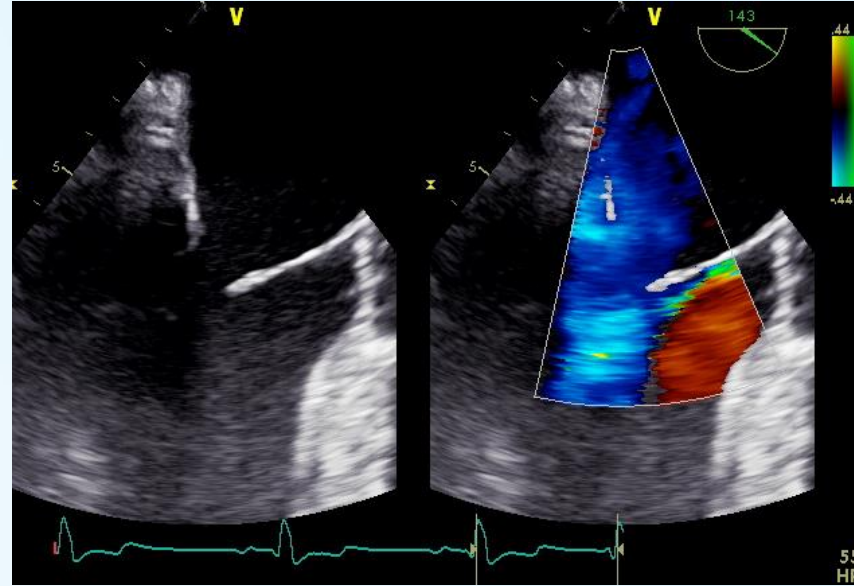
- ✓ Displacement apicale
- ✓ Jet centrale



Insufficienza mitralica funzionale *Ischemica*

Asimmetrico

- ✓ Displacement posteriore apparato sottovalvolare
- ✓ Jet eccentrico (posteriore)



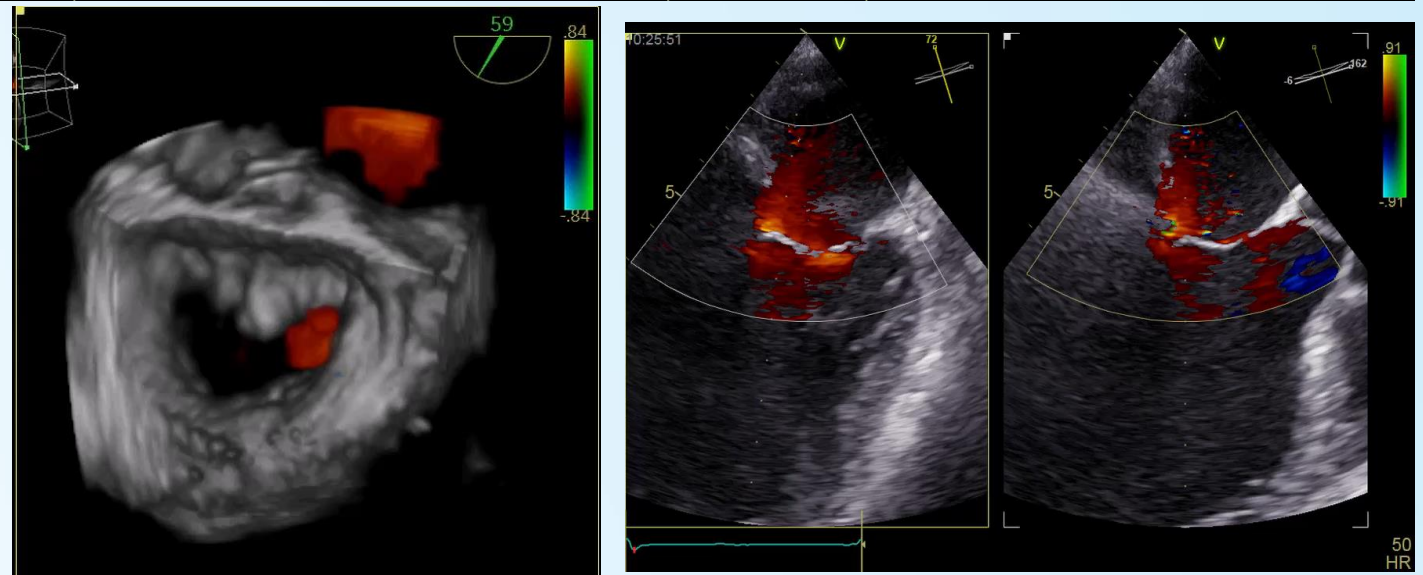
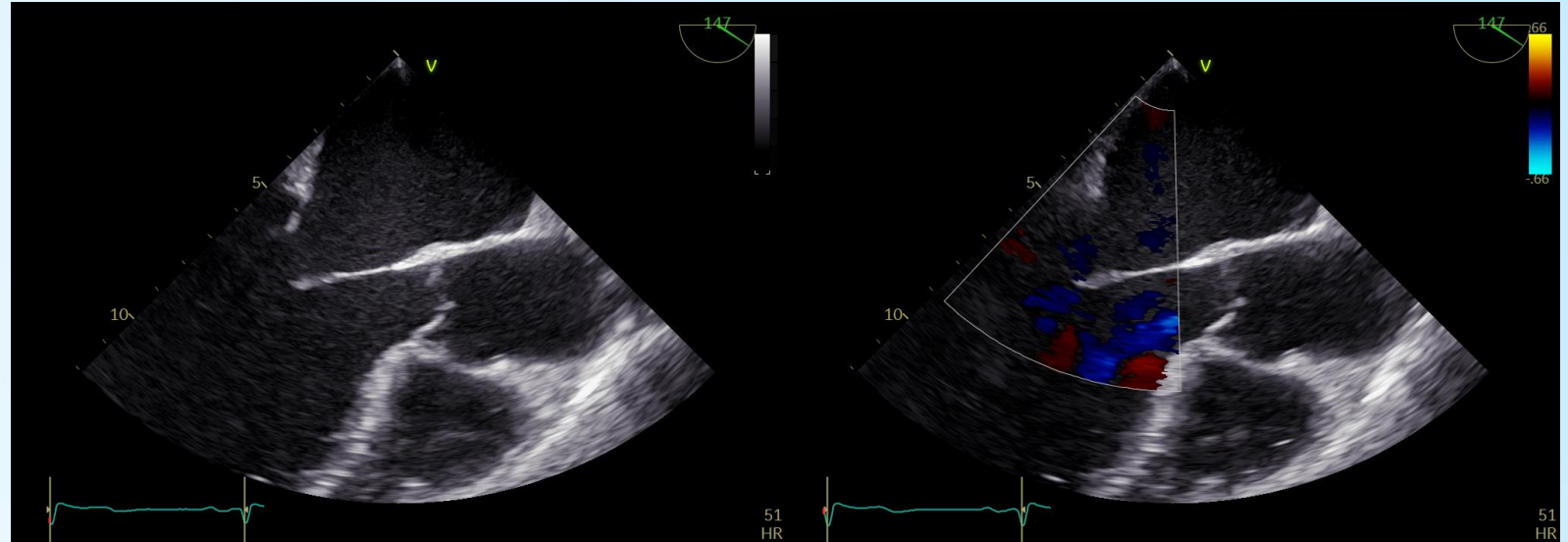
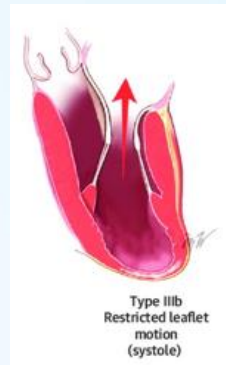
Insufficienza mitralica funzionale Non-Ischemica

Non ischemica Carpentier IIIb

- ✓ Secondaria a patologia VS:
dilatato, sferico
- ✓ Displacement apparato
sottovalvolare e dilatazione
anello

Caratteristiche predominanti

- ✓ Perdita della normale
funzione annulus
- ✓ Malcoaptazione simmetrica
- ✓ Jet diretto centralmente

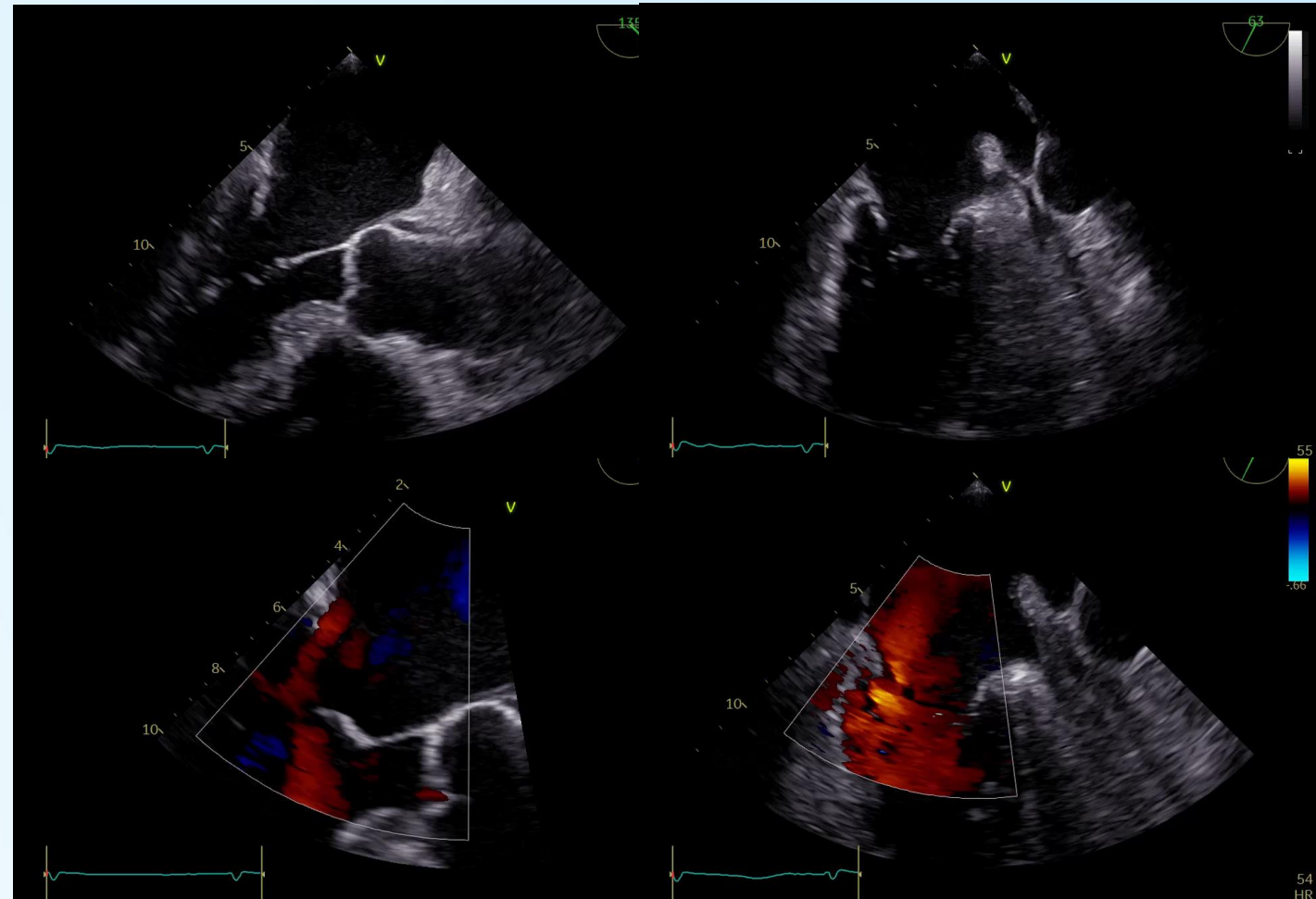
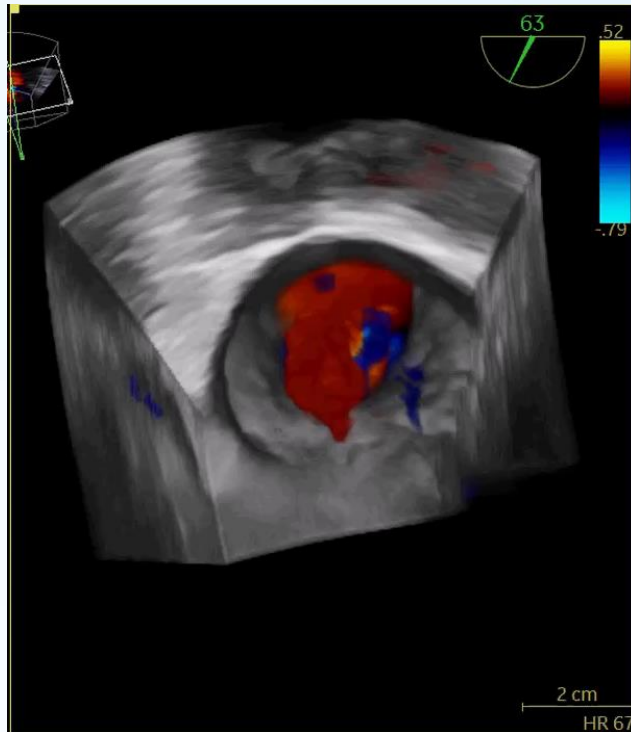


Insufficienza mitralica funzionale

Atriale - Dilatazione severa

Dilatazione AS Carpentier I

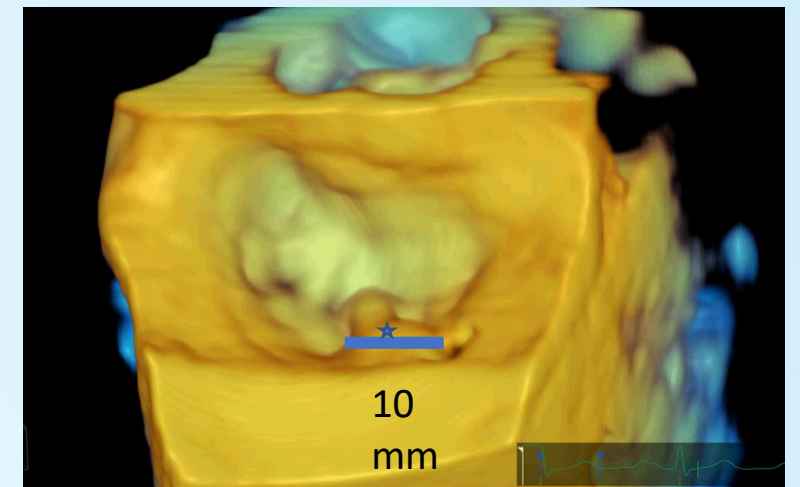
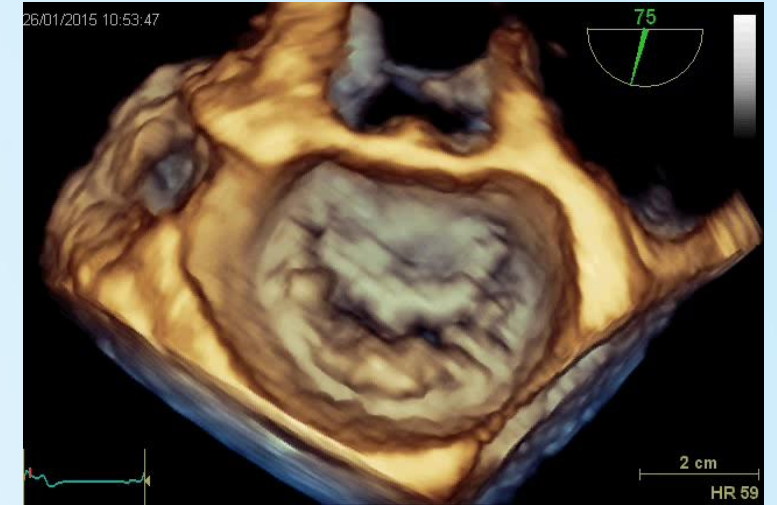
- ✓ In genere, con FA persistente/permanente
- ✓ Dilatazione e appiattimento dell'anello



Step 2

Valutazione area valvolare e studio dell'apparato sottovalvolare

- Valutazione area valvolare
- Caratteristiche e dimensioni dell'anello
 - ✓ Dilatazione
 - ✓ Calcificazione
 - ✓ Calcificazione estesa alla base o corpo del lembo mitralico
- Presenza di rottura di corde (flail) e localizzazione

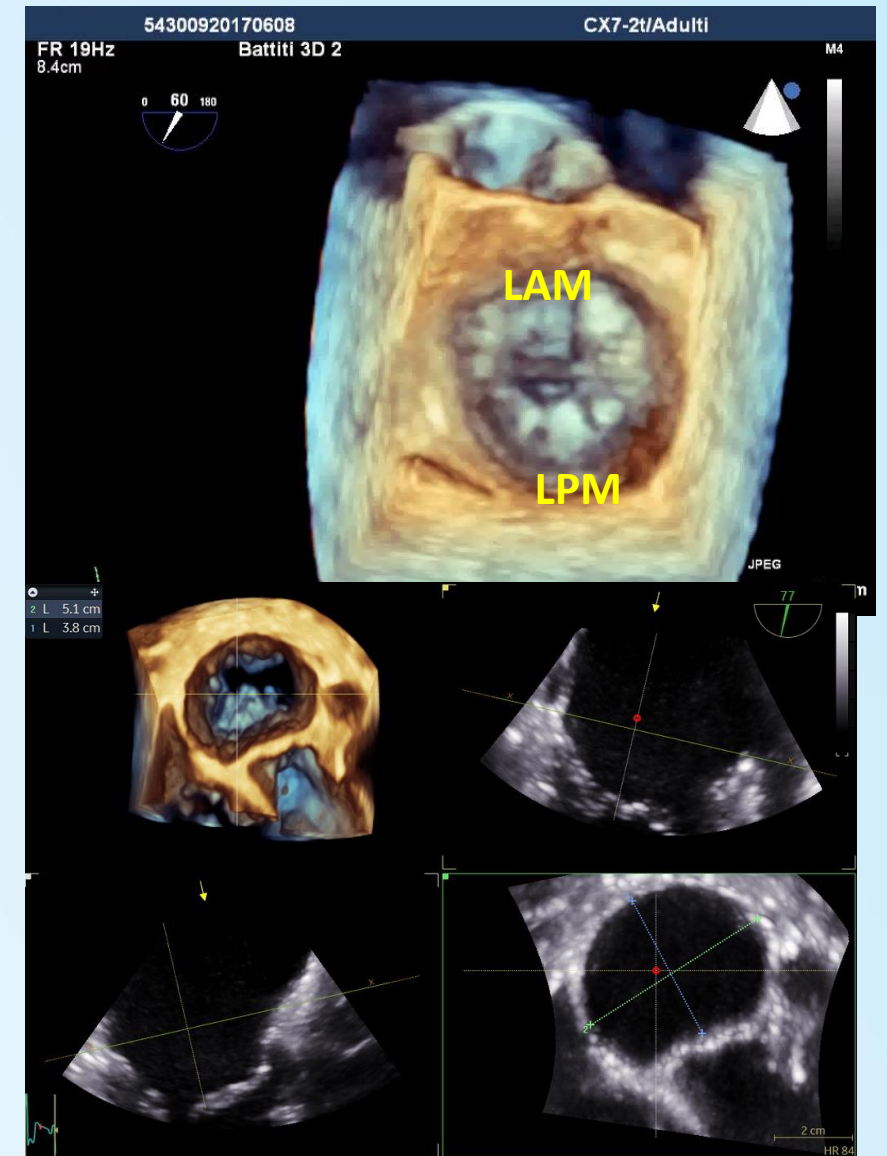
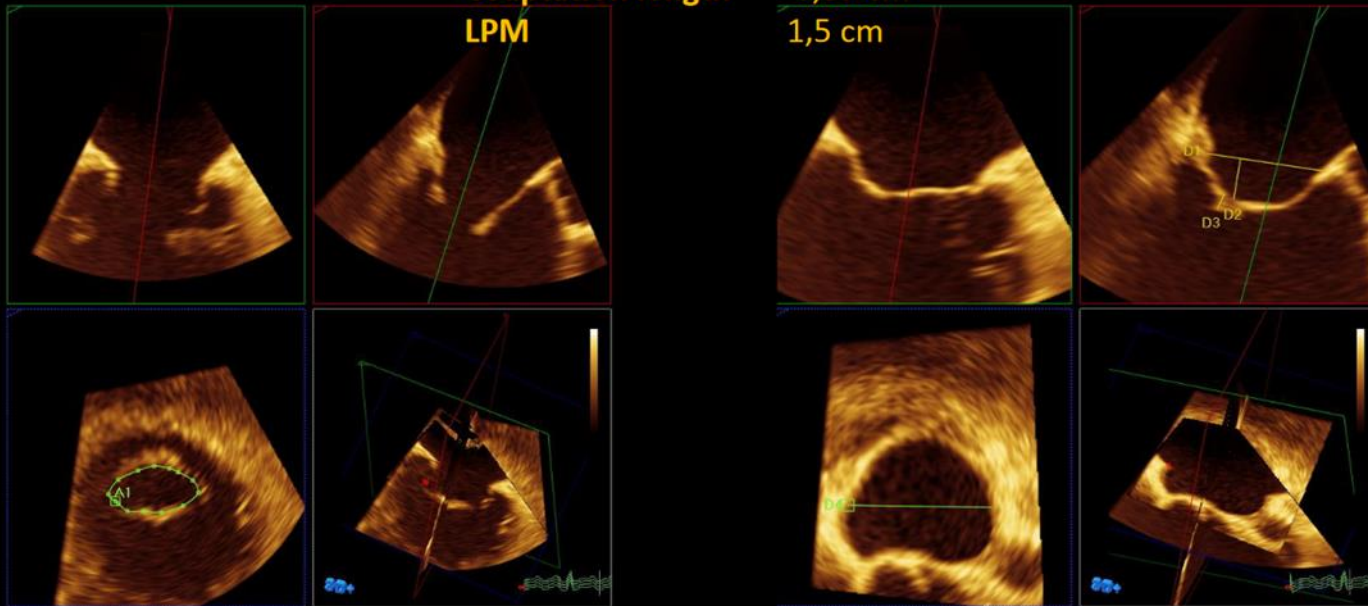


Criteri di selezione MitraClip

Area valvolare - Anello

APPARATO MITRALICO:

Anulus APx ML 40x 48 mm
 Area valvolare 6,18 cmq
 Coaptation depth 1,47cm
 Coaptation length 0,57 cm
 LPM 1,5 cm



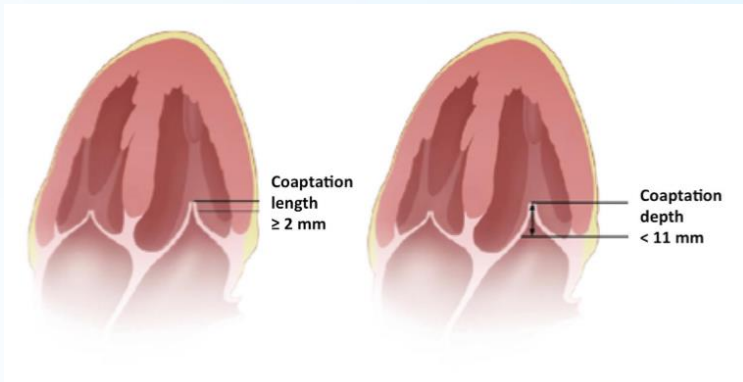
Step 3

Criteri di selezione MitraClip Everest

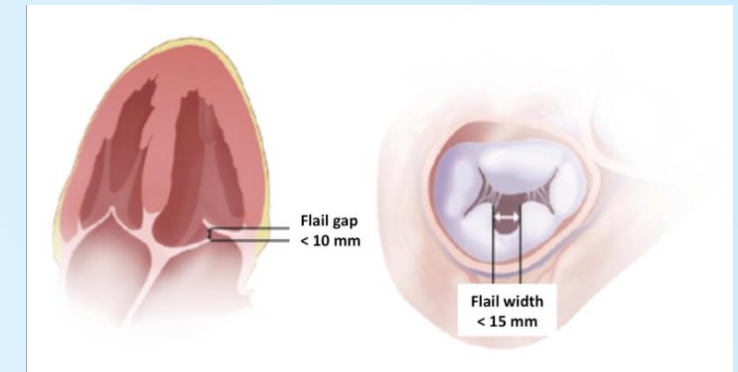
	OTTIMALE	POSSIBILE	SFAVOREVOLE
SEDE	A2-P2	A1/P1 A3/P3	PERFORAZIONE, (CLEFT)
CALCIFICAZIONI	ASSENTI	LIEVI AL DI FUORI DELLA SEDE DI GRASPING, ANULARI,	SEVERE NELLA SEDE DI GRASPING
AREA VALVOLARE	AVM>4 cmq	AVM>4 cmq	STENOSI V. AVM <4 cmq $\Delta P >5$ mmHg
TENTING/MOBILITA' LPM length	>10 mm	<7-10 mm	< 7mm
COAPT. DEPTH	<11 mm	>11 mm	
FLAIL WIDTH	<15 mm	>15 mm , SE AMPI ANELLI E POSSIBILITA' DI CLIP MULTIPLE	BARLOW S. CON PROLASSI MULTIPLI
FLAIL GAP	<10 mm		>10

Criteri di selezione MitraClip – Coaptation – Flail gap/width

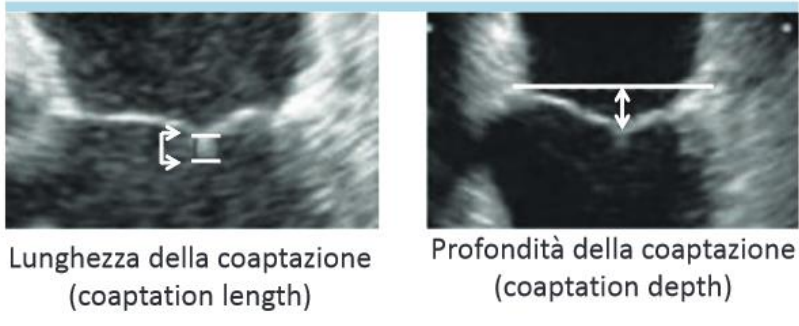
Criteri Everest II - Ottimale



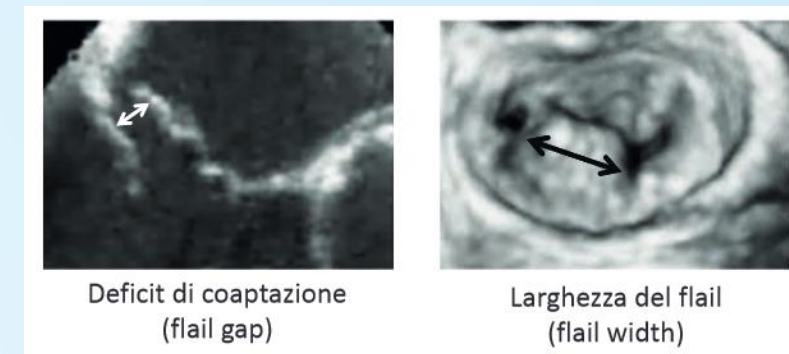
- ✓ Coaptation depth < 11mm
- ✓ Coaptation length ≥ 2 mm
- ✓ Lunghezza LPM ≥ 10 mm
- ✓ Flail width < 15mm
- ✓ Flail gap < 10mm



Criteri Everest II – Sfavorevole



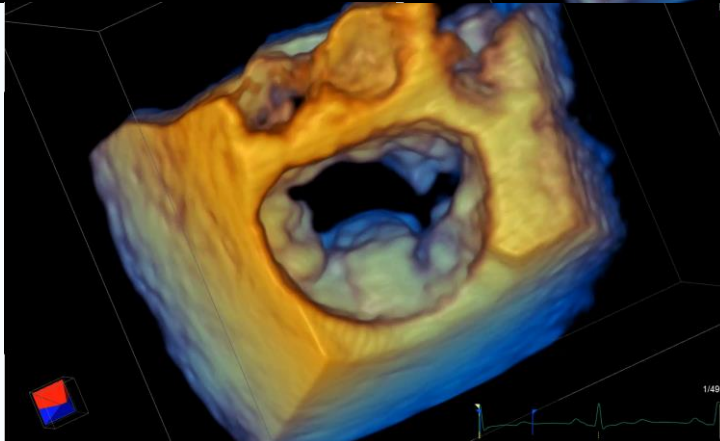
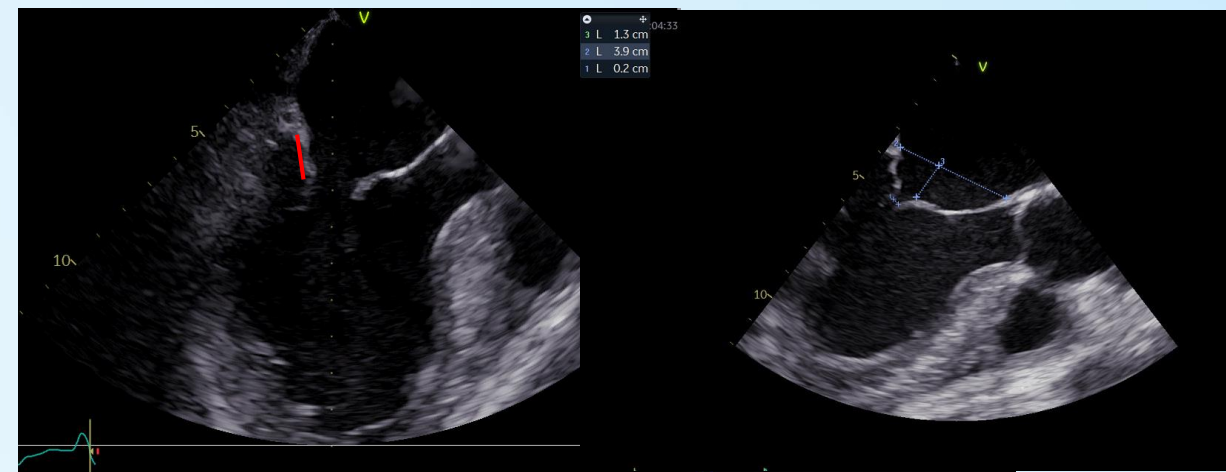
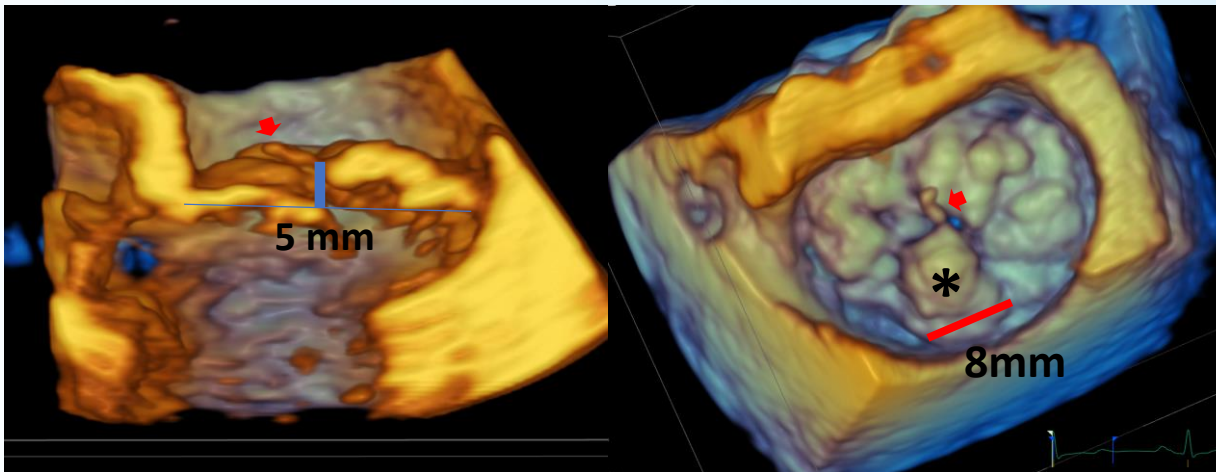
- ✓ Coaptation depth ≥ 11 mm
- ✓ Tenting area > 2 cm²
- ✓ Lunghezza LPM < 6mm
- ✓ Prolassi multipli - Barlow
- ✓ Flail gap > 10 mm



Criteri di selezione MitraClip

- Flail gap 5mm
- Flail width 8mm

- Coaptation depth **13 mm**
- LPM length **7 mm**



Insufficienza mitralica secondaria

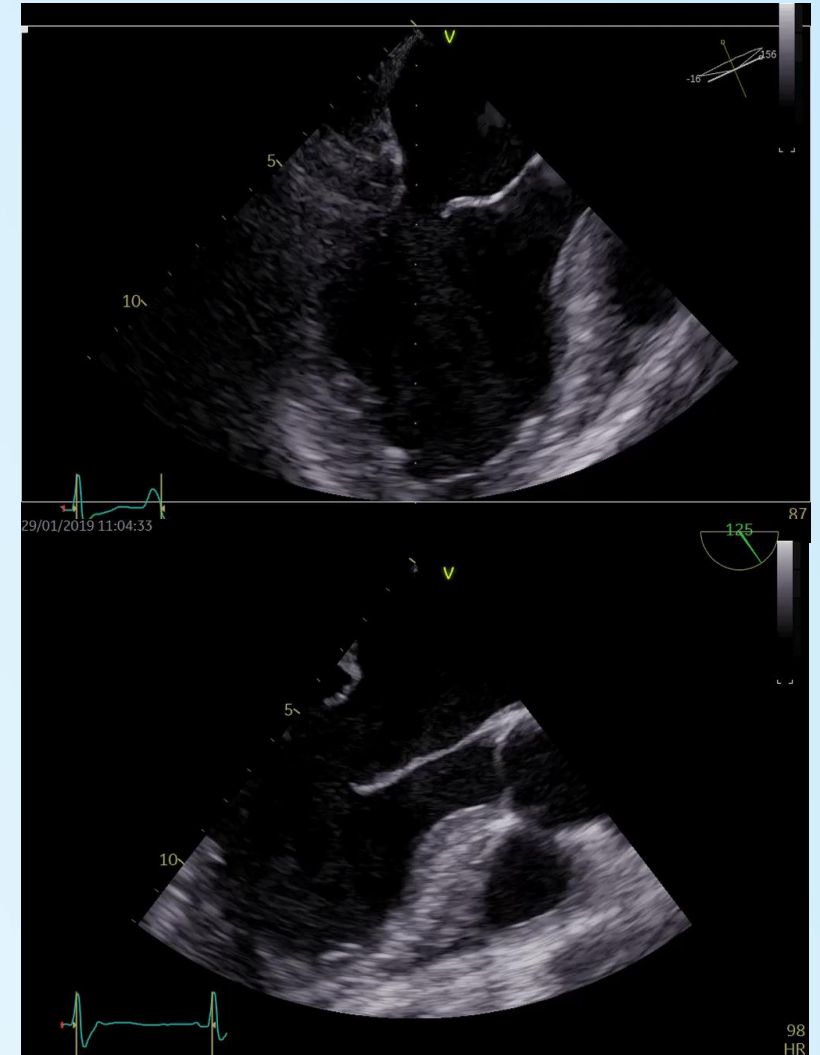
Favorire coaptazione

Pre procedura

- Sospensione di beta bloccante
- Ciclo di levosimendan

Durante procedura

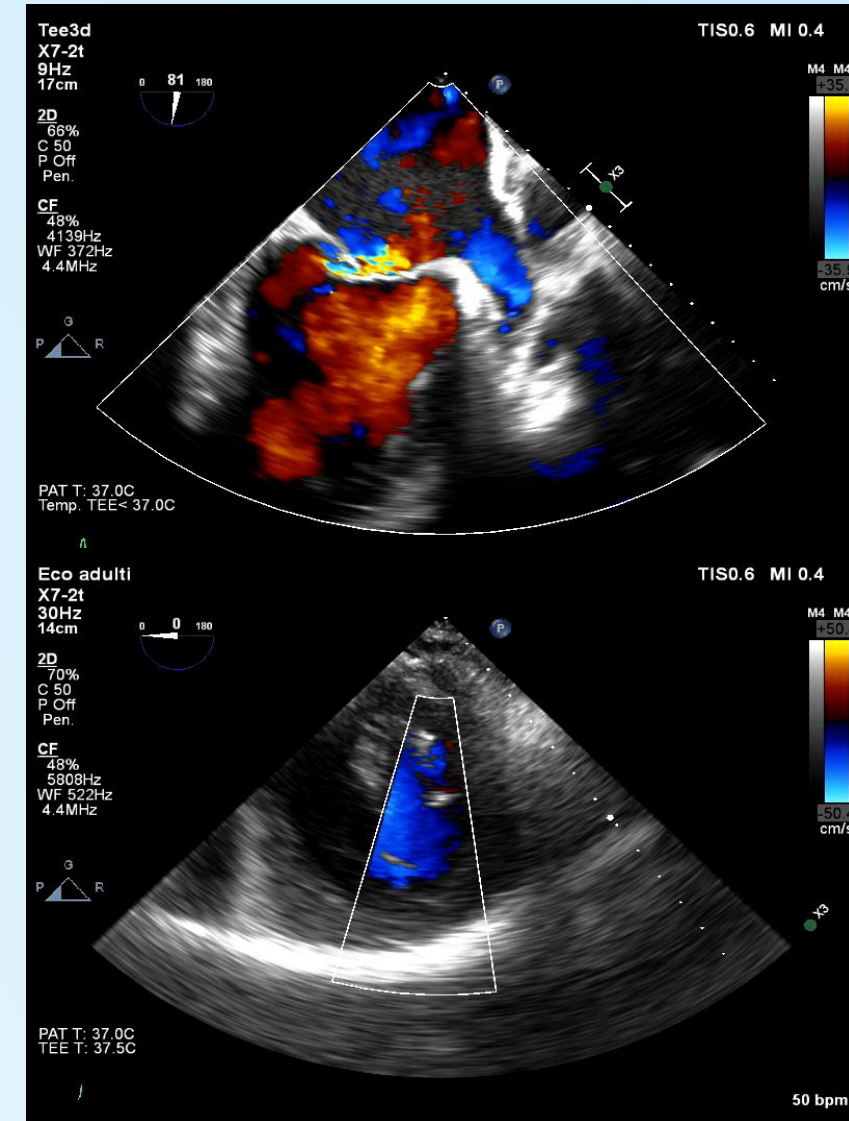
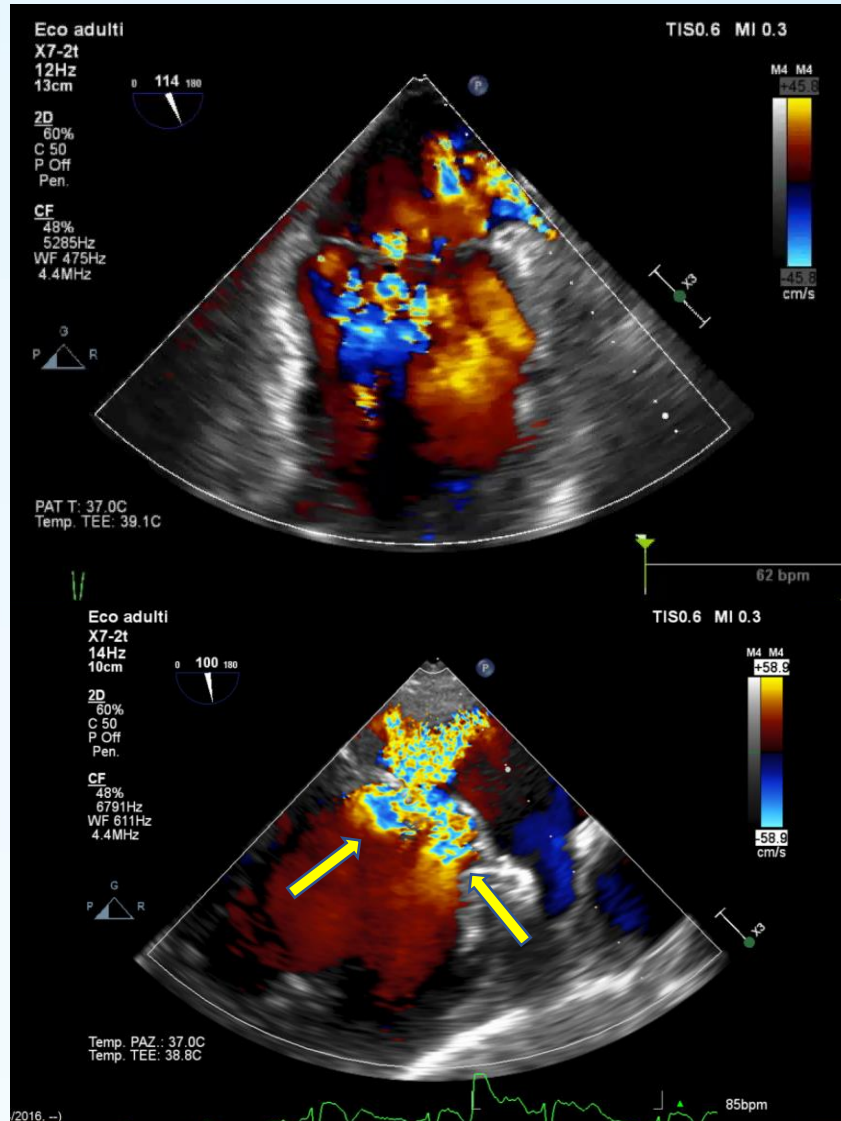
- Utilizzo di intropi
- Utilizzo di contropulsatore aortico
- Pacing rapido
- Posizionare 1° clip accanto al jet maggiore prima della clip sulla lesione target

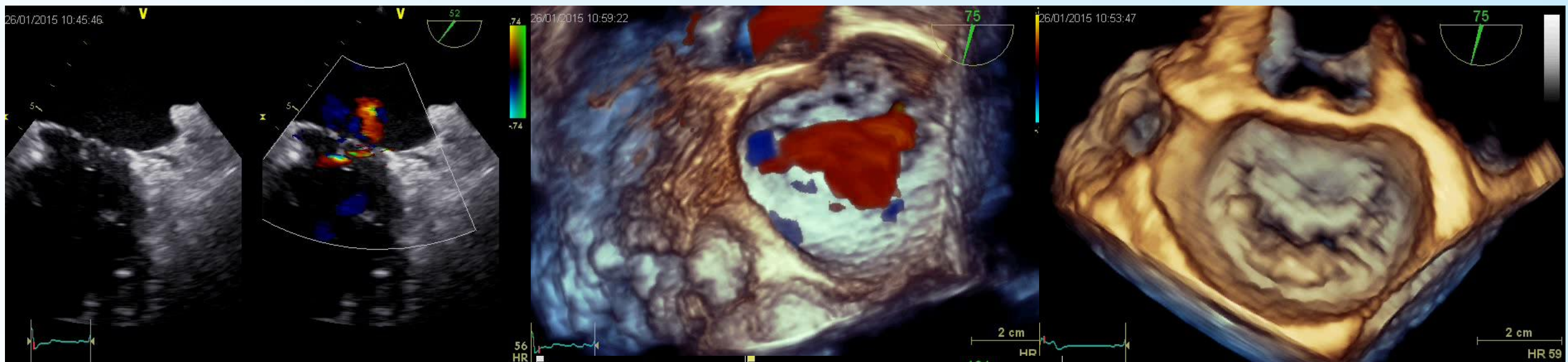


Dopo sospensione di beta bloccante

Step 4

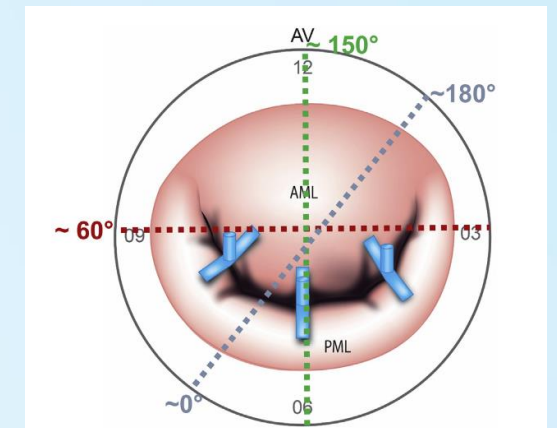
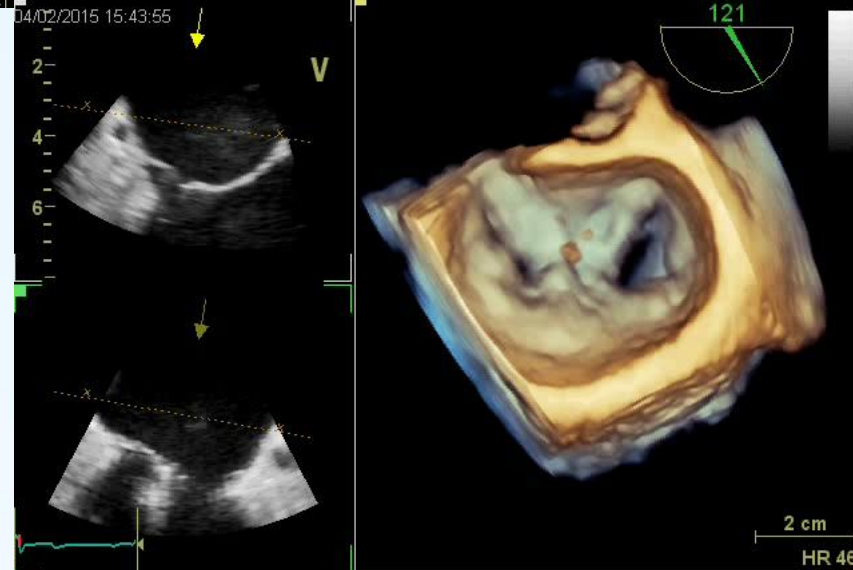
Criteri di selezione MitraClip – Sede dei jet





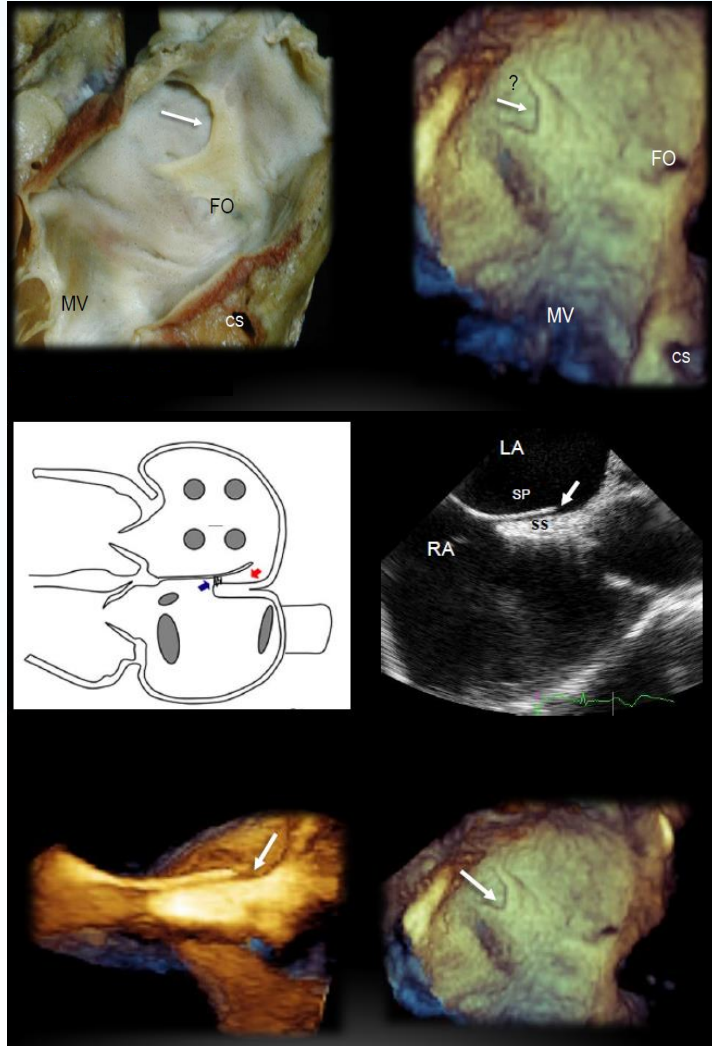
**Jet rigurgitanti e
pianificazione della
procedura**

Jet multipli



Step 5

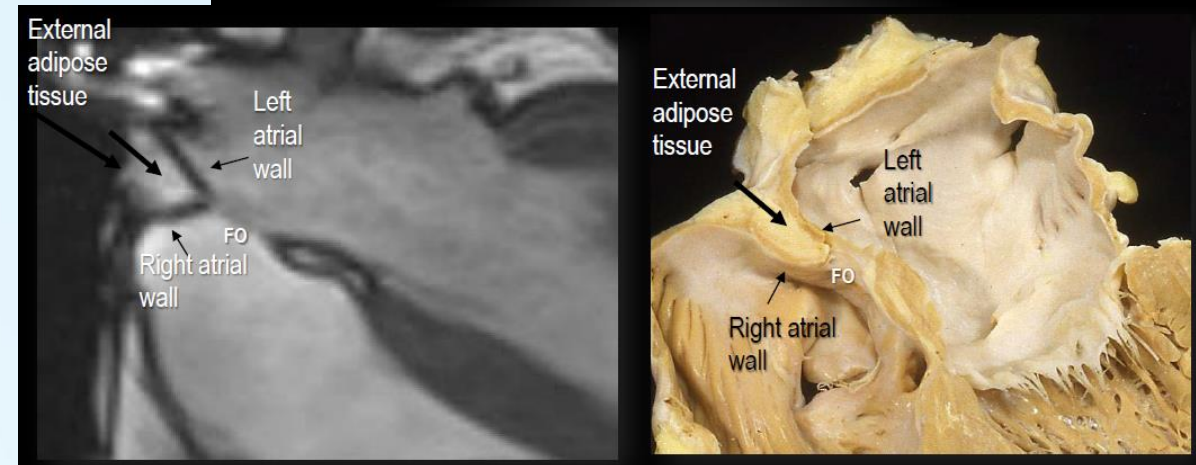
Criteri di selezione MitraClip Setto interatriale



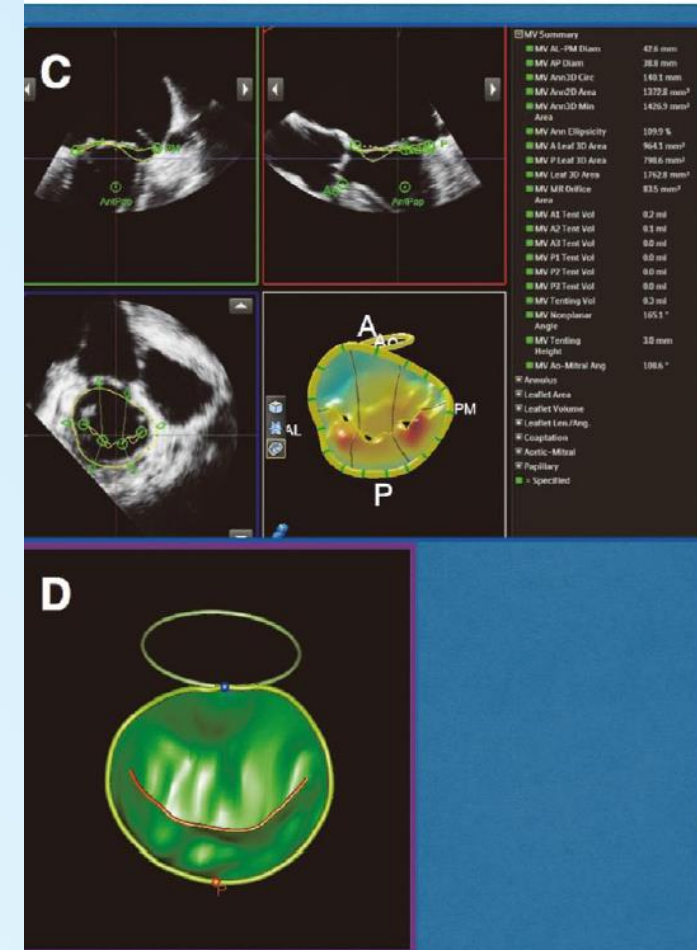
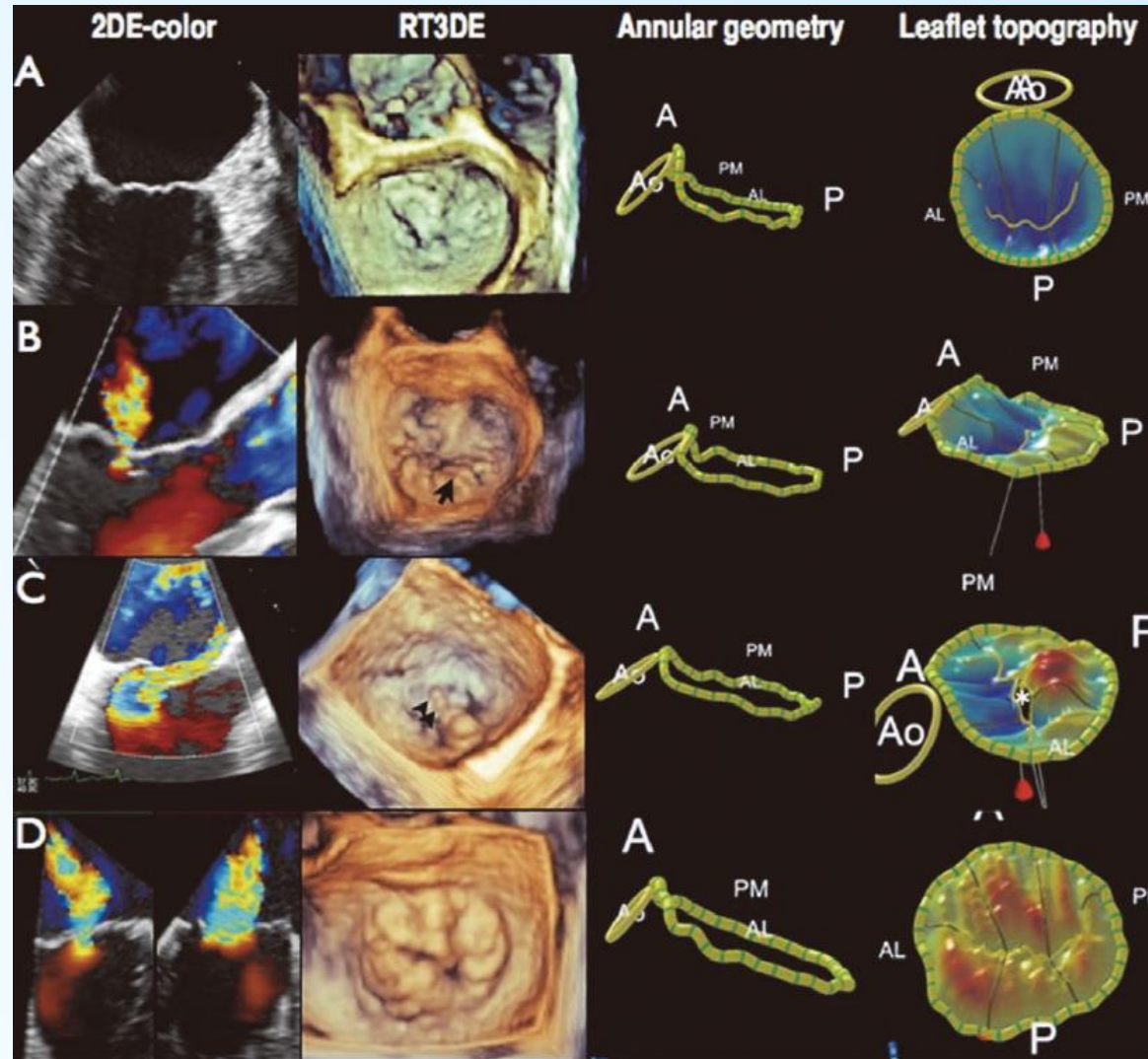
**Versante atriale
sinistro**
**Freccia bianca: septal
pouch**

Faletta et al. JACC 2020

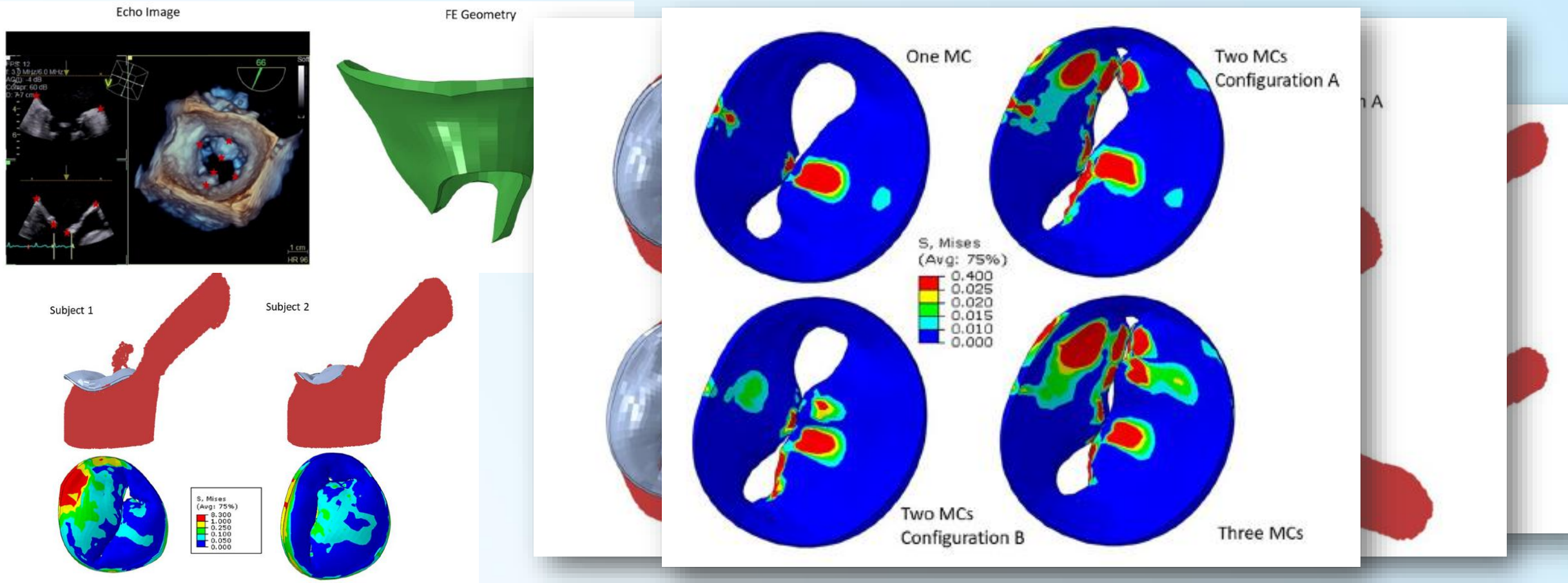
Puntura trans-settale



Software valutazione mitrale 3D



Intelligenza artificiale predittiva dell'outcomes di intervento MitraClip – Software ABAQUS



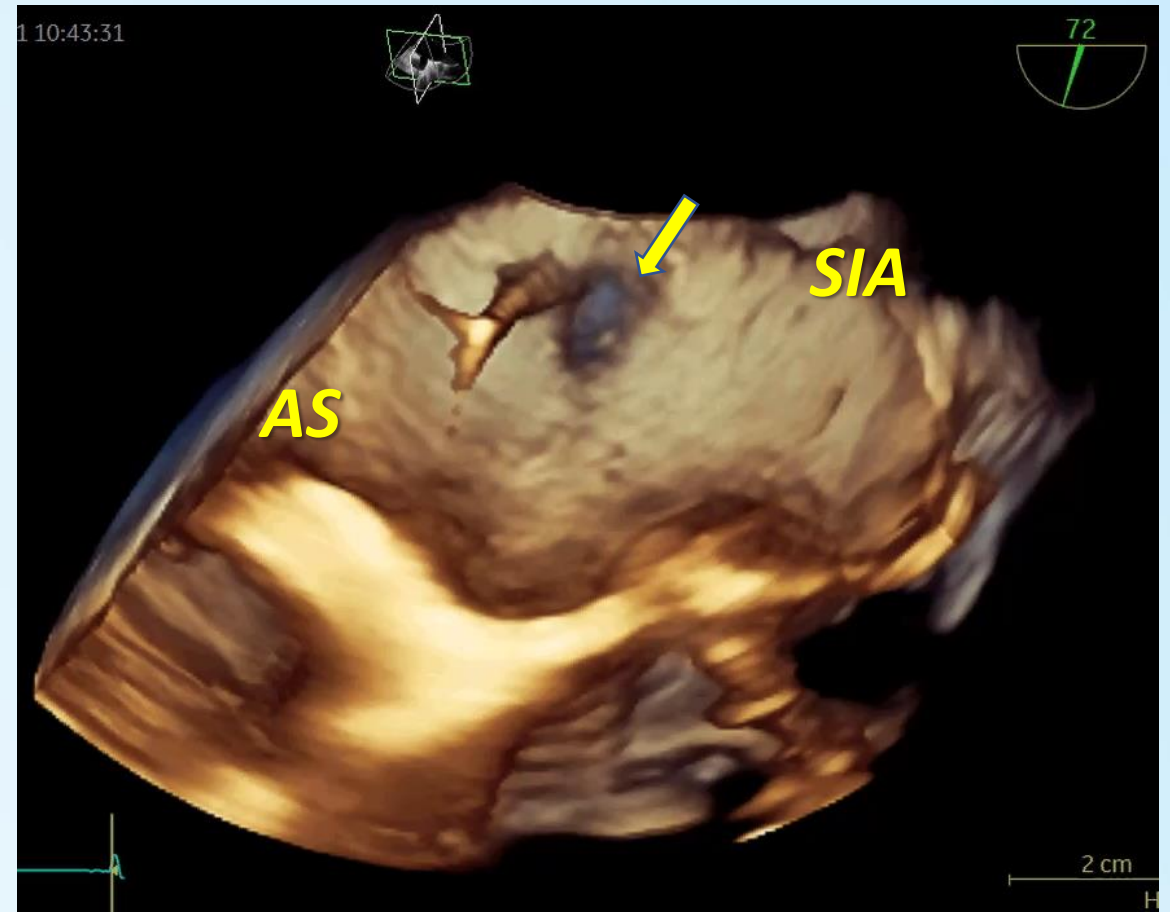
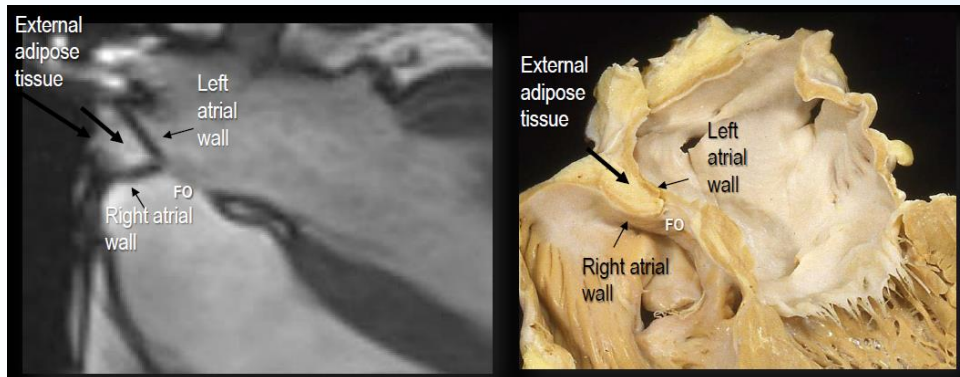
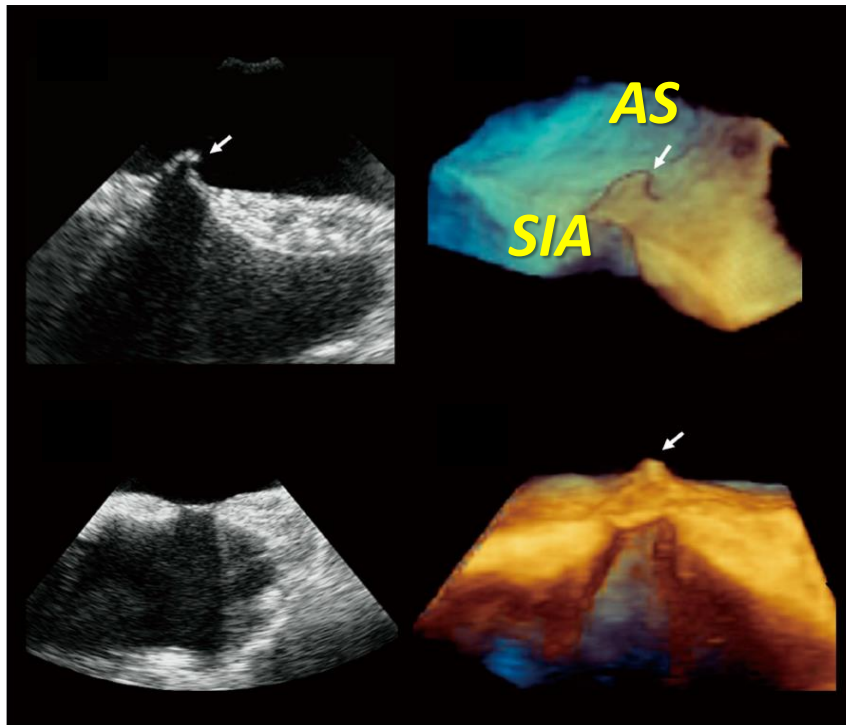
2. Guida intraprocedurale

5 Steps

1. Puntura transettale
2. Introduzione catetere guida e del *delivery system*
3. Posizionamento clip in atrio e orientamento
4. Avanzamento in ventricolo e *Grasping*
5. Verifica del risultato

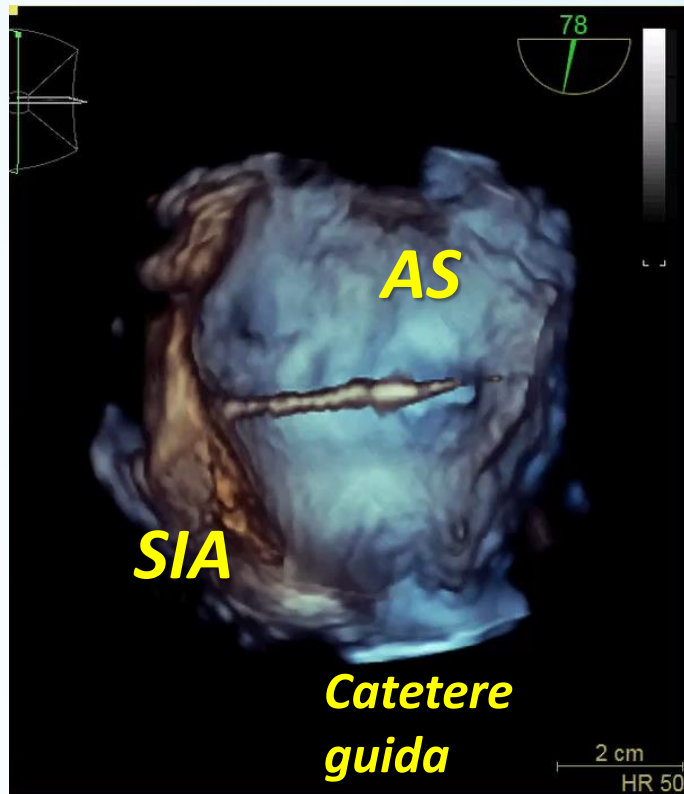


Puntura del Setto

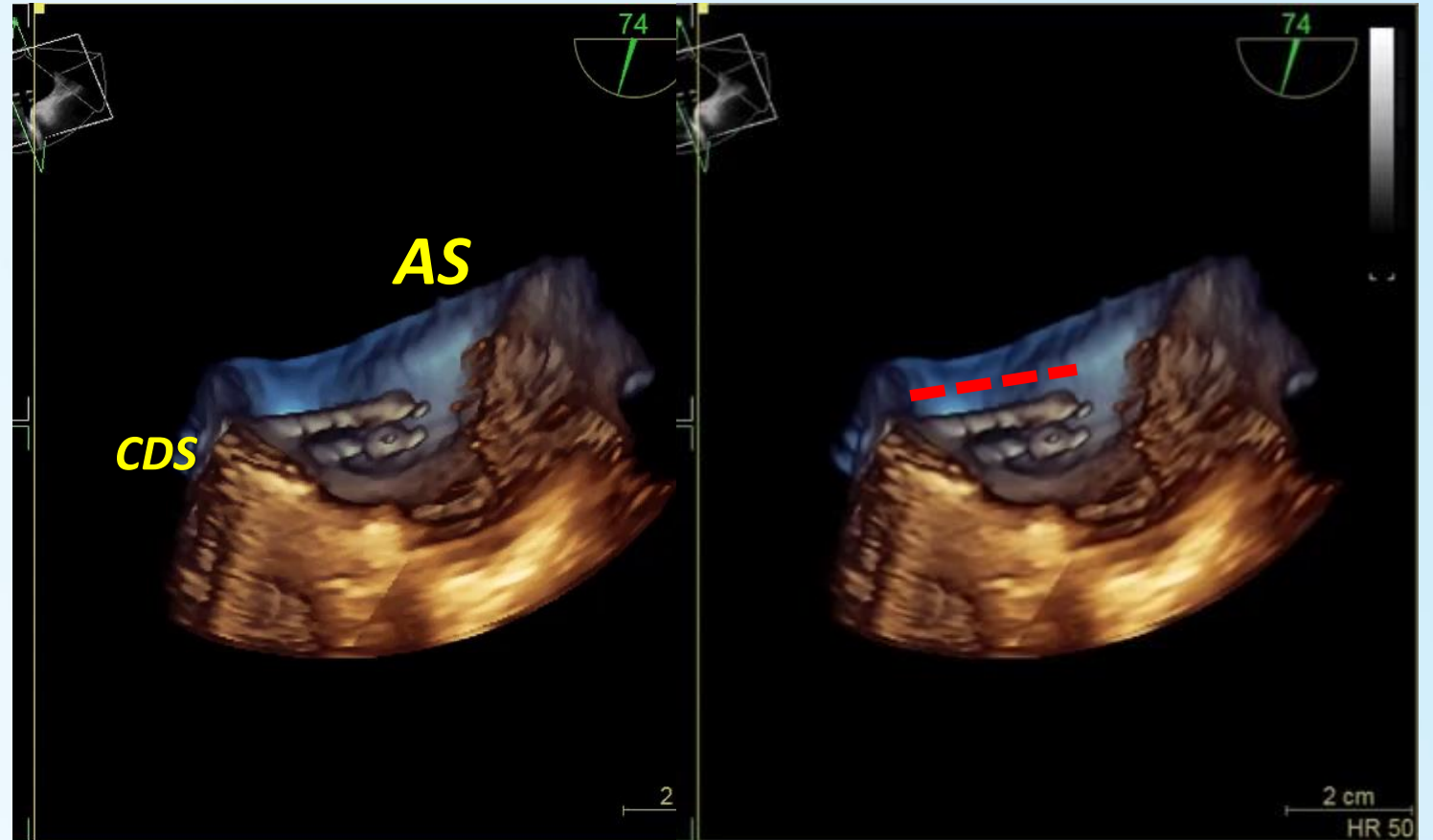


Versante atriale sinistro

Avanzamento del catetere guida

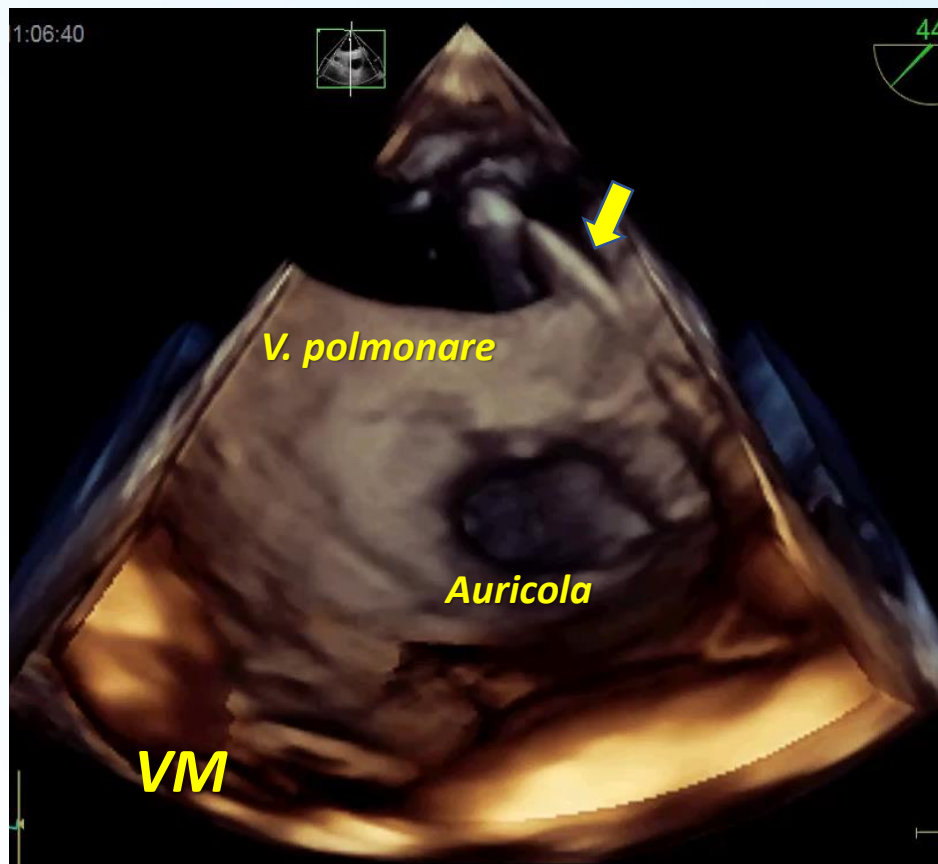


Avanzamento del catetere guida in atrio sinistro

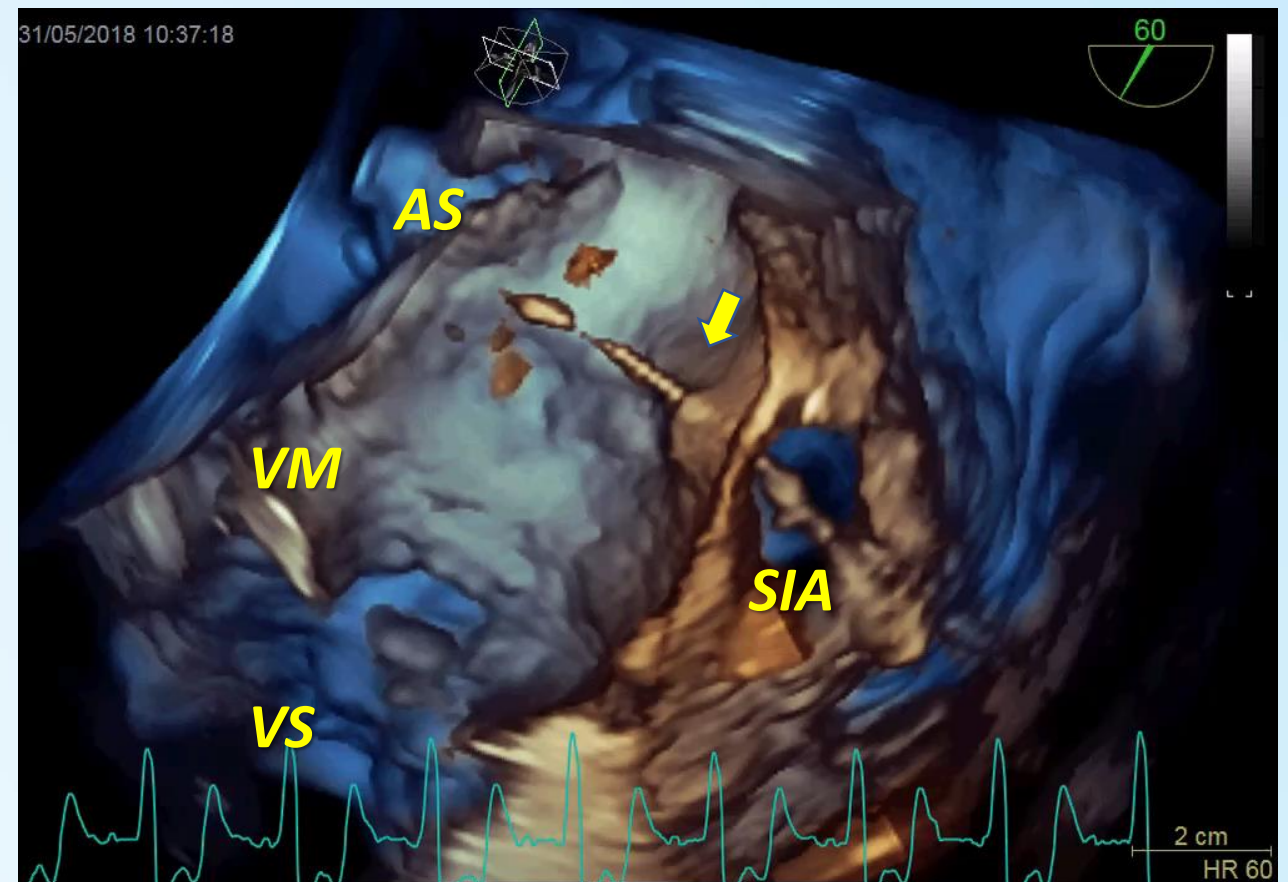


Avanzamento dell'introduttore e del catetere guida steerable

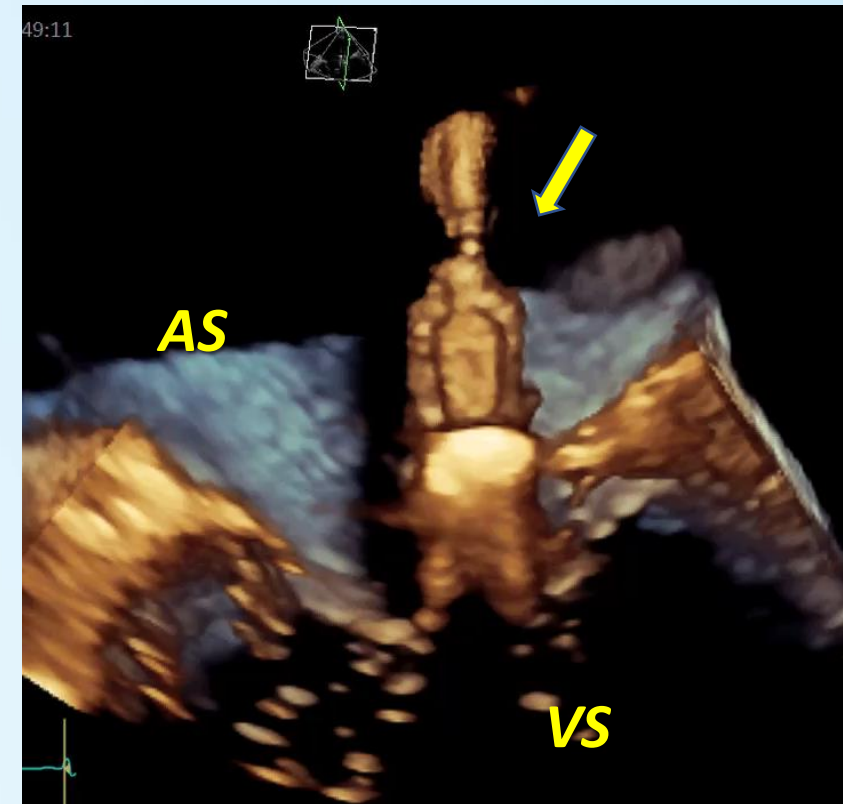
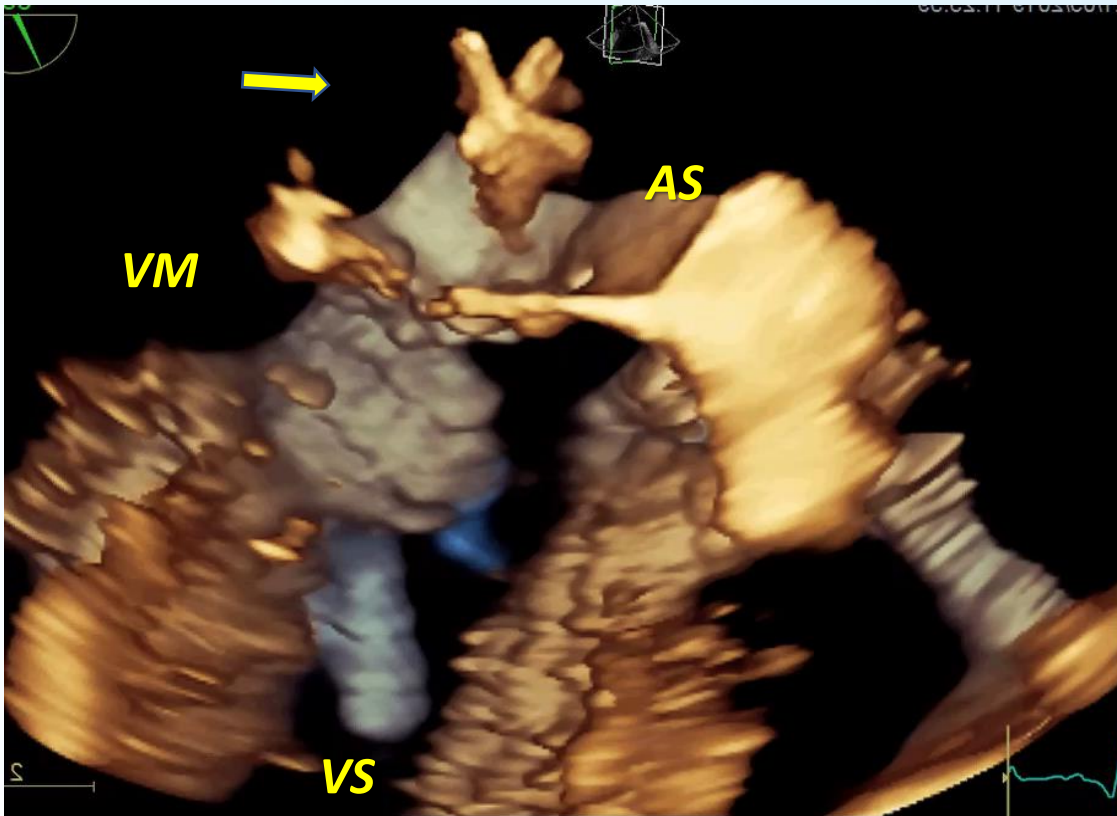
Guida rigida in polmonare e avanzamento del *delivery system*



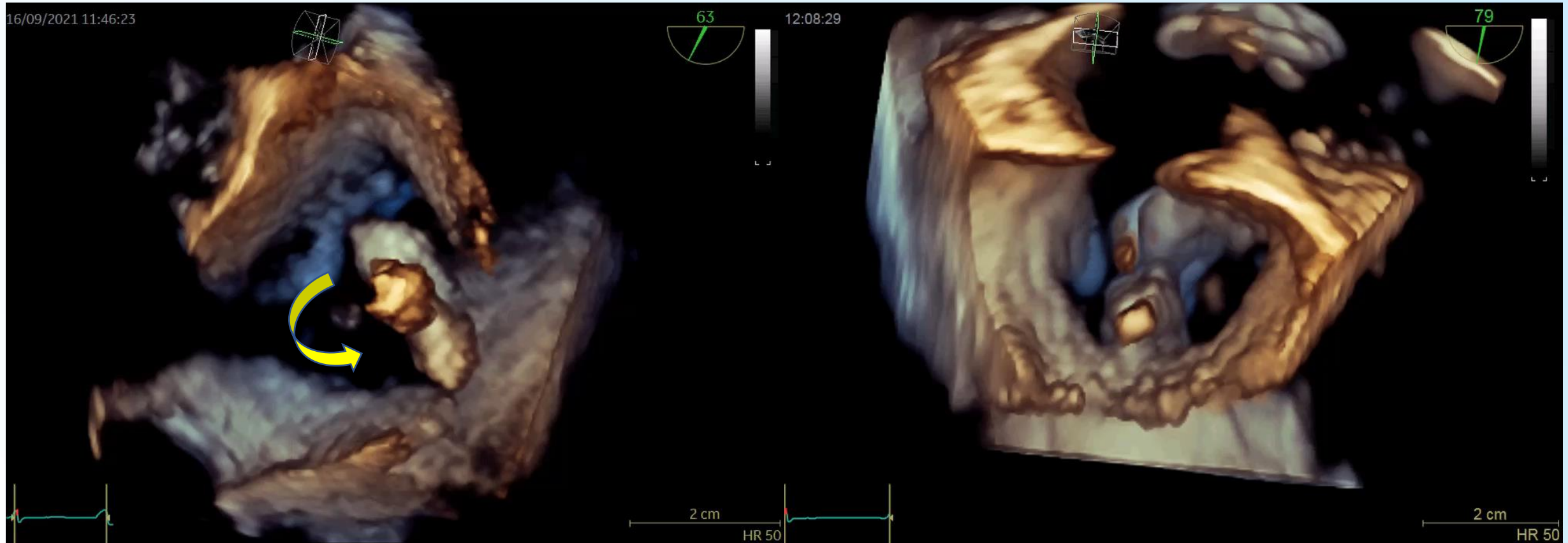
Posizionamento guida rigida in v. polmonare superiore sn



Posizionamento della clip in atrio e avanzamento sul piano valvolare

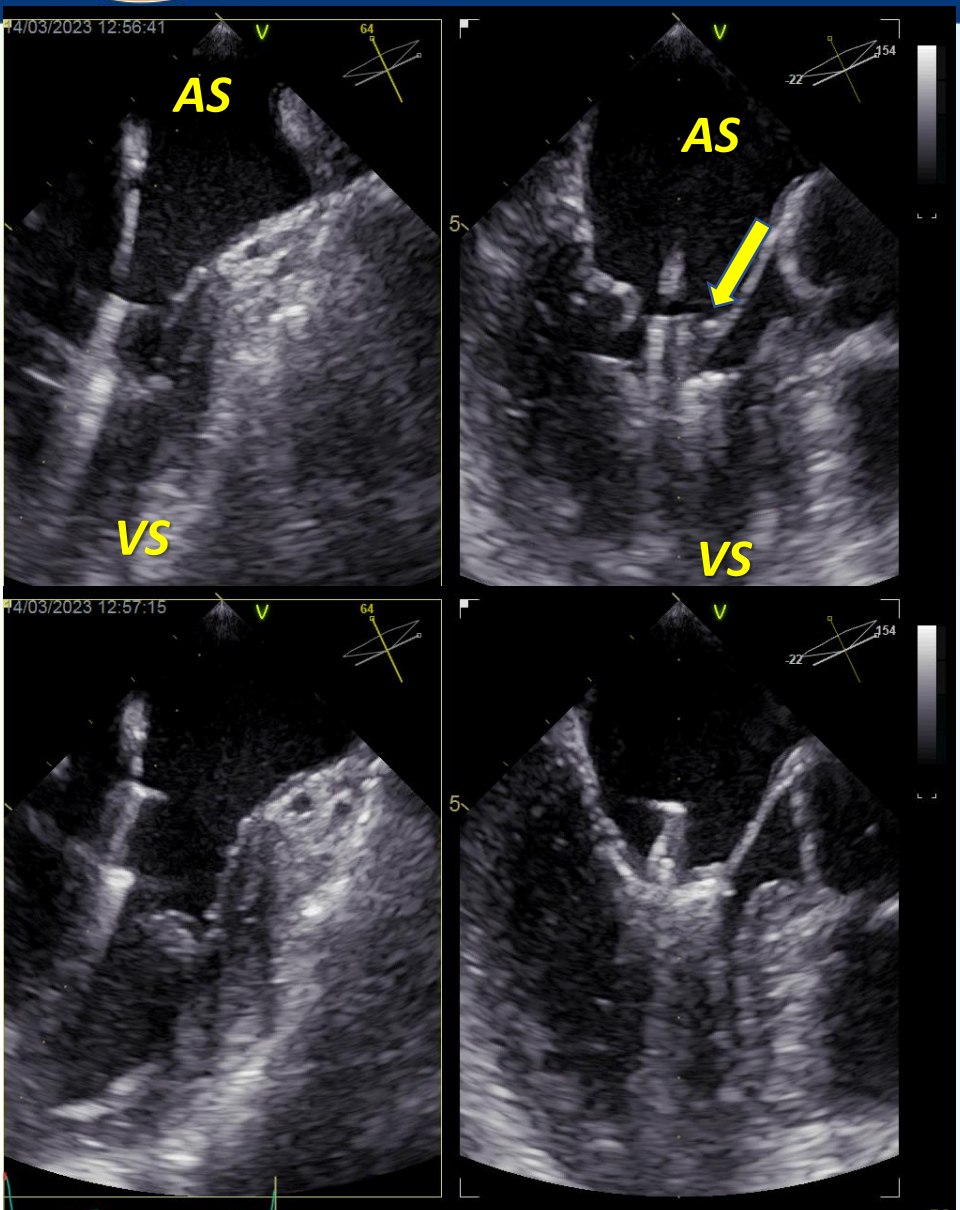


Posizionamento al di sopra della mitrale *Correzione Rotazione*

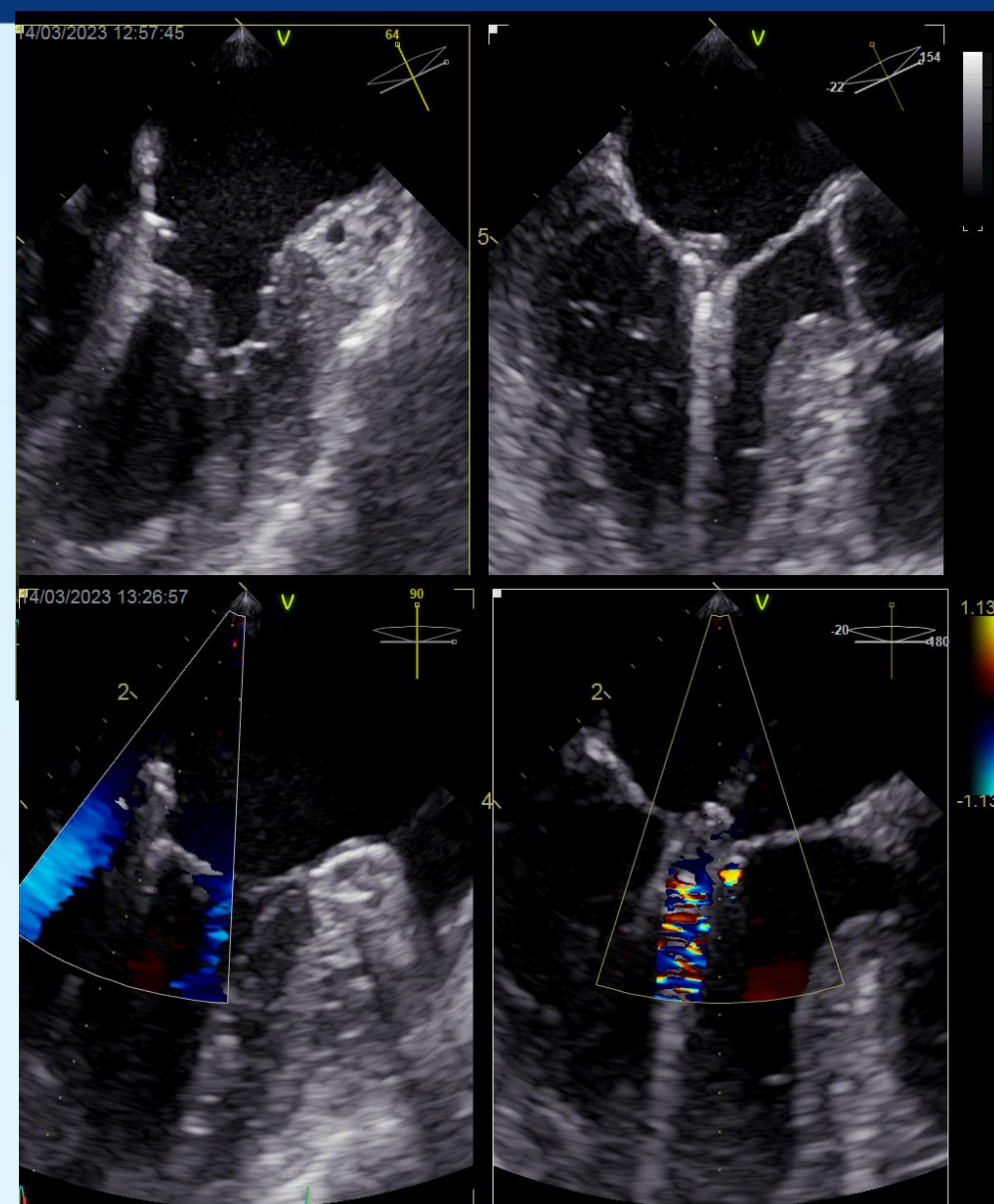


Iniziale non corretto

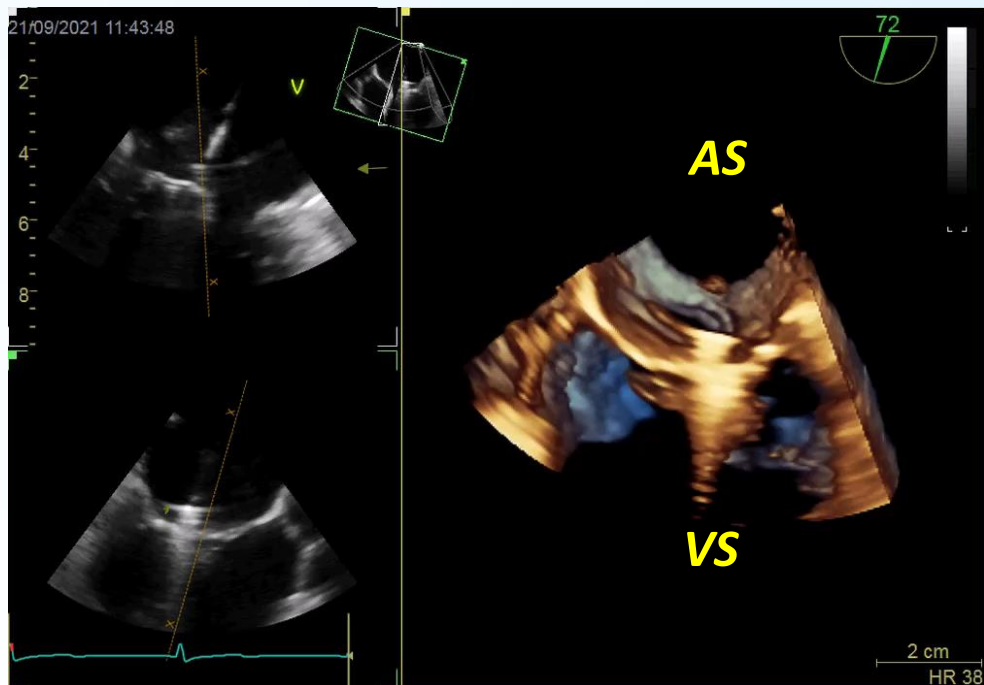
Corretto



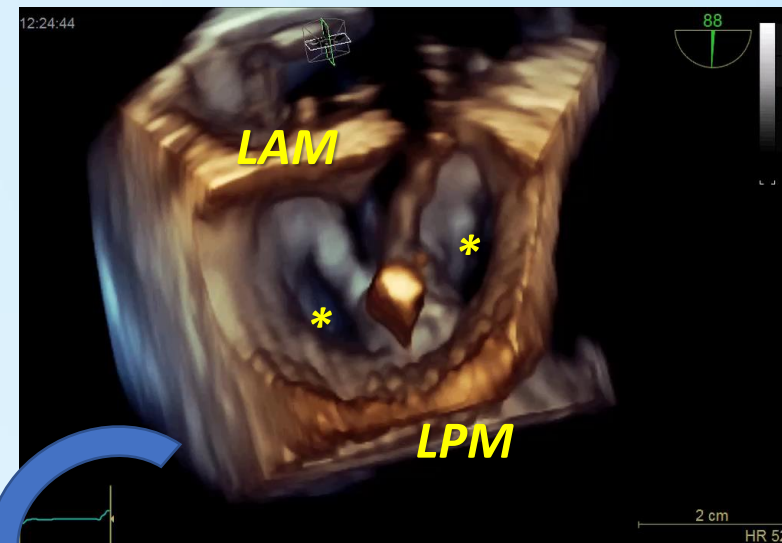
Posizionamento in ventricolo e *Grasping*



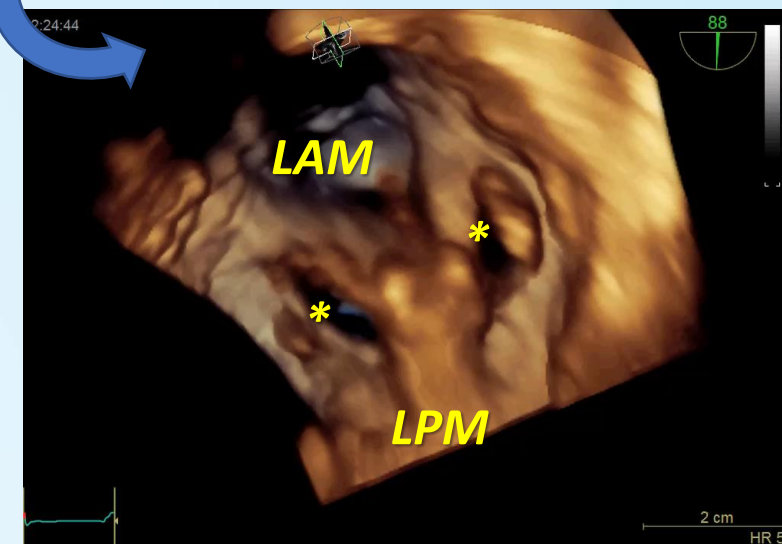
Grasping – verifica dei grippers



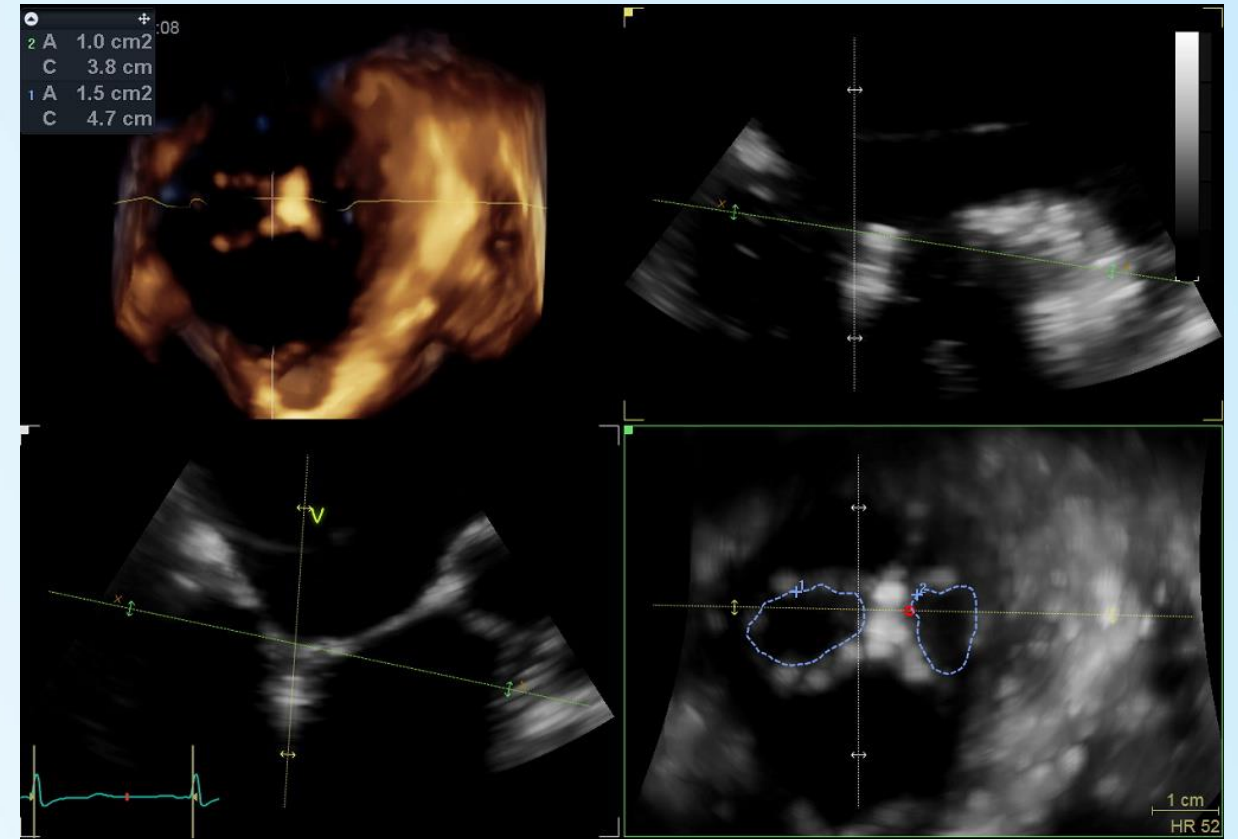
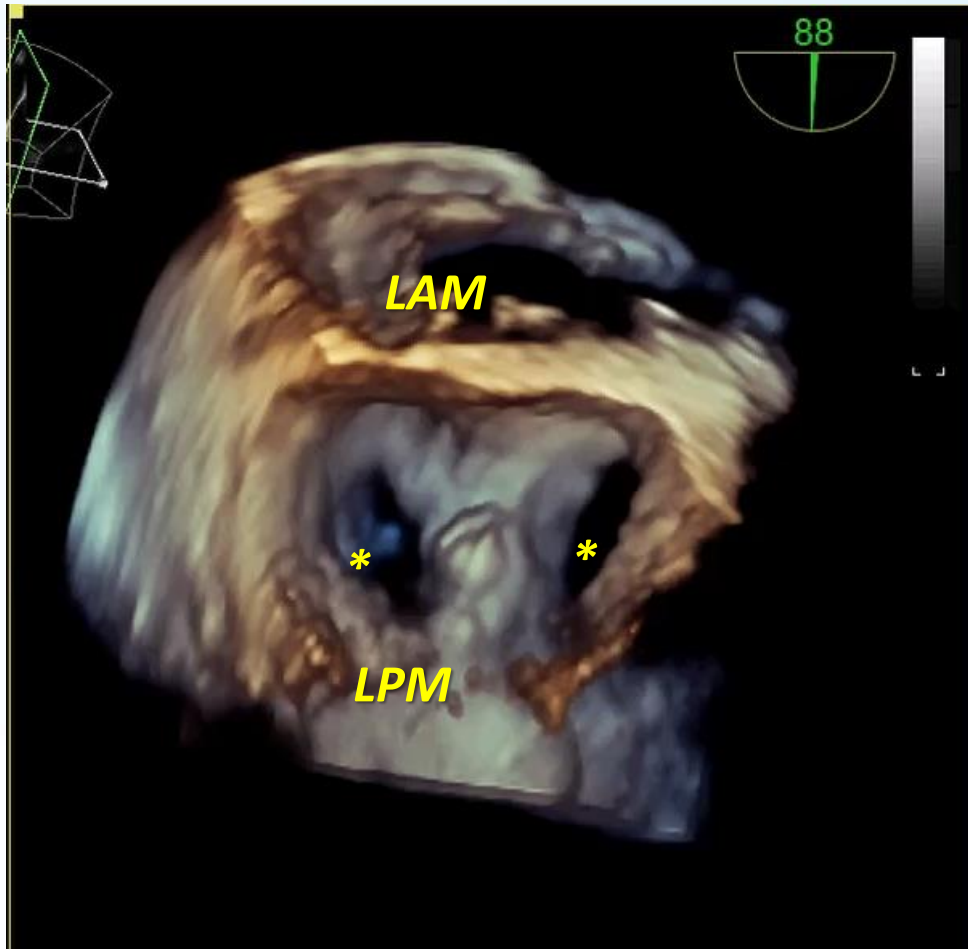
Versante atriale



Versante ventricolare

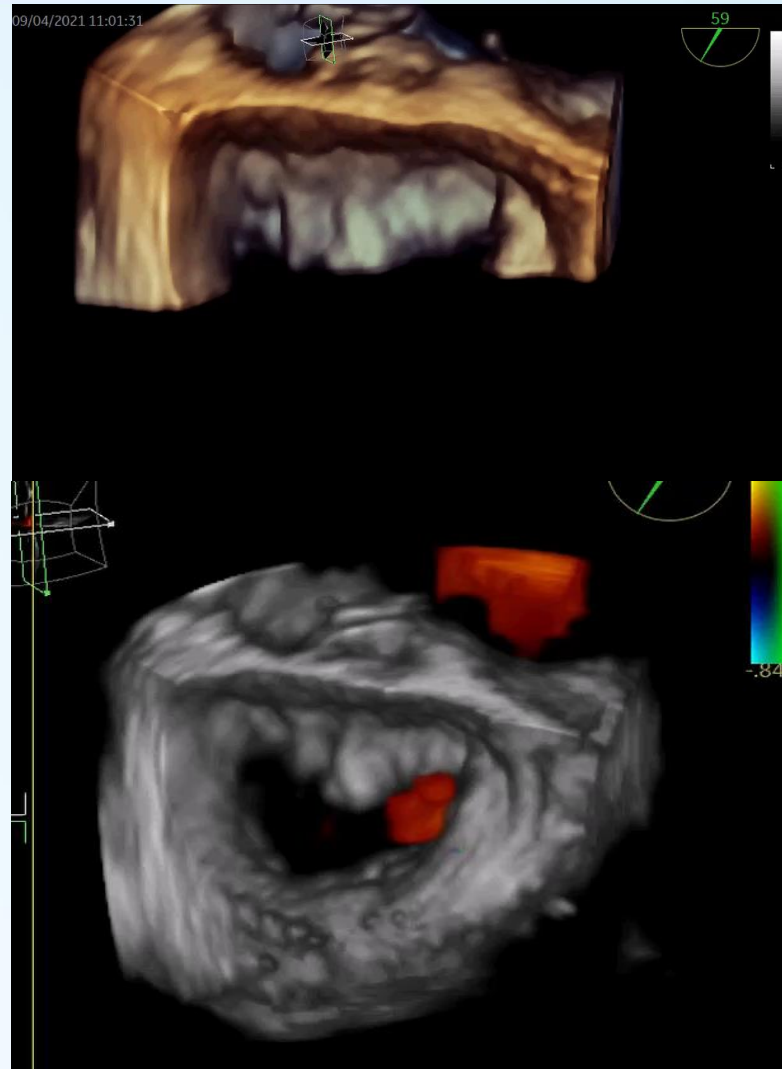


Controllo dell'area residua

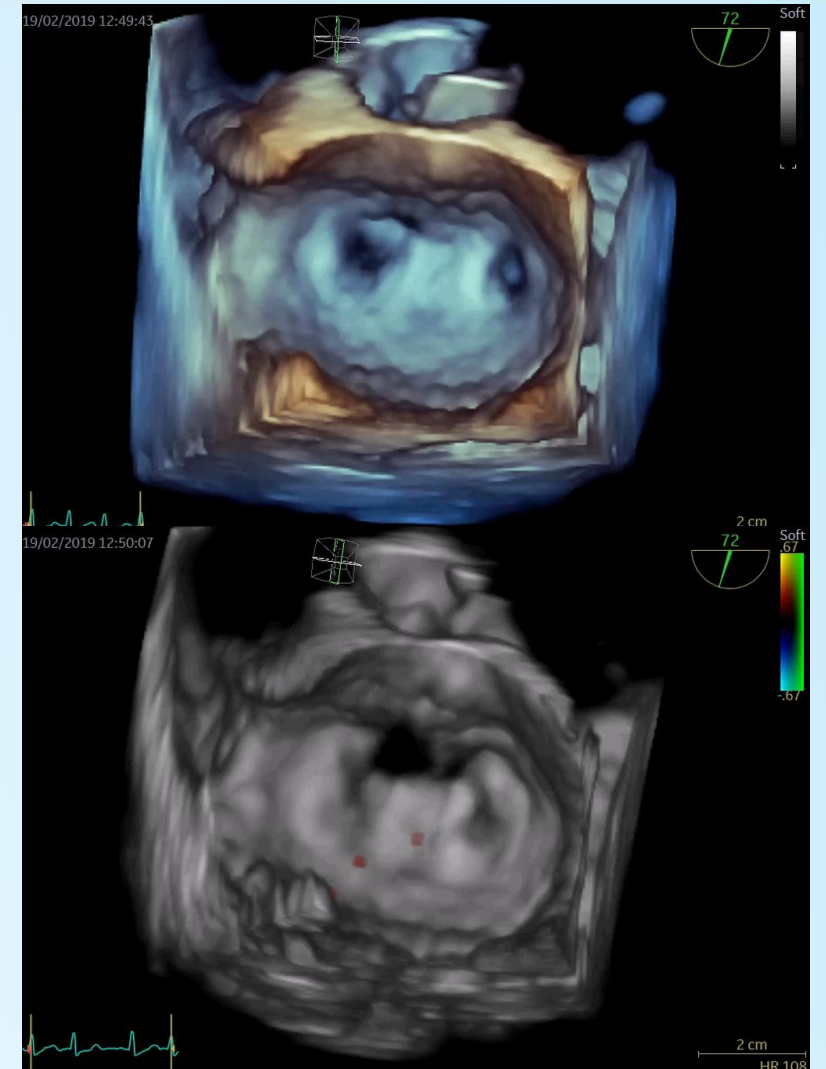


1 clip

Controllo dell'insufficienza residua

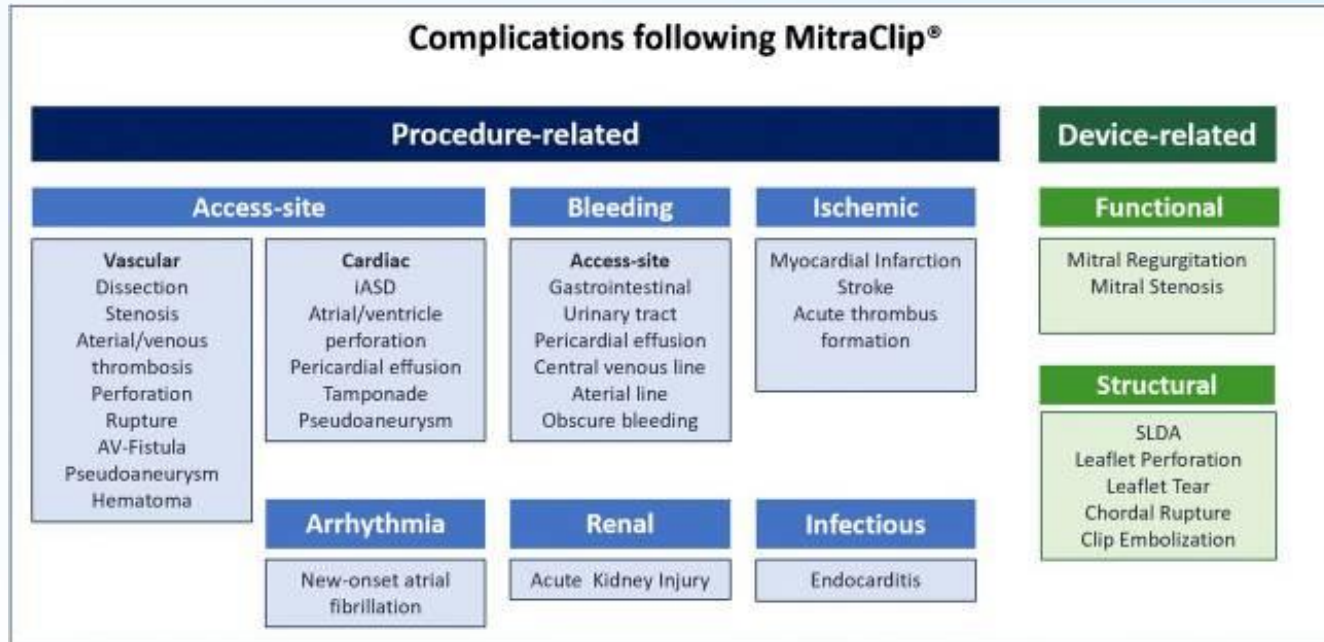


Pre



Post 2 Clip

3. Gestione complicanze



Detachment

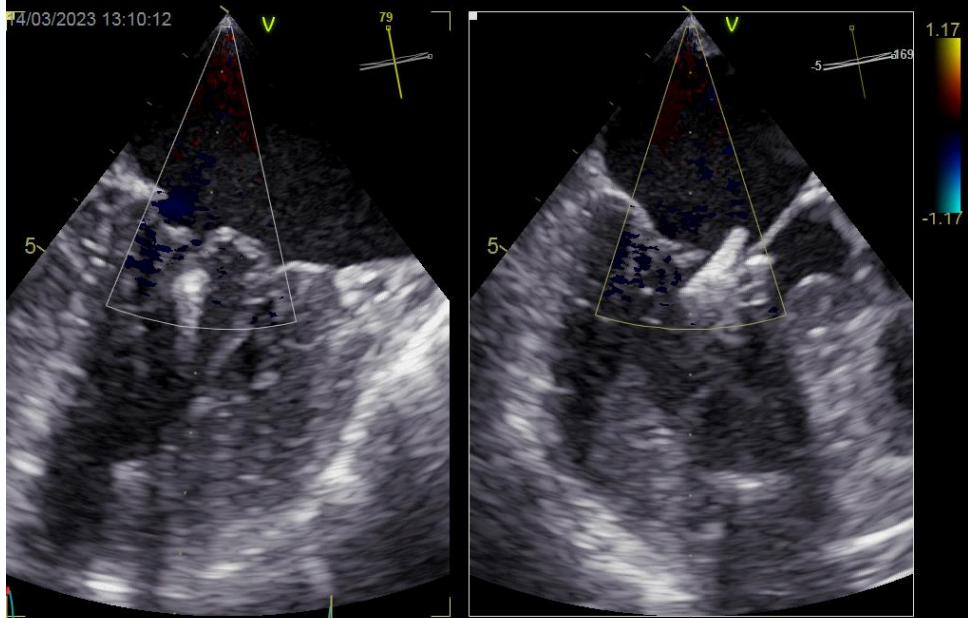
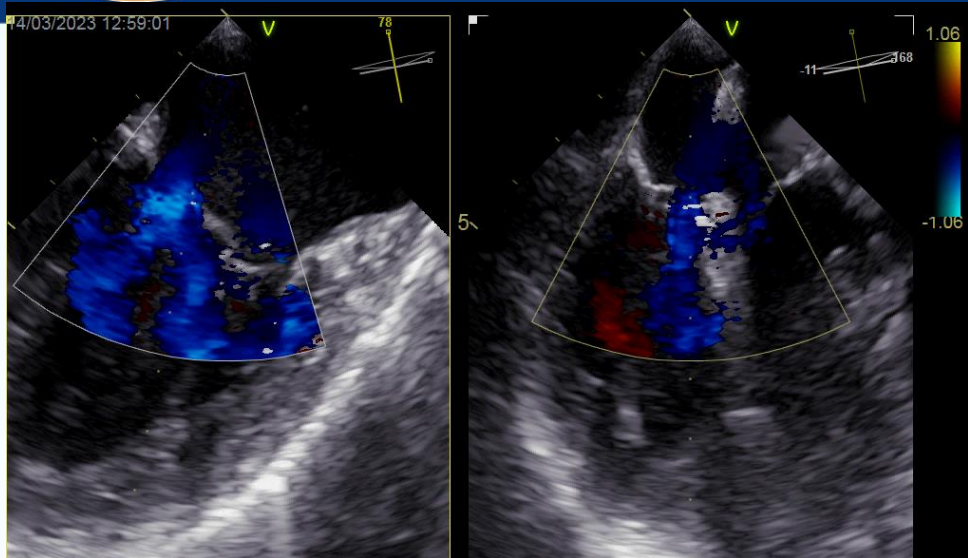
- ✓ Acuta
- ✓ Post-intervento

Rottura/perforazione di lembo

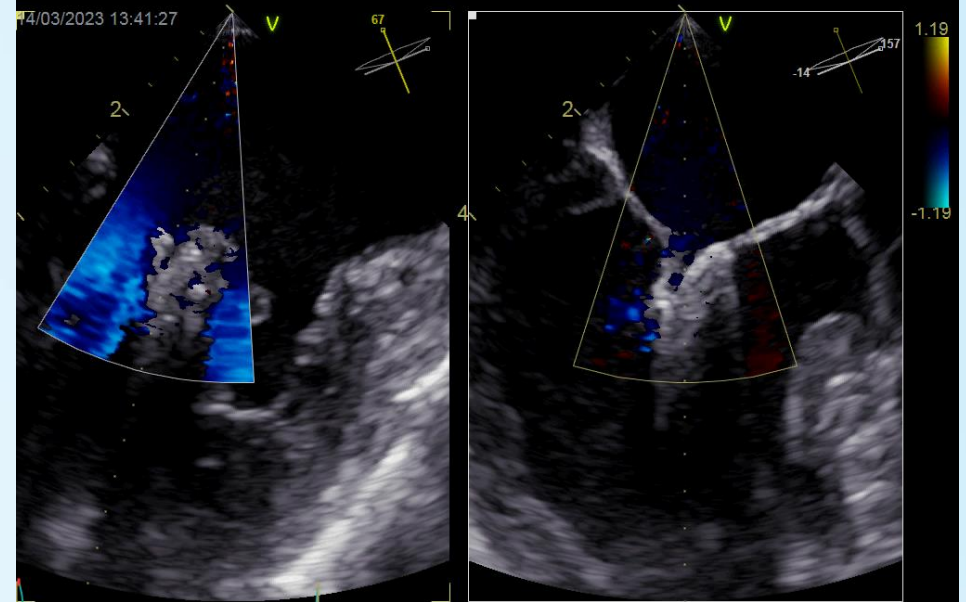
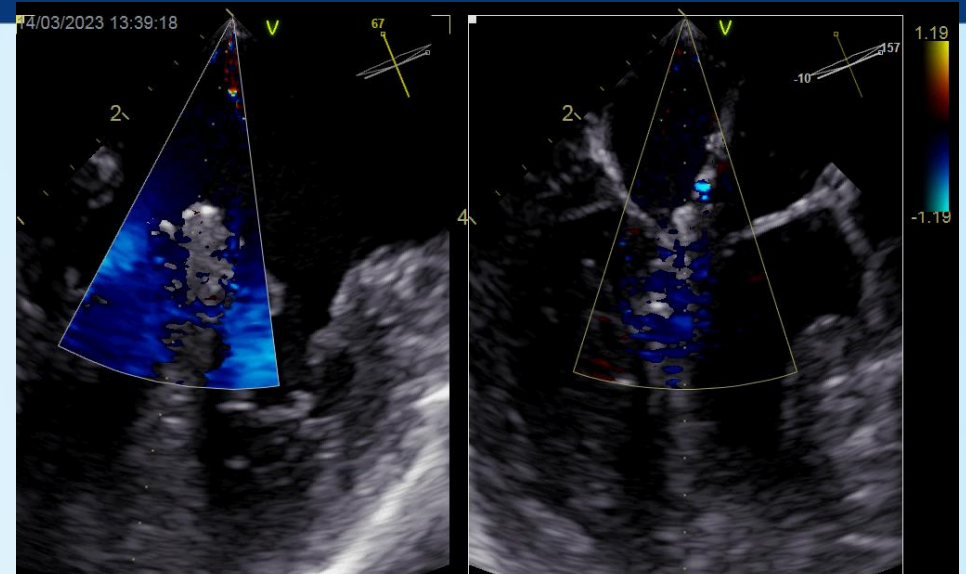
Rottura di corde

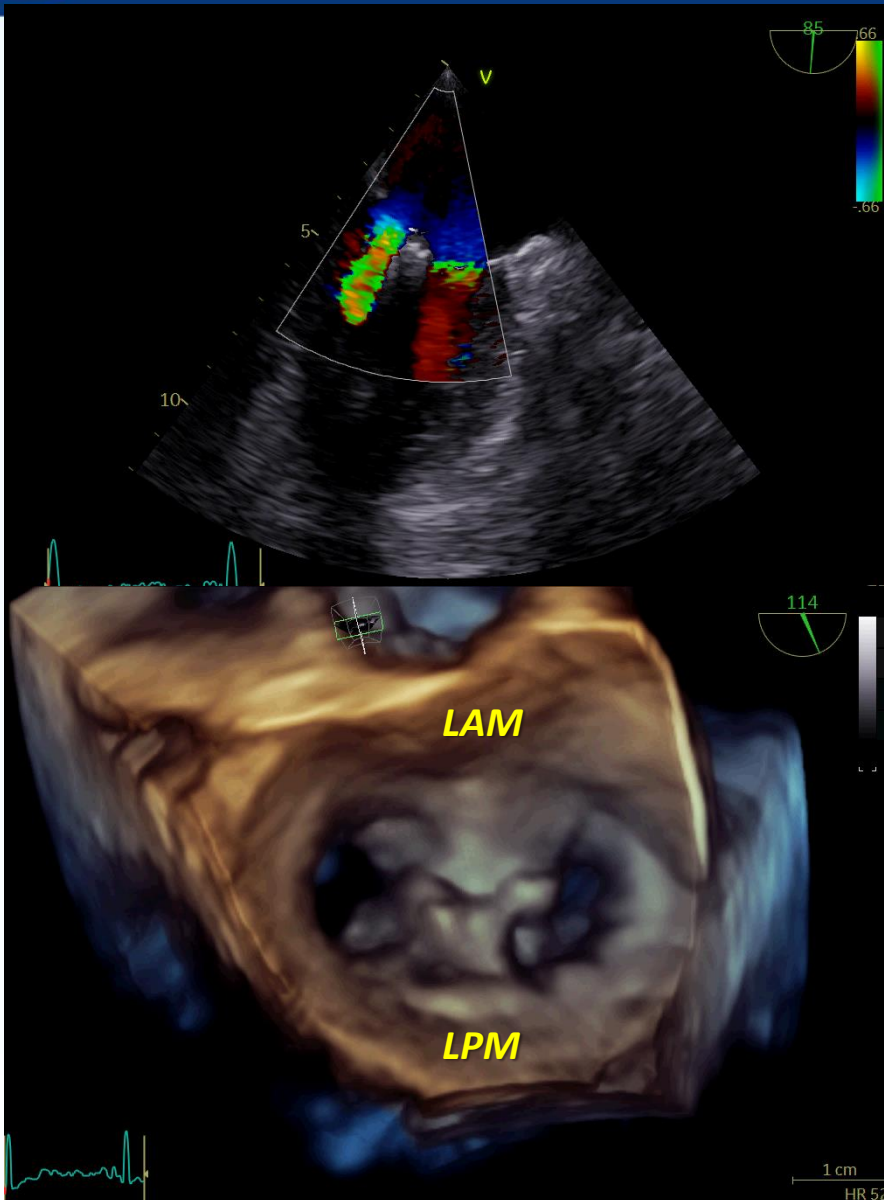
Embolizzazione del device

Formazione di trombi

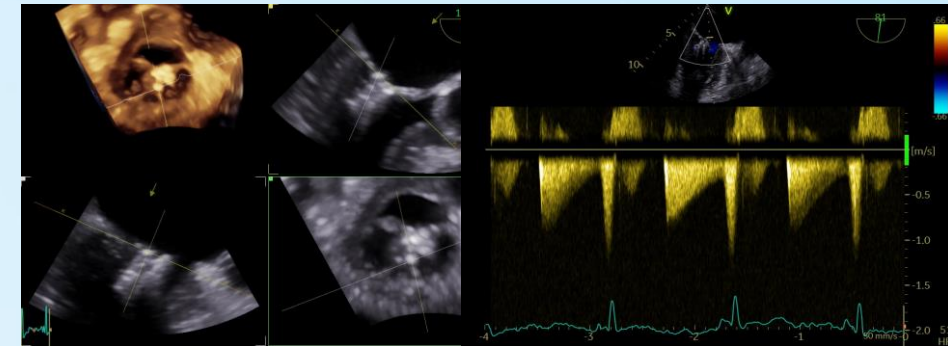


Detachment LPM

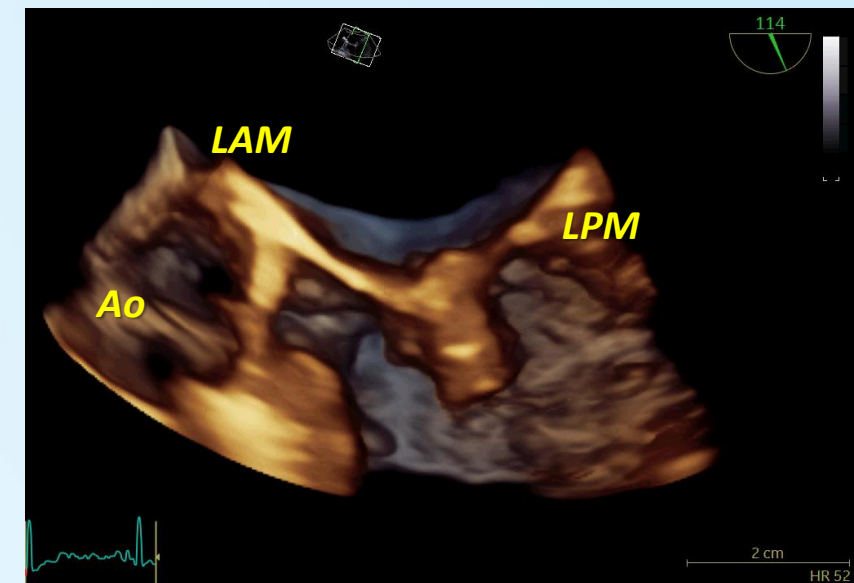


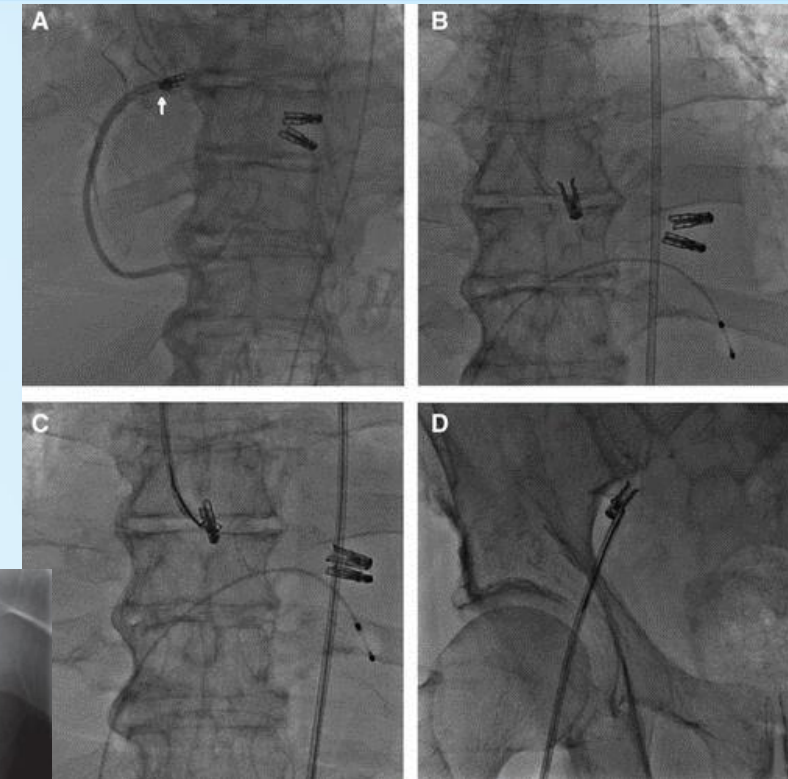
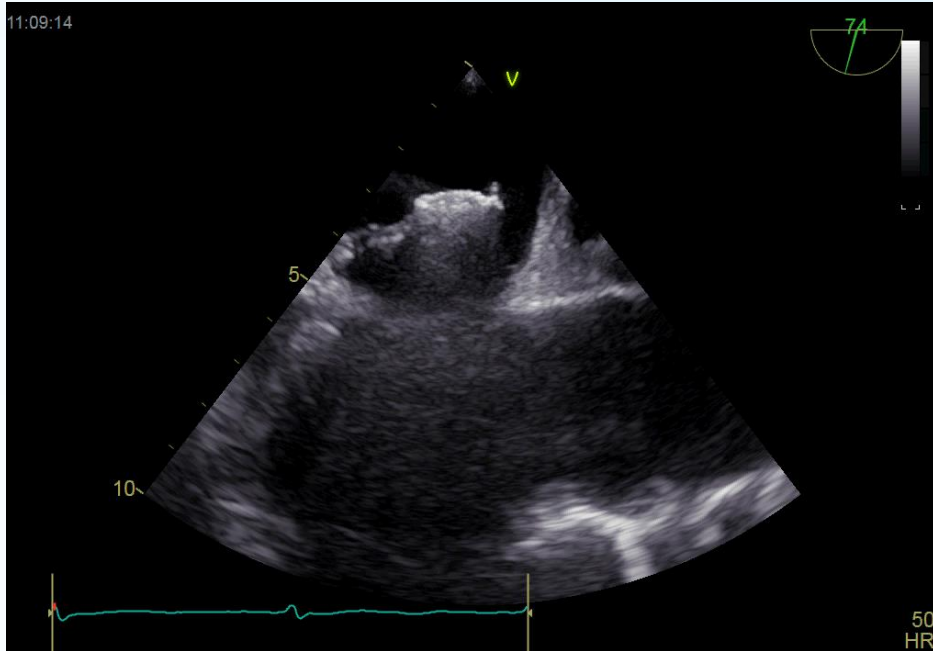


**Detachment
LPM I clip –
controllo a 1
mese**



**Grad medio 1,8 mmHg
Area residua 2,8 cm²**





Formazione di trombi Embolizzazione

Chitsaz et al. Circulation:
Cardiovascular Interventions. 2016

Bilge et al. Anatol J Cardiol 2016

TAVI



European Journal of Echocardiography (2011) 12, 557–584
doi:10.1093/ejechocard/jer086

RECOMMENDATIONS

EAE/ASE recommendations for the use of echocardiography in new transcatheter interventions for valvular heart disease

Peri-procedural echocardiography during transcatheter aortic valve implantation

Two-dimensional echocardiography

Although TTE clearly plays an important role in patient selection

its role during the actual procedure is limited.

undergoing TAVI via a transapical approach, TTE can be helpful in locating and marking the position of the LV apex in order to guide the thoracotomy. However, there are a number of points to remember when doing this: (i) it is important to use two

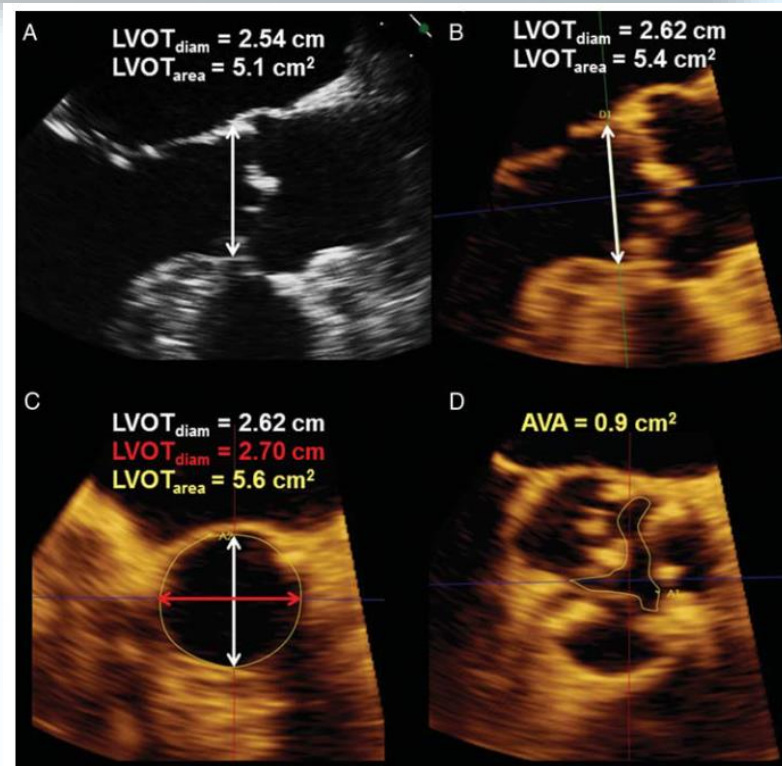


European Heart Journal – Cardiovascular Imaging (2012) 13, 541–555
doi:10.1093/ehjci/jes075

REVIEW PAPER

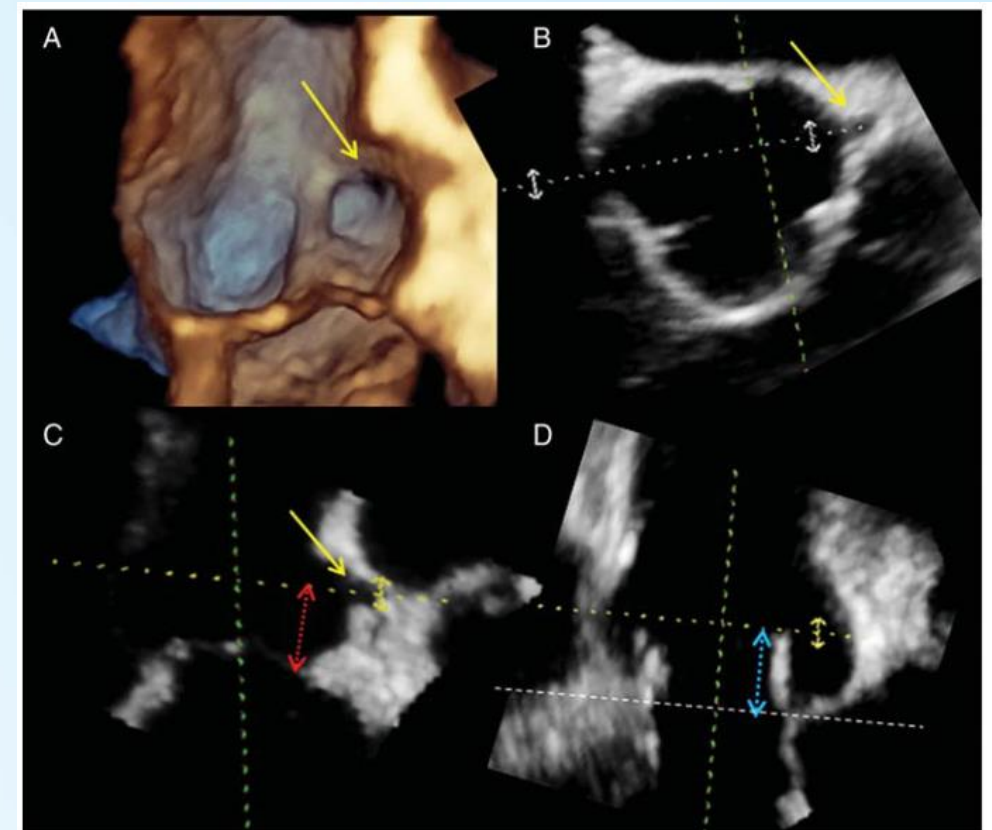
Assessment of aortic valve complex by three-dimensional echocardiography: a framework for its effective application in clinical practice

Denisa Muraru^{1*}, Luigi P. Badano¹, Mani Vannan², and Sabino Iliceto¹



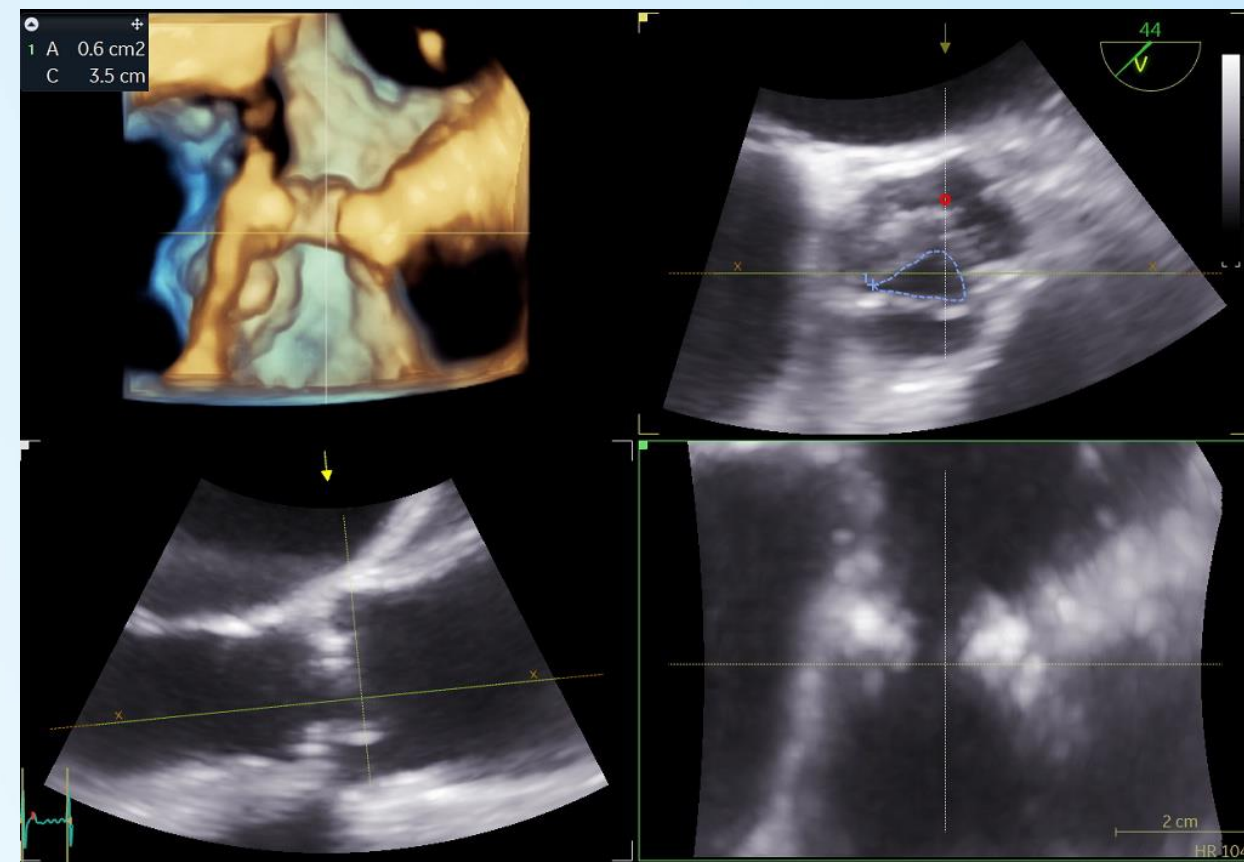
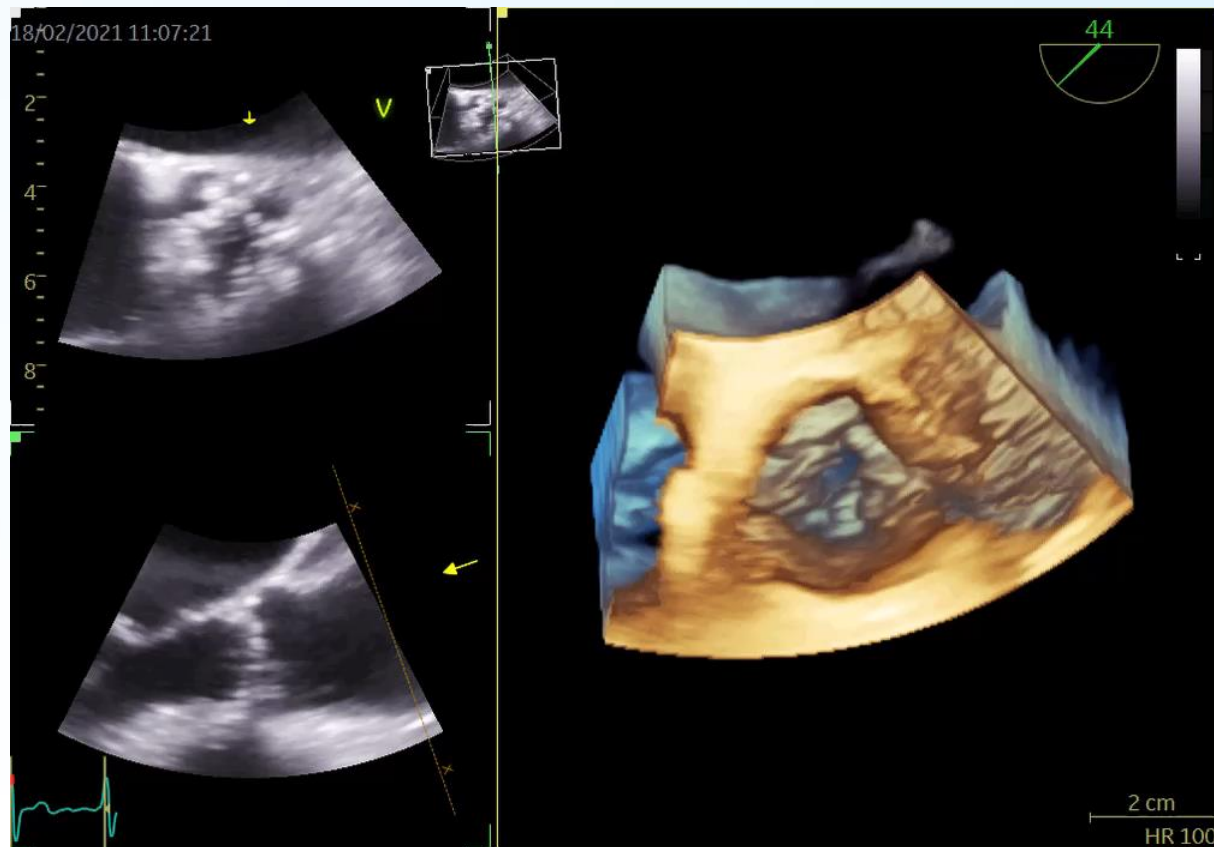
Anatomia valvolare aortica

Calcolo area planimetrica –definizione aortic root

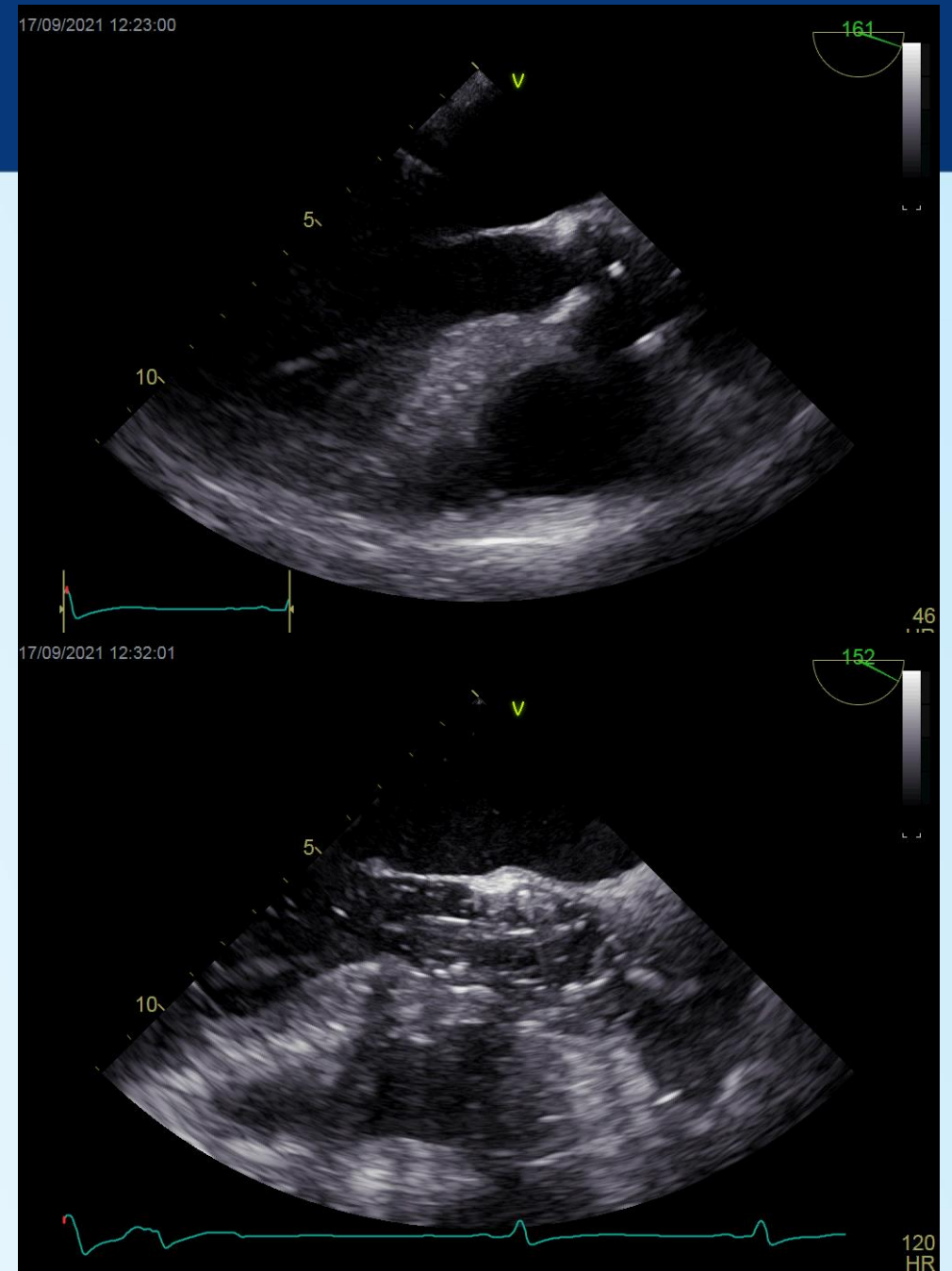
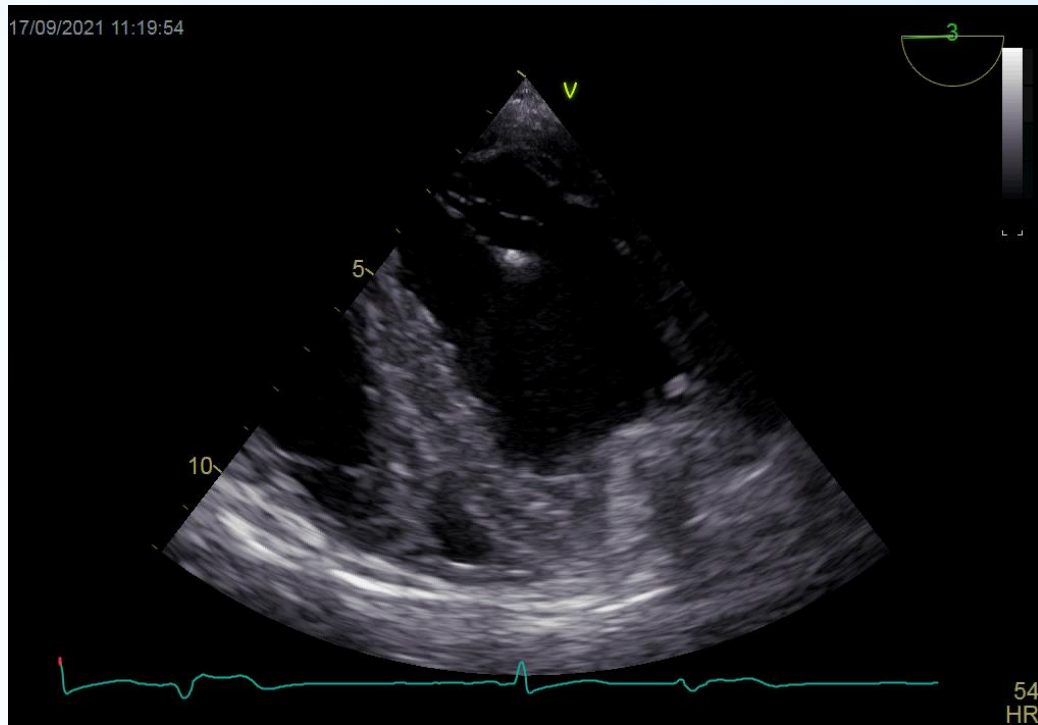


Anatomia valvolare aortica

Stenosi aortica – Area planimetrica 3D



TAVI transapicale



TAVI transapicale

