Napoli, 16-18 aprile

Indicazioni ecocardiografiche al trattamento interventistico nel congenito adulto

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Indicazioni ecocardiografiche al trattamento interventistico nel congenito adulto

Ecocardiografia

- Indicazioni
- Monitoraggio della procedura
- Follow-up

Ecocardiografia

Procedure di occlusione

- Difetto interatriale
- Difetto interventricolare
- Dotto di Botallo pervio
- Collaterali sistemico-polmonari
- Altri vasi “esotici”

Difetto interatriale

Indicazioni alla chiusura ESC 2010

Indications	Class[a]	Level[b]
Patients with significant shunt (signs of RV volume overload) and PVR <5 WU should undergo ASD closure regardless of symptoms	I	B[26]
Device closure is the method of choice for secundum ASD closure when applicable	I	C
All ASDs regardless of size in patients with suspicion of paradoxical embolism (exclusion of other causes) should be considered for intervention	IIa	C
Patients with PVR ≥5 WU but <2/3 SVR or PAP <2/3 systemic pressure (baseline or when challenged with vasodilators, preferably nitric oxide, or after targeted PAH therapy) and evidence of net L–R shunt (Qp:Qs >1.5) may be considered for intervention	IIb	C
ASD closure must be avoided in patients with Eisenmenger physiology	III	C

Ecocardiografia Transtoracica/ transesofagea

Difetto interatriale

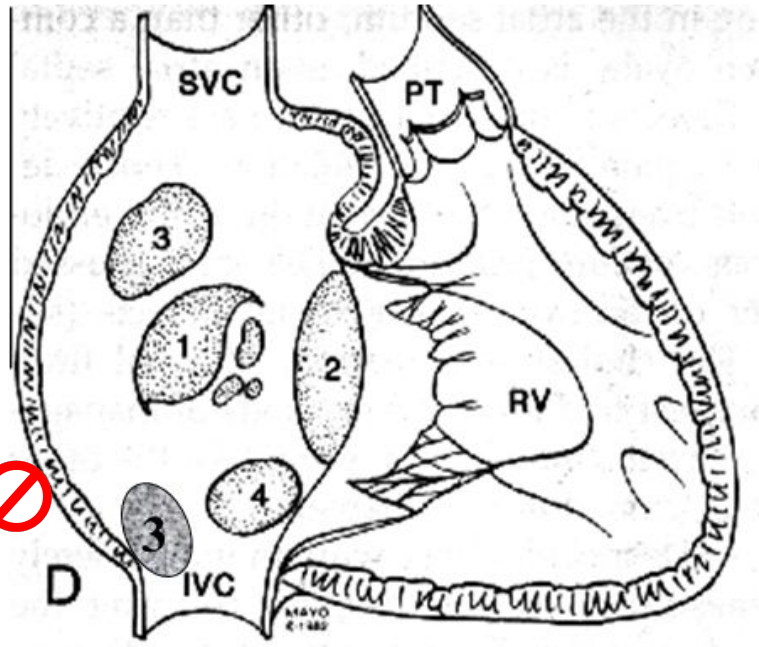
- Anatomia
- Dimensioni
- Dati emodinamici (Doppler)

Difetto del setto interatriale

Occlusione transcatetere

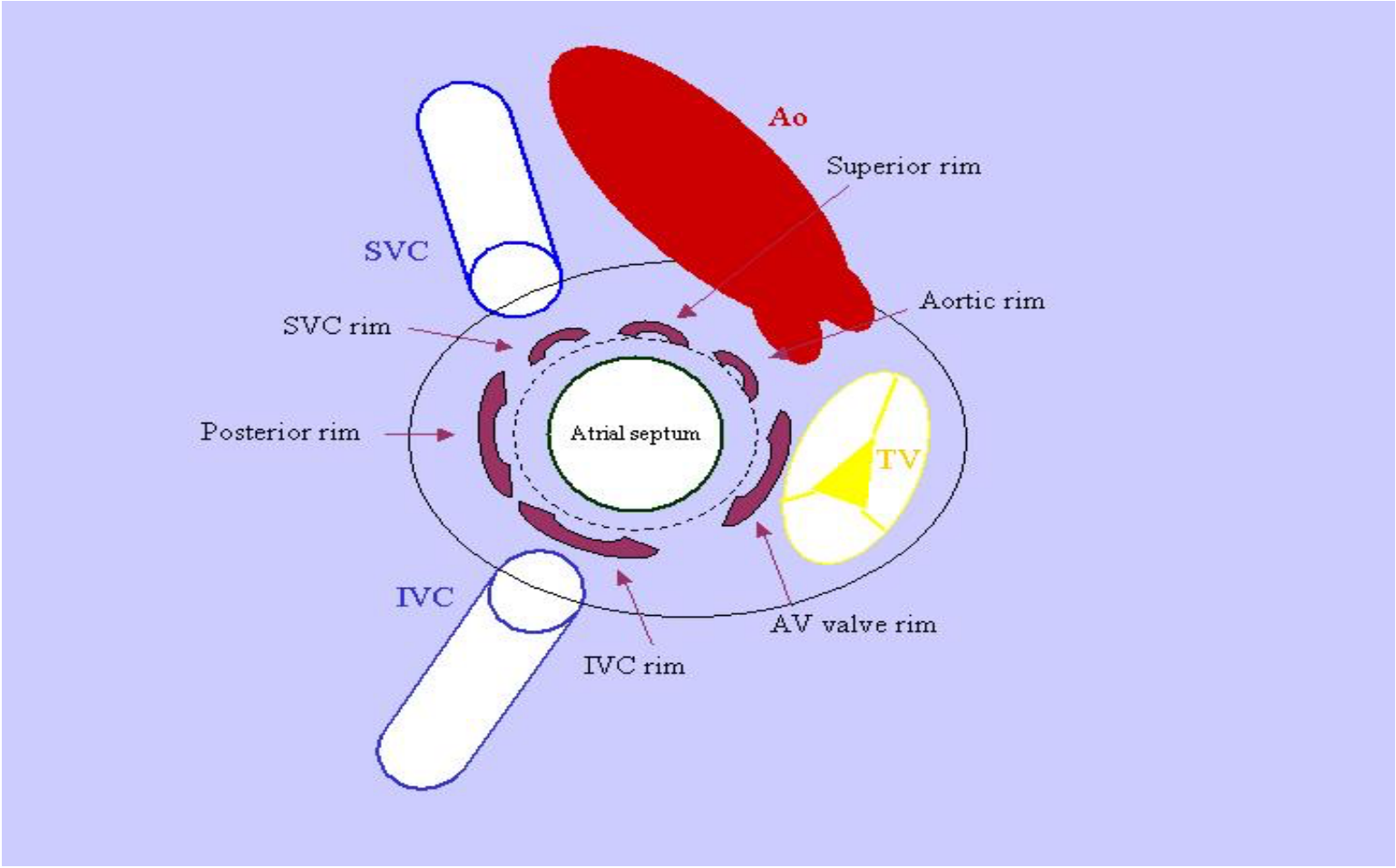
- Soluzione di continuità SIA
- 15% delle CC > 1 anno di età

1. Ostium Secundum (PVM)
2. Ostium Primum (Cleft valv.mitrale) ⊘
3. Seno venoso Superiore e Inferiore (RVPAP) ⊘
4. Seno coronarico (Unroofed CS) ⊘



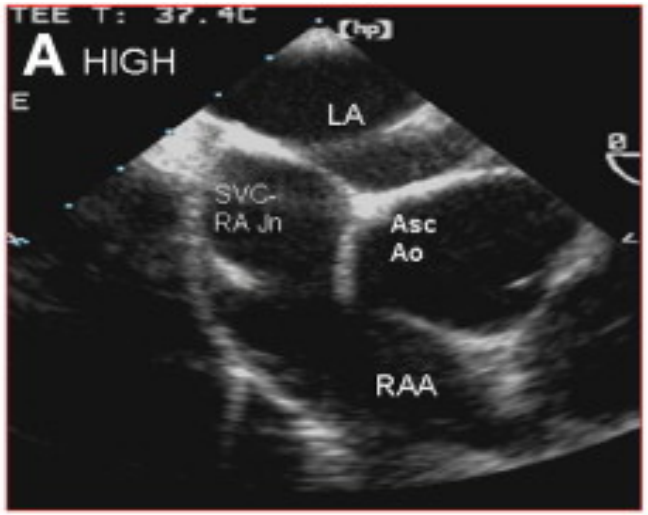
Ecocardiografia Transtoracica/ transesofagea

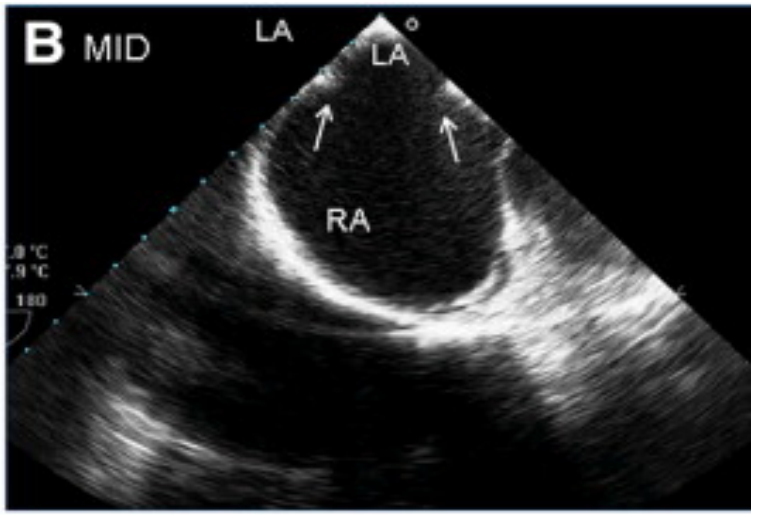
Margini del difetto interatriale

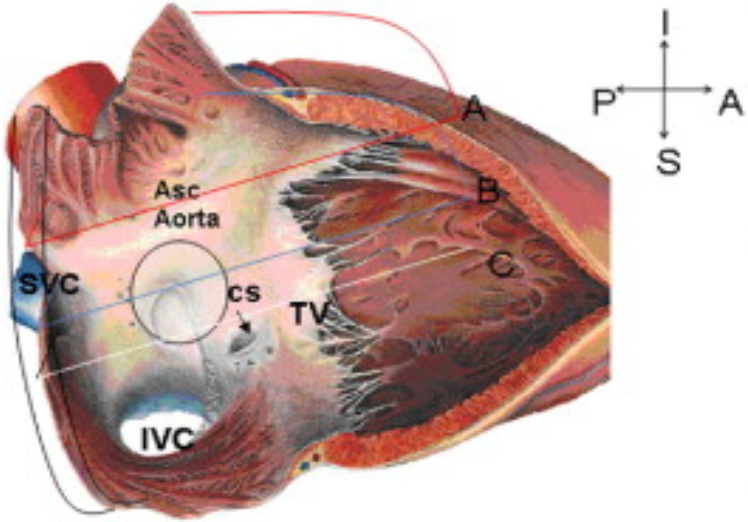


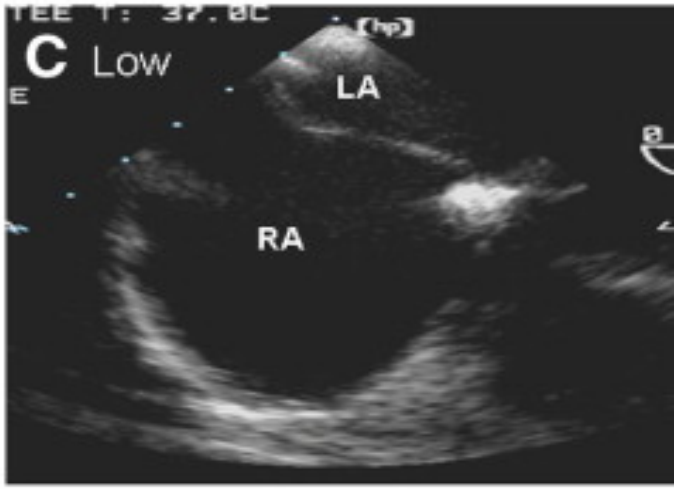
Ecocardiografia transesofagea

0° Rim anteriore e posteriore



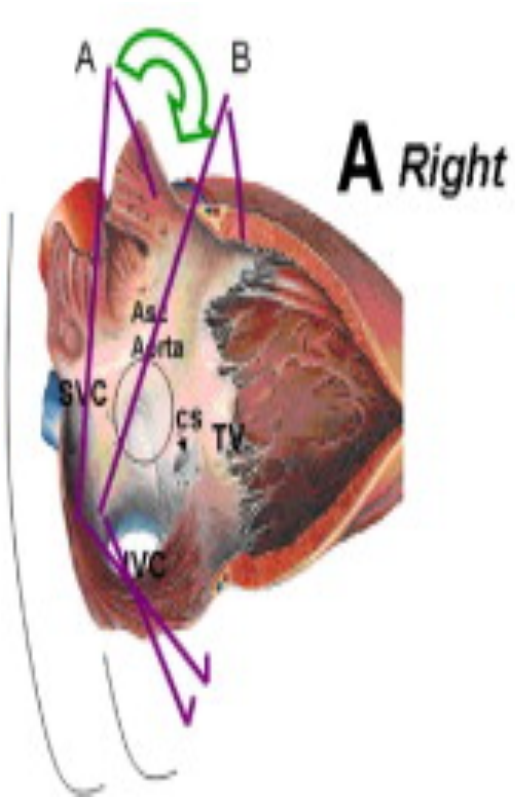




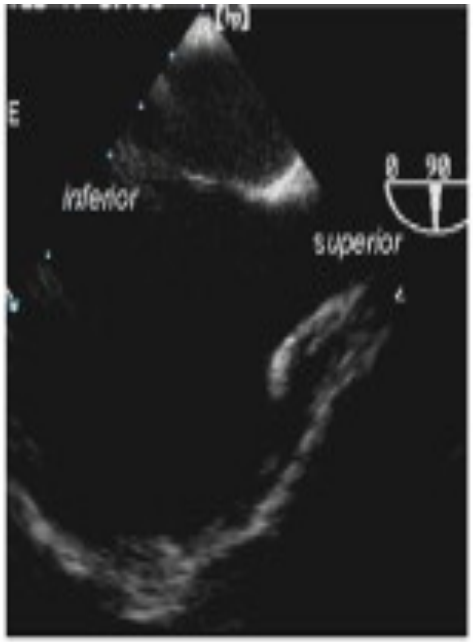


Ecocardiografia transesofagea

90° Rim cavale superiore e inferiore



A *Right*

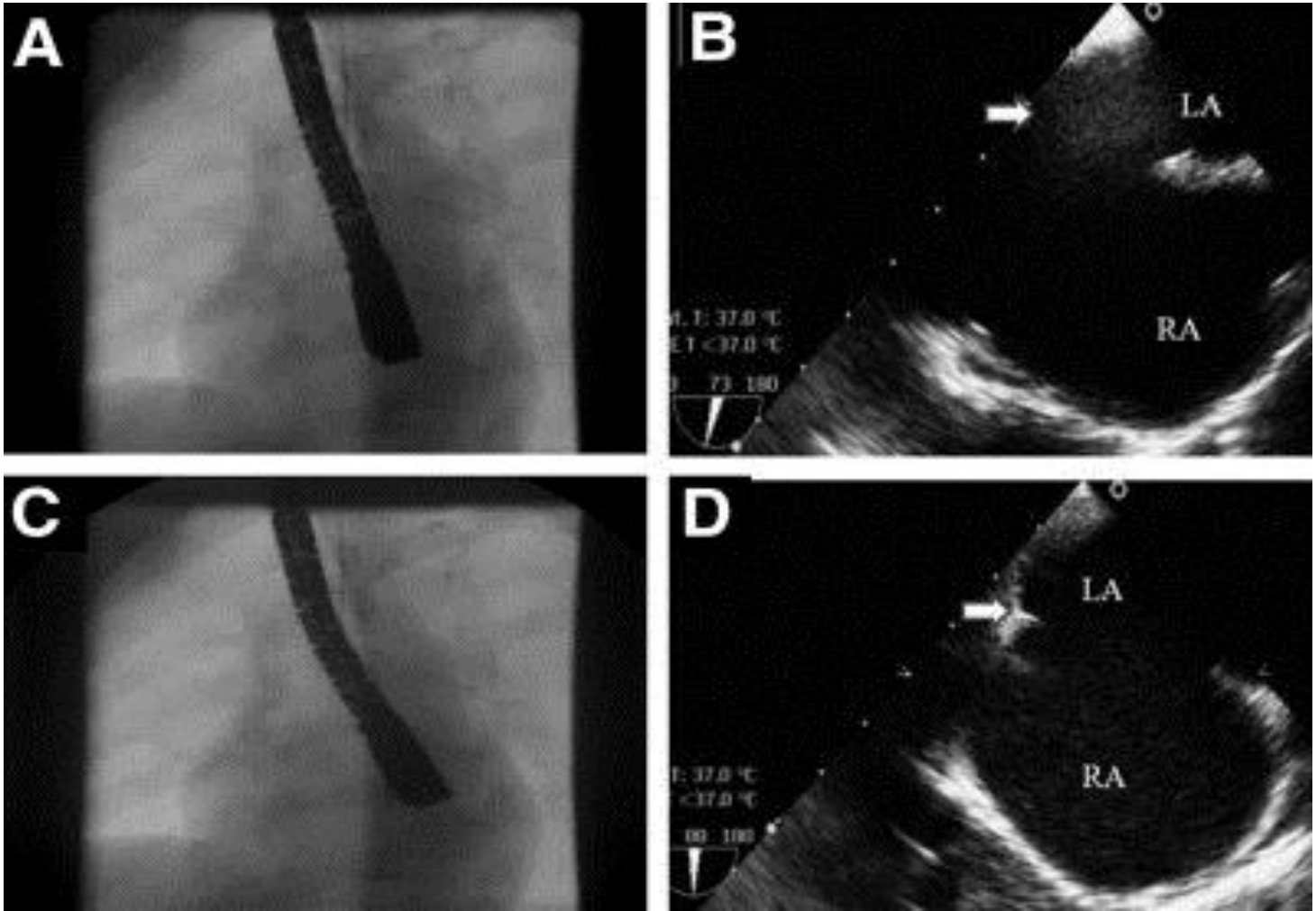


B *Left*

Ecocardiografia transesofagea

Rim posteroinferiore

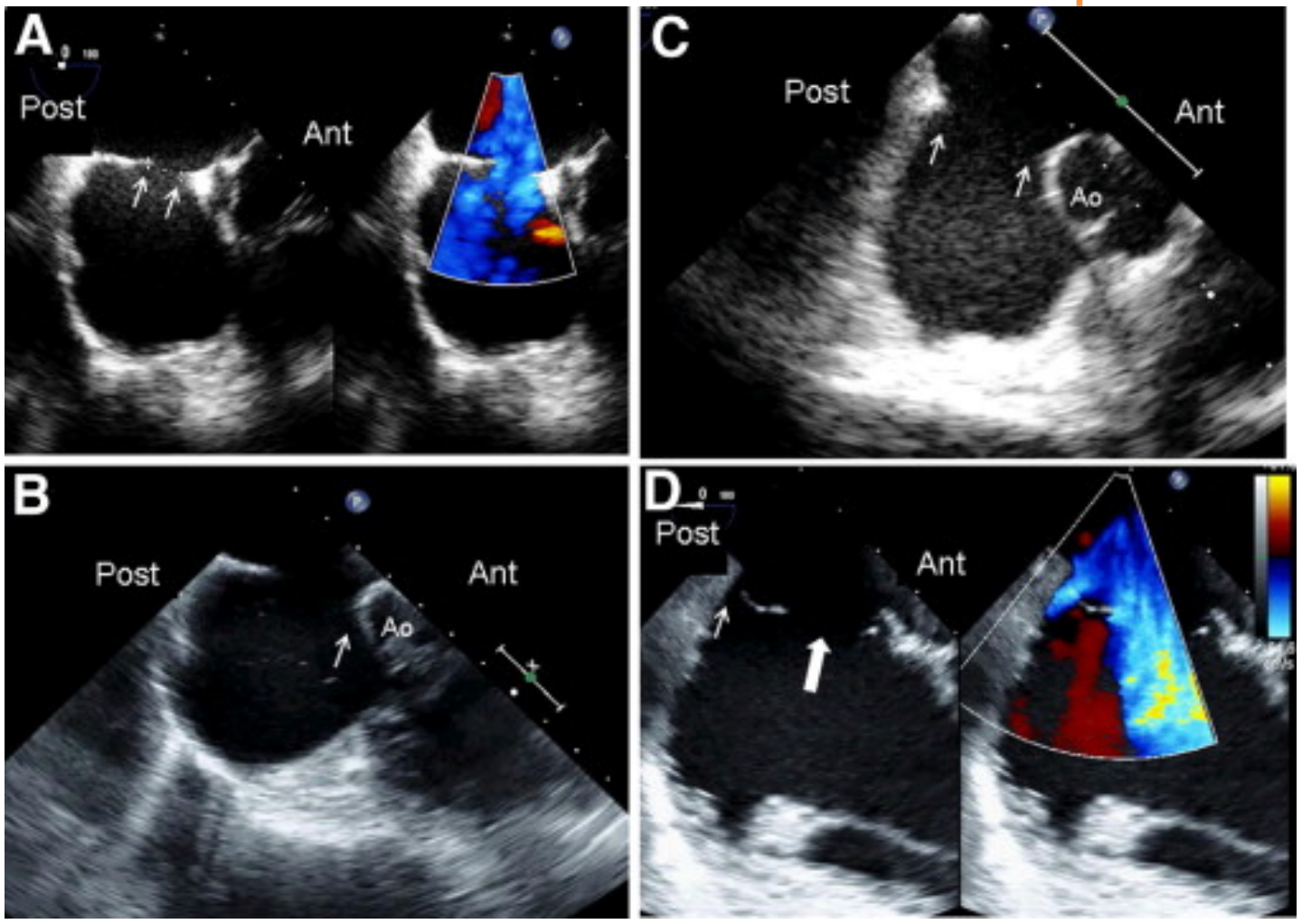
Long axis 70-90°



Ecocardiografia transesofagea

Centrale

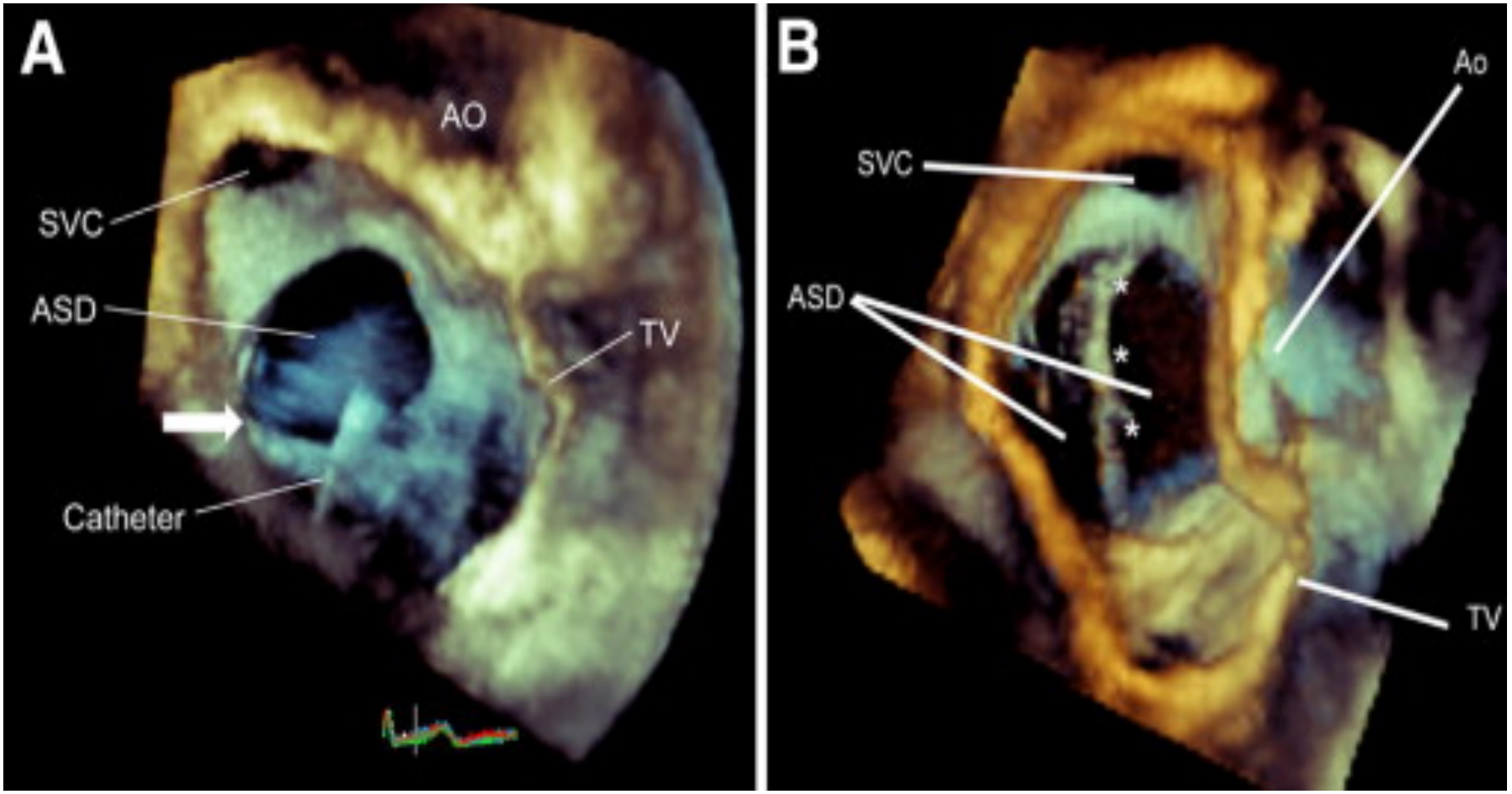
Deficit rim aortico e posteriore



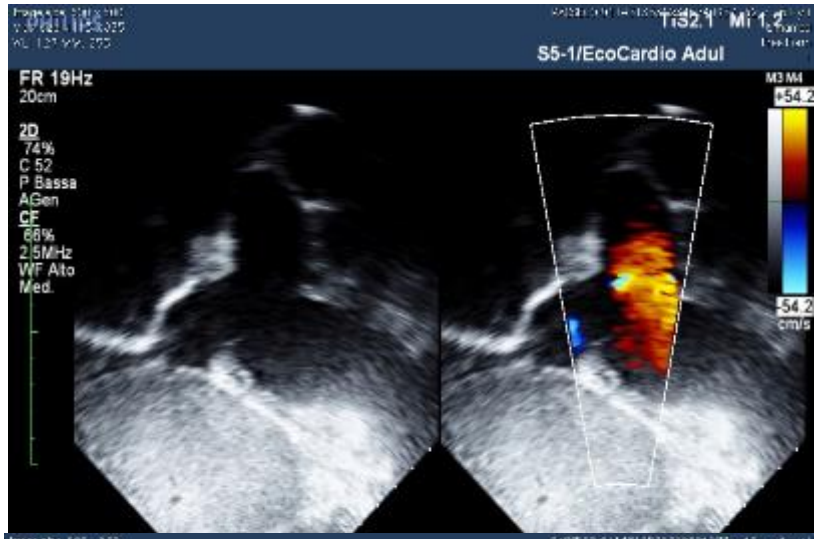
Deficit rim aortico

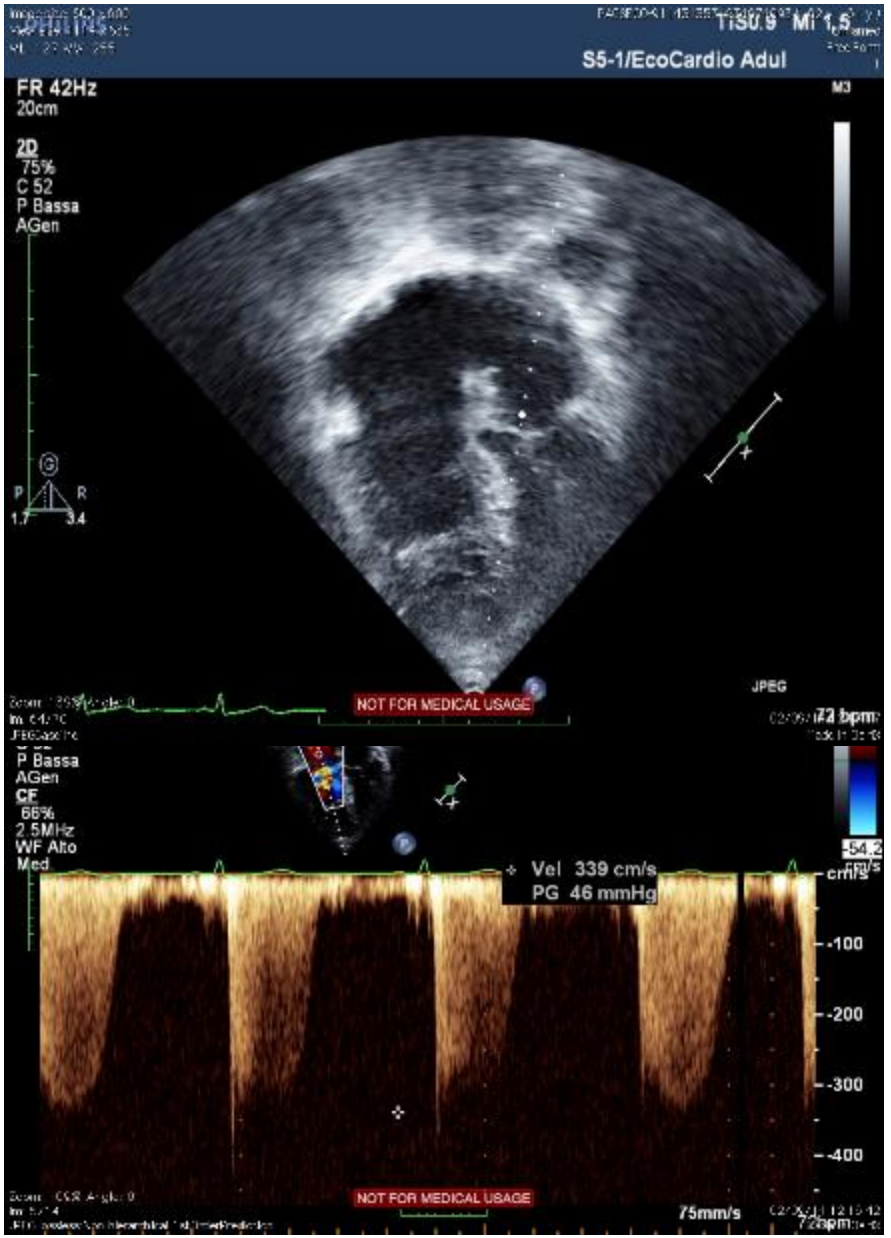
Difetti multipli :anteriore e posteriore

Ecocardiografia transesofagea

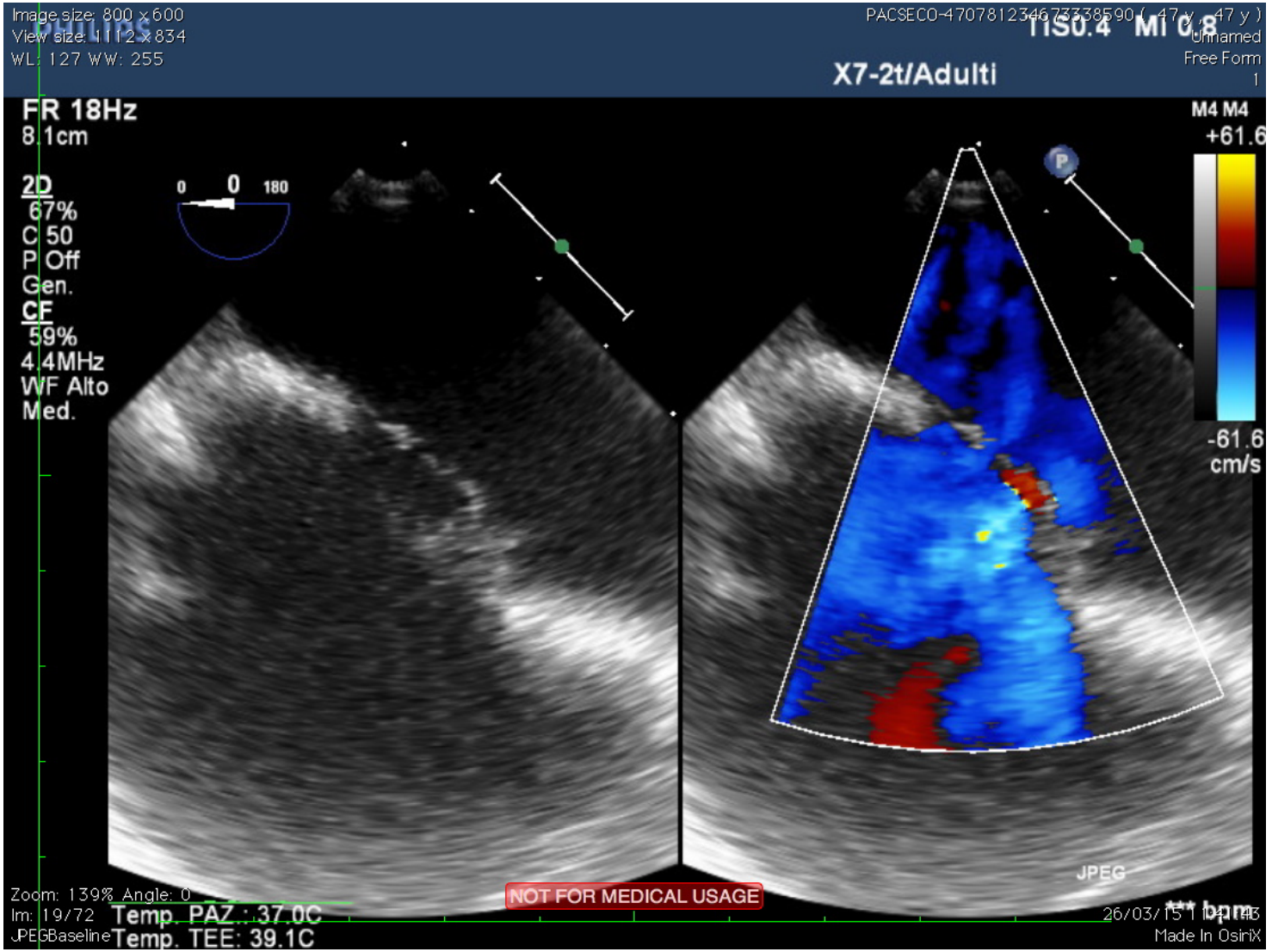


Difetto interatriale

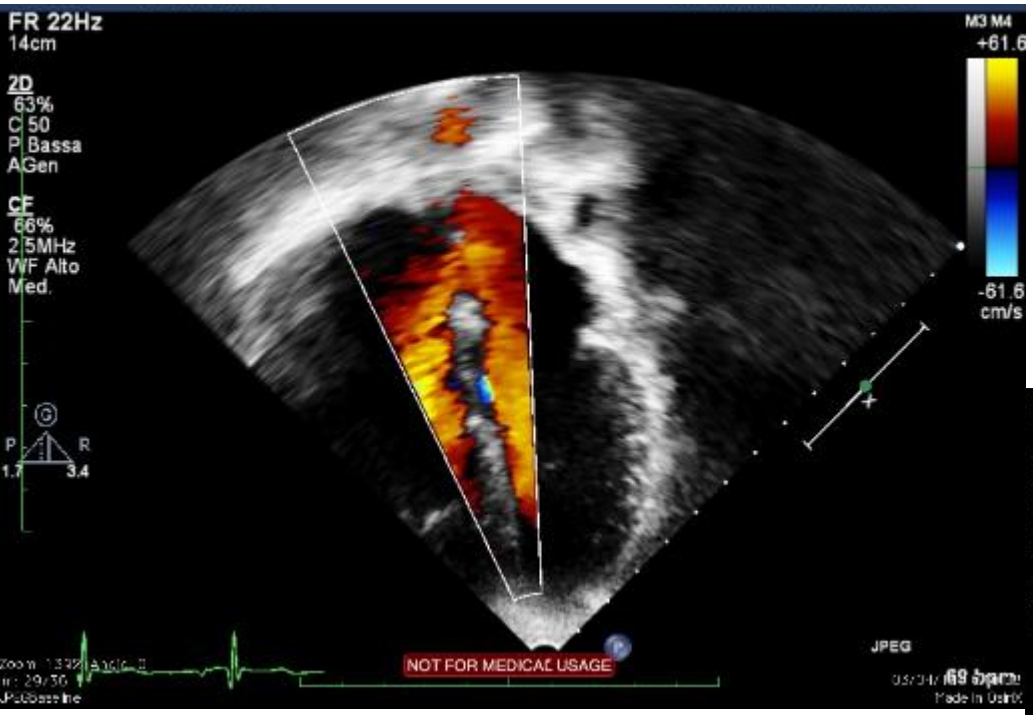




Difetto interatriale



Difetti interatriali multipli



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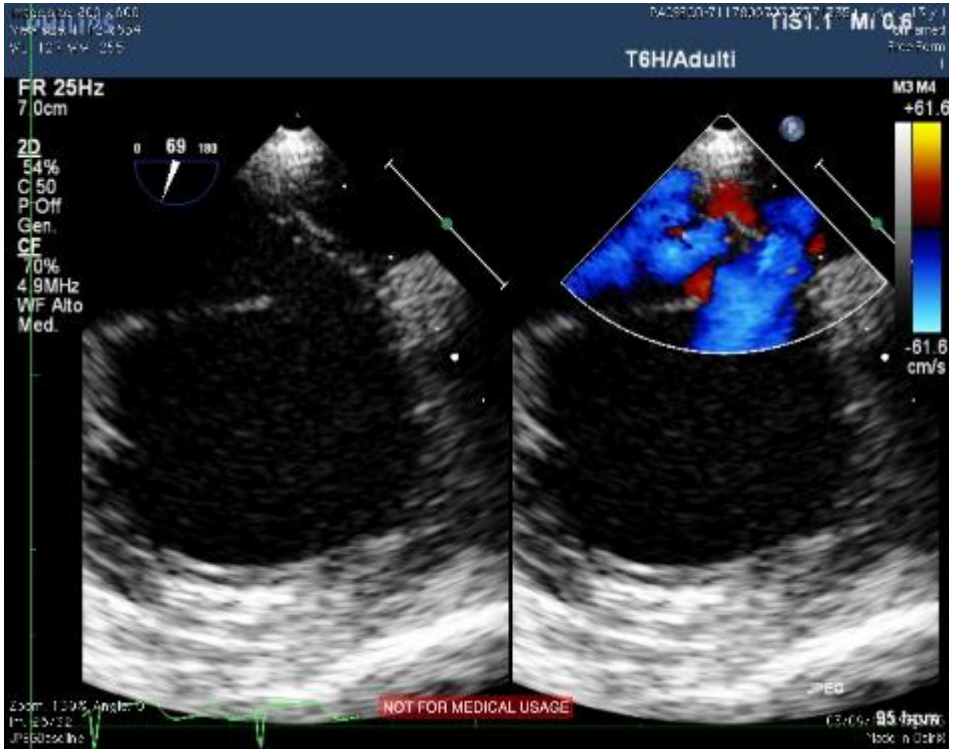

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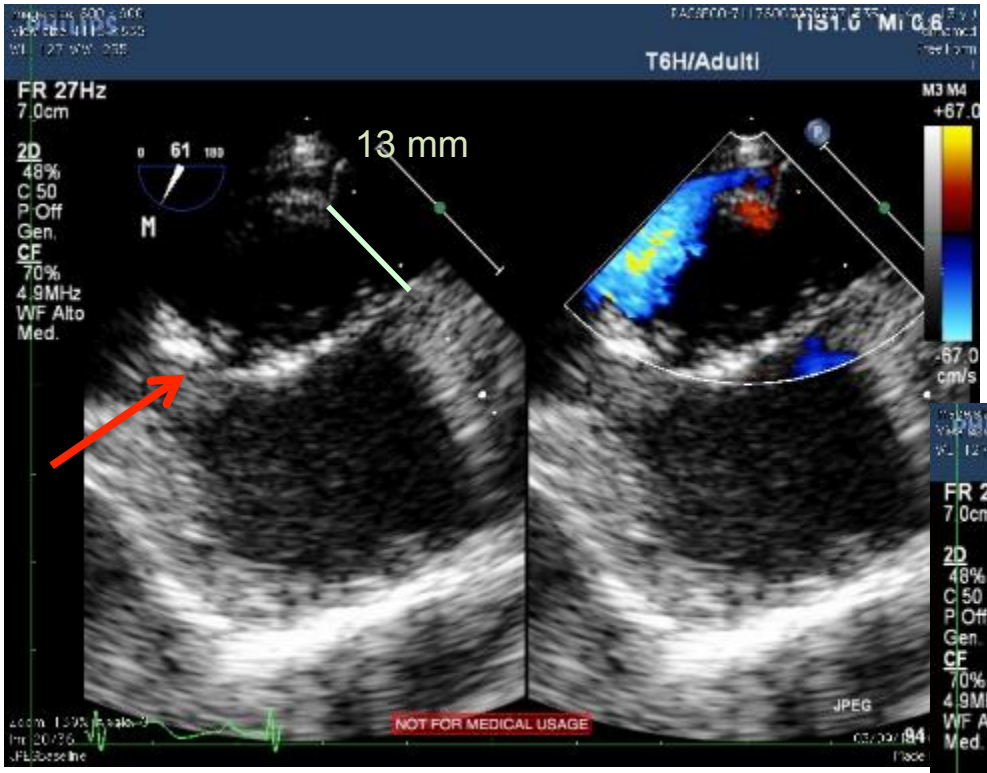

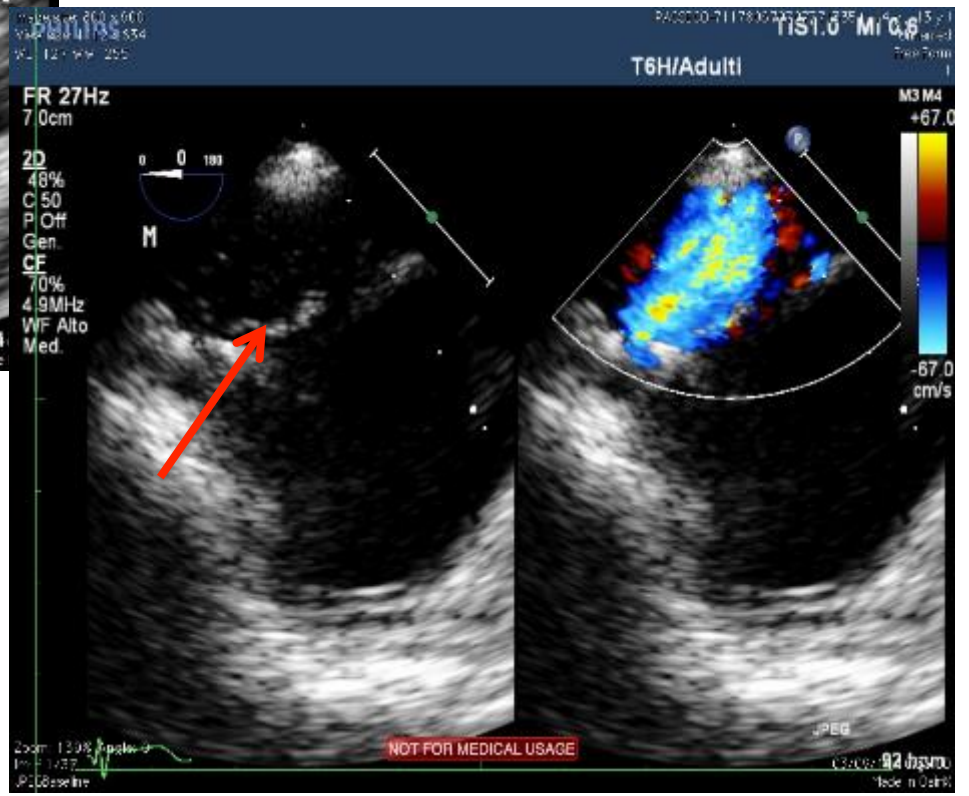

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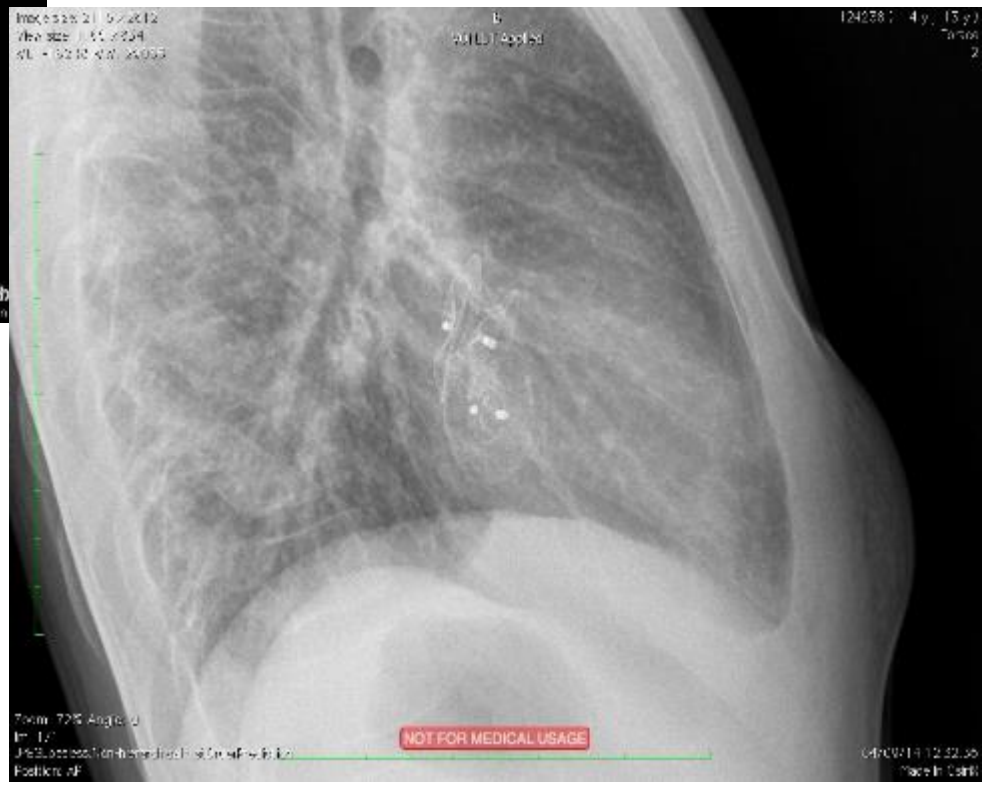
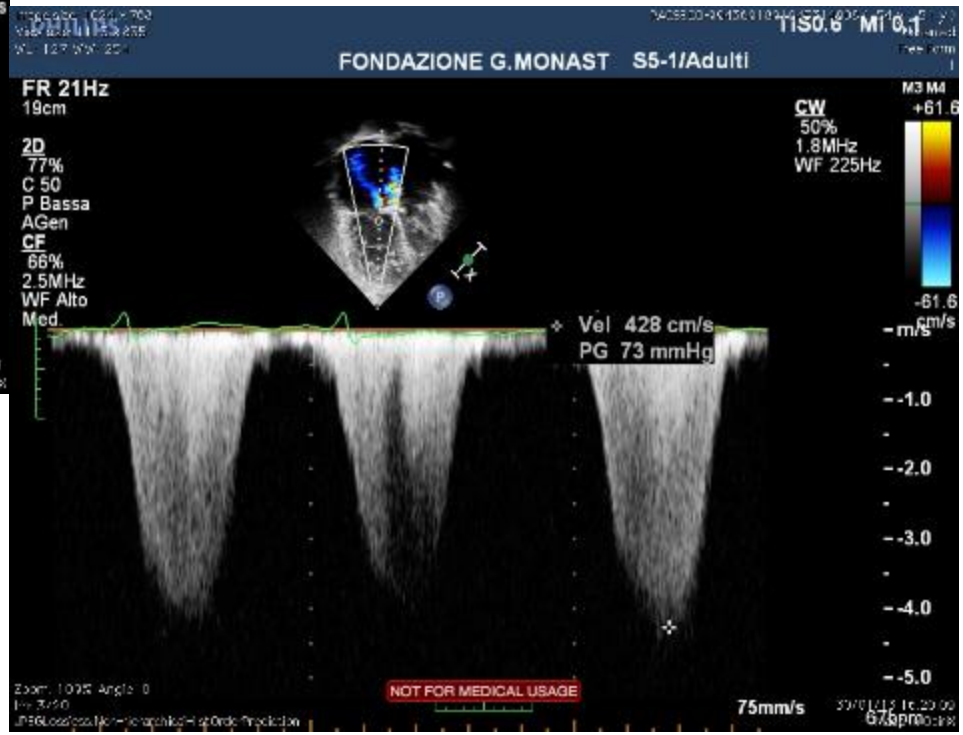


Difetto interatriale
Ipertensione polmonare



Difetto del setto interventricolare

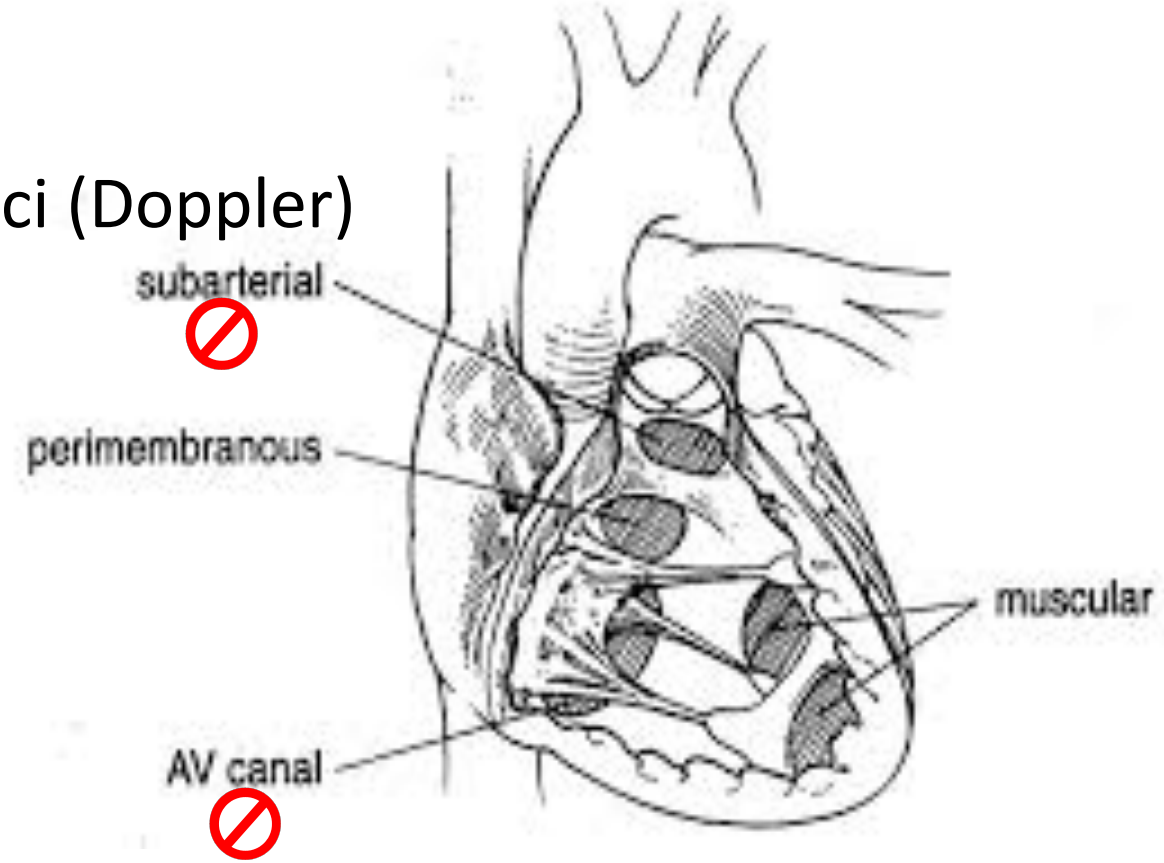
Indicazioni alla chiusura ESC 2010

Indications	Class[a]	Level[b]
Patients with symptoms that can be attributed to L–R shunting through the (residual) VSD and who have no severe pulmonary vascular disease (see below) should undergo surgical VSD closure	I	C
Asymptomatic patients with evidence of LV volume overload attributable to the VSD should undergo surgical VSD closure	I	C
Patients with a history of IE should be considered for surgical VSD closure	IIa	C
Patients with VSD-associated prolapse of an aortic valve cusp causing progressive AR should be considered for surgery	IIa	C
Patients with VSD and PAH should be considered for surgery when there is still net L–R shunt (Qp:Qs >1.5) present and PAP or PVR are <2/3 of systemic values (baseline or when challenged with vasodilators, preferably nitric oxide, or after targeted PAH therapy)	IIa	C
Surgery must be avoided in Eisenmenger VSD and when exercise-induced desaturation is present	III	C
If the VSD is small, not subarterial, does not lead to LV volume overload or pulmonary hypertension, and if there is no history of IE, surgery should be avoided	III	C

Difetto del setto interventricolare

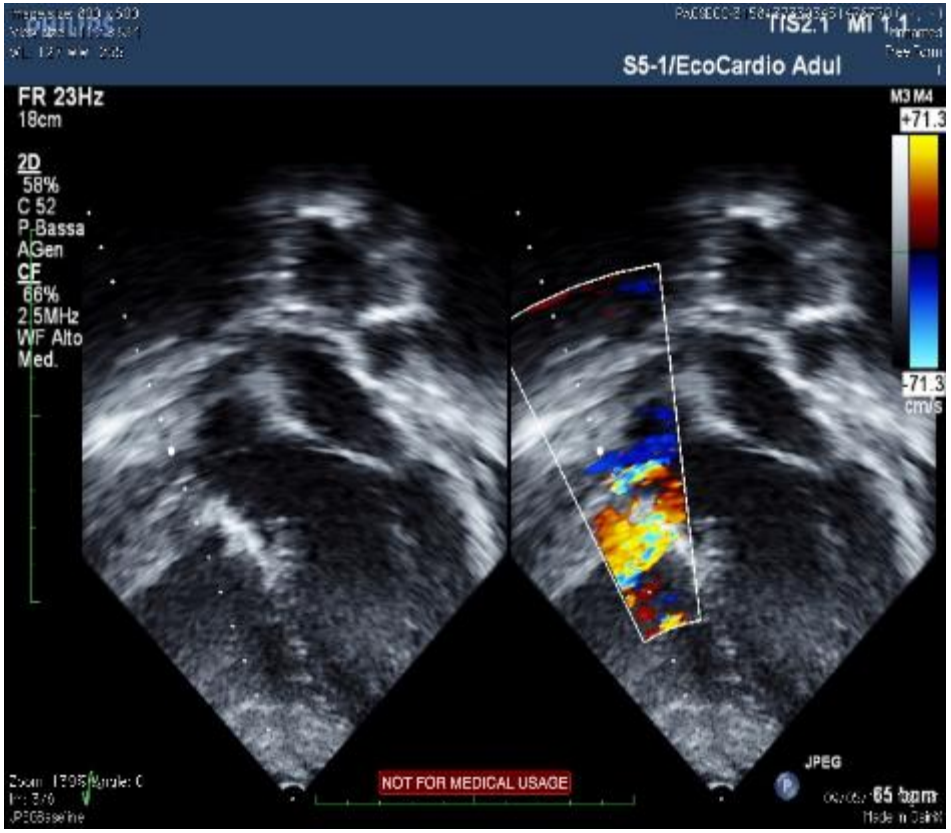
Ecocardiografia

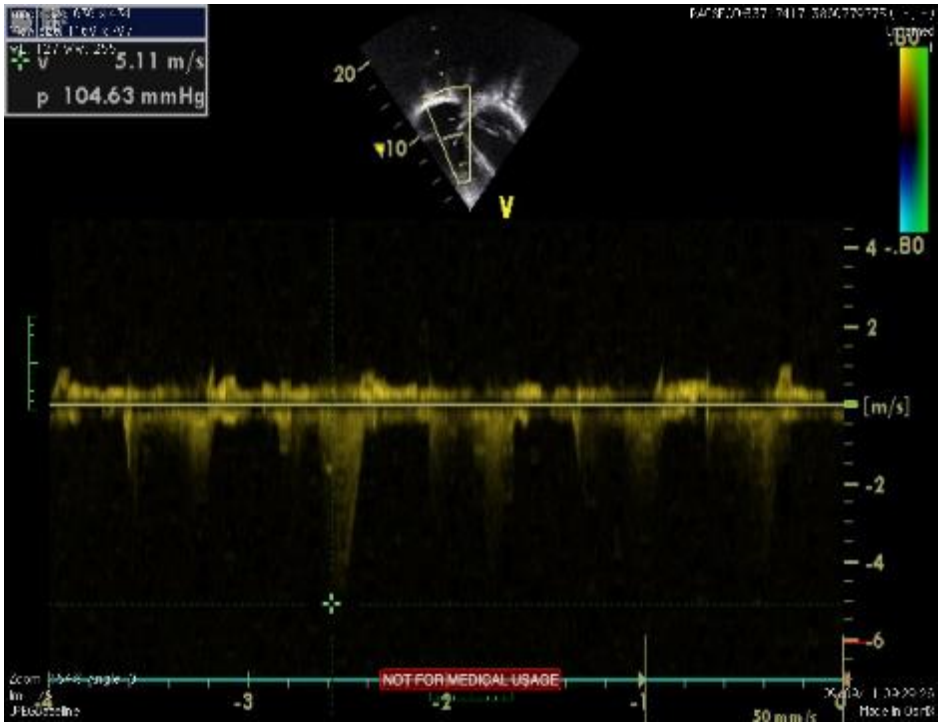
- Anatomia
- Dimensioni
- Dati emodinamici (Doppler)



Fallot post correzione chirurgica

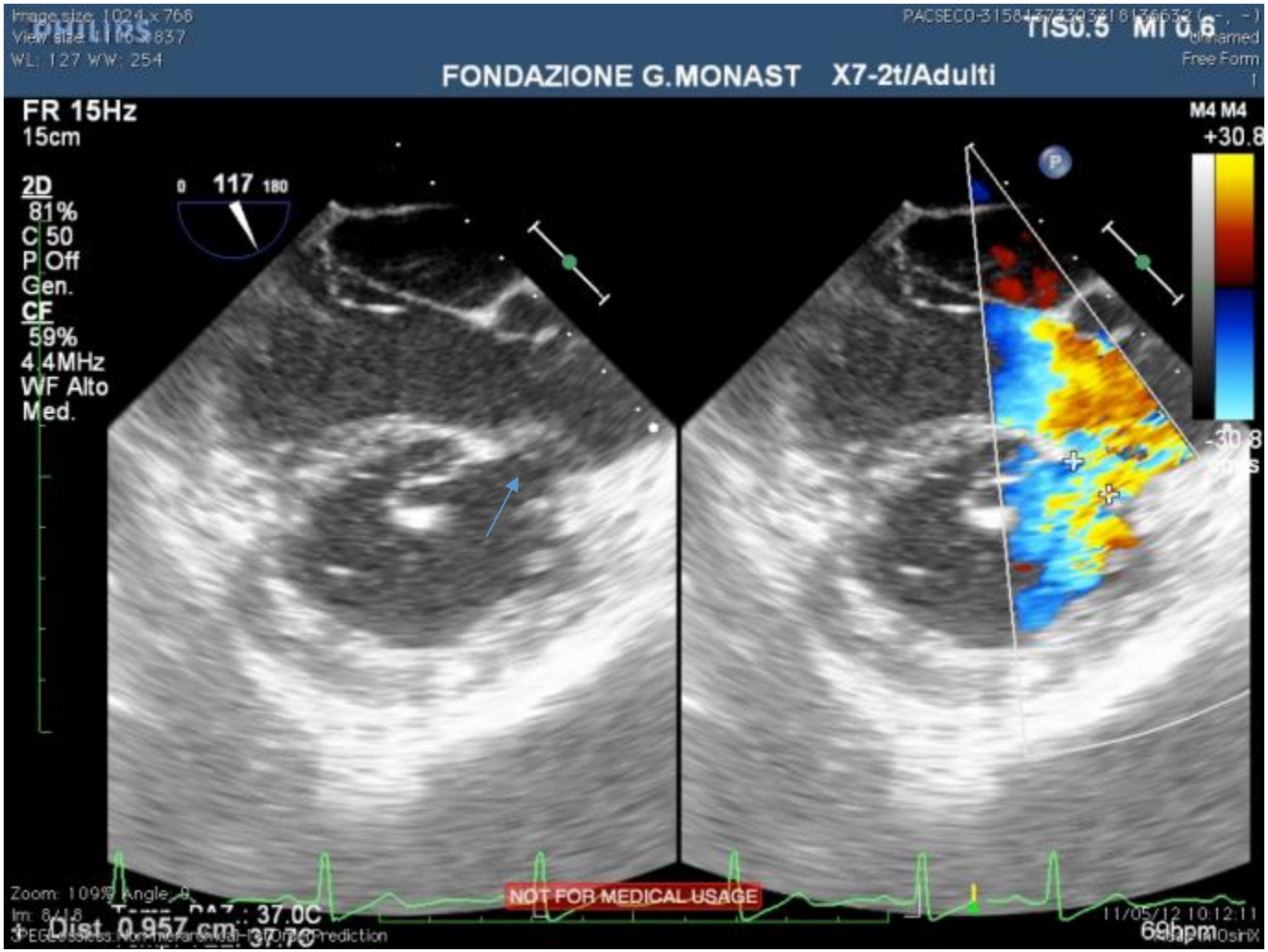
Shunt interventricolare residuo





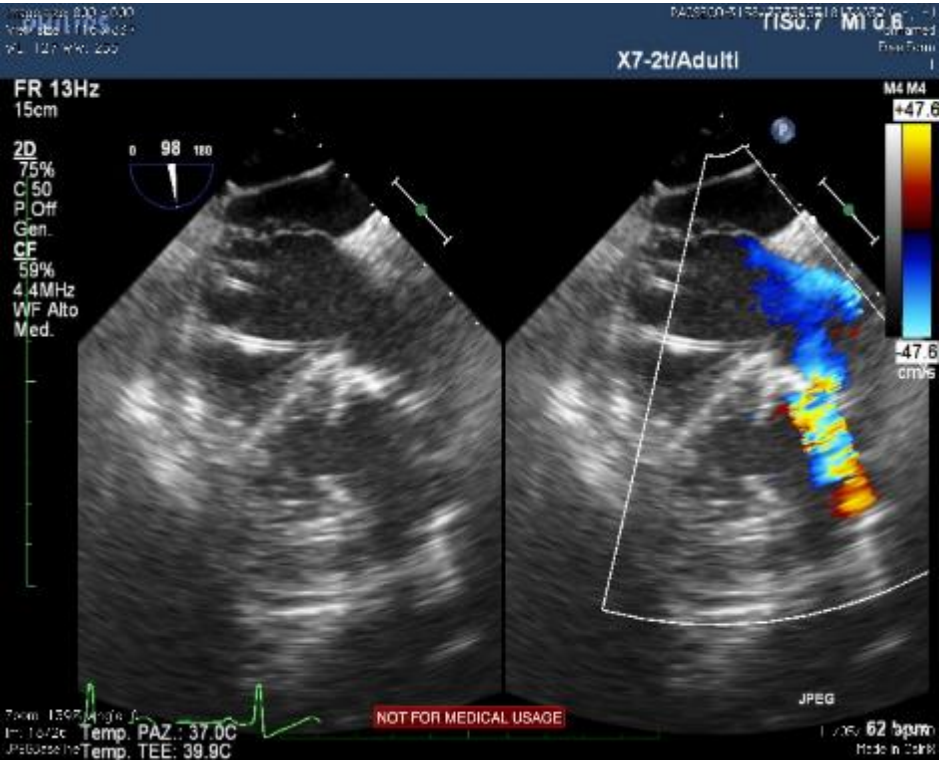
Fallot post correzione chirurgica

Shunt interventricolare residuo



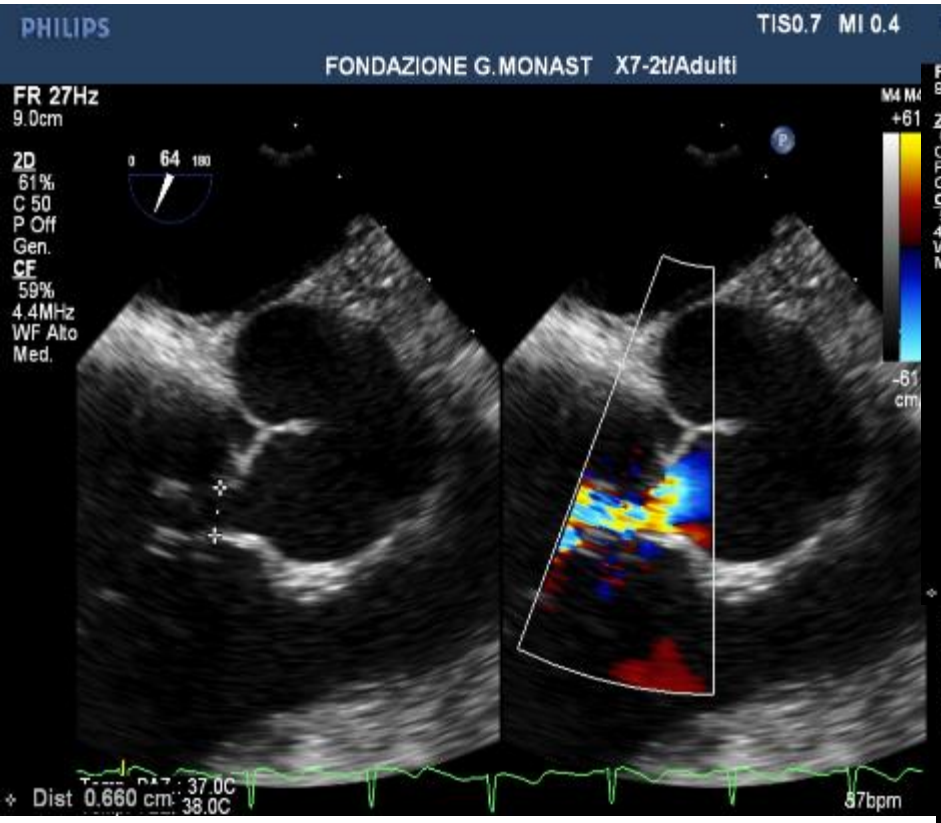
Fallot post correzione chirurgica

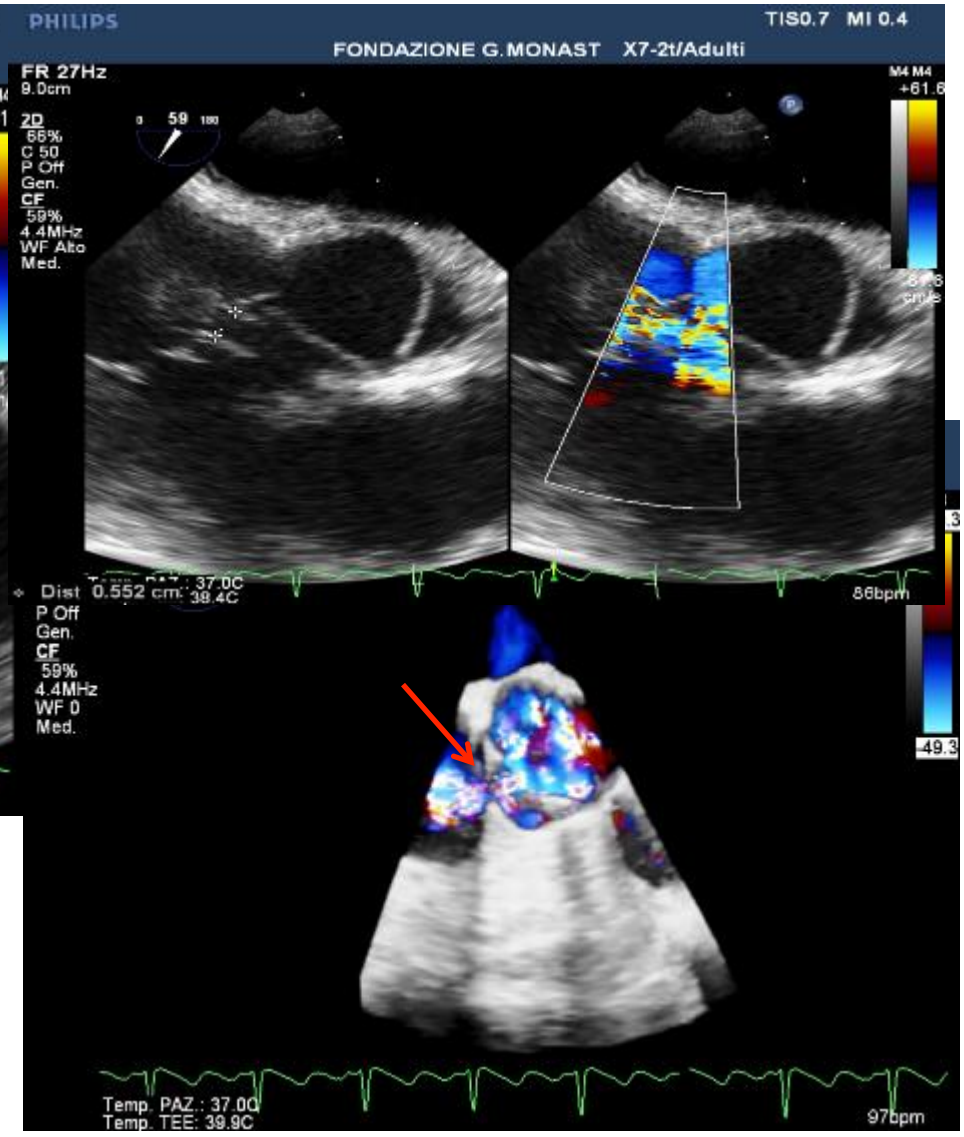
Shunt interventricolare residuo



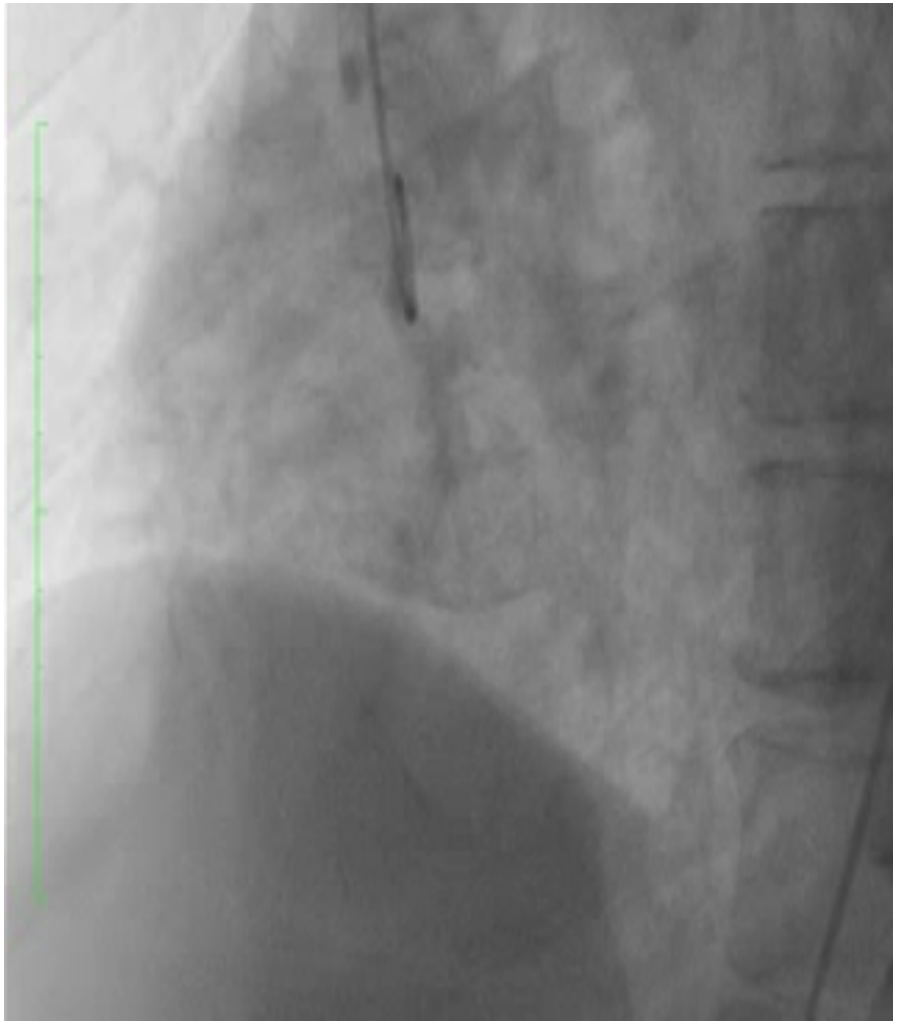
Dopo chiusura dei 3 DIV: Doppler p VD: 65 mmHg!!!

Difetto del setto interventricolare o……. ?





Rottura del seno di Valsalva



Dotto di Botallo pervio

Indicazioni alla chiusura ESC 2010

Indications	Class[a]	Level[b]
PDA should be closed in patients with signs of LV volume overload	I	C
PDA should be closed in patients with PAH but PAP <2/3 of systemic pressure or PVR <2/3 of SVR	I	C
Device closure is the method of choice where technically suitable	I	C
PDA closure should be considered in patients with PAH and PAP >2/3 of systemic pressure or PVR >2/3 of SVR but still net L–R shunt (Qp:Qs >1.5) or when testing (preferably with nitric oxide) or treatment demonstrates pulmonary vascular reactivity	IIa	C
Device closure should be considered in small PDAs with continuous murmur (normal LV and PAP)	IIa	C
PDA closure should be avoided in silent duct (very small, no murmur)	III	C
PDA closure must be avoided in PDA Eisenmenger and patients with exercise-induced lower limb desaturation	III	C

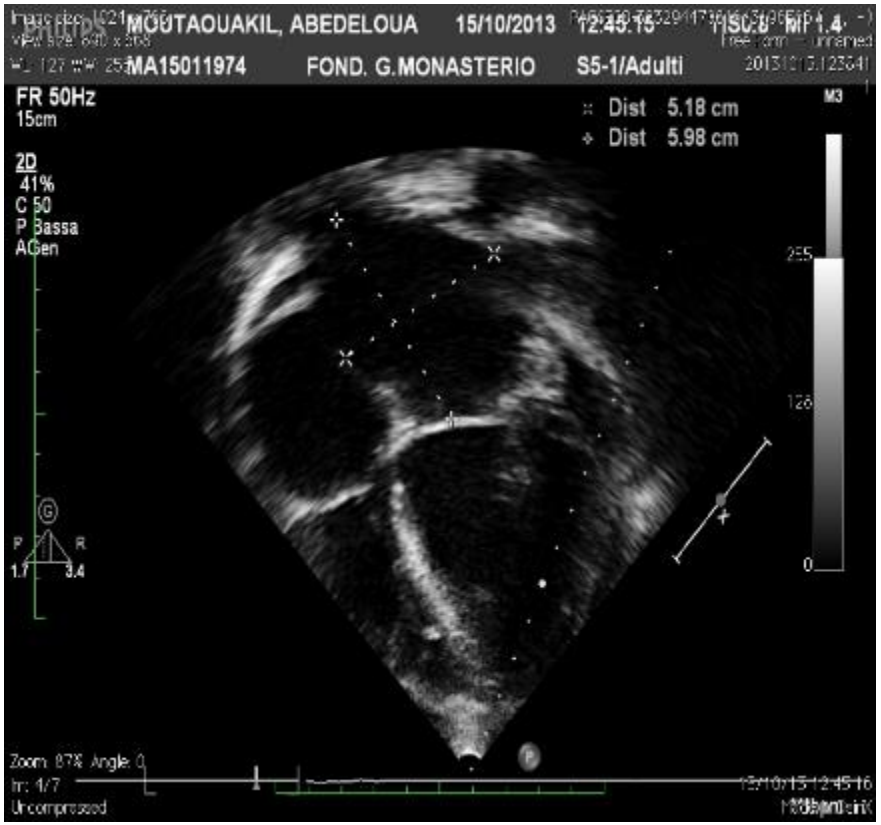
Dotto di Botallo pervio

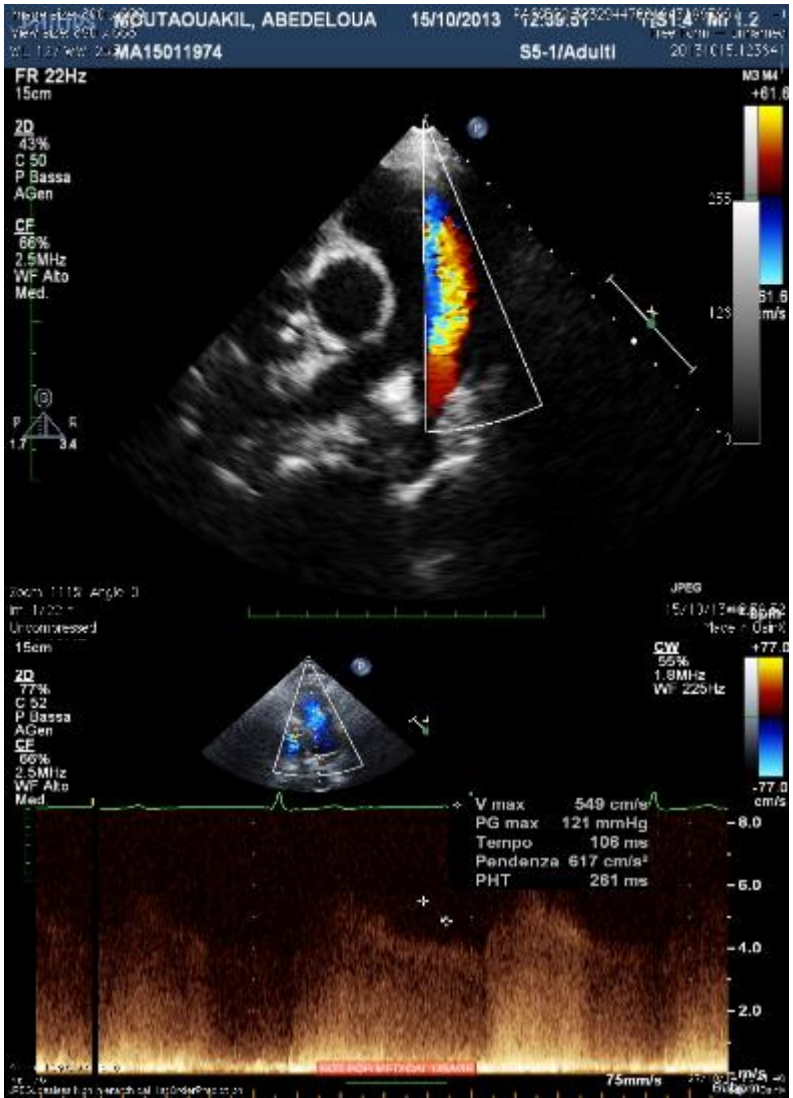
Ecocardiografia transtoracica

- Anatomia
- Dimensioni
- Dati emodinamici (Doppler)

Dotto di Botallo pervio

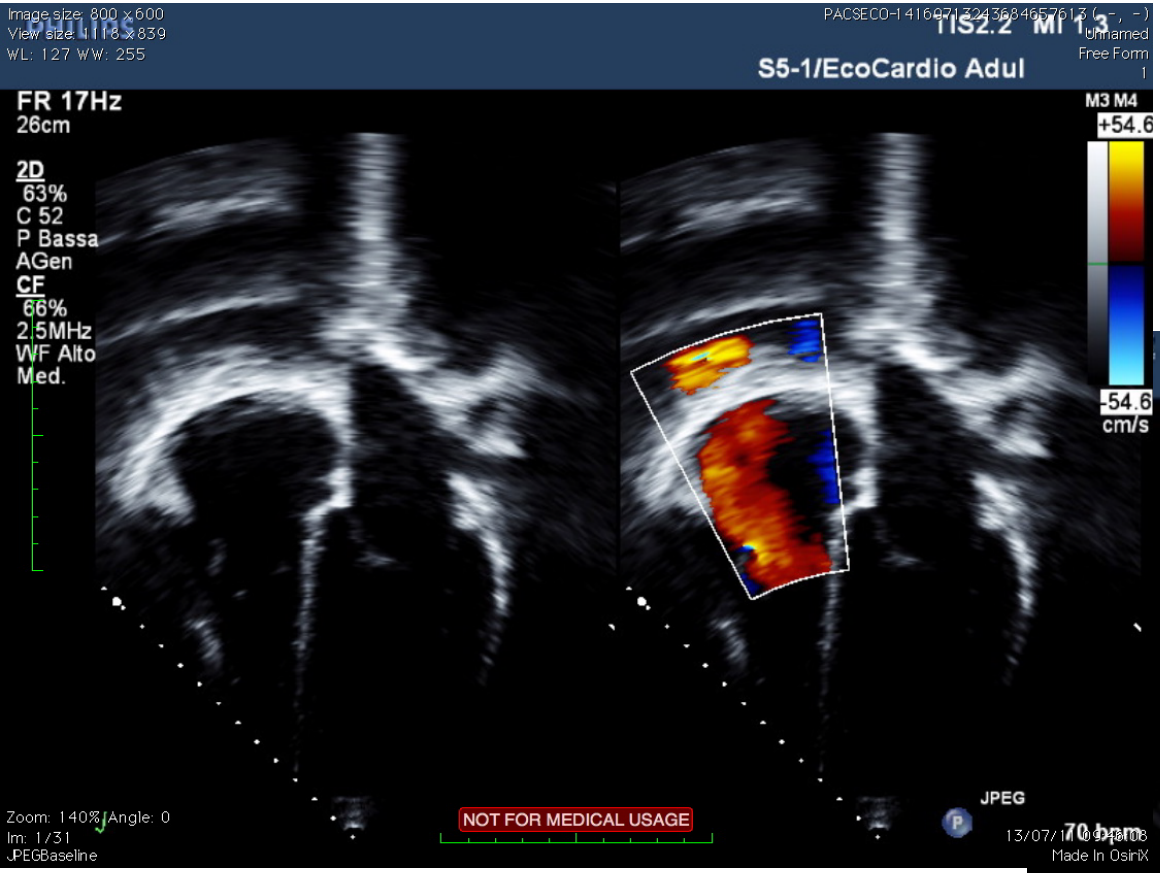
Ecocardiografia transtoracica

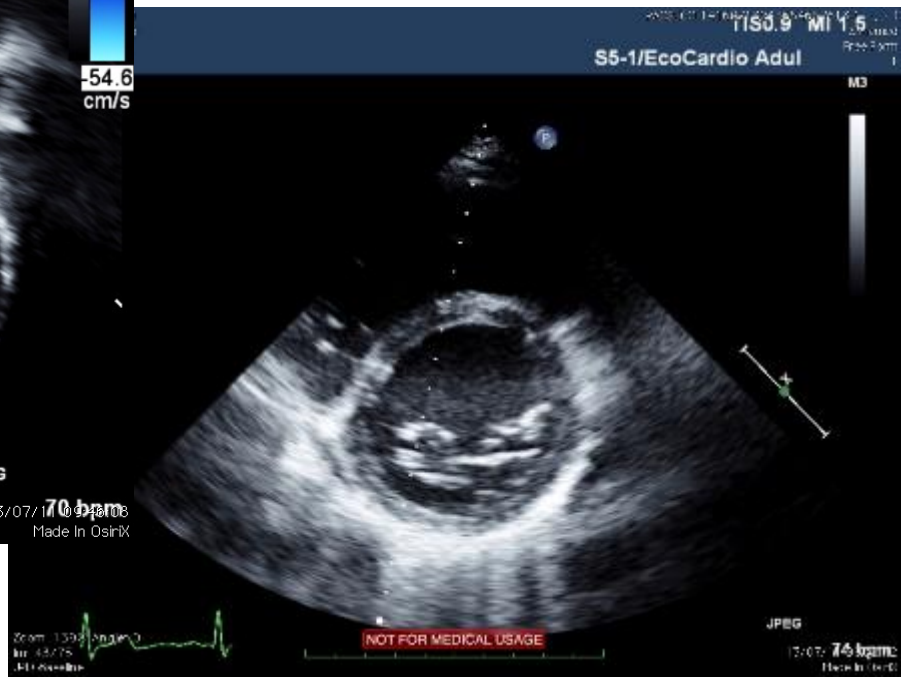




Cardiopatie con shunt: Vasi “esotici”

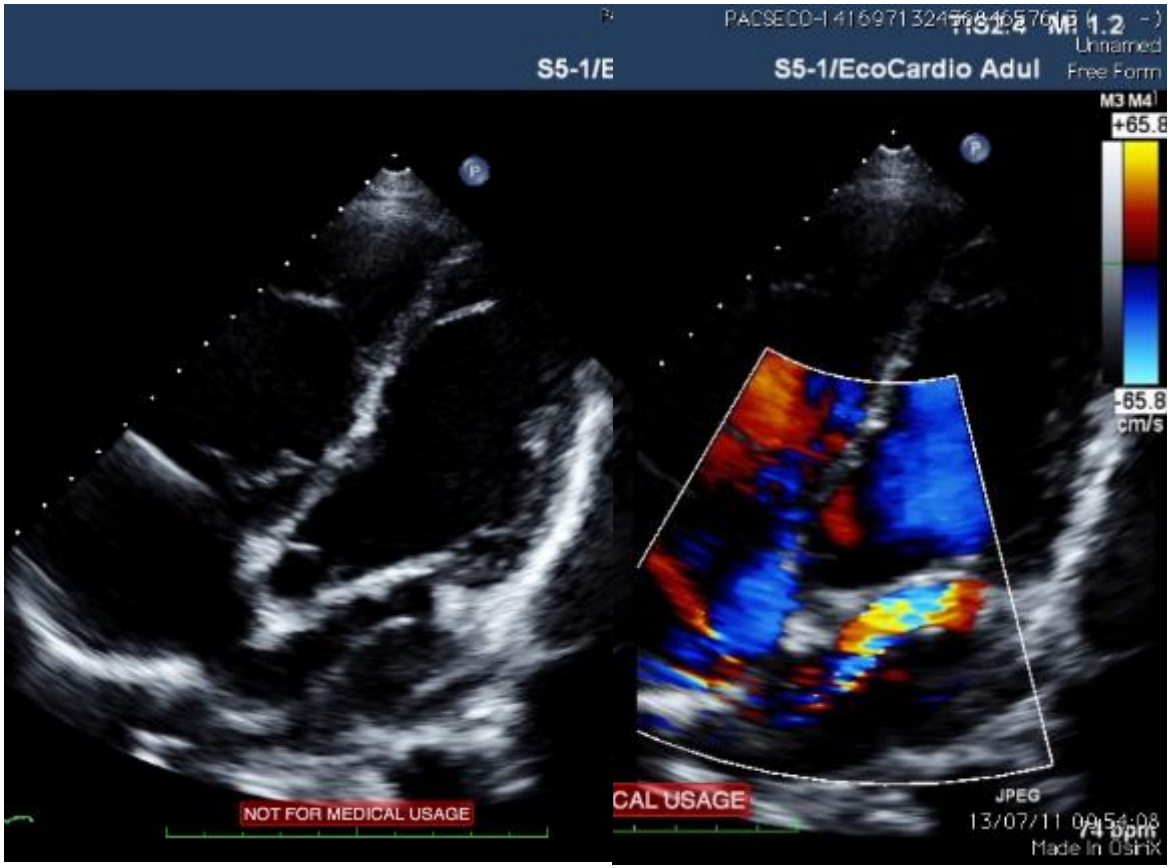
Ecocardiografia transtoracica

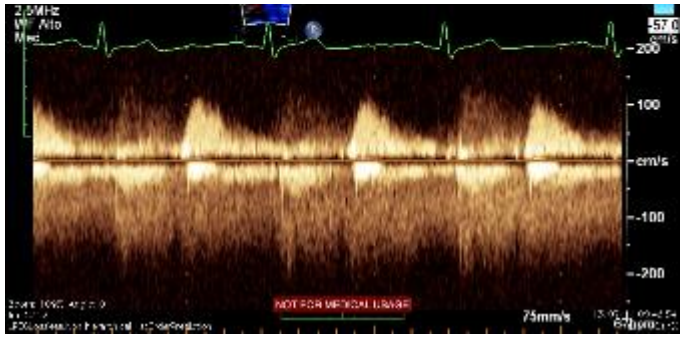




Cardiopatie con shunt: Vasi “esotici”

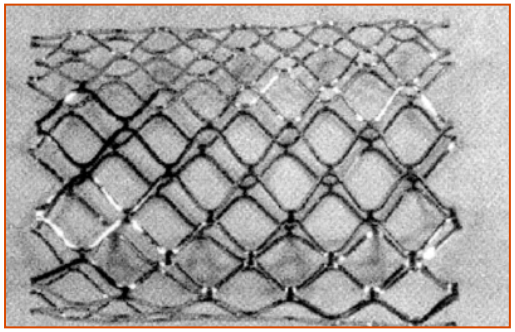
Ecocardiografia transtoracica

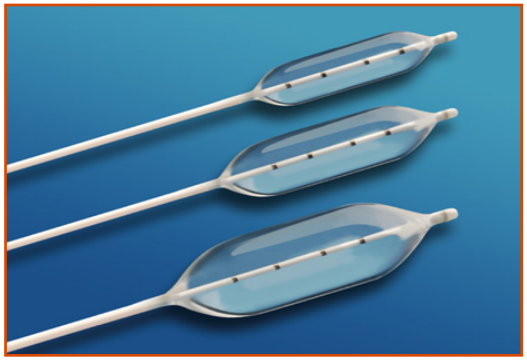


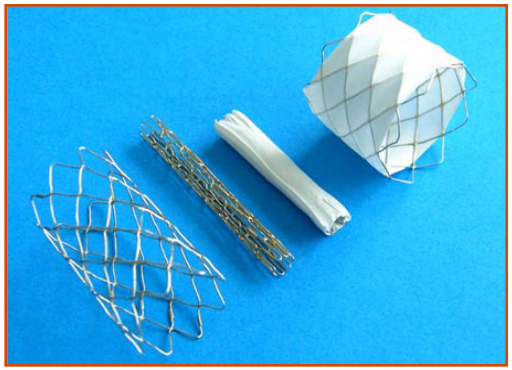


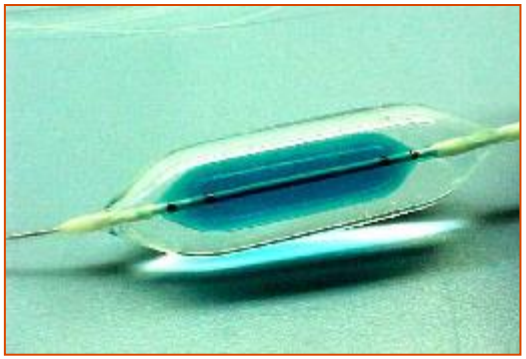
Cardiopatie con shunt
Tunnel Ao-AD

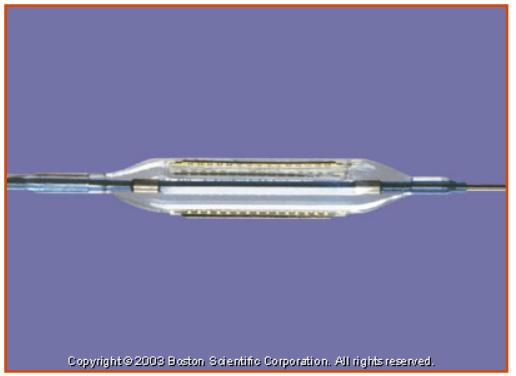
Dilatazioni











Ecocardiografia

Procedure di angioplastica/impianto stent

- Stenosi dell'outflow destro
  - Valvola polmonare
  - Rami polmonari
  - Condotti VD-AP
- Coartazione aortica
- Altro

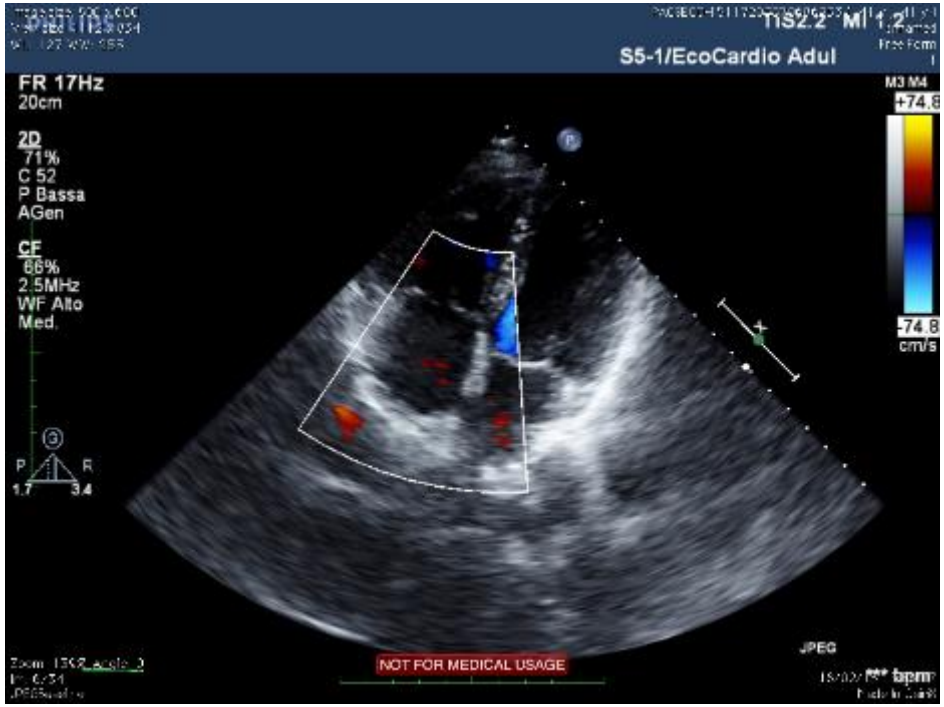
Stenosi outflow destro

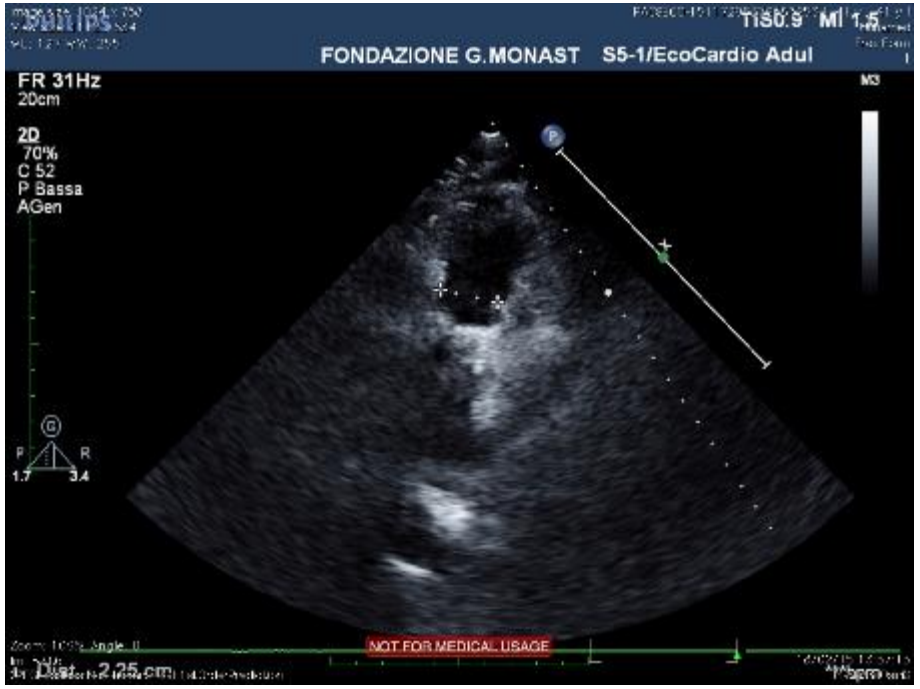
Indicazioni al trattamento ESC 2010

Indications	Class[a]	Level[b]
RVOTO at any level should be repaired regardless of symptoms when Doppler peak gradient is >64 mmHg (peak velocity >4m/s), provided that RV function is normal and no valve substitute is required	I	C
In valvular PS, balloon valvotomy should be the intervention of choice	I	C
In asymptomatic patients in whom balloon valvotomy is ineffective and surgical valve replacement is the only option, surgery should be performed in the presence of a systolic RVP >80 mmHg (TR velocity >4.3 m/s)	I	C
Intervention in patients with gradient <64 mmHg should be considered in the presence of: • symptoms related to PS or, • decreased RV function or, • double-chambered RV (which is usually progressive) or, • important arrhythmias or, • right-to-left shunting via an ASD or VSD.	IIa	C
Peripheral PS, regardless of symptoms, should be considered for repair if >50% diameter narrowing and RV systolic pressure >50 mmHg and/or lung perfusion abnormalities are present	IIa	C

Stenosi valvolare polmonare

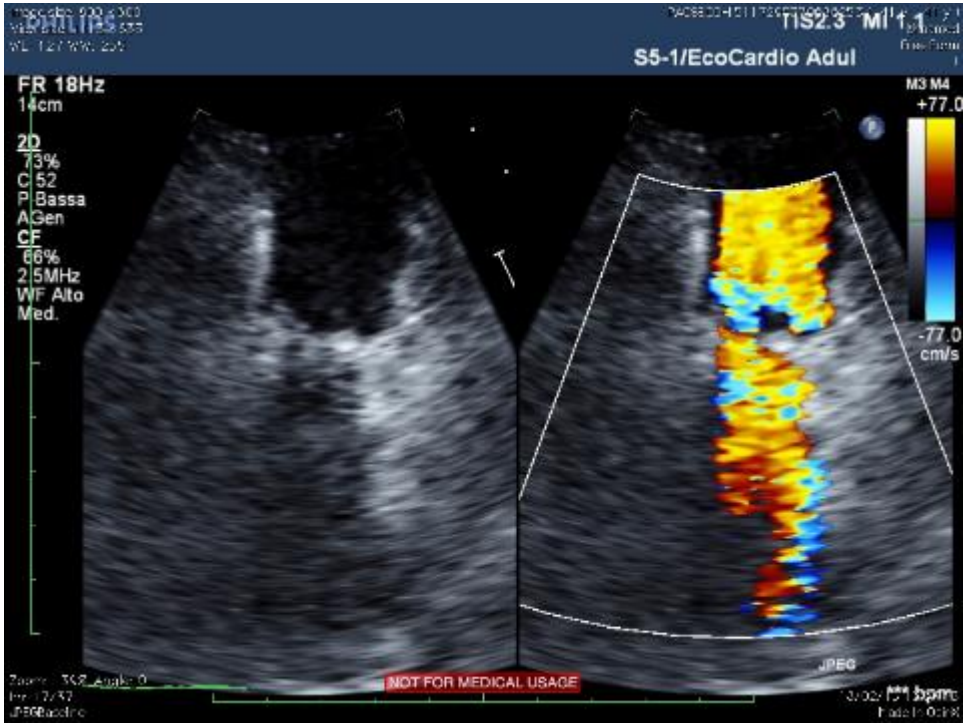
Ecocardiografia

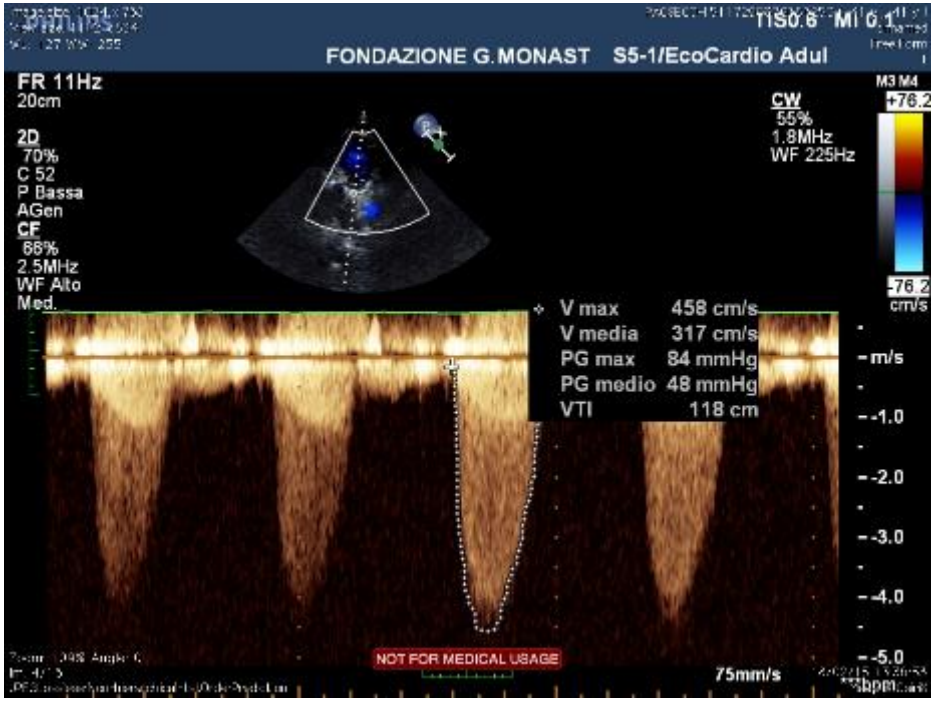




Stenosi valvolare polmonare

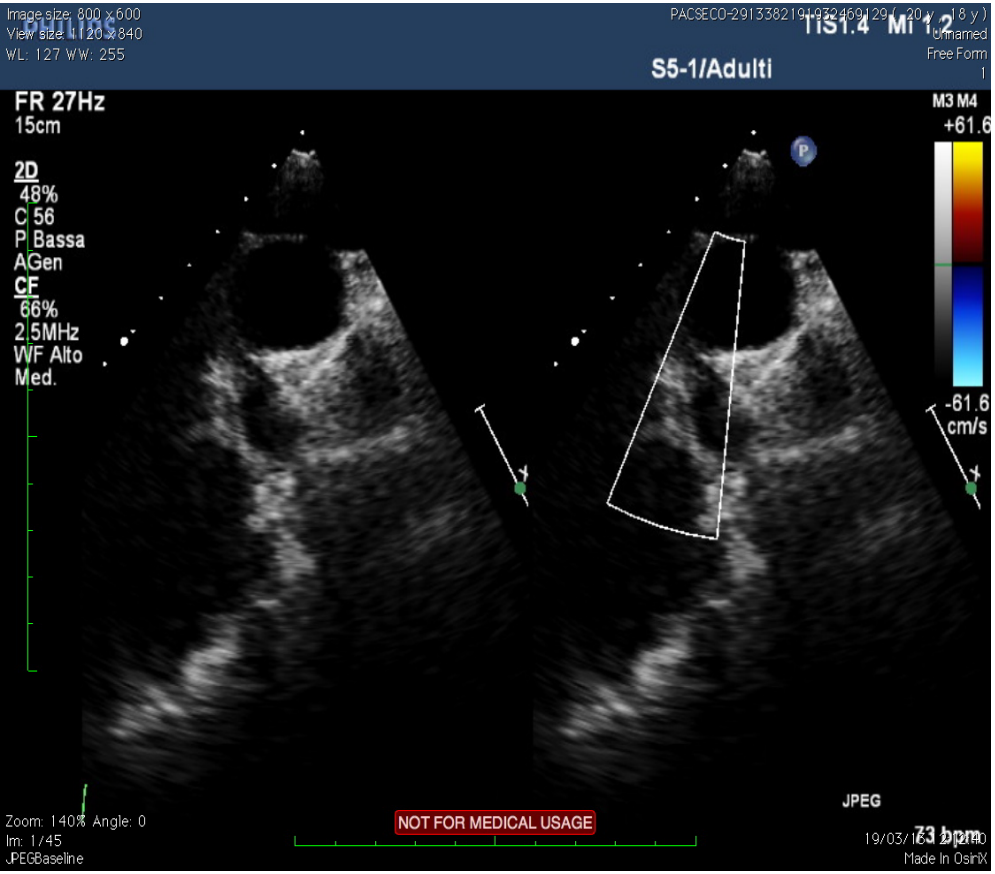
Ecocardiografia





Stenosi rami polmonari

Ecocardiografia



Ecocardiografia

Impianto valvola polmonare

- Insufficienza polmonare
- Stenosi polmonare
- Lesioni miste

Indications for Pulmonary Valve Replacement

Moderate/severe (RF ≥ 2pulmonary regurgitation 5%)

- RV end-diastolic volume index > 150 ml/m2 or Z-score > 4.
- RV/LV end-diastolic volume ratio > 2
- RV end-systolic volume index > 80 ml/m2
- RV ejection fraction < 47%
- LV ejection fraction < 55%
- Large RVOT aneurysm
- QRS duration > 140 ms
- Sustained tachyarrhythmia related to right heart volume load

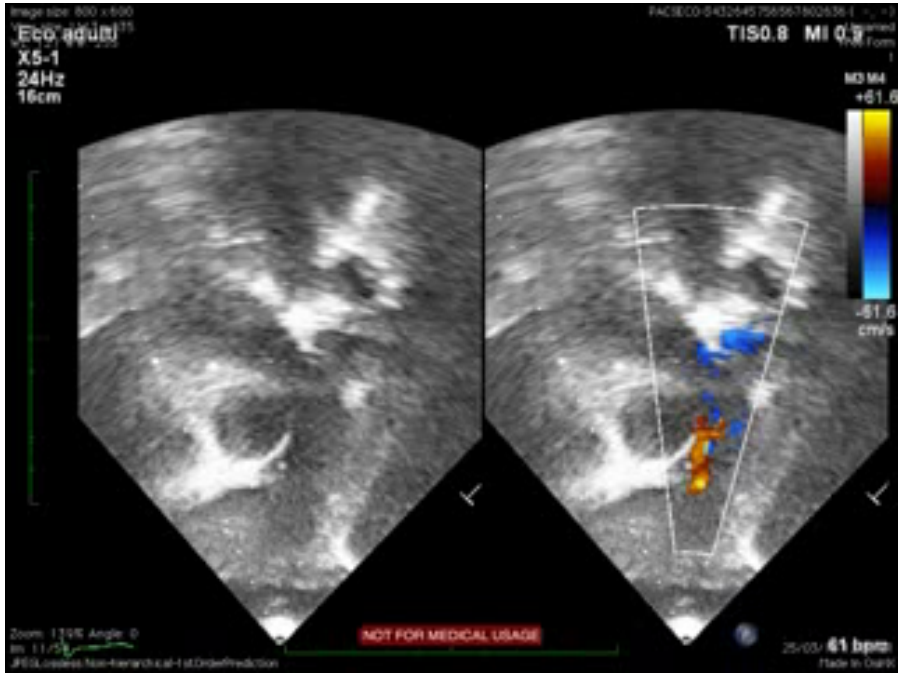
RVOT obstruction with RV systolic pressure≥ 2/3 systemic

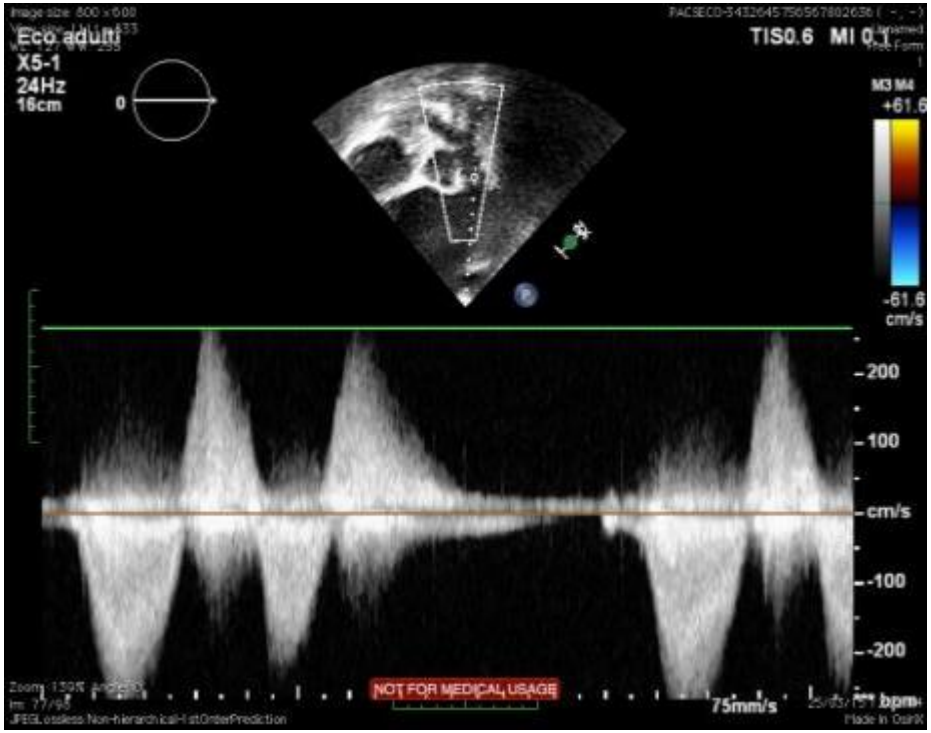
No symptoms: at least 2 criteria Symptoms: at least 1 criteria

Geva Journal of Cardiovascular Magnetic Resonance 2011, 13:9

Fallot post chirurgia riparativa

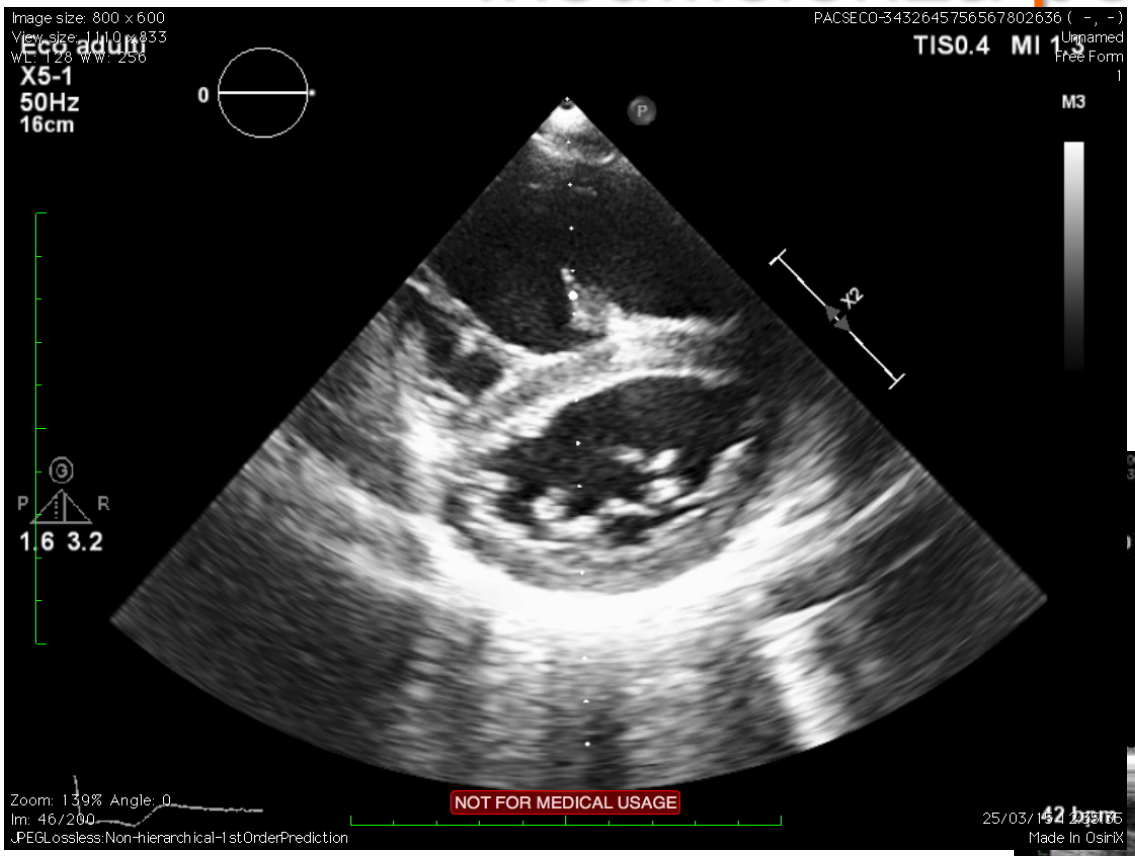
Insufficienza polmonare

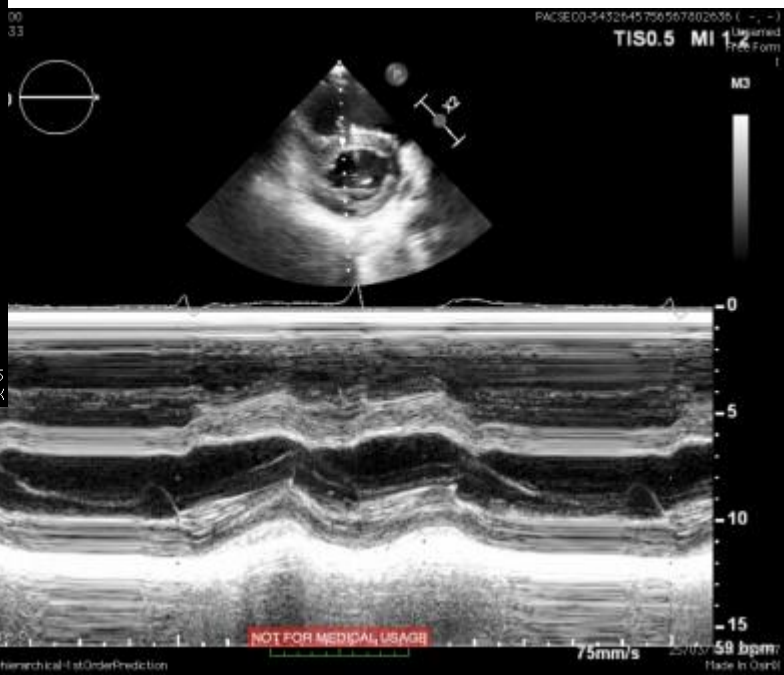




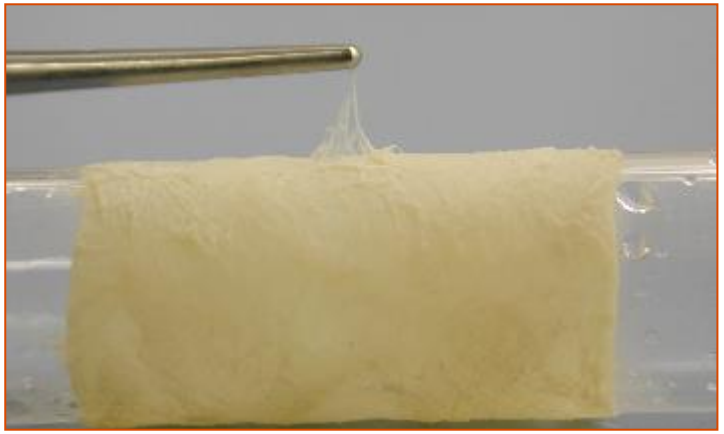
Fallot post chirurgia riparativa

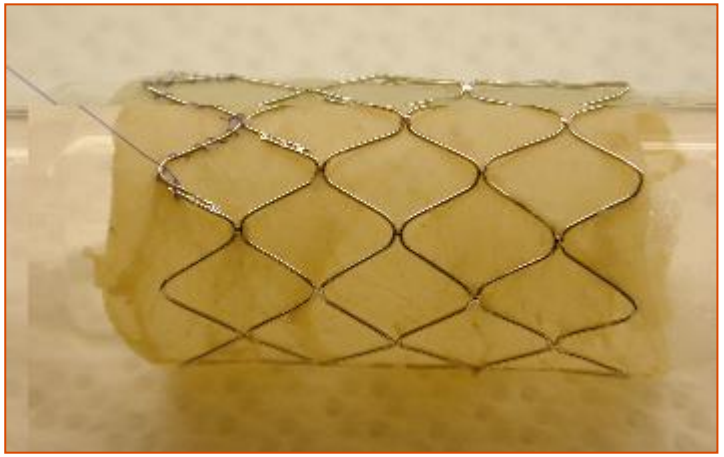
Insufficienza polmonare





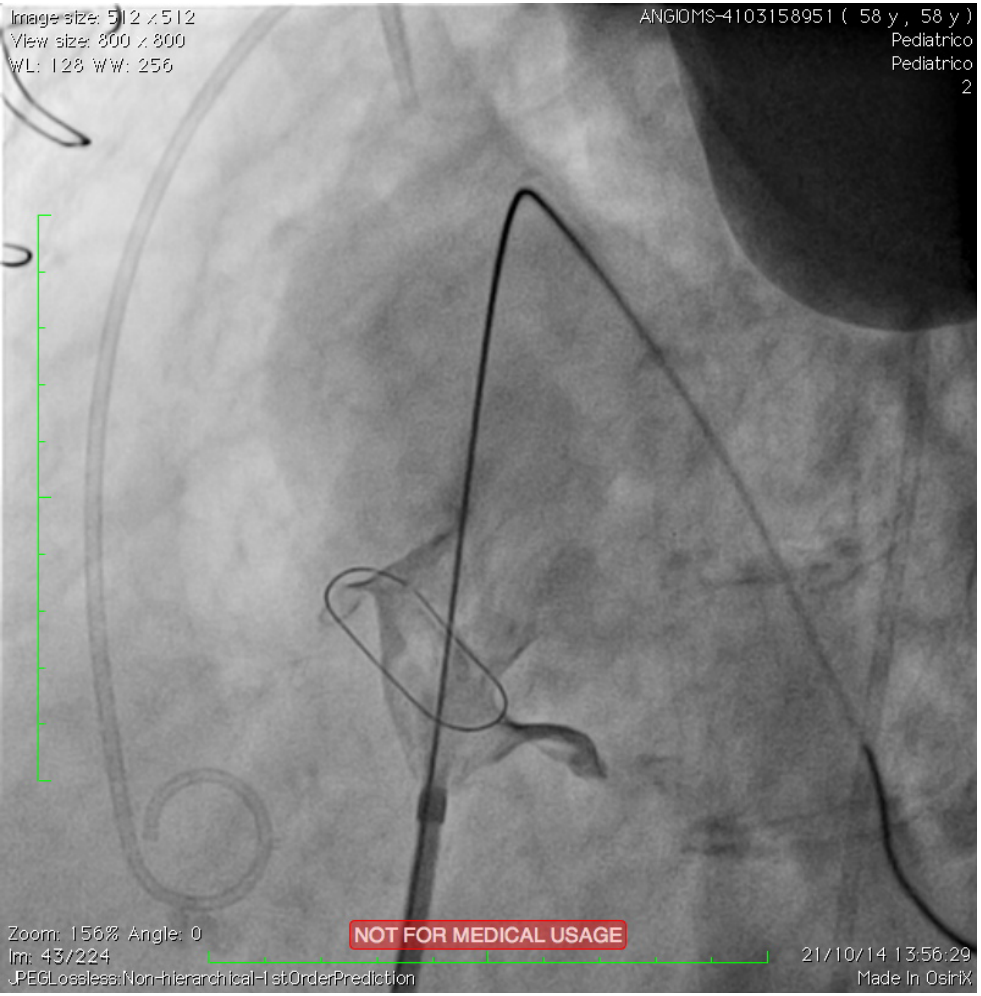
Impianto di valvola polmonare

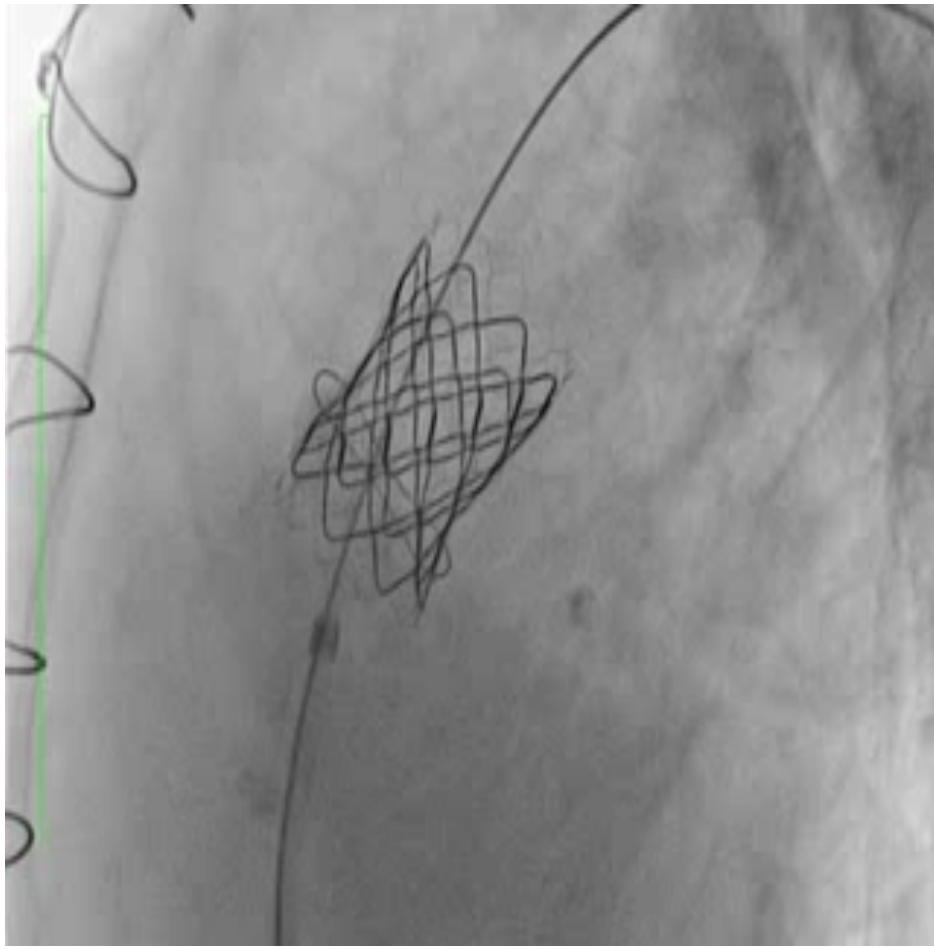




Fallot post correzione chirurgica

Impianto valvola polmonare





G.A., d.n. 21/05/88

		2003	2006	2007	2008	2011
MRI	RVEDVi (ml/m2)	145	152	143	131	153
MRI	RVESVi (ml/m2)	69	66	63	59	60
MRI	RV EF (%)	↓52	57	56	55	51
MRI	LVEDVi (ml/m2)	82	77	68	75	76
MRI	↓LVESVi (ml/m2)	29	33	29	27	37
MRI	↓LV EF (%)	65	57	57	64	52
MRI	PR fraction (%)	30	40	42	40	40
ECHO	Tric. regurgitation	+++/++++	+++/++++	+++/++++	+++/++++	+++/++++
ECHO	↓RV pressure (mmHg)	50	50	50	50	50
Stress -Echo	RV pressure max (mmHg)				**85**	
CPET	VO_2Max (ml/kg/min)	19,3	19	18	22	22,5
CPET	Workload (Watt)	90	↓100	125	130	103
ECG	QRs duration (ms)	160	↓180	180	180	180
	Arrhythmias	no	↓no	no	no	no
	NT-pro BNP (ng/l)	109	167	131	159	159

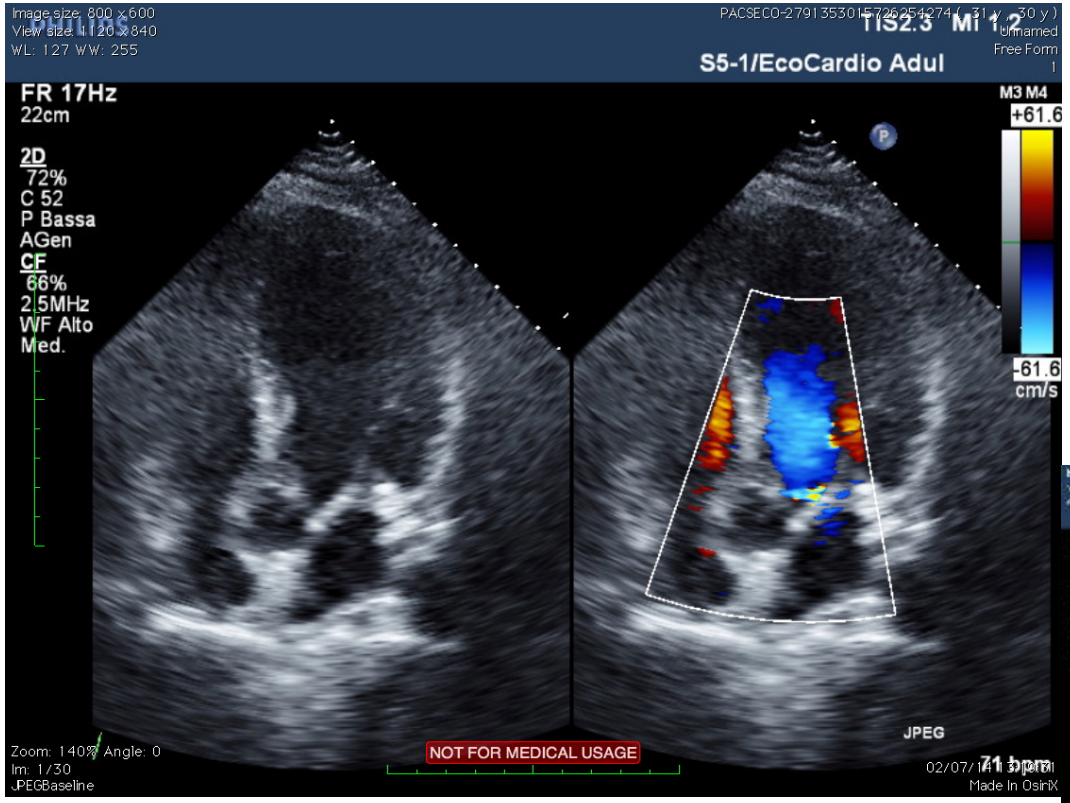
Coartazione aortica

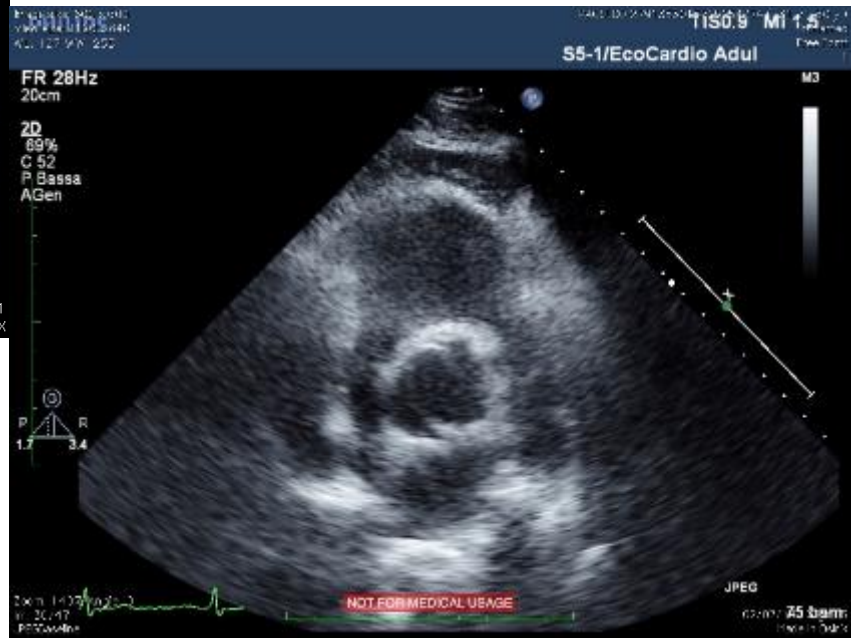
Indicazioni al trattamento ESC 2010

Indications	Class[a]	Level[b]
All patients with a non-invasive pressure difference >20 mmHg between upper and lower limbs, regardless of symptoms but with upper limb hypertension (>140/90 mmHg in adults), pathological blood pressure response during exercise, or significant LVH should have intervention	I	C
Independent of the pressure gradient, hypertensive patients with ≥50% aortic narrowing relative to the aortic diameter at the diaphragm level (on CMR, CT, or invasive angiography) should be considered for intervention	IIa	C
Independent of the pressure gradient and presence of hypertension, patients with ≥50% aortic narrowing relative to the aortic diameter at the diaphragm level (on CMR, CT, or invasive angiography) may be considered for intervention	IIb	C

Coartazione aortica

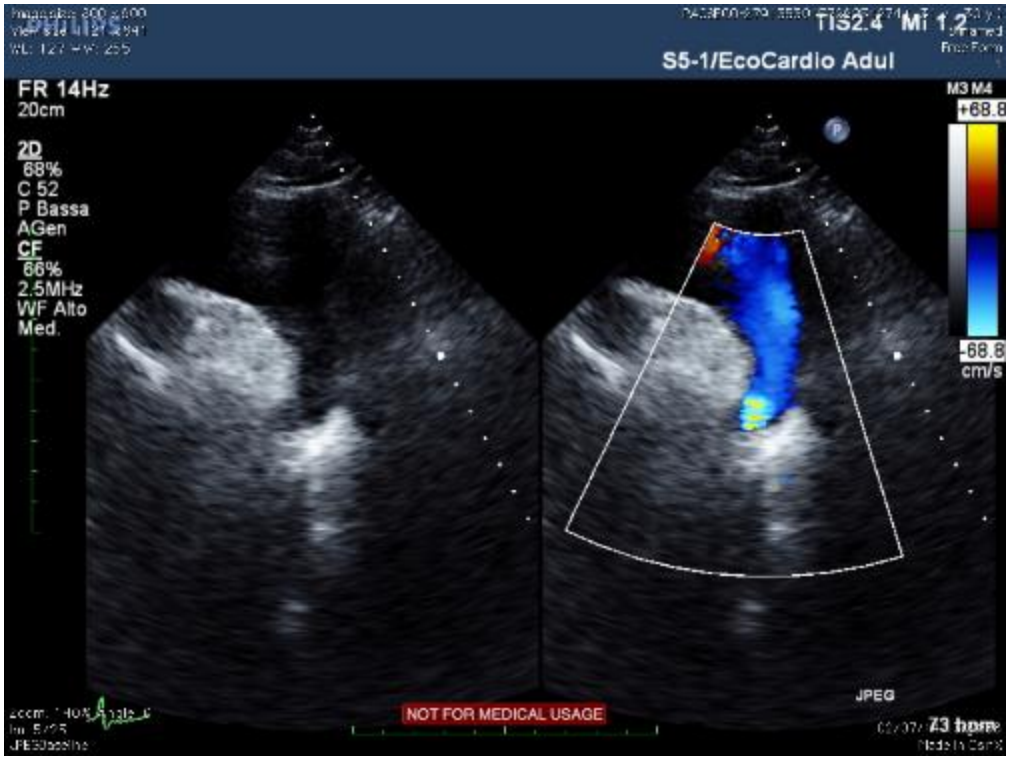
Ecocardiografia

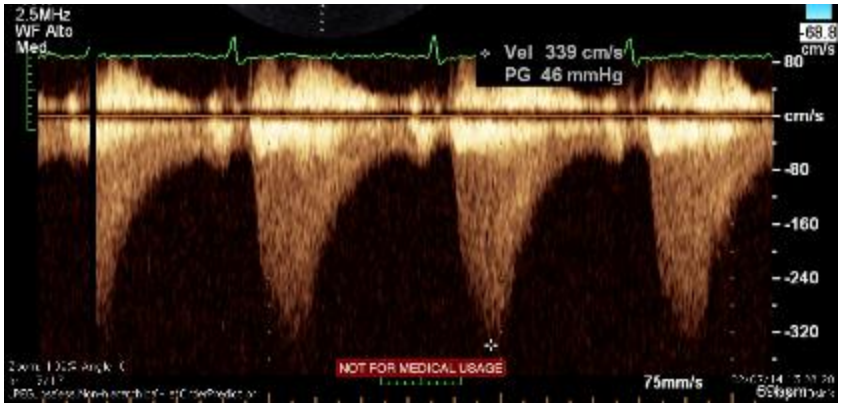


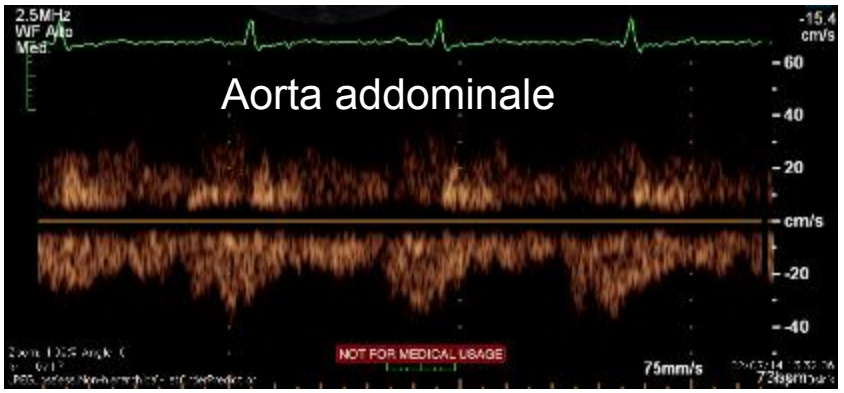


Coartazione aortica

Ecocardiografia







Coartazione aortica

Coartazione aortica

Indicazioni al trattamento interventistico nel congenito adulto

Conclusioni

- Nelle cardiopatie semplici in storia naturale (c. con shunt, stenosi valvolare polmonare) l'indicazione al trattamento interventistico non necessita di ulteriori indagini di imaging
- Nelle cardiopatie complesse, soprattutto post correzione chirurgica, l'integrazione con altre metodiche è mandatoria

Indicazioni al trattamento interventistico nel congenito adulto

Il cardiologo e il Centro GUCH

Napoli, 16-18 aprile

Indicazioni ecocardiografiche al trattamento interventistico nel congenito adulto

Isabella Spadoni

Cardiologia Pediatrica e del Congenito Adulto
Fondazione Toscana "G. Monasterio" Massa