

Interventional treatment of pulmonary embolism: clinical cases



I.R.C.C.S.
POLICLINICO SAN DONATO

Riccardo Gorla MD PhD
Interventional cardiology unit
IRCCS Policlinico San Donato

Rome, 25th June 2026

Clinical case - 1

65 year old male patient

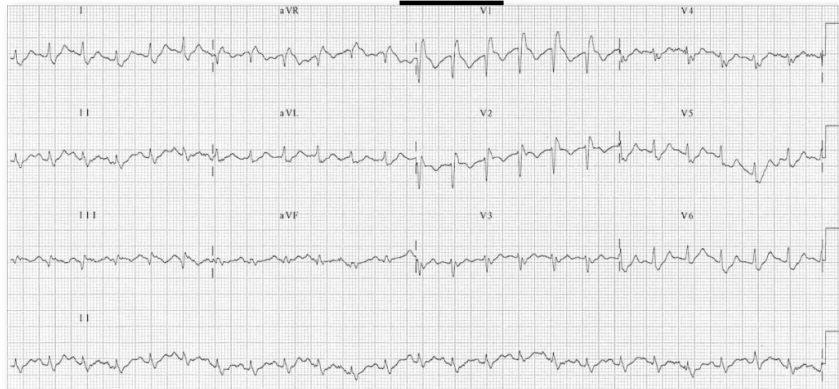
21/03/2026: admission at ER for worsening dyspnea and thoracic pain

PA 109/63 mmHg, FC 127 bpm - R

EGA

BLOOD GAS VALUES	
pH	7.48
PaCO ₂	30
PaO ₂	55
HCO ₃ ⁻ (calc)	22
Base Excess (BE _{ef})	-1.0
SaO ₂	88
ELECTROLYTES	
Na ⁺	138
K ⁺	3.8
Cl ⁻	101
Ca ²⁺ (Ionized)	1.15
OTHER VALUES	
Lactate	3.2
Glucose	112

ECG

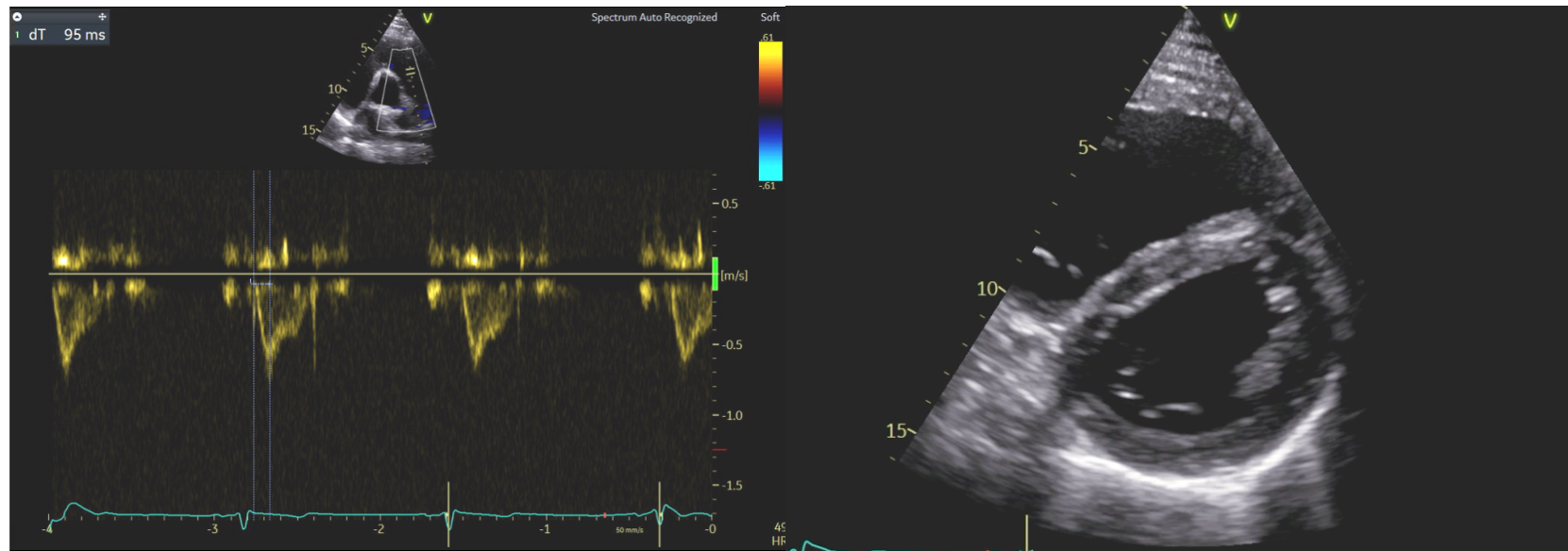


EEC

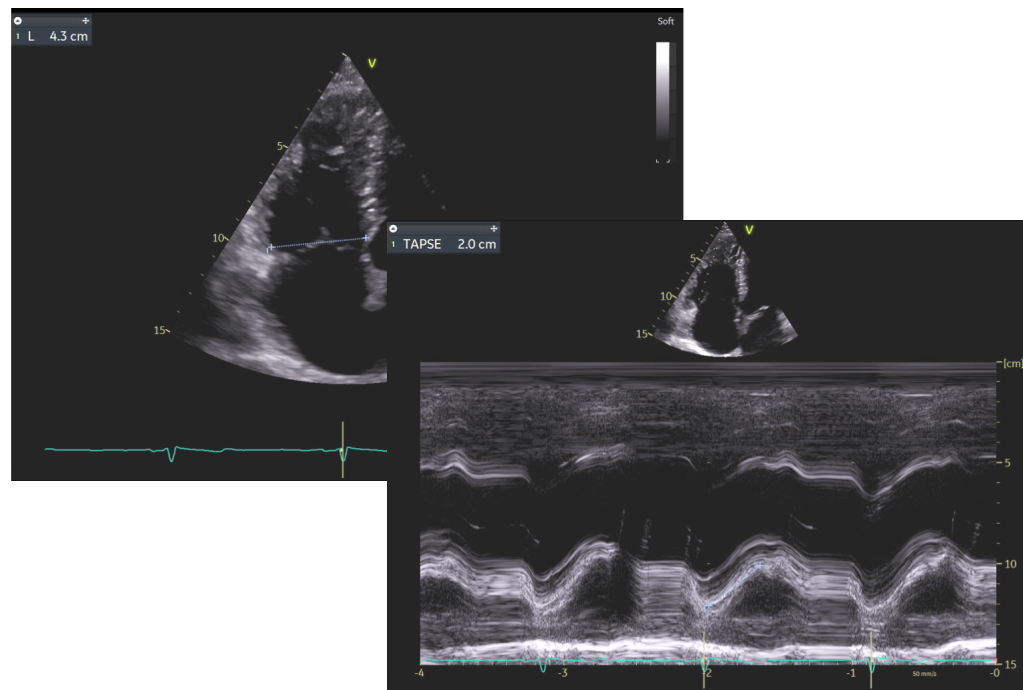
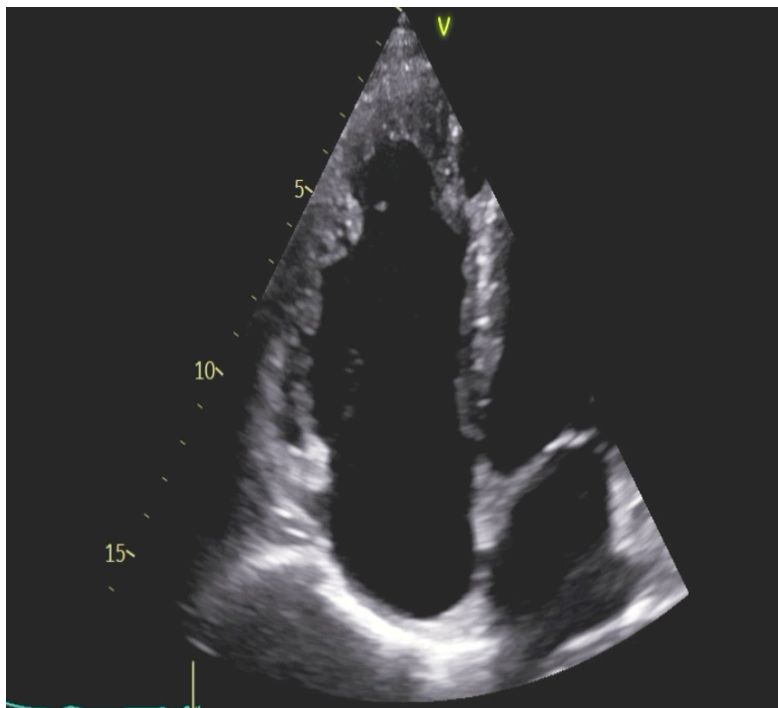
S-SODIO	139	mmol/L	136 - 145
S-POTASSIO	Analisi non eseguibile per campione emolitico		
S-ASPARTATO AMINOTRANSFERASI (AST-GOT)	Analisi non eseguibile per campione emolitico		
S-ALANINA AMINOTRANSFERASI (ALT-GPT)	Analisi non eseguibile per campione emolitico		
S-CREATINA CHINASI (CK)	Analisi non eseguibile per campione emolitico		
S-TROPONINA I-hs	56	*	ng/L Fino a 45
S-CK-MB massa	Analisi non eseguibile per campione emolitico		
S-PROTEINA C REATTIVA	48,94	*	mg/L Fino a 5,00
P-TEMPO DI PROTROMBINA (PT)			
Rapporto Normalizzato Internazionale (INR)	1,16		0,80 - 1,20
RATIO	1,16		0,80 - 1,20
P-TEMPO TROMBOPLASTINA PARZIALE (aPTT)	1,00		0,82 - 1,25
RATIO			
P-D-DIMERO	4391,00*	ug/L FEU	Fino a 550,00



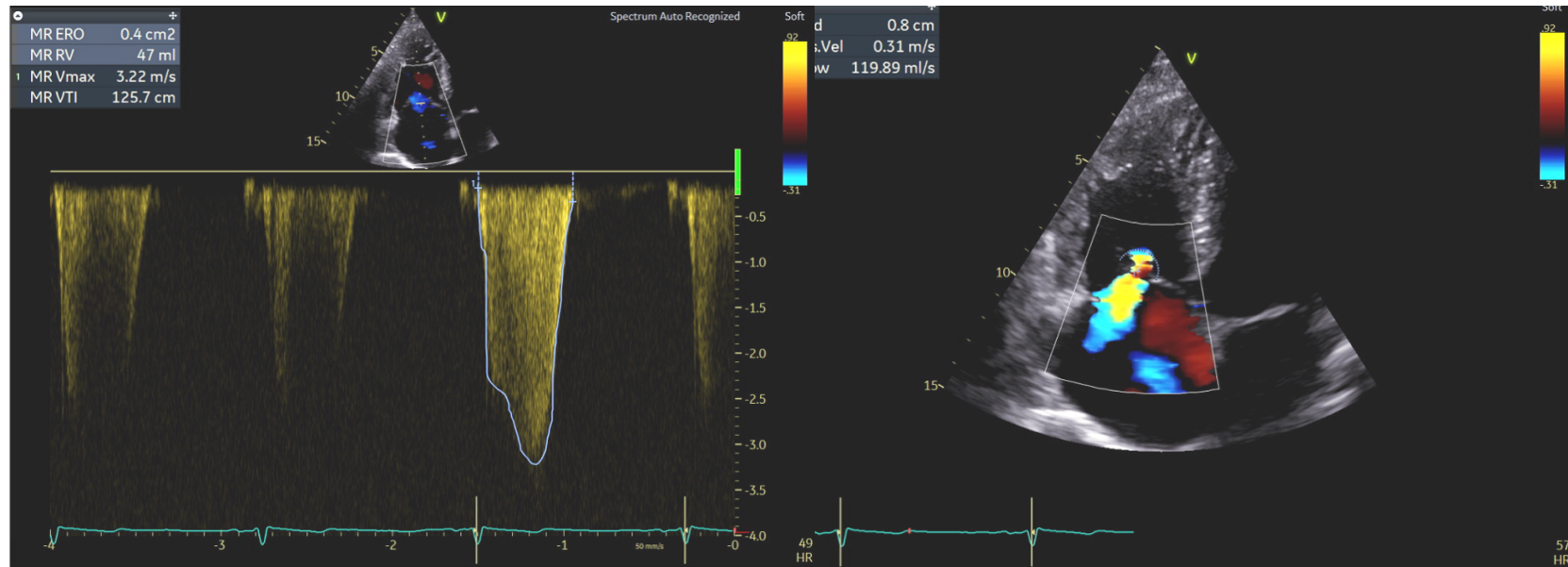
TT echo



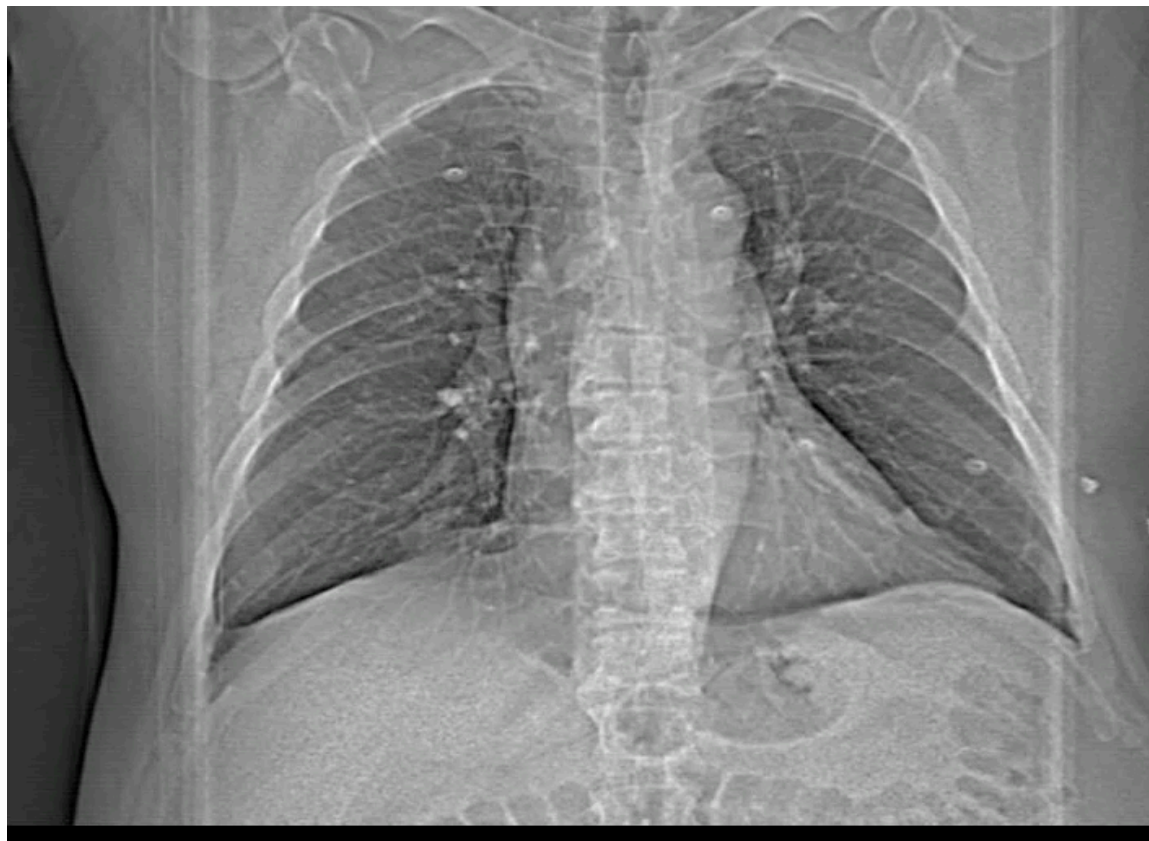
TT echo



TT echo



AngioCT



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Bilater
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focola
Altera
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Risk classification

Simplified PESI (Pulmonary Embolism Severity Index)

Predicts 30-day outcome of patients with PE, with fewer criteria than the original PESI.



When to Use	Pearls/Pitfalls	Why Use
Age, years	≤80 0 >80	+1
History of cancer	No 0 Yes	+1
History of chronic cardiopulmonary disease	No 0 Yes	+1
Heart rate, bpm	<110 0 ≥110	+1
Systolic BP, mmHg	≥100 0 <100	+1
O ₂ saturation	≥90% 0 <90%	+1

High risk

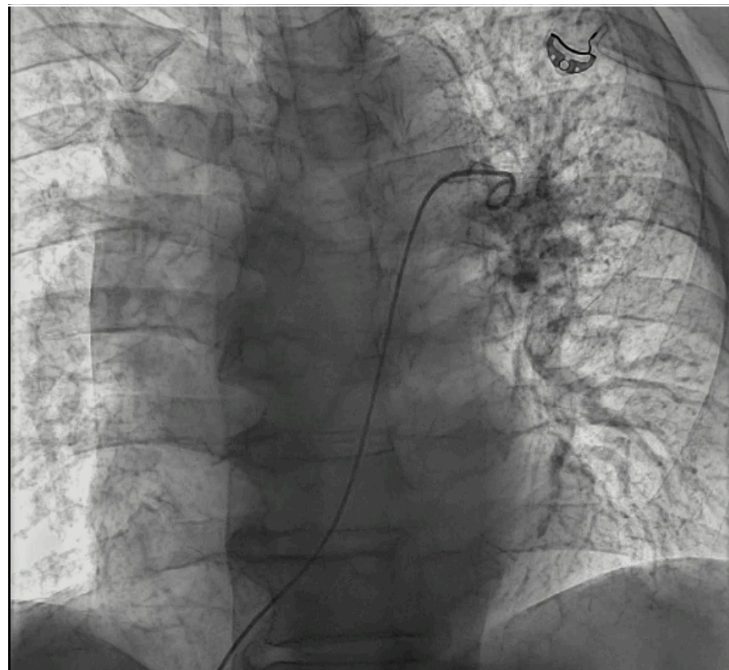
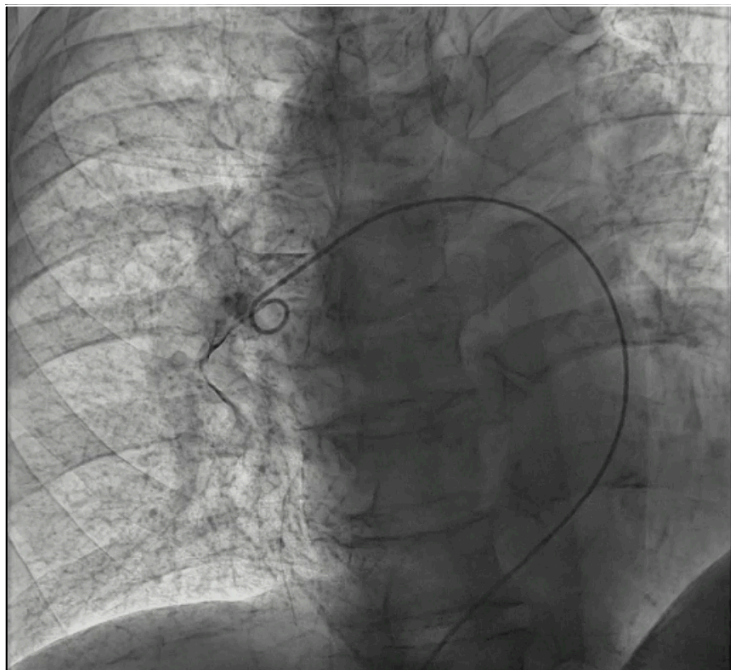
8.9% risk of death in the "High" risk group (>0 points)

Early mortality risk		Indicators of risk			
		Haemodynamic instability ^a	Clinical parameters of PE severity and/or comorbidity: PESI class III–V or sPESI ≥1	RV dysfunction on TTE or CTPA ^b	Elevated cardiac troponin levels ^c
High		+	(+) ^d	+	(+)
Intermediate	Intermediate–high	-	+ ^e	+	+
	Intermediate–low	-	+ ^e	One (or none) positive	
Low		-	-	-	Assesment optional; if assessed, negative

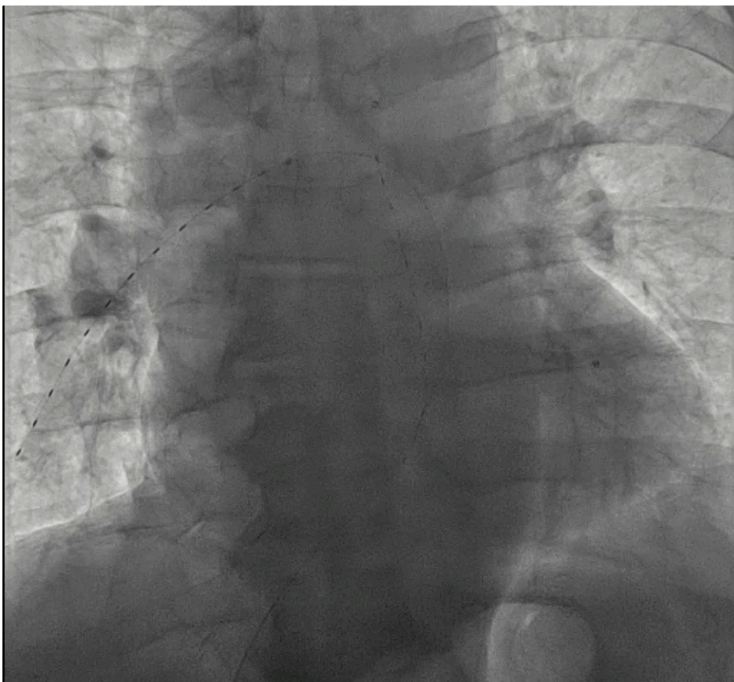
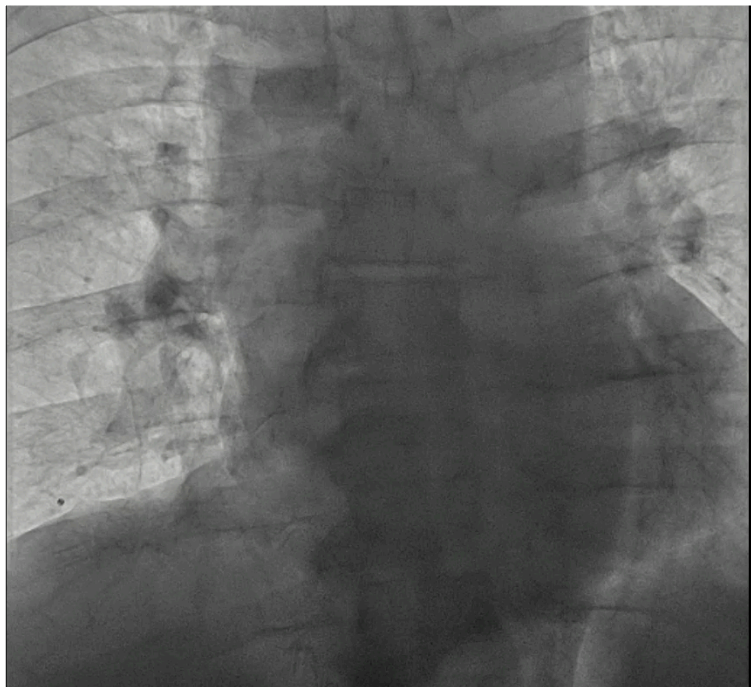
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Pulmonary angio



EKOS system insertion



Coronary care unit

Anticoagulation:

- UFH → sec ACT 160-180 ms
- EKOS → DOSE: 1 mg rt-PA/h/catheter – per 6h

Improvement of haemodynamic status after 6h

FC: 90; PA 140/70 mmHg; SO2 95%

24h evaluation

EcoTT: RV D1 39 mm, TAPSE 20 mm, absence of D-shape, PAPs 32+5 mmHg

Shift to NOAC

- Eliquis 10 mg x 2 per 7 giorni
- Eliquis 5 mg x 2

Abdominal echo and oncomarkers: negative

ECD AaII → DVT of right popliteal vein



Clinical case - 2



Male, 77 years old



Cardiovascular risk factors

- History of smoking
- Arterial Hypertension
- Dyslipidemia



Cardiac history: ascending aortic dilatation and abdominal aortic aneurysm under regular clinical follow-up.



Comorbidities

- Benign prostatic hyperplasia treated with surgical and laser resection
- History of saphenectomy and multiple procedures for varicose veins of the lower limbs



Baseline medications

- Bisoprolol 2,5 mg once daily
- Lisinopril 20 mg once daily
- Doxazosin 2 mg one daily
- Simvastatin 10 mg once daily

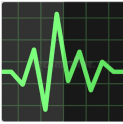


Clinical presentation

January 21th 2025: emergency department admission for chest pain and dyspnea.



Examination: PA 130/95 mmHg, FC 100 bpm, SpO2 89% on room air, RR 22 breaths per minute.



EKG: sinus tachycardia at 100 bpm, known RBBB.



TTE echo: severely dilated and hypokinetic right ventricle, reduced antegrade transpulmonary flow with mid-systolic notch, D-shaped interventricular septum; left-sided chambers within normal limits.

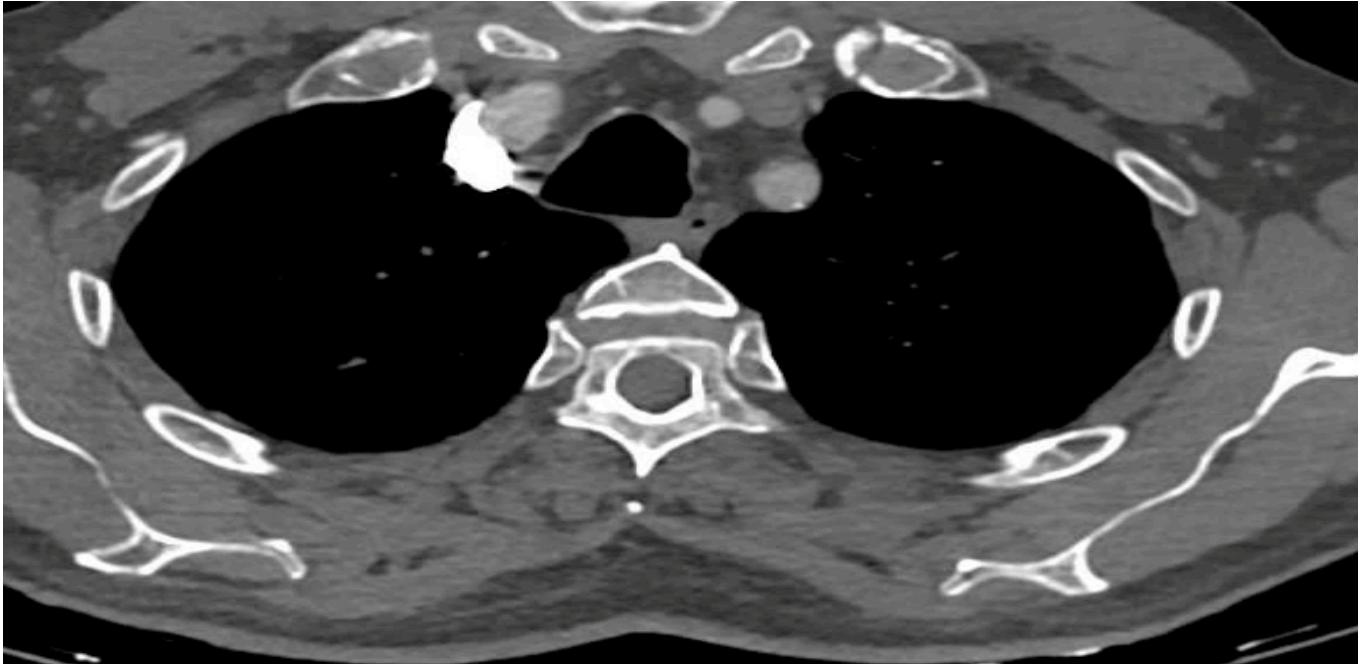


Baseline laboratory data: D-dimer 9529 ug/L, TnI 210 ng/L, NT-proBNP 201 ng/L, Lactate 2,15 mmol/L.



Imaging – CT

Extensive thromboembolic filling defects in the left pulmonary artery, extending into the ipsilateral lobar and segmental branches, and in the right pulmonary artery, extending into the lobar branches of the upper and lower lobes.



Risk Stratification

Early mortality risk		Indicators of risk			
		Haemodynamic instability ^a	Clinical parameters of PE severity and/or comorbidity: PESI class III–V or sPESI ≥1	RV dysfunction on TTE or CTPA ^b	Elevated cardiac troponin levels ^c
High		+	(+) ^d	+	(+)
Intermediate	Intermediate–high	-	+ ^e	+	+
	Intermediate–low	-	+ ^e	One (or none) positive	
Low		-	-	-	Assesment optional; if assessed, negative

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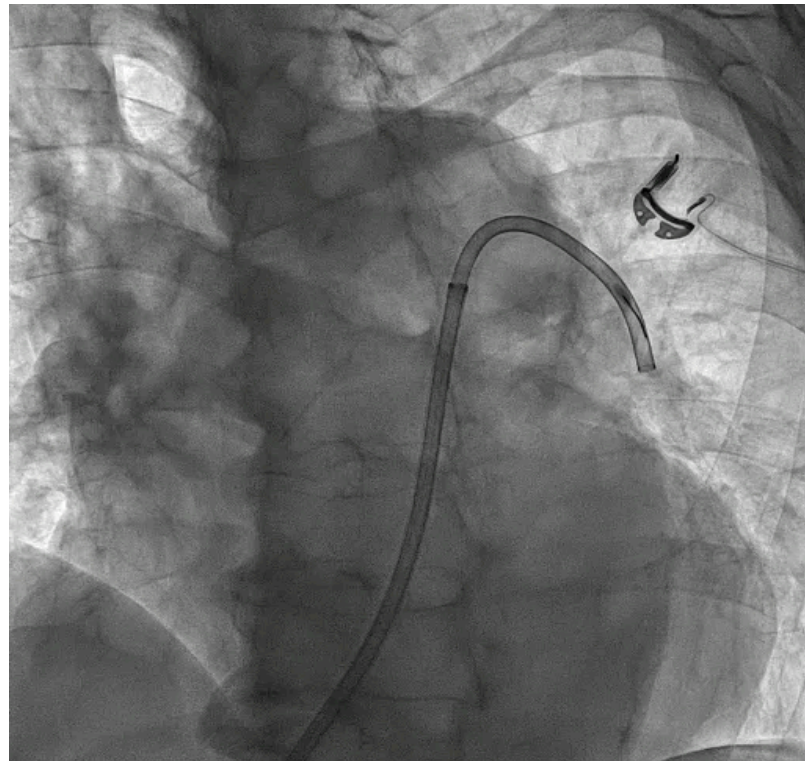
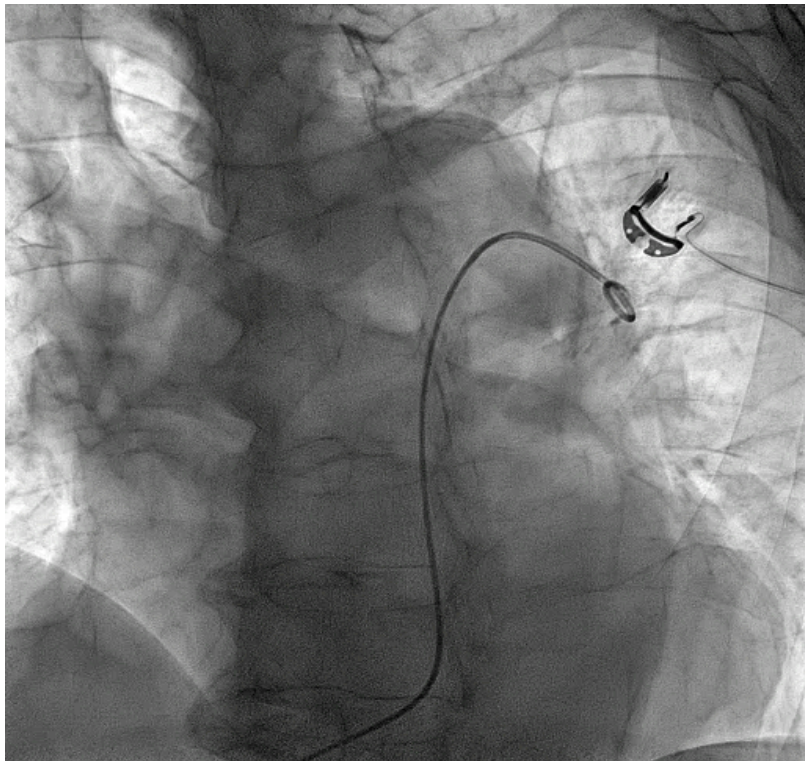
INTERMEDIATE-HIGH RISK!

Index	
sPESI criteria	Points
Age >80 years	1
History of cancer	1
Chronic cardiopulmonary disease	1
Systolic blood pressure <100 mmHg	1
Heart rate ≥110 b.p.m.	1
Arterial oxygen saturation <90%	1
The sPESI score is the sum of the assigned points for each criterion. If the sPESI score is 0 points, i.e. the patient classified as low 30-day risk of death, patient qualification is home treatment. If the sPESI score is >0, i.e. the patient classified as high 30-day risk of death, patient qualification is in-hospital treatment. sPESI, simplified Pulmonary Embolism Severity Index.	

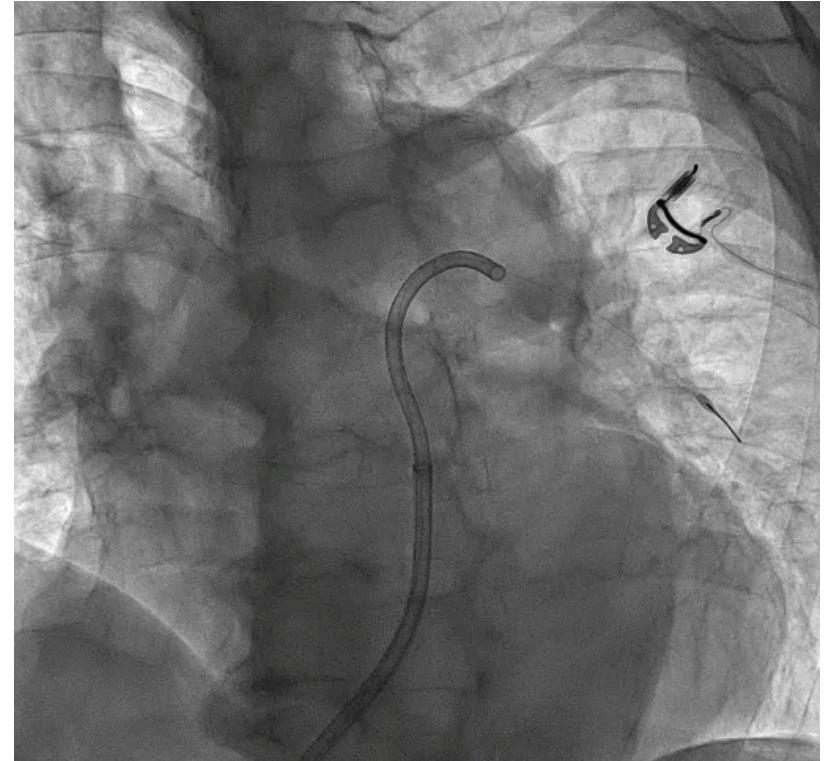
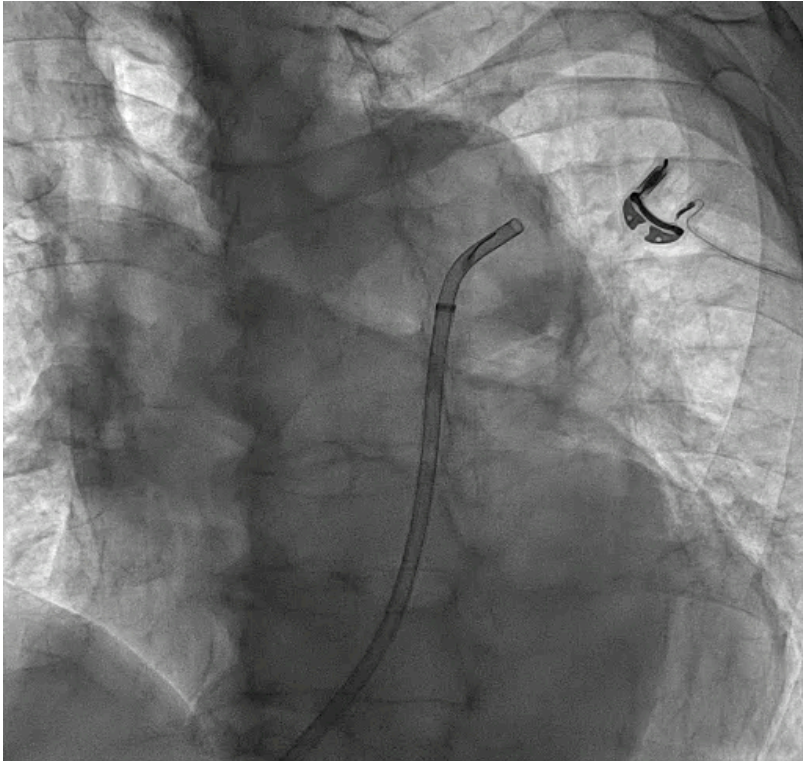
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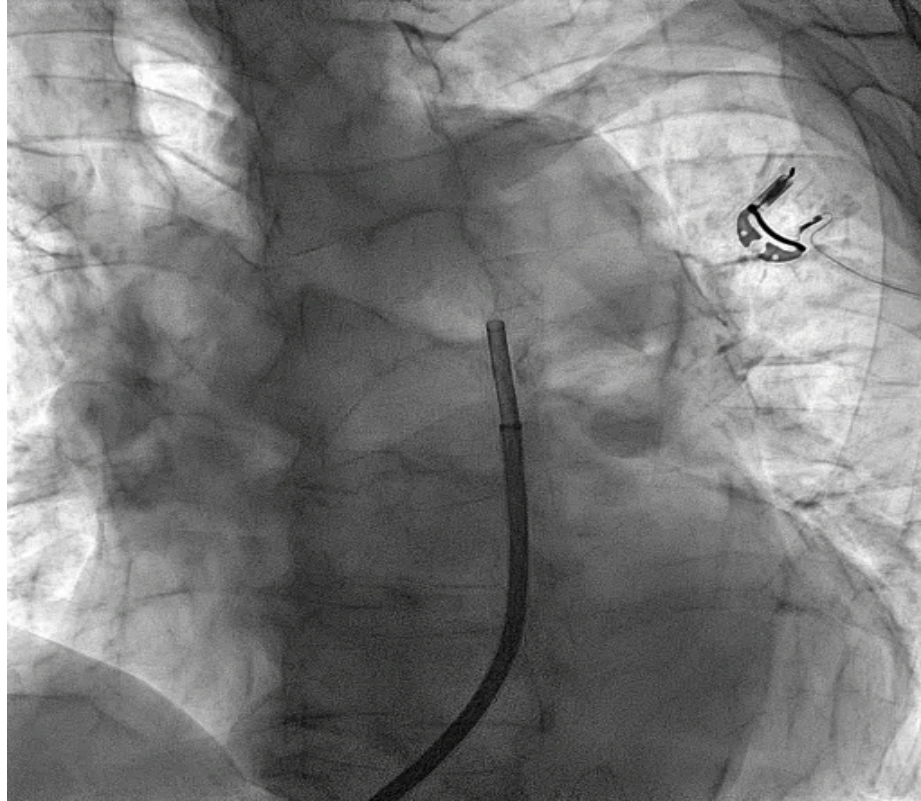
Transcatheter embolectomy - LPA



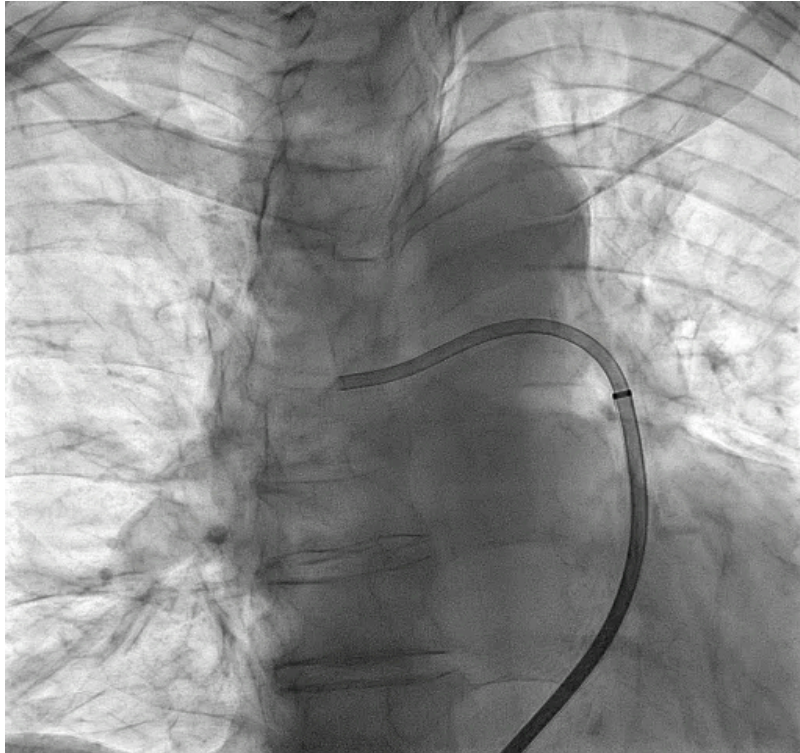
Transcatheter embolectomy - LPA



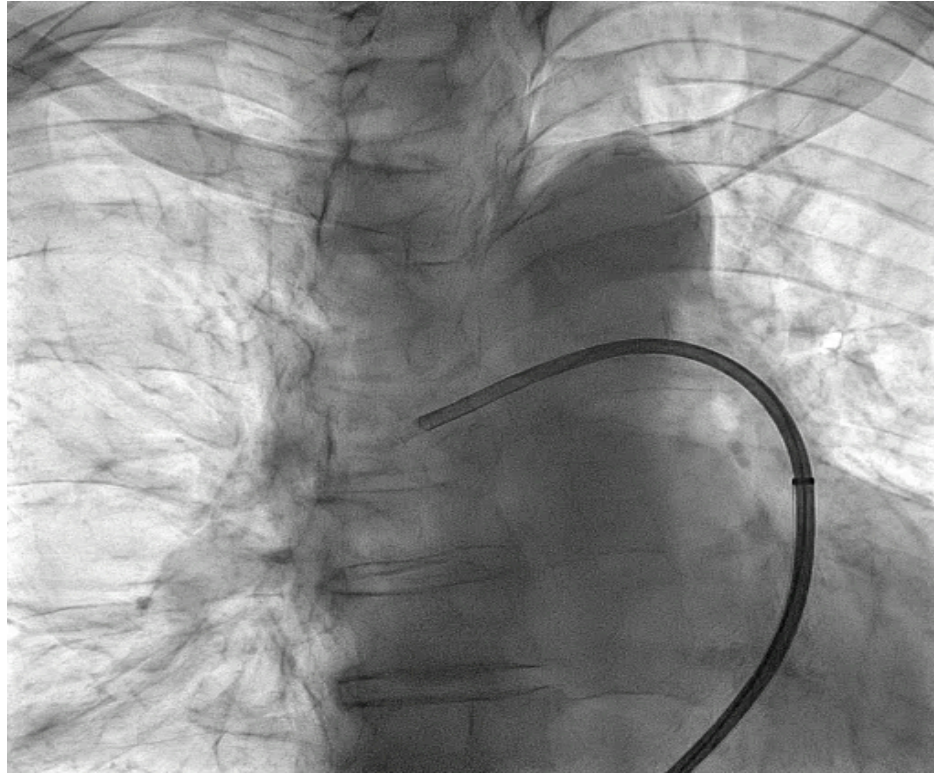
Transcatheter embolectomy - LPA



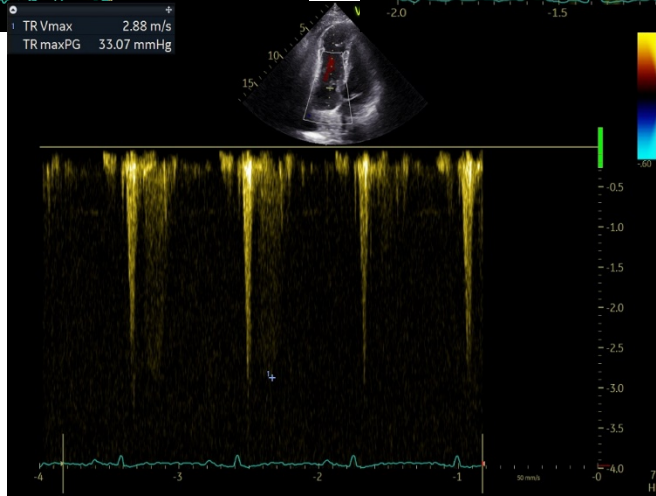
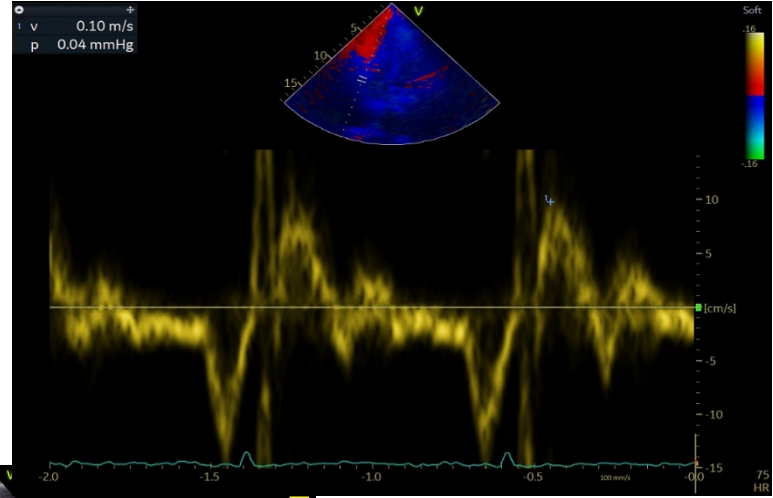
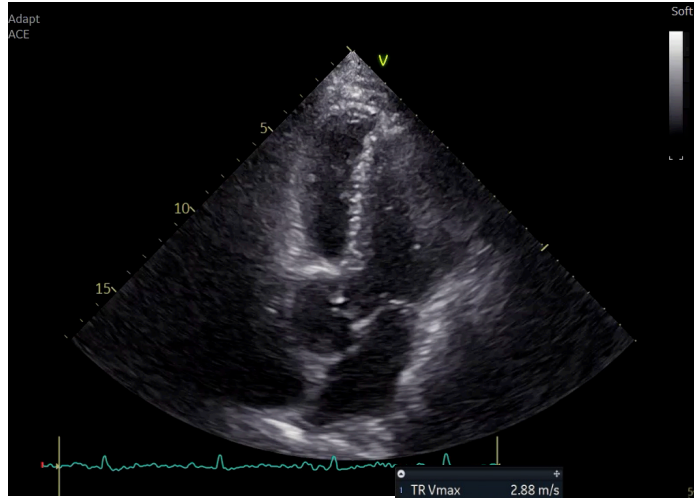
Transcatheter embolectomy - RPA



Transcatheter embolectomy - RPA



Imaging – ETT post



Clinical case - 3



Female, 60 years old



Cardiovascular risk factors

- History of smoking
- Arterial Hypertension
- Dyslipidemia
- Family history of ischemic heart disease



Comorbidities

- Past history of right-sided breast carcinoma treated with surgery, adjuvant chemotherapy, and subsequent hormonal therapy



Baseline medications

- Atorvastatin 20 mg once daily
- Ramipril 5 mg once daily
- Sotalol 80 mg once daily
- Letrozole 2,5 mg once daily

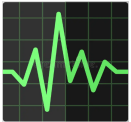
Clinical presentation

Cardiac history: previous transcatheter radiofrequency ablation performed for focal VT originating from the anterolateral papillary muscle.

February 4th 2024: emergency department admission for epigastric pain and dyspnea.



Examination: PA 125/90 mmHg, FC 110 bpm, SpO2 97% on room air.



EKG: sinus tachycardia at 110 bpm with normal intraventricular conduction and no ventricular repolarization abnormalities.



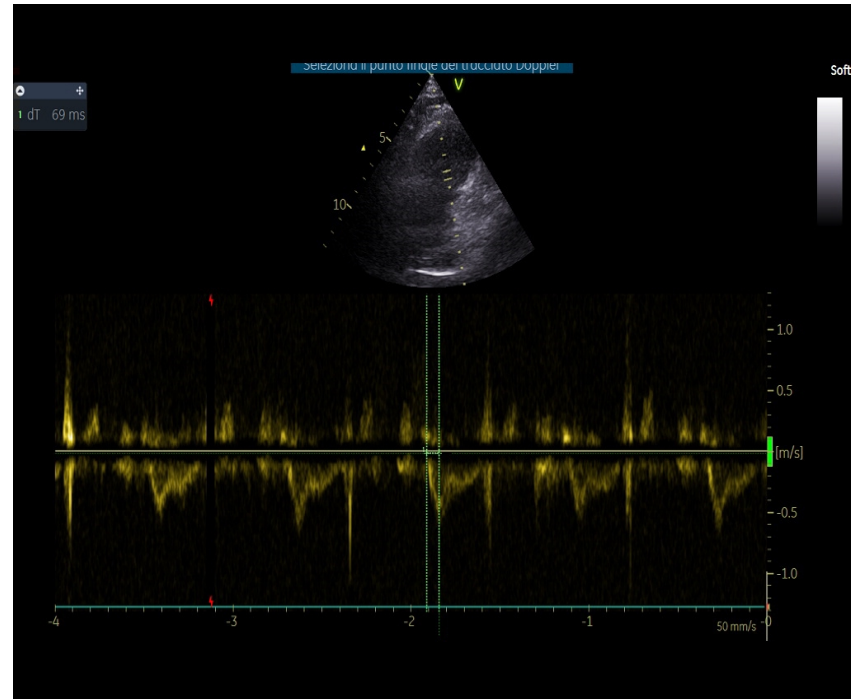
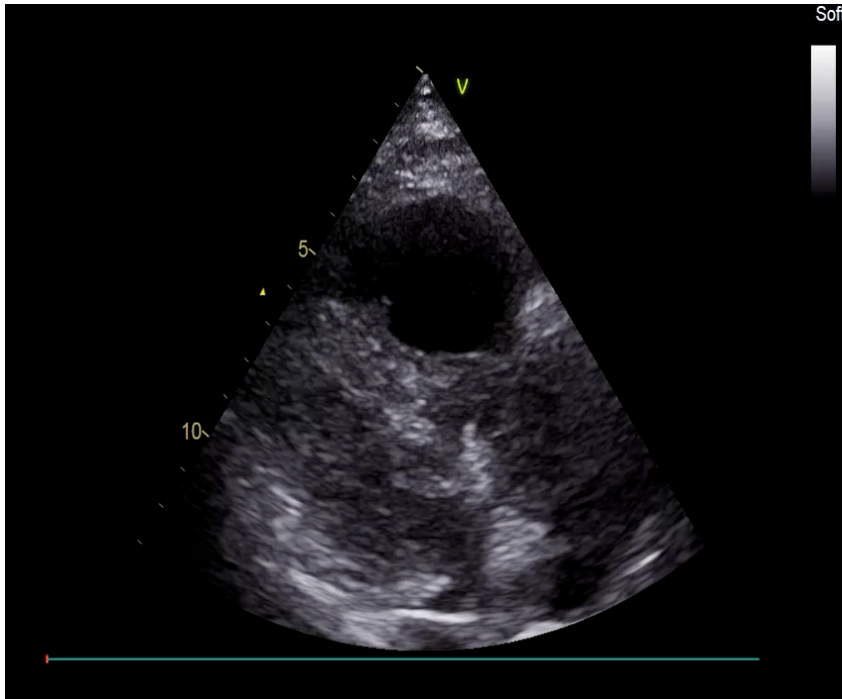
TTE echo: dilated RV with preserved longitudinal systolic function (TAPSE 17 mm) but reduced radial shortening (FAC 25%), moderate TR, PASP within normal limits in the absence of caval plethora; left ventricle normal in size and function.



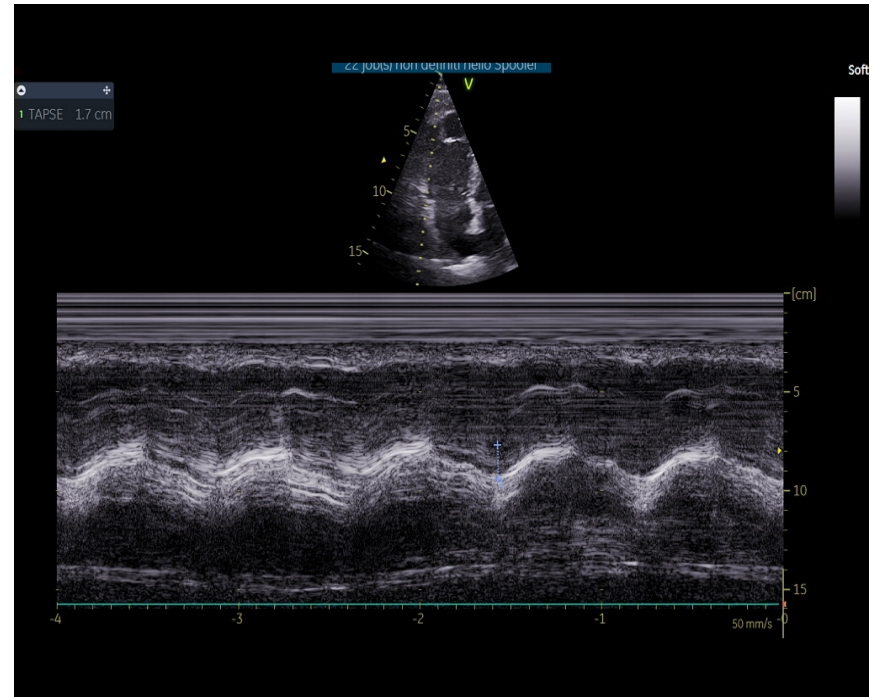
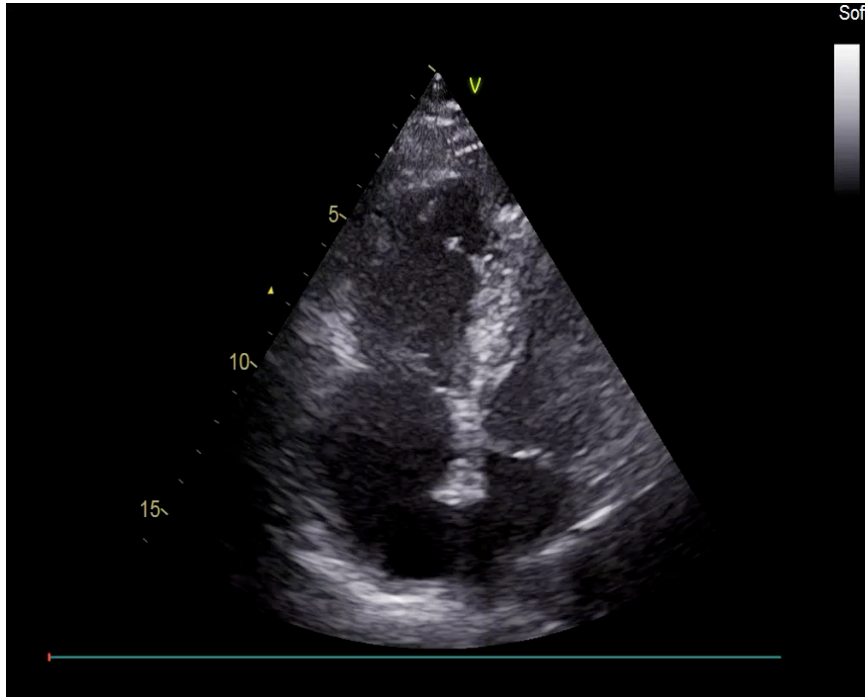
Baseline laboratory data: Hb 12,9 g/dl, creatinine 0,7 mg/dL, D-dimer 11326 ug/L, hsTNI 1848 ng/L.



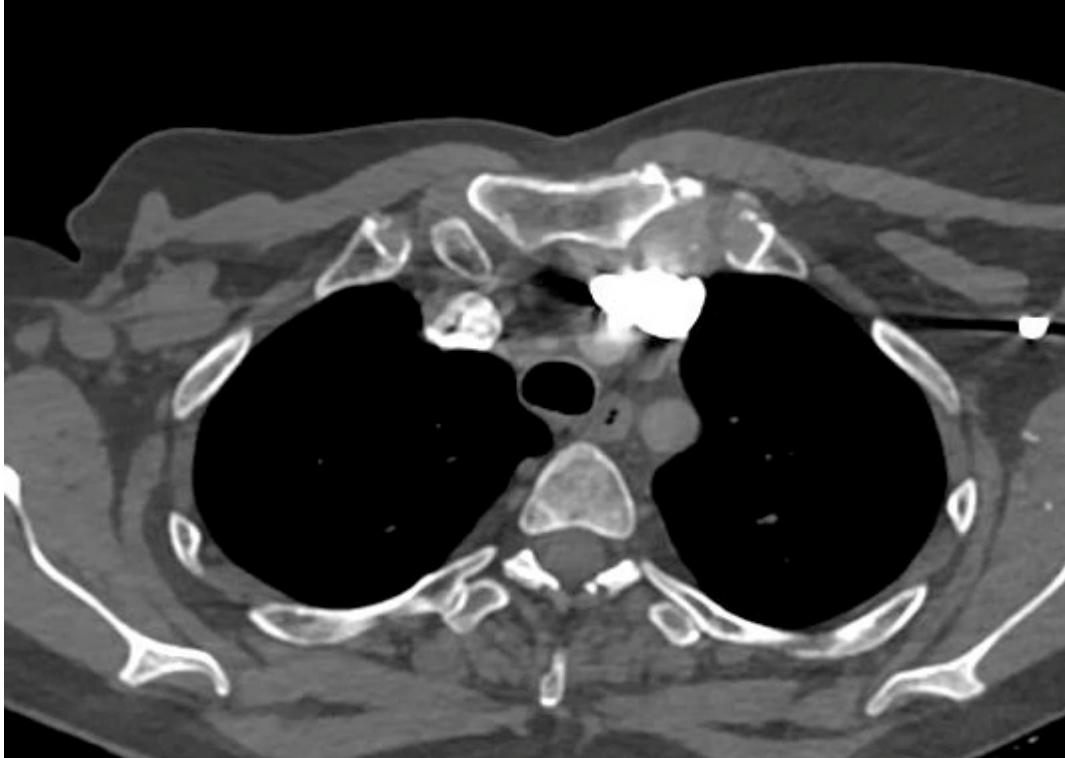
Imaging – ETT pre



Imaging – ETT pre



Imaging - CT



Saddle thrombus, multiple filling defects in all lobar and segmental branches of the RPA, as well as in the upper and in the lower lobes of the LPA.

Risk Stratification

Early mortality risk		Indicators of risk			
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Index

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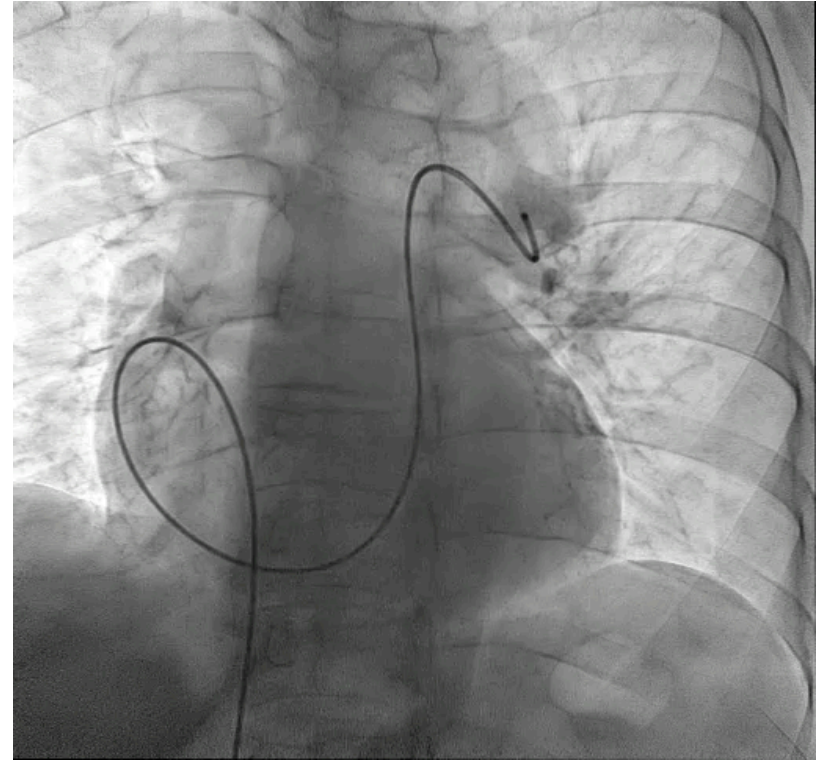
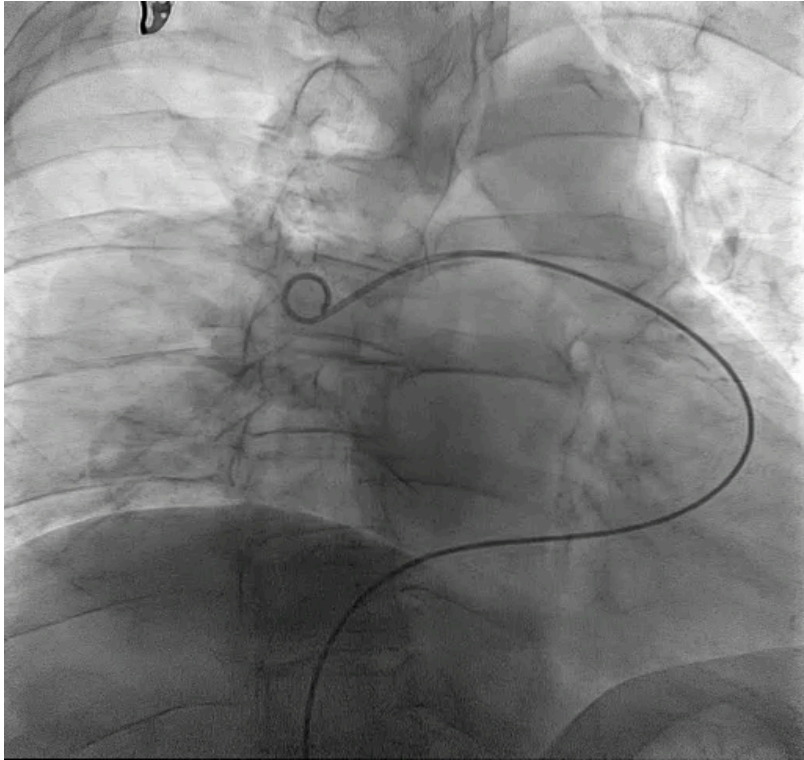
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INTERMEDIATE-HIGH RISK!

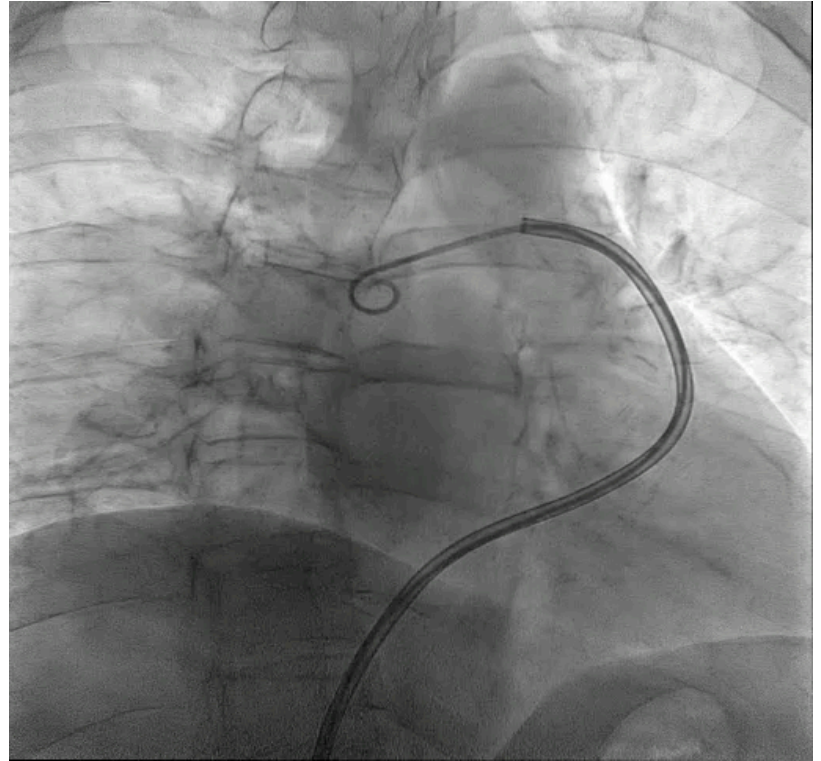
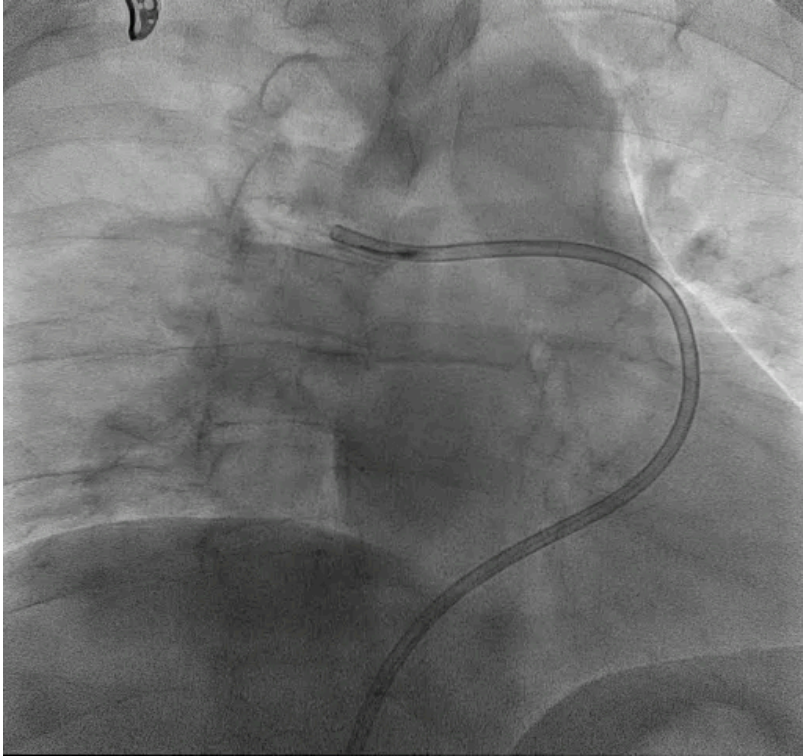
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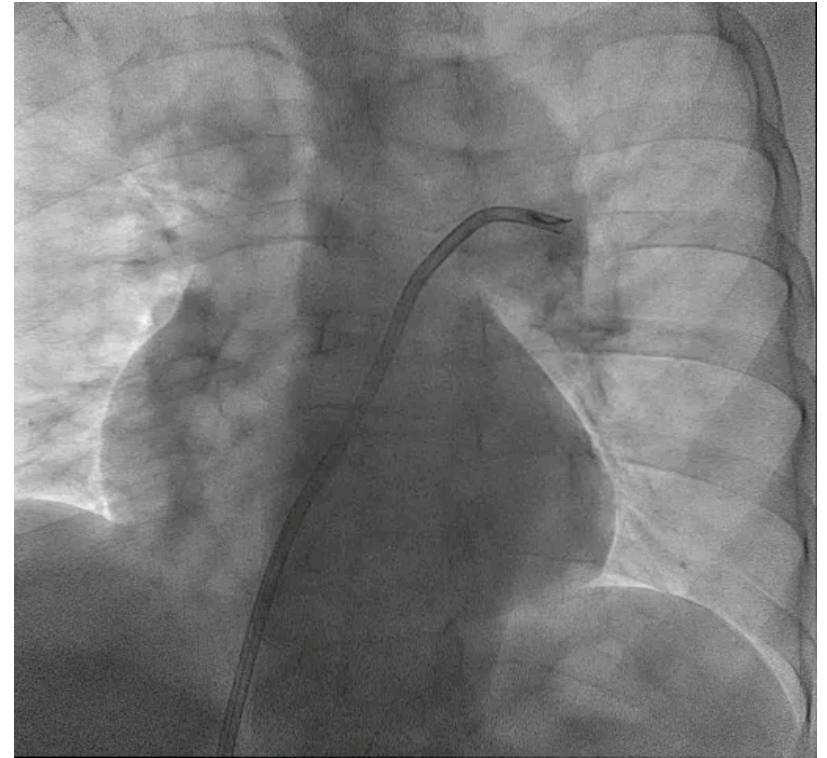
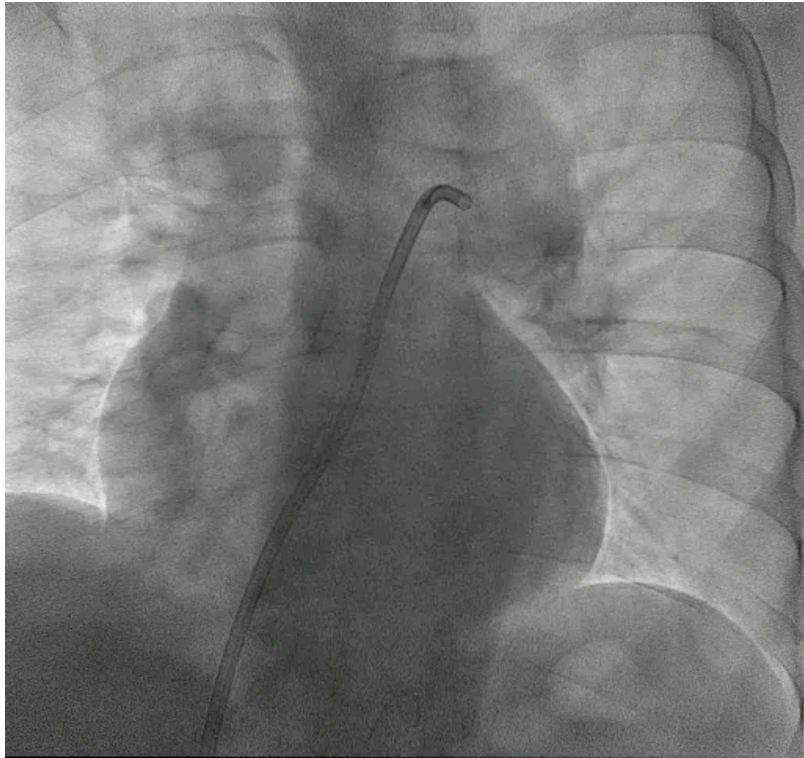
Transcatheter embolectomy



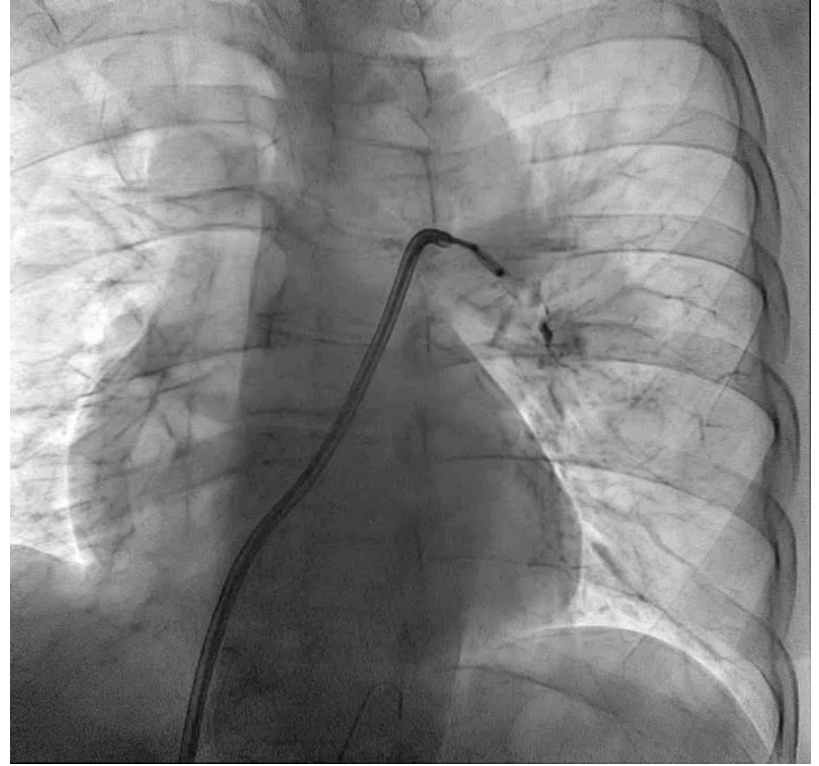
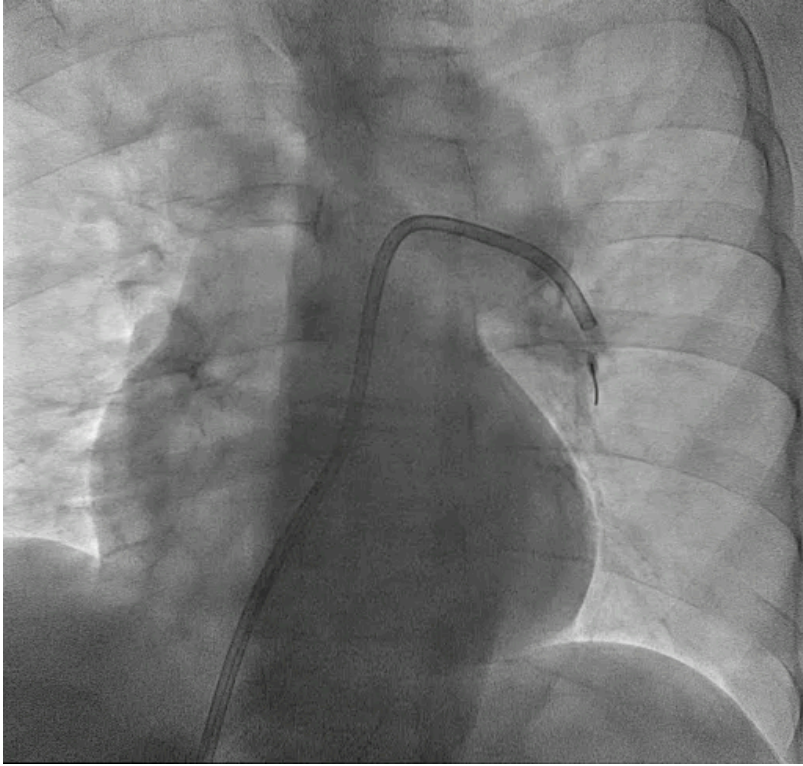
Transcatheter embolectomy - RPA



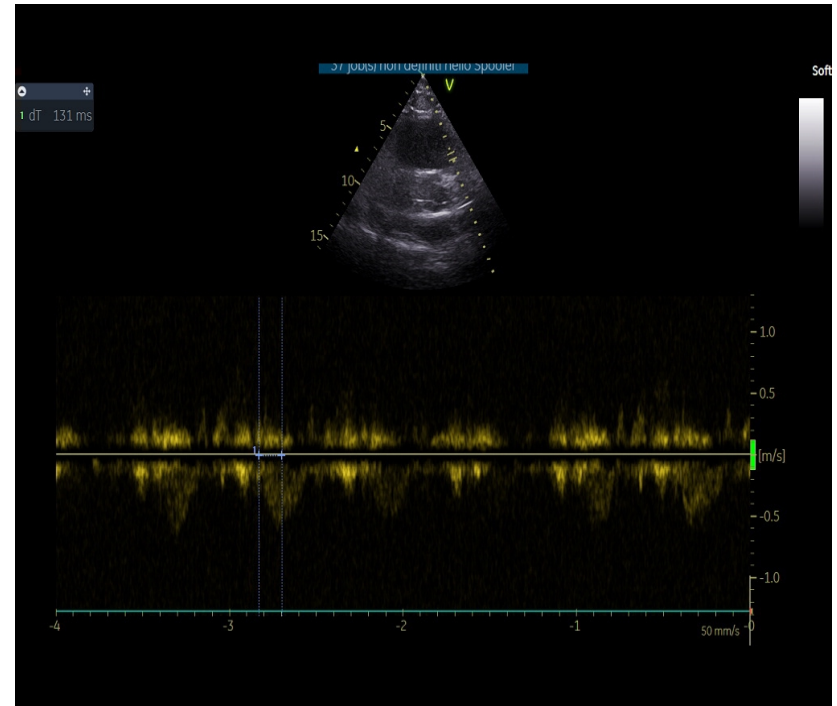
Transcatheter embolectomy - LPA



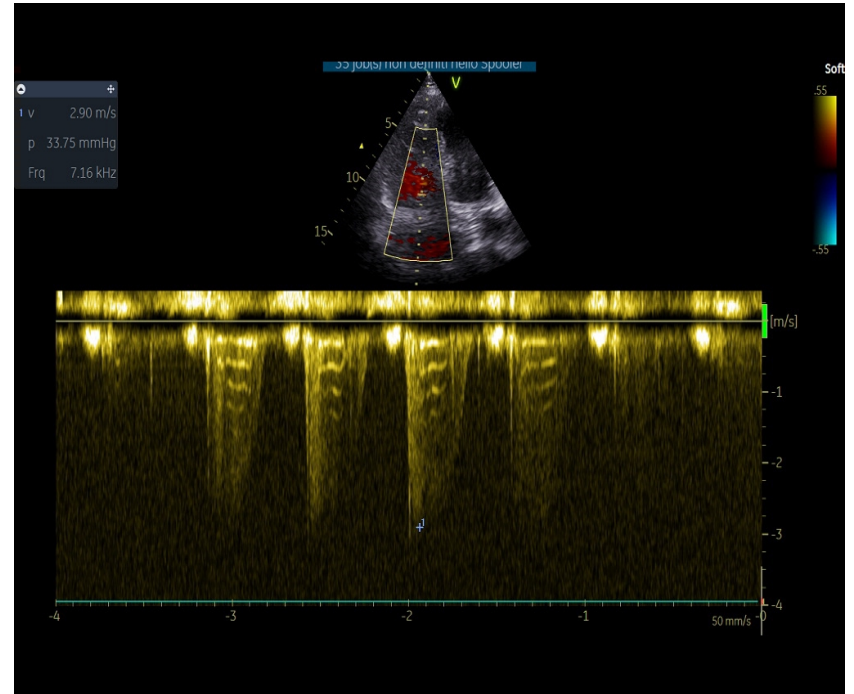
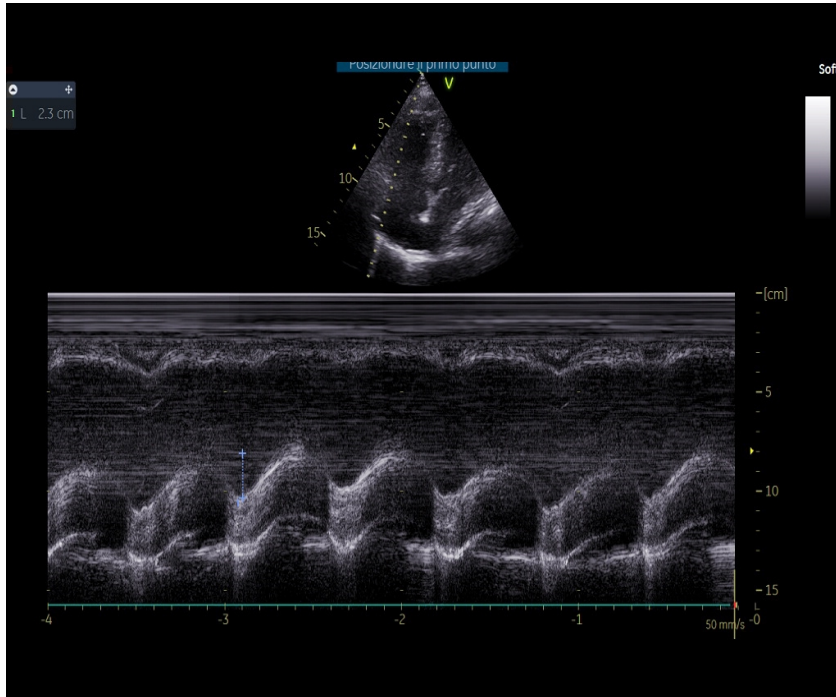
Transcatheter embolectomy - LPA



Imaging – ETT post



Imaging – ETT post



Grazie per l'attenzione

