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ÚNICA EXPERIENCIA EDUCACIONAL EN TU ÁREA

Contemporary Imaging for Heart Failure

Clinical Case

ACUTE RIGHT VENTRICULAR FAILURE: PULMONARY EMBOLISM

Gustavo Restrepo MD. FACC

ACC – Colombia Chapter Governor

President Elect Interamericam Society of Cardiology

Director Echocardiography Laboratory Clínica Medellín

Director Fellowship Training in Echocardiography. CES University

Medellín, Colombia

Disclosure Information

- I will not discuss off label use or investigational use in my presentation
- I have no financial relationships to disclose

Clinical case

- **30 year old male, farmer**
- **2 months history of progressively worsening disnea and orthopnea, hemopthysis**
- **Initially treated as pneumonia with antibiotics**
- **PMH : 8 months ago left knee surgery (post-traumatic lesion)**
- **PE: BP 100/60, HR 124, Respiratory Rate 24, Arterial 0_2Sat 84%**
- **Neck veins distended, no heart murmur, lungs clear, extremities appeared normal**

Laboratory

Pa02 48.5 mmHg, Sat 02 86%, PaC02 33.8 mmHg,

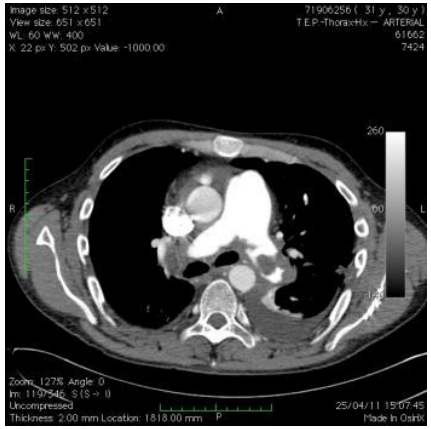
NaHCO3 19, pH 7.36

HB 17.2, HTO 50.4, leucocites 8780 mm3, Neut 70%,

Platelets 117.200 mm3, C-Reactive Protein 15.2

D- dimer 5.13 mg per liter (normal level, <0.5)

Troponin T level 0.5 µg per liter (normal level, < 0.01)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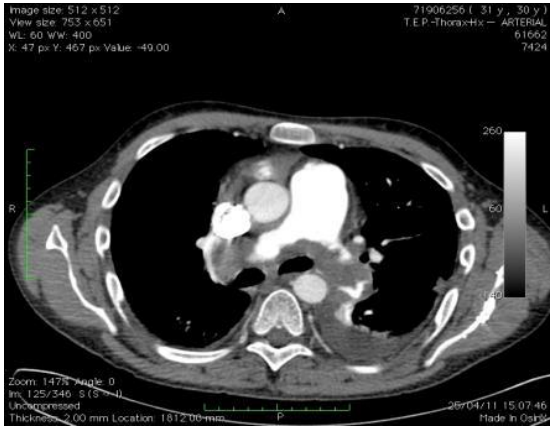
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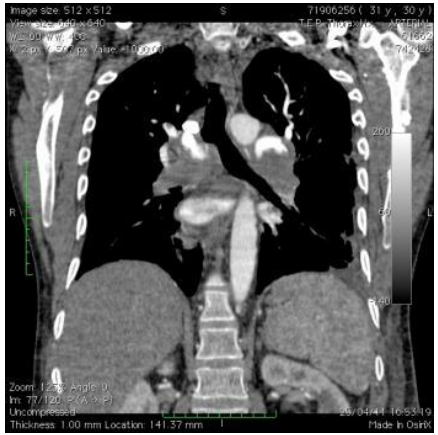
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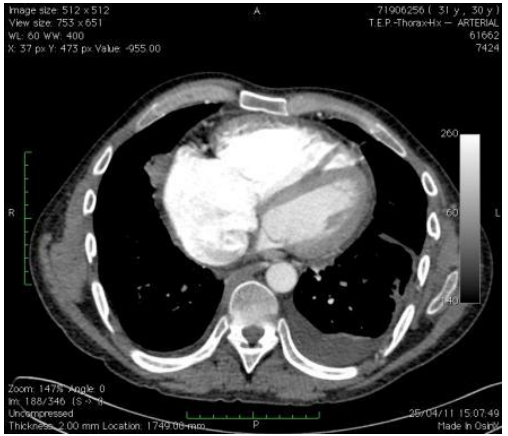
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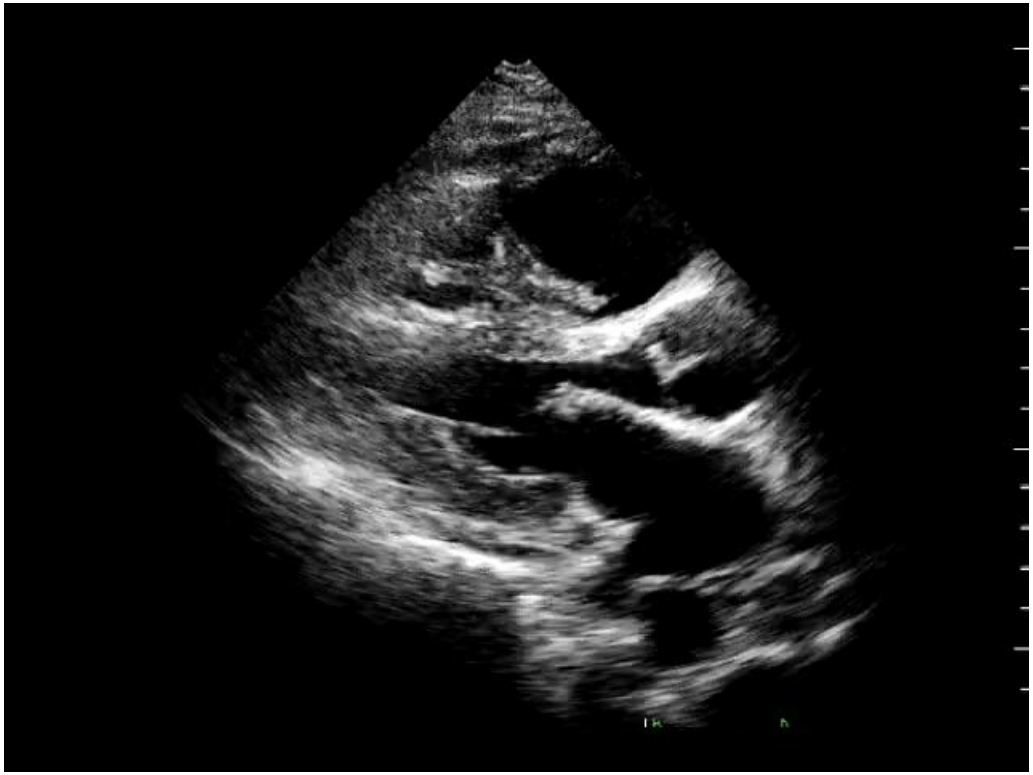

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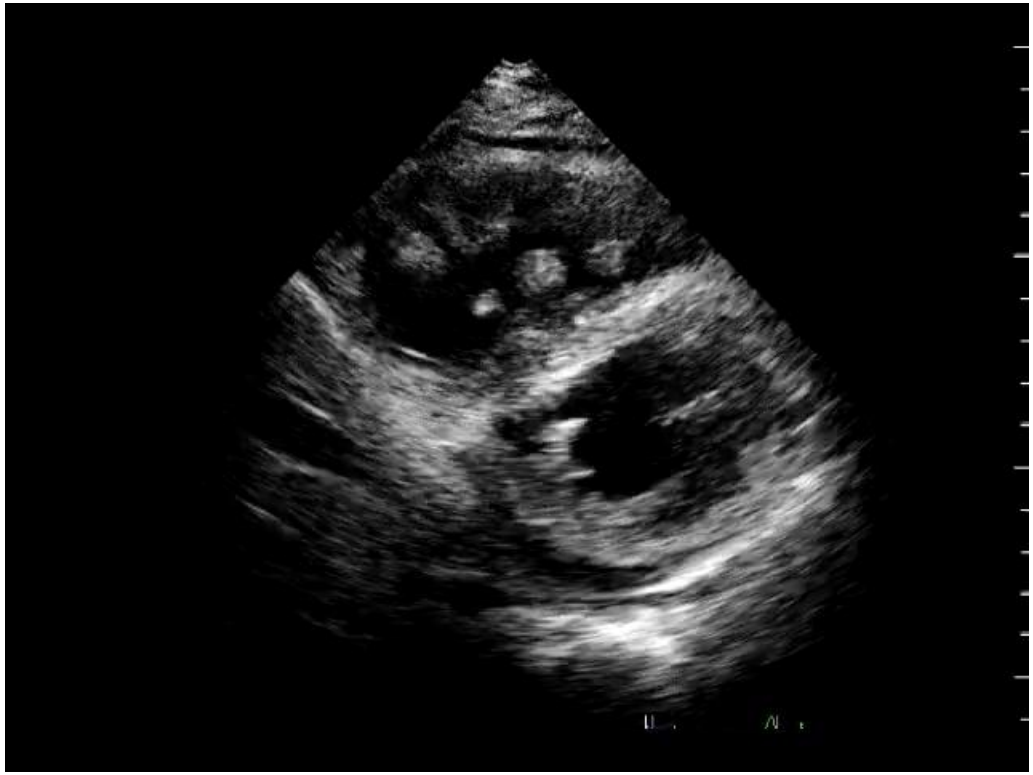

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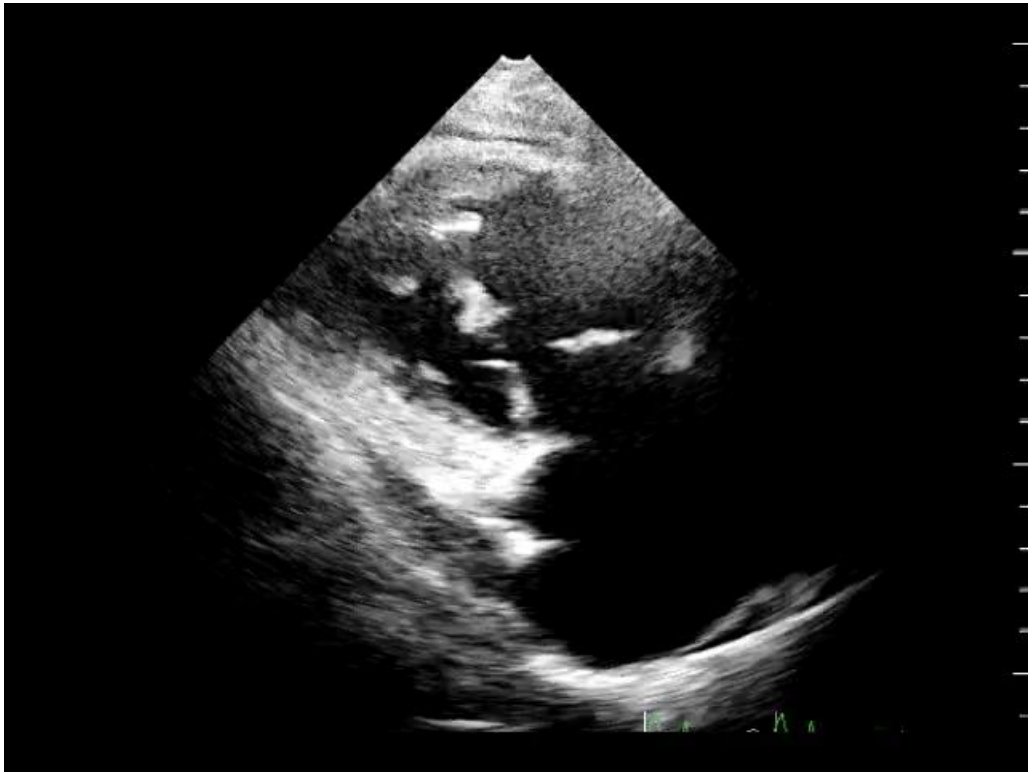

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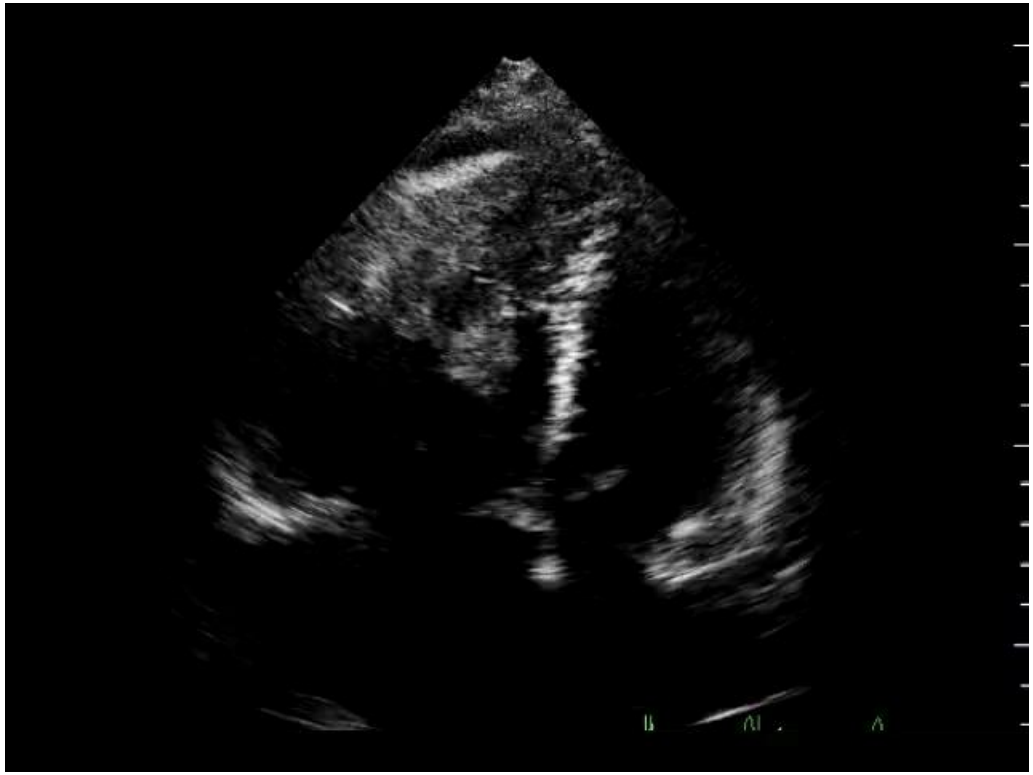

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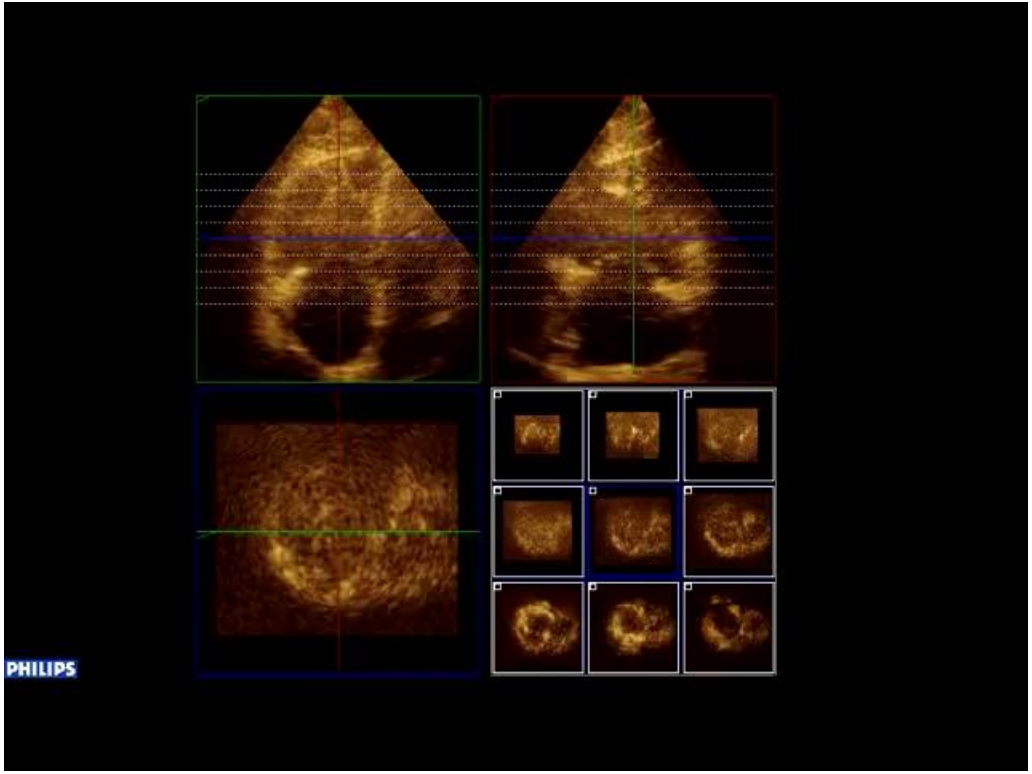
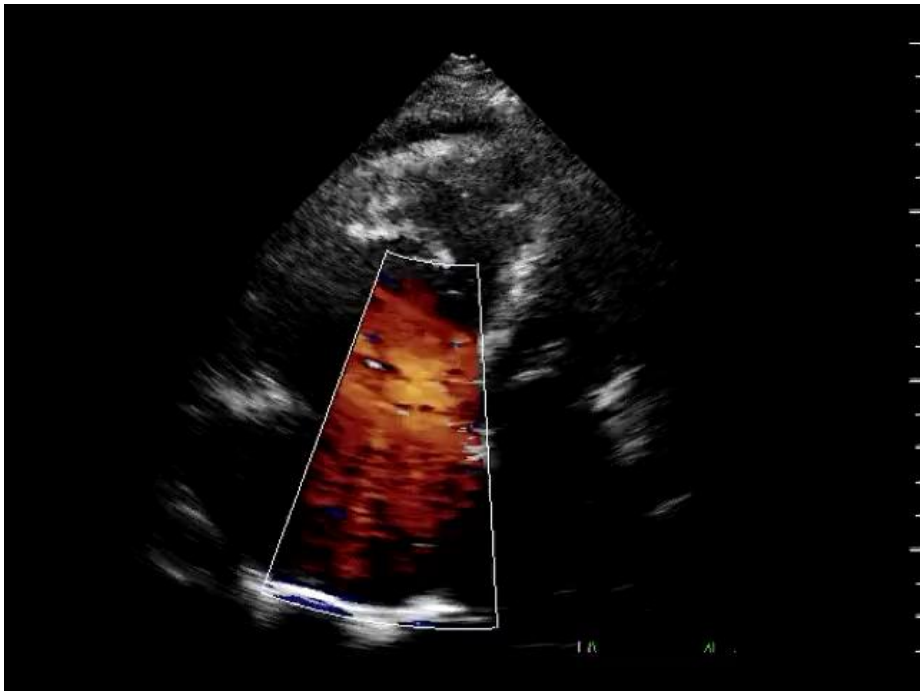
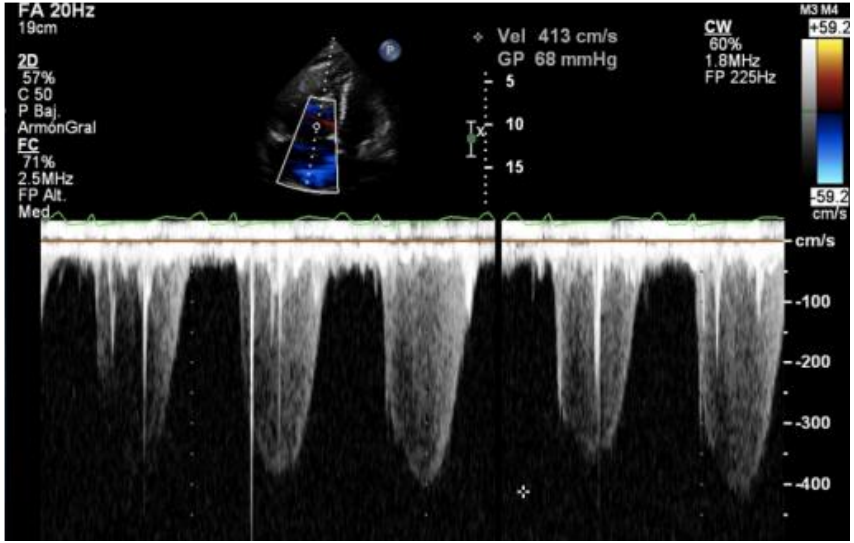


RVOT aceleration time 55 ms
TAPSE 15 mm
Gradient RV-RA 68 mmHg





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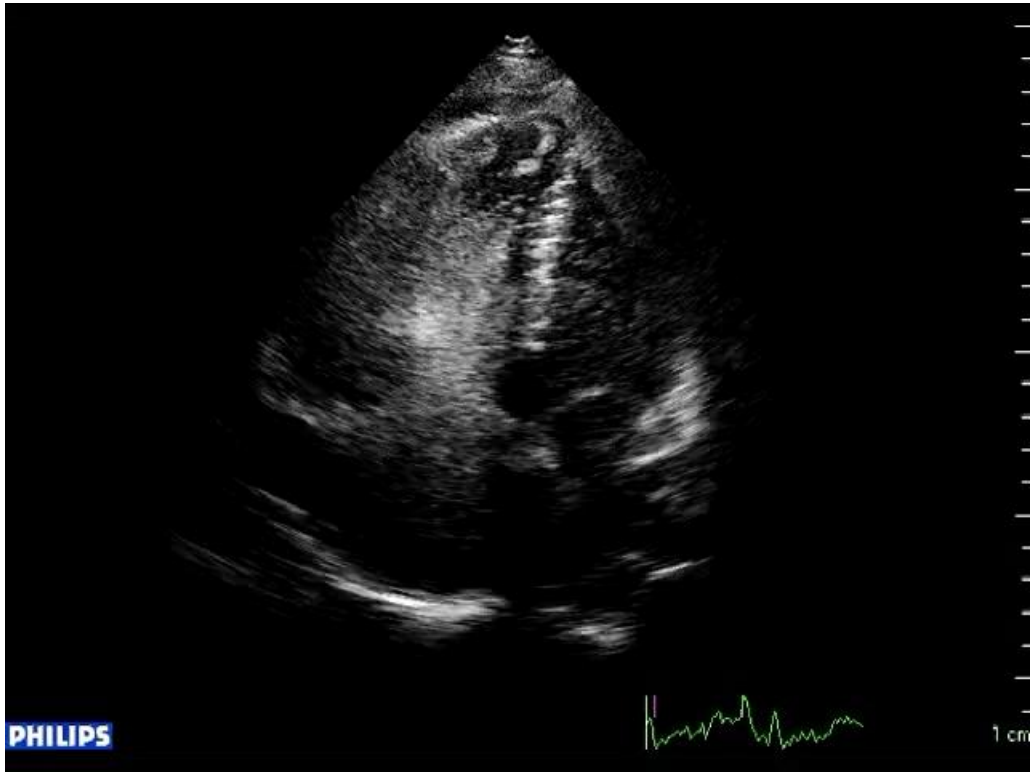

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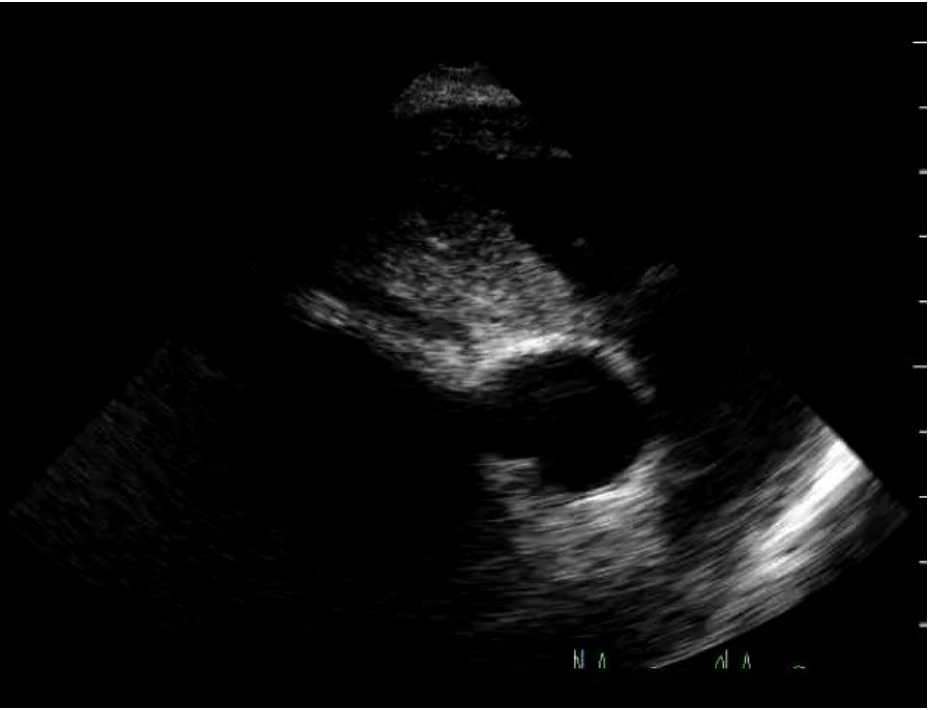

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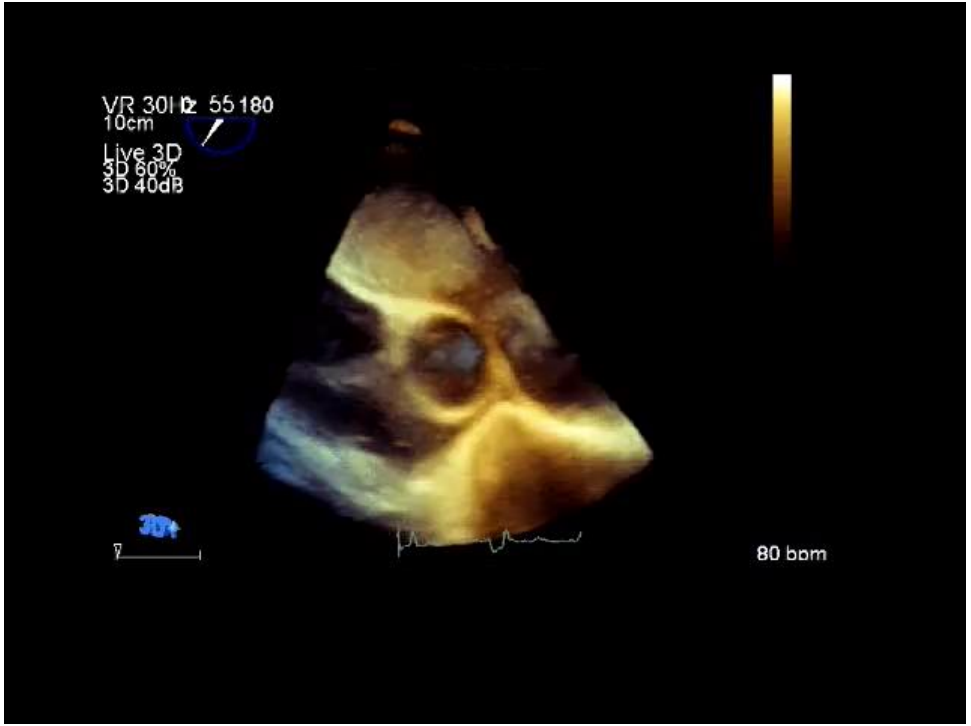


Treatment

- 18-04-2016.Haemodynamic and respiratory support
- 19-04-2016.Thrombolysis (Streptokinase), with inadecuate response
- 26-04-2016.Surgical pulmonary embolectomy
- The patient died in the inmediate postoperative period

Right Heart Thrombi in Pulmonary Embolism

Results From the International Cooperative Pulmonary Embolism Registry

Adam Torbicki, MD,* Nazzareno Galié, MD,† Anna Covezzoli, BS,‡ Elisa Rossi, BS,‡
Marisa De Rosa, PHD,‡ Samuel Z. Goldhaber, MD,§ on behalf of the ICOPER Study Group
Warsaw, Poland; Bologna, Italy; and Boston, Massachusetts

2454 patients, 1113 had results available from baseline echocardiography
They compared 42 patients with RHTh versus 1071 without RHTh

Patients with RHTh had

- **Shorter duration of symptoms**
- **Lower systolic blood pressure**
- **More frequent right ventricular hypokinesis**
- **Congestive heart failure**

The overall mortality rate at 14 days and at three months was higher in patients with RHTh (21% vs. 11%)

The difference in early mortality was observed almost entirely within the subgroup of patients treated with heparin alone (23.5% vs. 8%)

(J Am Coll Cardiol 2003;41:2245–51

Acute Pulmonary Embolism

Echocardiographic Findings

RV overload criteria

Right-sided cardiac thrombus,
RV diastolic dimension (parasternal view) > 30 mm or RV/LV ratio > 1
Systolic flattening of the interventricular septum
Acceleration time < 90 ms or tricuspid insufficciency pressure gradient ≤ 60 mmHg

The 60/60 sign

Acceleration time of RV ejection< 60 ms in the presence of tricuspid insufficiency gradient ≤ 60 mmHg

The McConnell sign

Normokinesia and/or hyperkinesia of the apical segment of the RV free wall despite hypokinesia and/or akinesia of the remaining parts of the RV free wall

Diagnostic value of three sets of echocardiographic signs suggesting the presence of acute PE in patients

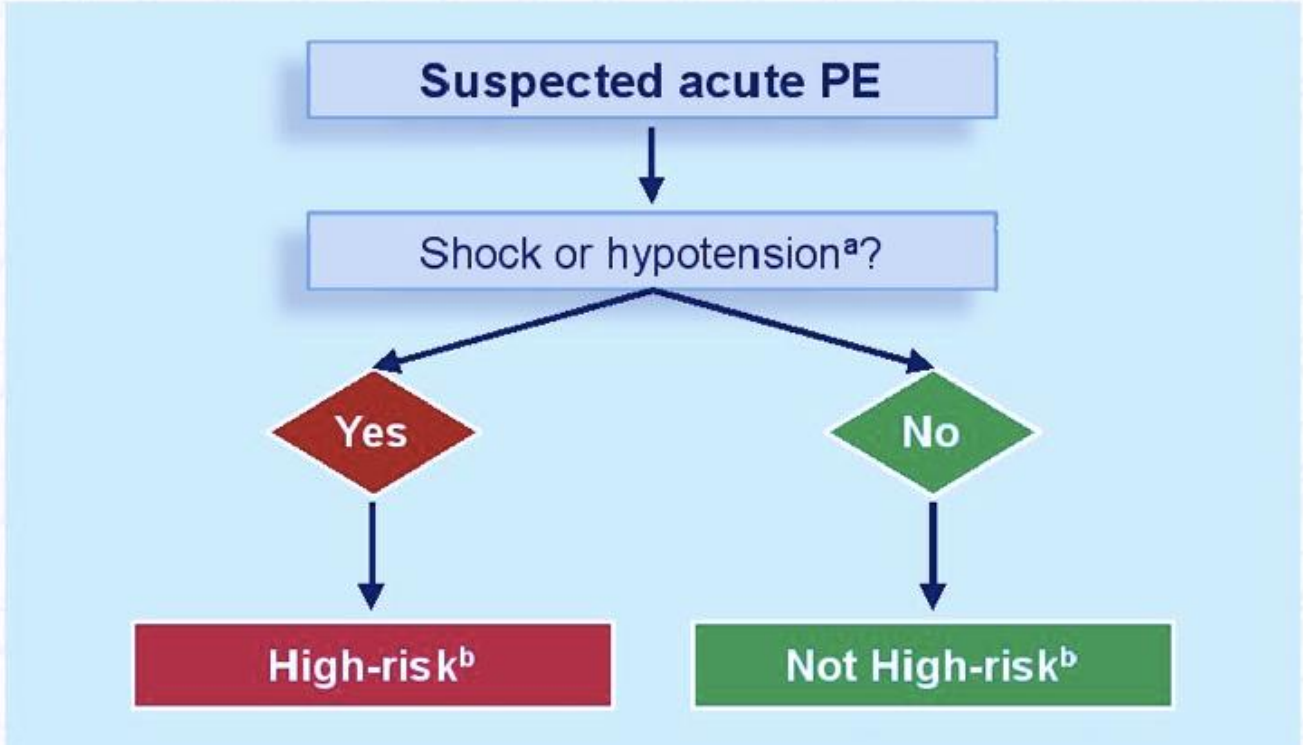
without previous cardiorespiratory diseases (n=46)

	RV overload criteria	60/60 sign	McConnell sign
Specificity (%)	78	100	100
Sensitivity (%)	81	25	19
PPV (%)	90	100	100
NPV (%)	64	37	35

Diagnostic value of three sets of echocardiographic signs suggesting the presence of acute PE in patients with *known previous cardiorespiratory diseases (n=54)*

	RV overload criteria	60/60 sign	McConnell sign
Specificity (%)	21	89	100
Sensitivity (%)	80	26	20
PPV (%)	65	82	100
NPV (%)	36	40	40

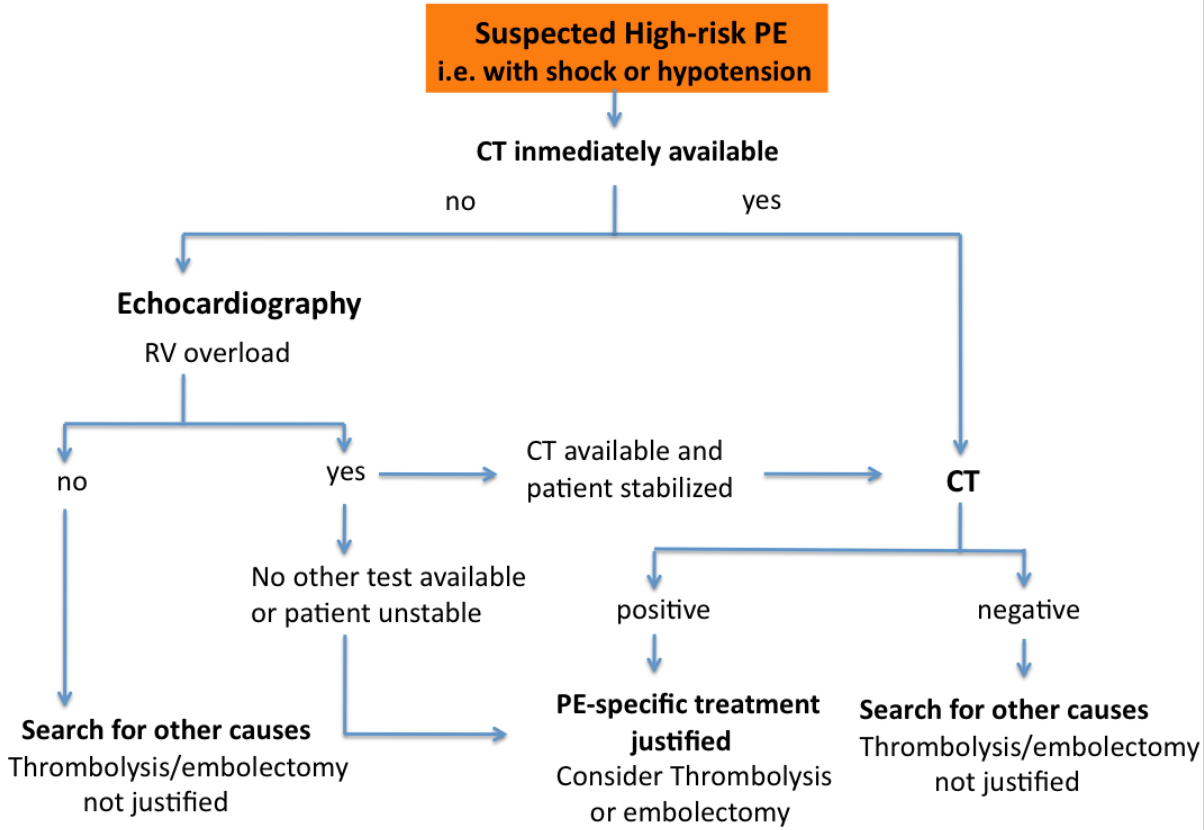
Initial risk stratification of acute PE



Classification of early mortality risk

Early mortality risk		Risk parameters and scores			
		Shock or hypotension	PESI Class III-V or sPESI ≥1	Signs of RV dysfunction on an imaging test	Cardiac laboratory biomarkers
High		+	(+)	+	(+)
Intermediate	Intermediate-high	–	+	Both positive	
	Intermediate-low	–	+	Either one (or none) positive	
Low		–	–	Assessment optional; if assesed, both negative	

2014 ESC Guidelines on the Diagnosis and Management of Acute Pulmonary Embolism. Eur Heart J 2014


Suspected High-risk PE
i.e. with shock or hypotension
CT inmediately available
no
yes
Echocardiography
RV overload
no
yes
CT available and
patient stabilized
CT
No other test available
or patient unstable
positive
negative
Search for other causes
Thrombolysis/embolectomy
not justified
PE-specific treatment
justified
Consider Thrombolysis
or embolectomy
Search for other causes
Thrombolysis/embolectomy
not justified

Summary

- This is a case of a 30 yo male with right ventricular thrombus with secondary pulmonary hypertension and pulmonary embolism.
- At presentation he showed high risk signs of poor outcome such as RV thrombus, RV overload and dysfunction and PFO.
- Echocardiography is particularly useful in emergency management decisions. In a patient with shock or hypotension, the absence of echocardiographic signs of RV overload or dysfunction particularly excludes PE as cause of haemodynamic compromise