TEAM Cardio Vascular Interventional

ECOCARDIOCHIRURGIA

IX CONGRESSO NAZIONALE ECOCARDIOCHIRURGIA 2017

MILANO, 27 - 28 - 29 MARZO 2017

Il trattamento delle urgenze cardiorespiratorie time-dipendenti

Perché implementare il trattamento della TEP a rischio intermedio con Trattamento Farmaco Meccanico ?

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❑ **I have the following** potential conflicts of interest to report:

❑ Consulting: Boston Scientific – EKOS -

- Interventional “Cardiologist”

Acute MI 

Acute Aortic Syndrome 

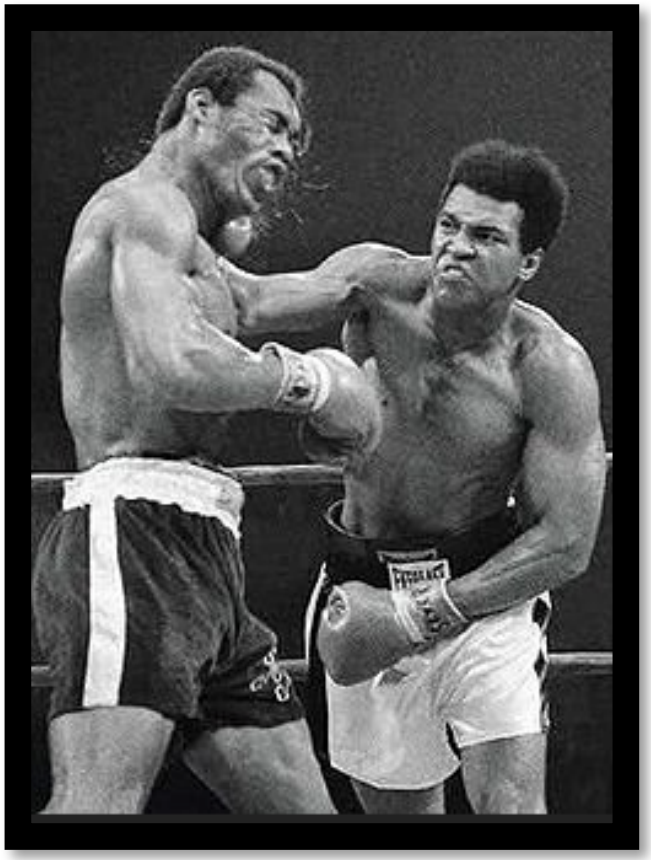
High Risk PE 

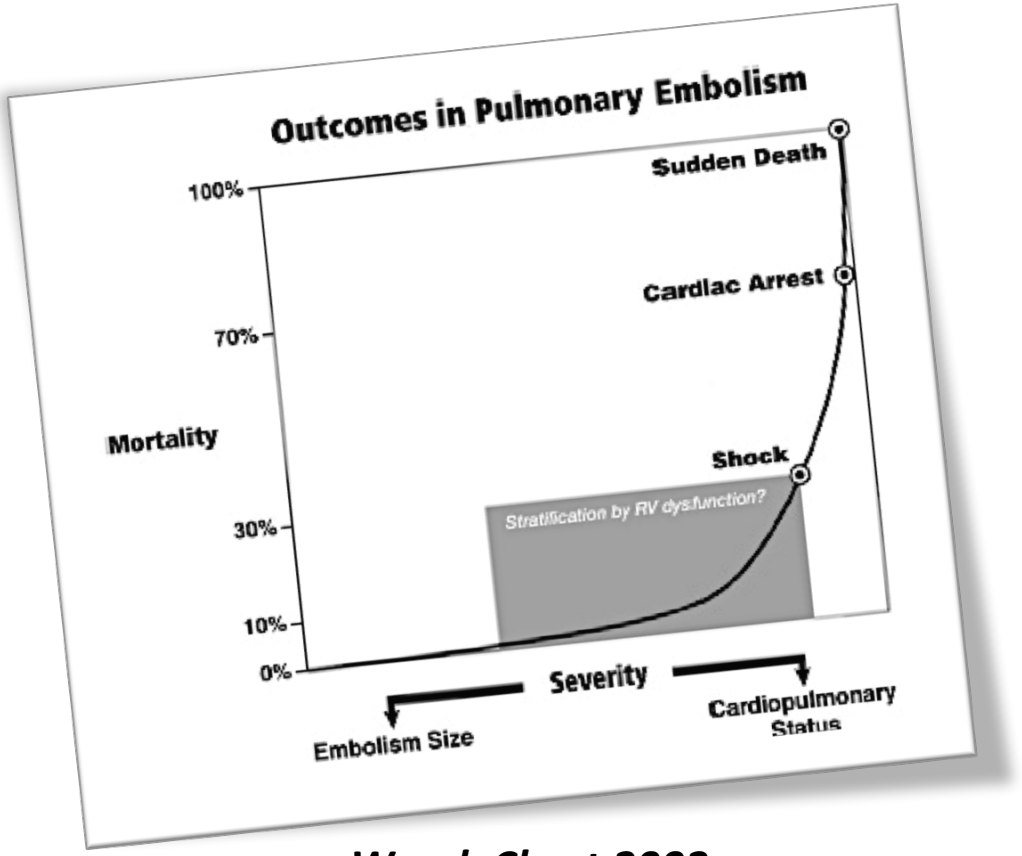
Intermediate/High risk PE ?

I have the following potential conflicts of interest to report:


WHAT
WHO
HOW
?
WHEN
WHERE
WHY

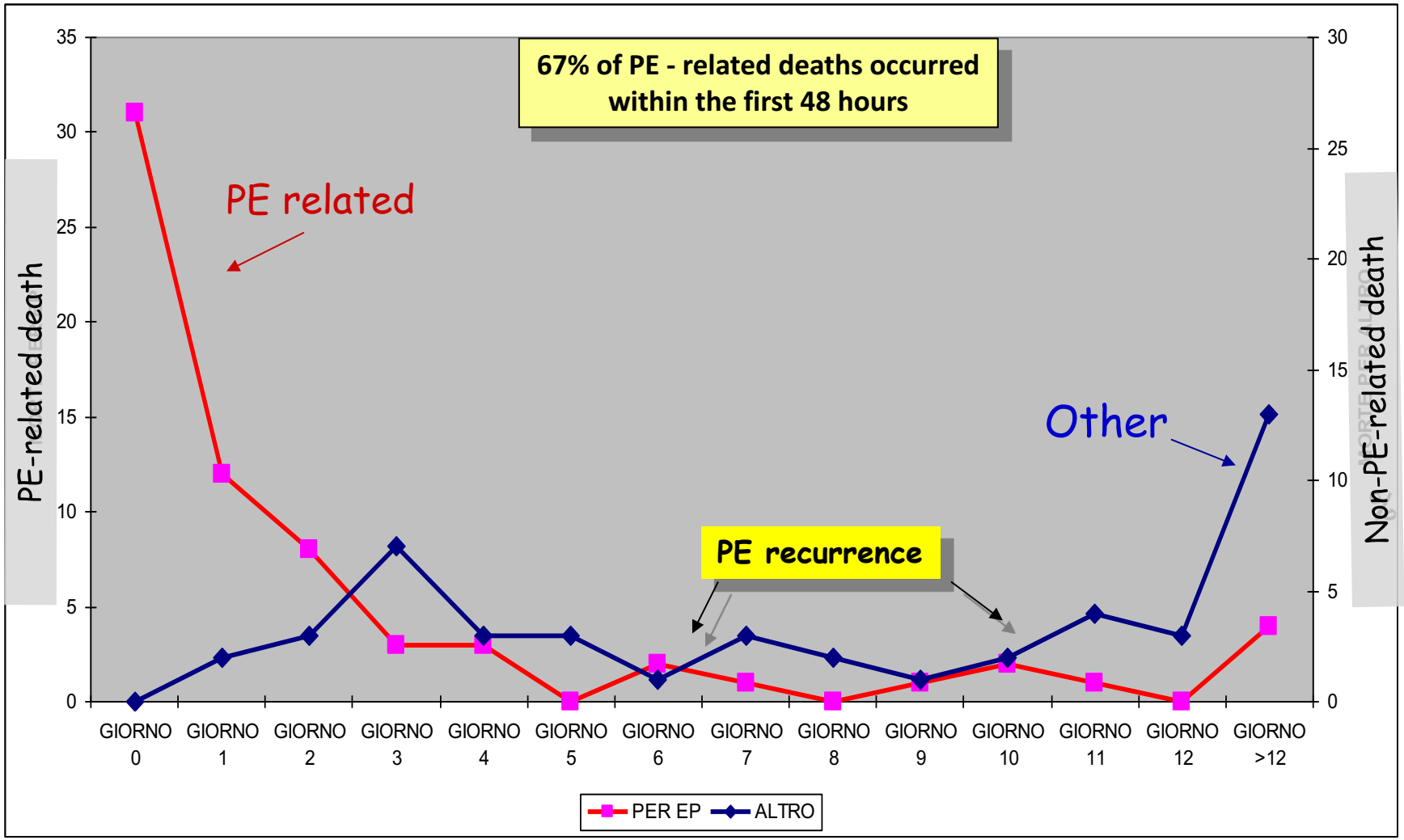
Challenges in diagnosis and treatment of Pulmonary Embolism



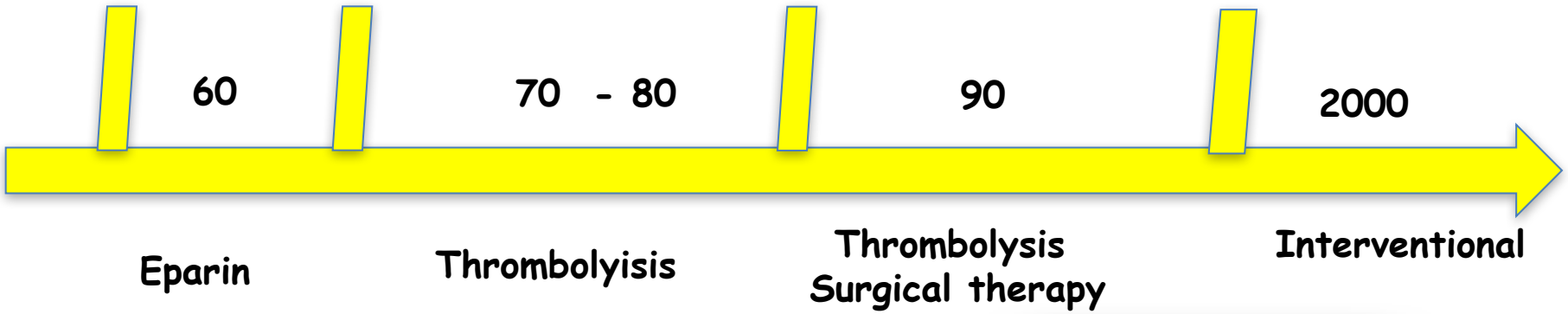


Wood ,Chest 2002

Cause of death in the first days and over time



Management of acute PE



Era of observation

Era of interventional

Management of acute PE

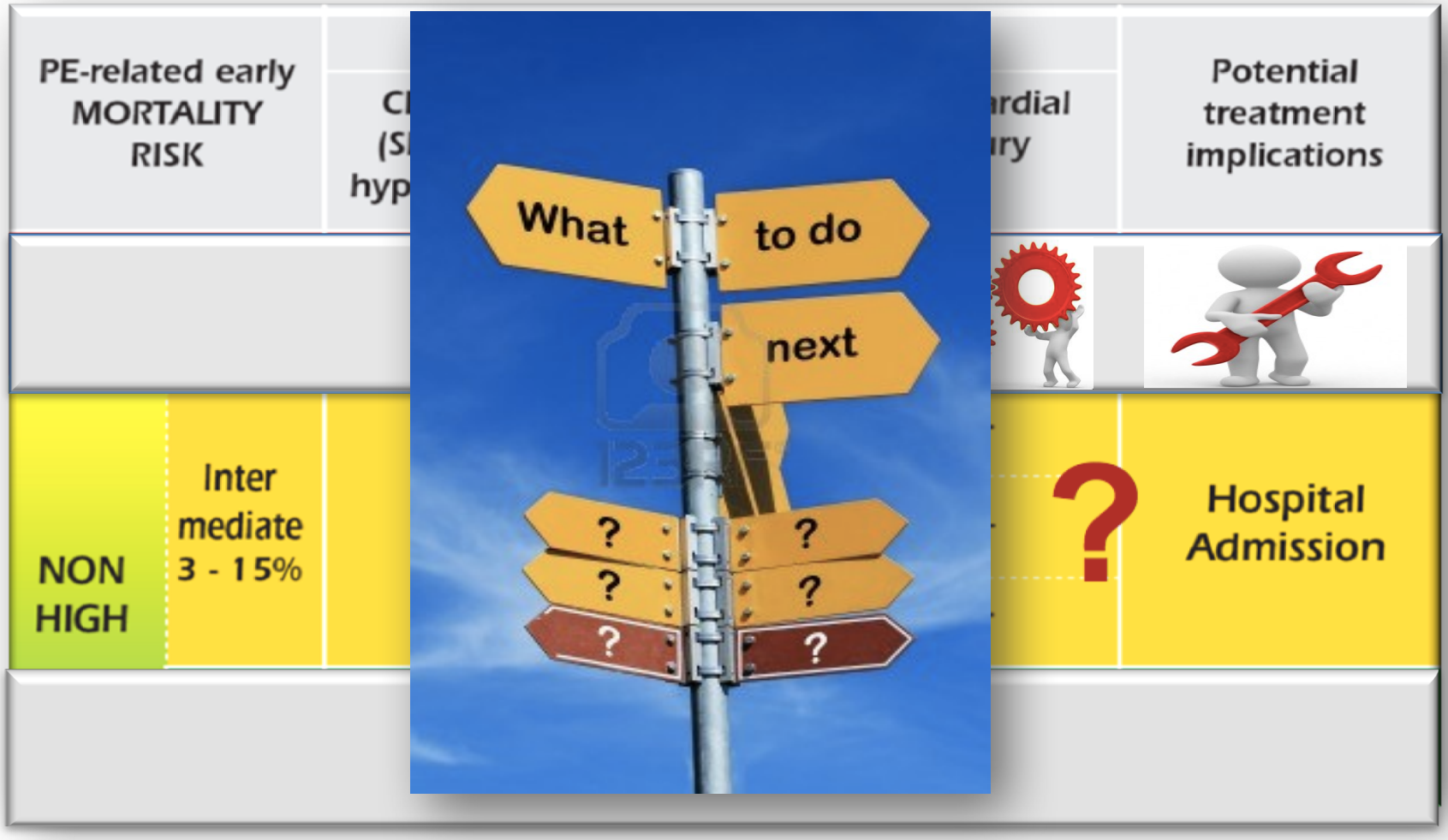
Early mortality risk		Risk parameters and scores			
		Shock or hypotension	PESI class III-V or sPESI ≥1[a]	Signs of RV dysfunction on an imaging test[b]	Cardiac laboratory biomarkers[c]
High		+	(+)[d]	+	(+)[d]
Intermediate	Intermediate–high	–	+	Both positive	
	Intermediate–low	–	+	Either one (or none)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

Interaction between specialists in diagnostic and therapeutic strategy of the PE

PE-related early MORTALITY RISK	RISK MARKERS			Potential treatment implications
	CLINICAL (Shock or hypotension)	RV Dysfunction	Myocardial injury	
Low <1%	–	–	–	Early discharge or home treatment

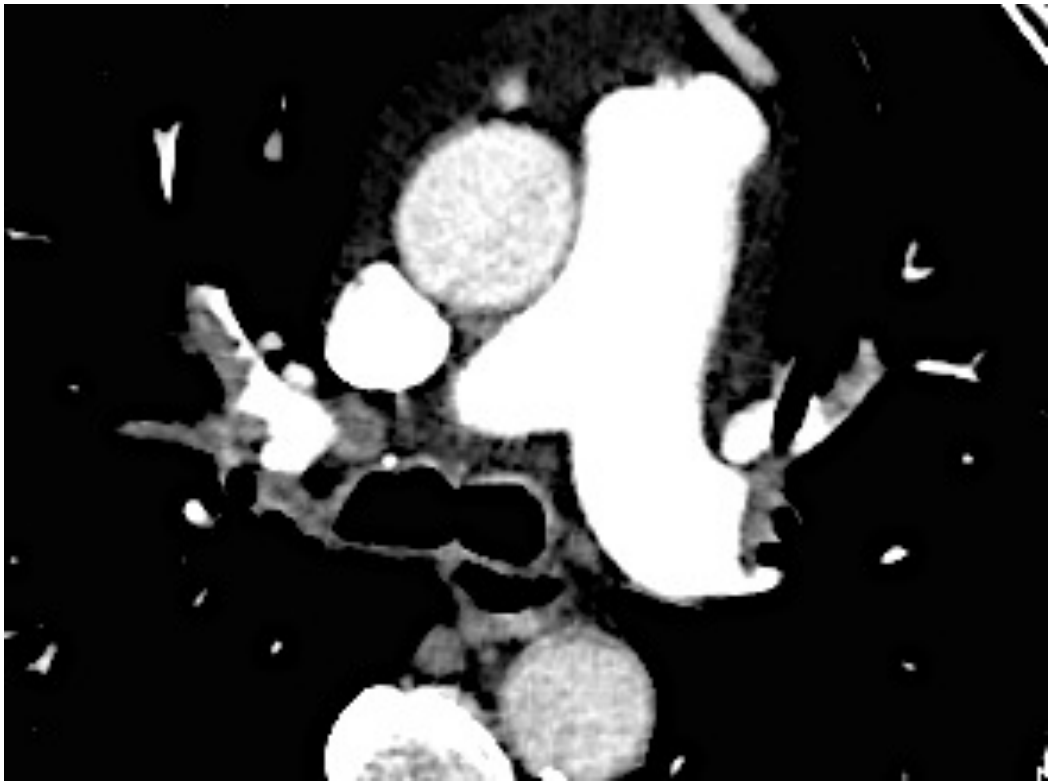
PE-related early MORTALITY RISK	RISK MARKERS			Potential treatment implications
	CLINICAL (Shock or hypotension)	RV Dysfunction	Myocardial injury	
HIGH > 15%	+	(+)*	(+)*	Thrombolysis or Embolectomy

Interaction between specialists in diagnostic and therapeutic strategy of the PE



Intermediate-high risk patient

- 45 years old male
- Dispnea
- BP 120
- FC 95
- Sat 95%
- VD +-
- Biomarkers -



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Fibrinolysis for Patients with Intermediate-Risk Pulmonary Embolism

ABSTRACT

BACKGROUND

The role of fibrinolytic therapy in patients with intermediate-risk pulmonary embolism is controversial.

METHODS

In a randomized, double-blind trial, we compared tenecteplase plus heparin with placebo plus heparin in normotensive patients with intermediate-risk pulmonary embolism. Eligible patients had right ventricular dysfunction on echocardiography or computed tomography, as w
for cardiac troponin I or trop
namic decompensation (or c
safety outcomes were major
stroke within 7 days after ran

RESULTS

Of 1006 patients who underwe
to-treat analysis. Death or her
tients (2.6%) in the tenectepl
placebo group (odds ratio, 0.4
tween randomization and day
and 9 (1.8%) in the placebo g
32 patients (6.3%) in the tenecteplase group and 6 patients (1.2%) in the placebo group (P<0.001). Stroke occurred in 12 patients (2.4%) in the tenecteplase group and was hemorrhagic in 10 patients; 1 patient (0.2%) in the placebo group had a stroke, which was hemorrhagic (P=0.003). By day 30, a total of 12 patients (2.4%) in the tenecteplase group and 16 patients (3.2%) in the placebo group had died (P=0.42).

CONCLUSIONS

In patients with intermediate-risk pulmonary embolism, fibrinolytic therapy prevented hemodynamic decompensation but increased the risk of major hemorrhage and stroke. (Funded by the Programme Hospitalier de Recherche Clinique in France and others; PEITHO EudraCT number, 2006-005328-18; ClinicalTrials.gov number, NCT00639743.)

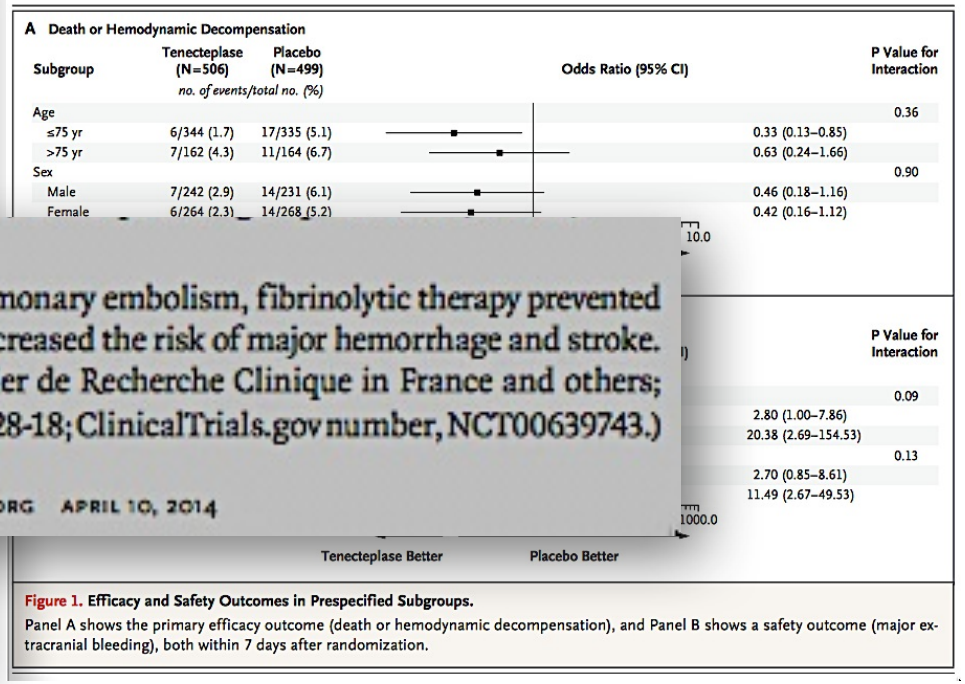


Figure 1. Efficacy and Safety Outcomes in Prespecified Subgroups.

Panel A shows the primary efficacy outcome (death or hemodynamic decompensation), and Panel B shows a safety outcome (major extracranial bleeding), both within 7 days after randomization.

Thromb Res. 2015 Nov;136(5):932-7. doi: 10.1016/j.thromres.2015.09.012. Epub 2015 Sep 12.

Thrombolysis for acute intermediate-risk pulmonary embolism: A meta-analysis.

Gao GY[1], Yang P[2], Liu M[3], Ding M[4], Liu GH[5], Tong YL[6], Yang CY[7], Meng FB[8].

Author information

Abstract

BACKGROUND: The use of thrombolytic therapy in patients with intermediate-risk pulmonary embolism is controversial. To compare with anticoagulation alone, no analysis before has determined whether thrombolytic therapy is associated with improved survival or lower incidence of adverse clinical outcomes for intermediate-risk pulmonary embolism.

OBJECTIVE: This meta-analysis was performed to assess mortality benefits, bleeding and recurrent pulmonary embolism risks associated with thrombolytic therapy compared with anticoagulation in patients with intermediate-risk pulmonary embolism.

METHODS: The Web of Science, PubMed, Embase, EBSCO, and the Cochrane Library databases were searched for randomized

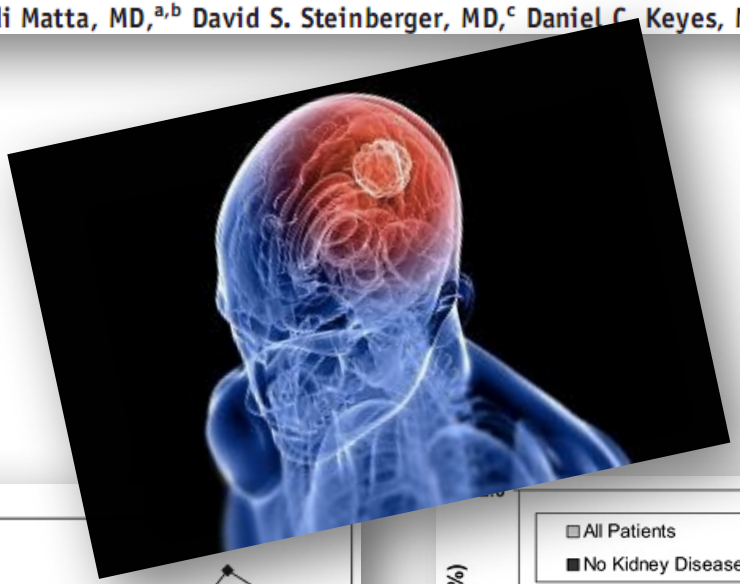
Conclusion

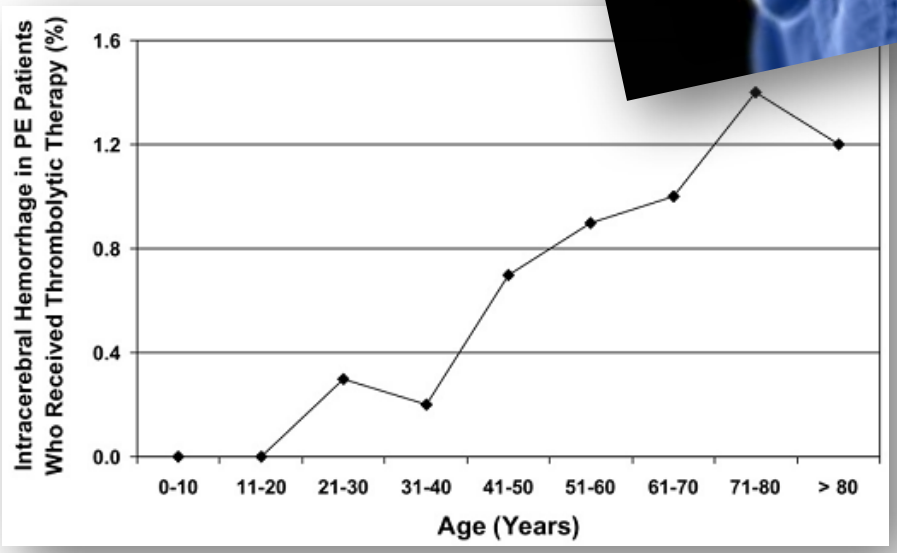
Compared with anticoagulation, thrombolytic therapy in patients with intermediate-risk pulmonary embolism is associated with lower all-cause mortality and recurrent pulmonary embolism risk despite increased major and minor bleeding risks.

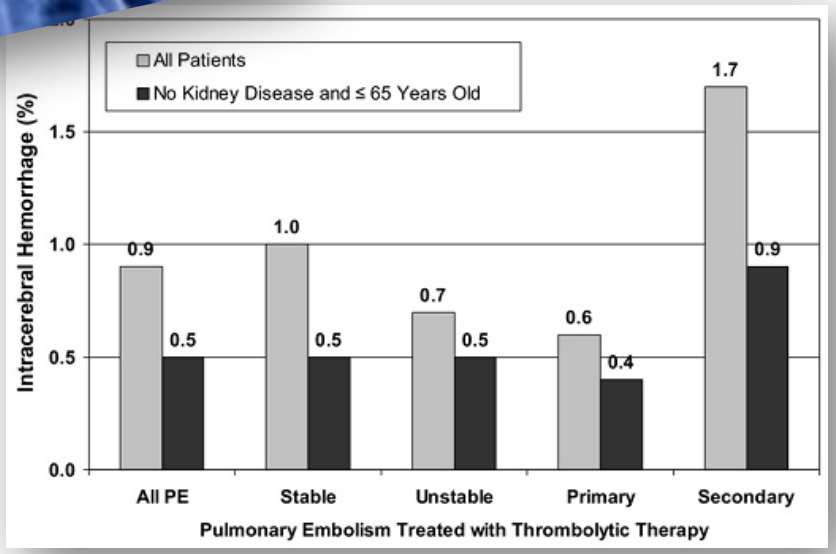
1.39% [12/866] vs. 2.92% [26/889]). Compared with anticoagulation, thrombolytic therapy was associated with a higher risk of major (RR, 3.35; 95% CI, 2.03-5.54; 7.80% [64/820] vs. 2.28% [19/834]) and minor (RR, 3.66; 95% CI, 2.77-4.84; 32.78% [197/601] vs. 8.94% [53/593]) bleeding. Furthermore, thrombolytic therapy was associated with a lower incidence of recurrent pulmonary embolism (RR, 0.33; 95% CI, 0.15-0.73; 0.73% [6/826] vs. 2.72% [23/846]).

Intracerebral Hemorrhage with Thrombolytic Therapy for Acute Pulmonary Embolism

Paul D. Stein, MD,[a,b] Fadi Matta, MD,[a,b] David S. Steinberger, MD,[c] Daniel C. Keyes, MD[d,e]

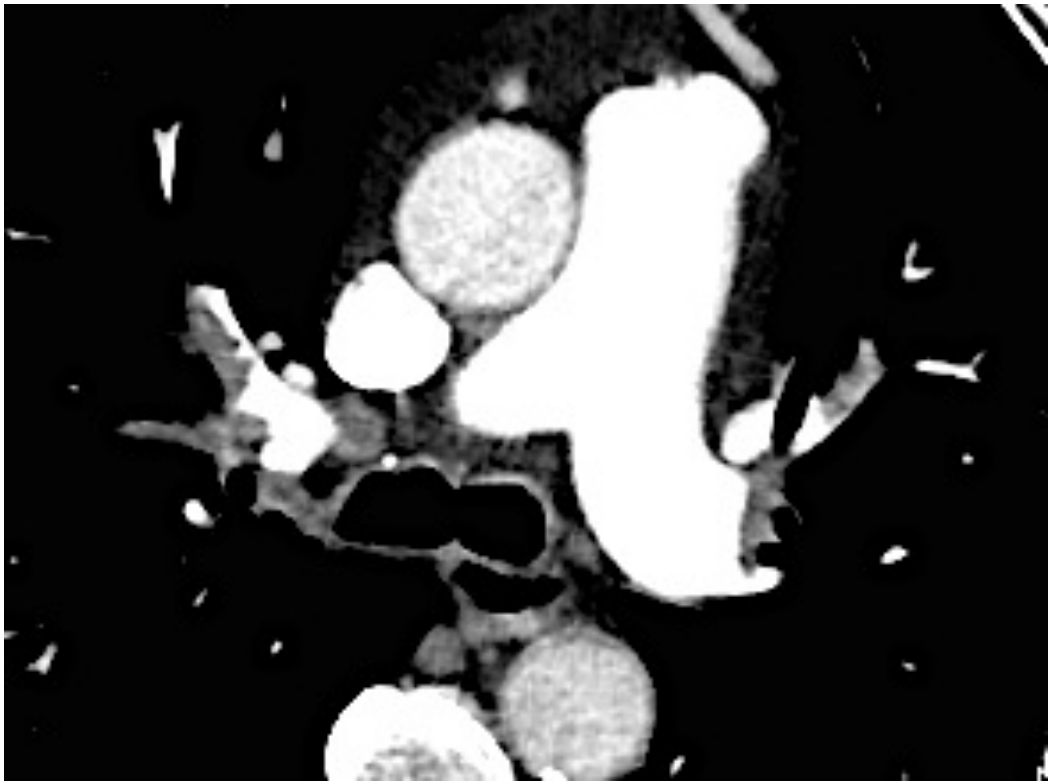






Intermediate-high risk patient

- 45 years old male
- Dispnea
- BP 120
- FC 95
- Sat 95%
- VD +-
- Biomarkers -



Catheter-based technique in Intermediate-high-risk patients

"Pharmacomechanical" Therapy

Mechanical Fragmentation

Hydrodynamic

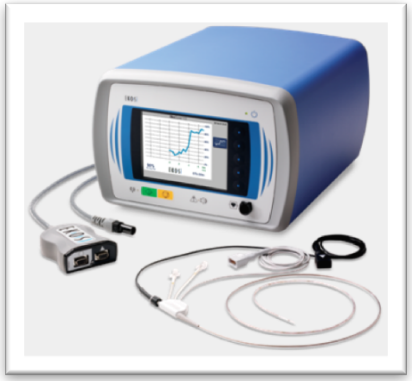
Ultrasound-Accelerated Fibrinolysis

Suction Embolectomy

PMT in Intermediate-high-risk patients

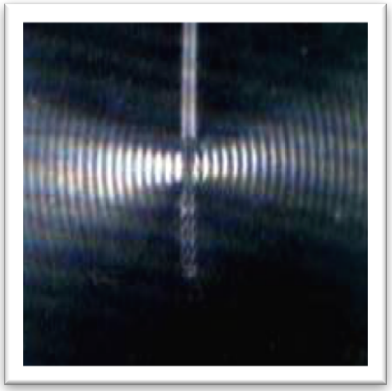
Ultrasound assisted thrombolysis

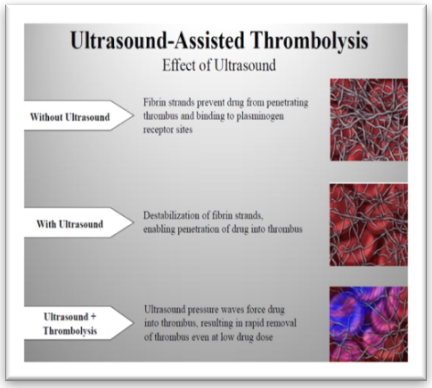
Ekosonic Control Unit



Endovascular device

Active Drug Delivery
Drug is actively driven into clot by "Acoustic Streaming"





Acoustic Streaming Drives Lytic into clot

PMT in Intermediate-high-risk patients

European Heart Journal (2014) **35**, 758–764
doi:10.1093/eurheartj/ehu029

REVIEW

20th cardiology update

Ultrasound-assisted thrombolysis for acute pulmonary embolism: a systematic review

Rolf P. Engelberger[1] and Nils Kucher[1,2]*

Table I Summary of published studies on ultrasound-assisted thrombolysis for acute pulmonary embolism

First author and year of publication	No. of patients	Patients with high-risk PE	Total rt-PA dose (mg)	Total thrombolysis duration (h)	RV/LV ratio		Mean pulmonary artery pressure (mmHg)		Cardiac index (l/min/m^2)		Relative reduction in pulmonary occlusion score (%)	Bleeding complications		Mortality at 3 months
					Before	After	Before	After	Before	After		Minor	Major	
Chamsuddin *et al.* (2008)[26]	10	NA	21.8	24.8 ± 8.4	NA	NA	NA	NA	NA	NA	NA	2 (20)	0 (0)[a]	0 (0)
Lin *et al.* (2009)[25]	11	2 (18)	17.2 ± 2.4	17.4 ± 5.2	NA	NA	NA	NA	NA	NA	69.0[b]	0 (0)	0 (0)[c]	1 (9)
Engelhardt *et al.* (2011)[29]	24	5 (21)	33.5 ± 15.5	19.7 ± 8.1	1.33 ± 0.24[d]	1.0 ± 0.13[d]	NA	NA	NA	NA	51.1[e]	2 (8)	4 (17)[f]	0 (0)
Quintana *et al.* (2013)[27]	10	2 (20)	18 (7–38)[g]	20.8 (12–49)[g]	NA	NA	NA	NA	NA	NA	41.9[h]	2 (20)	0 (0)[i]	0 (0)
Kennedy *et al.* (2013)[28]	60	12 (20)	35.1 ± 11.1	19.6 ± 6.0	NA	NA	27 ± 9	20 ± 6	NA	NA	32.0[b]	1 (2)	1 (2)[a]	4 (7)
Engelberger *et al.* (2013)[21]	52	14 (27)	21.0 ± 5.7	15.2 ± 1.7	1.42 ± 0.21[j]	1.06 ± 0.23[j]	37 ± 9	25 ± 8	2.0 ± 0.7	2.7 ± 0.9	NA	11 (21)	2 (4)[k]	2 (4)
Kucher *et al.* (2013)[30]	30	0 (0)	20.8 ± 3.0	15.0 ± 1.0	1.28 ± 0.19[j]	0.99 ± 0.17[j]	30 ± 9	24 ± 7	2.5 ± 0.5	3.9 ± 2.3	NA	3 (10)	0 (0)[k]	0 (0)
Total[l]	197	35 (18)	26.9[m]	17.8[m]	1.36 ± 0.21	1.03 ± 0.20	31.3 ± 9.0	22.7 ± 6.9	2.2 ± 0.7	3.1 ± 1.3	41.2	21 (10.7)	7 (3.6)	7 (3.6)

PMT in Intermediate-high-risk patients

Optimum Duration of Acoustic Pulse Thrombolysis Procedure in Acute Pulmonary Embolism (OPTALYSE PE)

Active Comparator: 2 hours APT Procedure and 4/8 mg rtPA

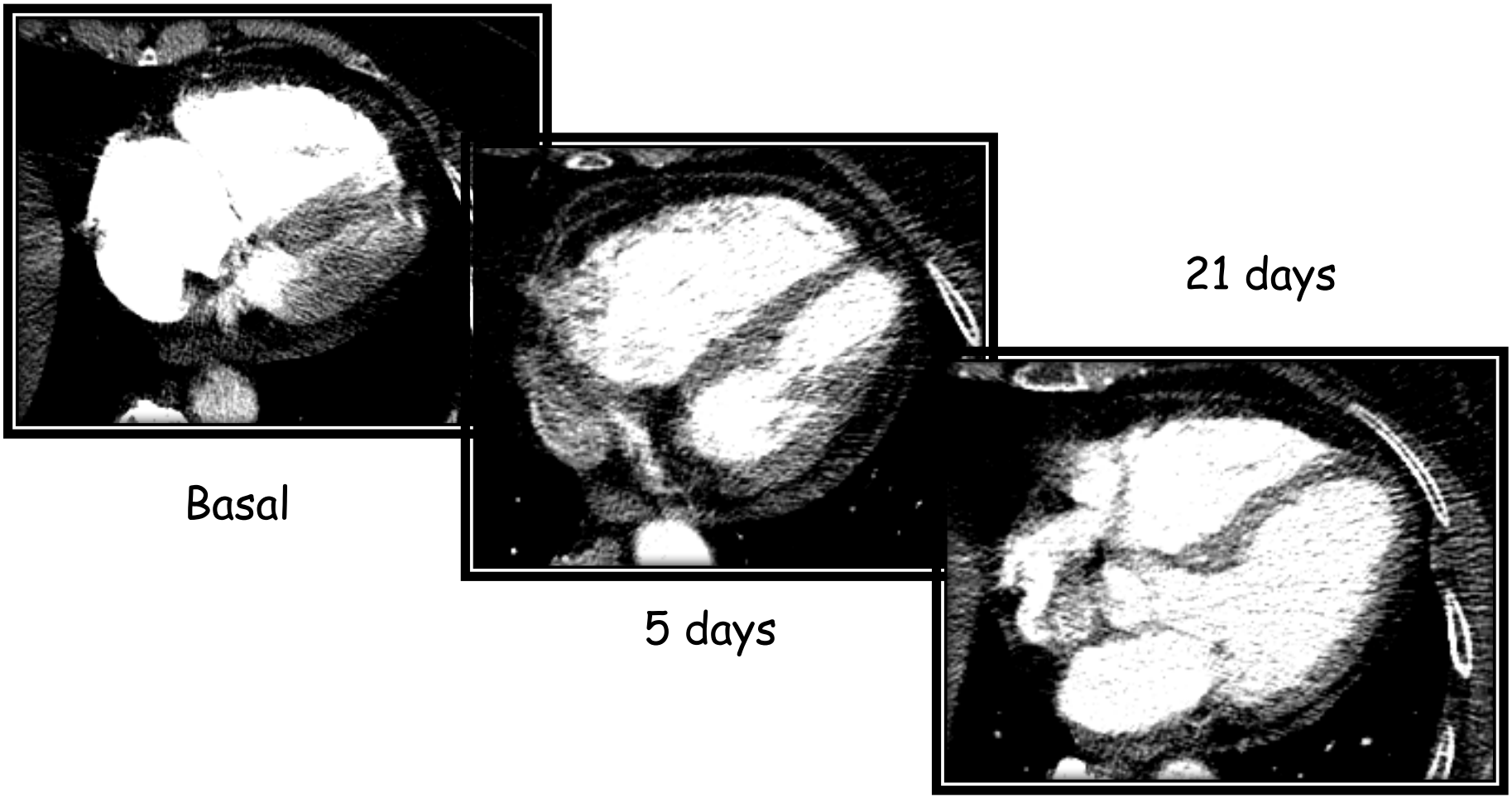
Active Comparator: 4 hours APT Procedure and 4/8 mg rtPA

Active Comparator: 6 hours APT Procedure and 6/12 mg rtPA

Active Comparator: 6 hours APT Procedure and 12/24 mg rtPA

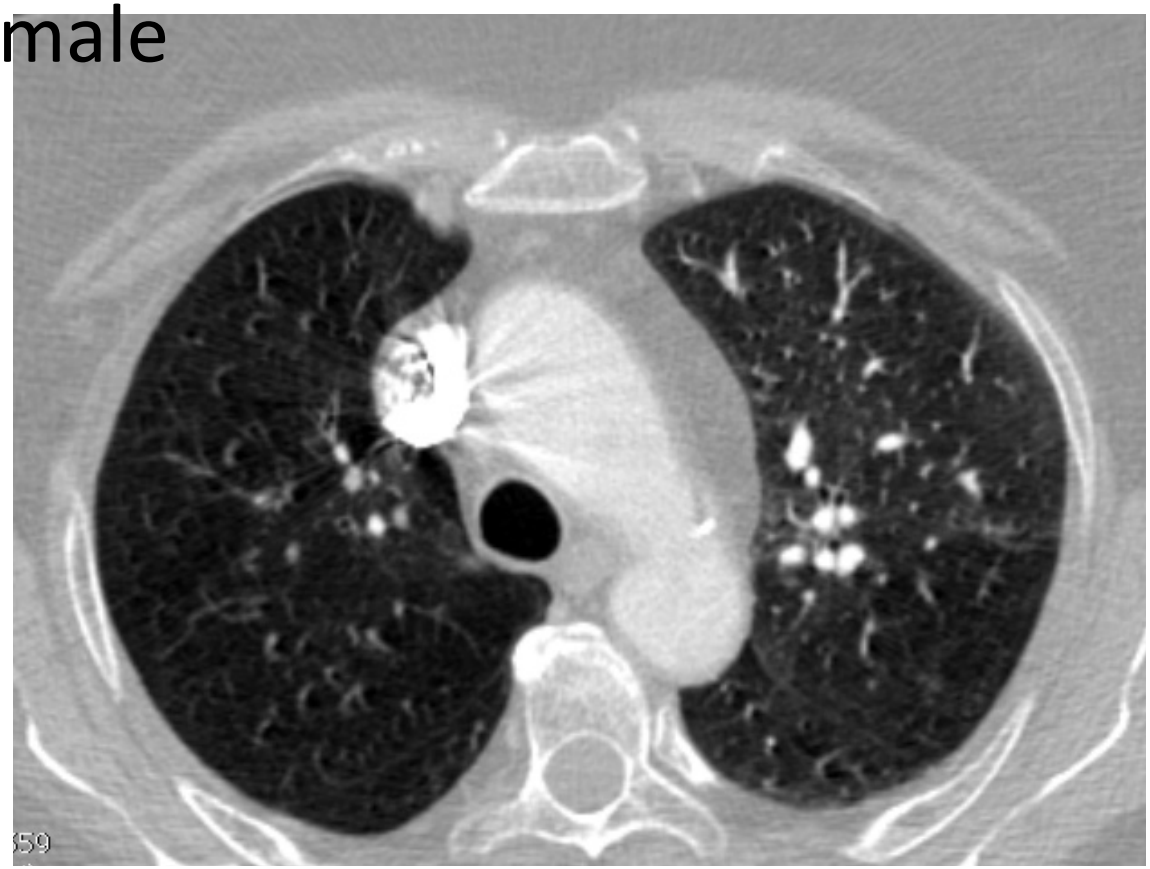
Active Comparator: tbd x hr treatment with EkoSonic Endovascular

RV disfunction



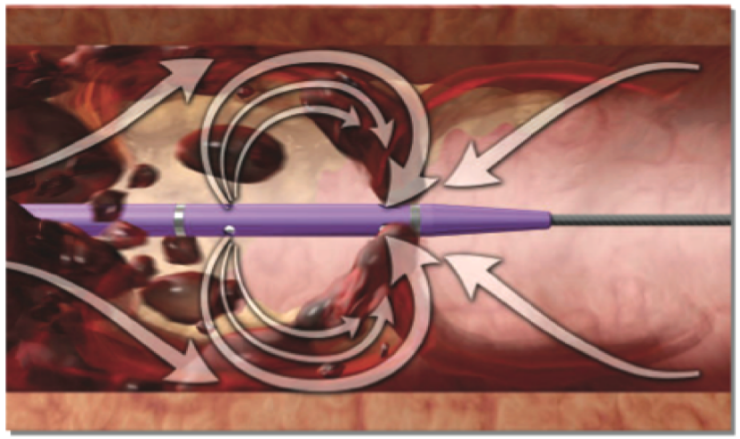
Intermediate-high-risk patients

- 79 years old female
- Dispnea
- BP 110
- FC 95
- Sat 93%
- VD ++
- Biomarkers +



PMT in Intermediate-high-risk patients

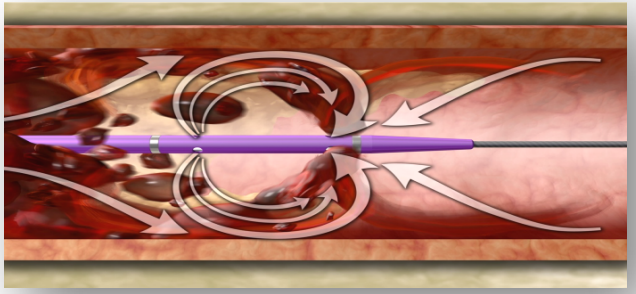
- Rheolytic:
  - **Rheo** from the Greek *rheo* (to flow)
  - **Lytic** from the Greek lytikos (able to loosen)
- AngioJet = Rheolytic Thrombectomy



Pharmaco-Mechanical Treatment

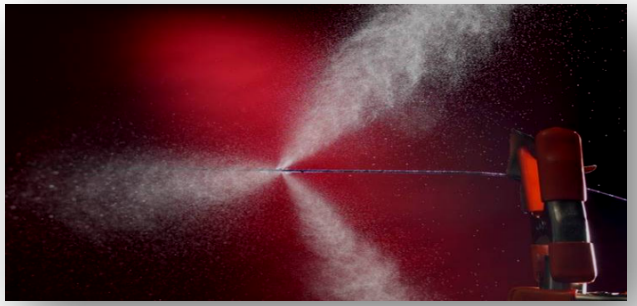
☑ Rapidlysis (5-10 mg Actilyse added to 250/500ml saline)

Cardiac Arrest – Shock



☑ Power pulse technique (20mg Actilyse added to 50ml saline power pulse spray, then 15-20 minutes wait and after that thrombectomy)

High/intermediate risk

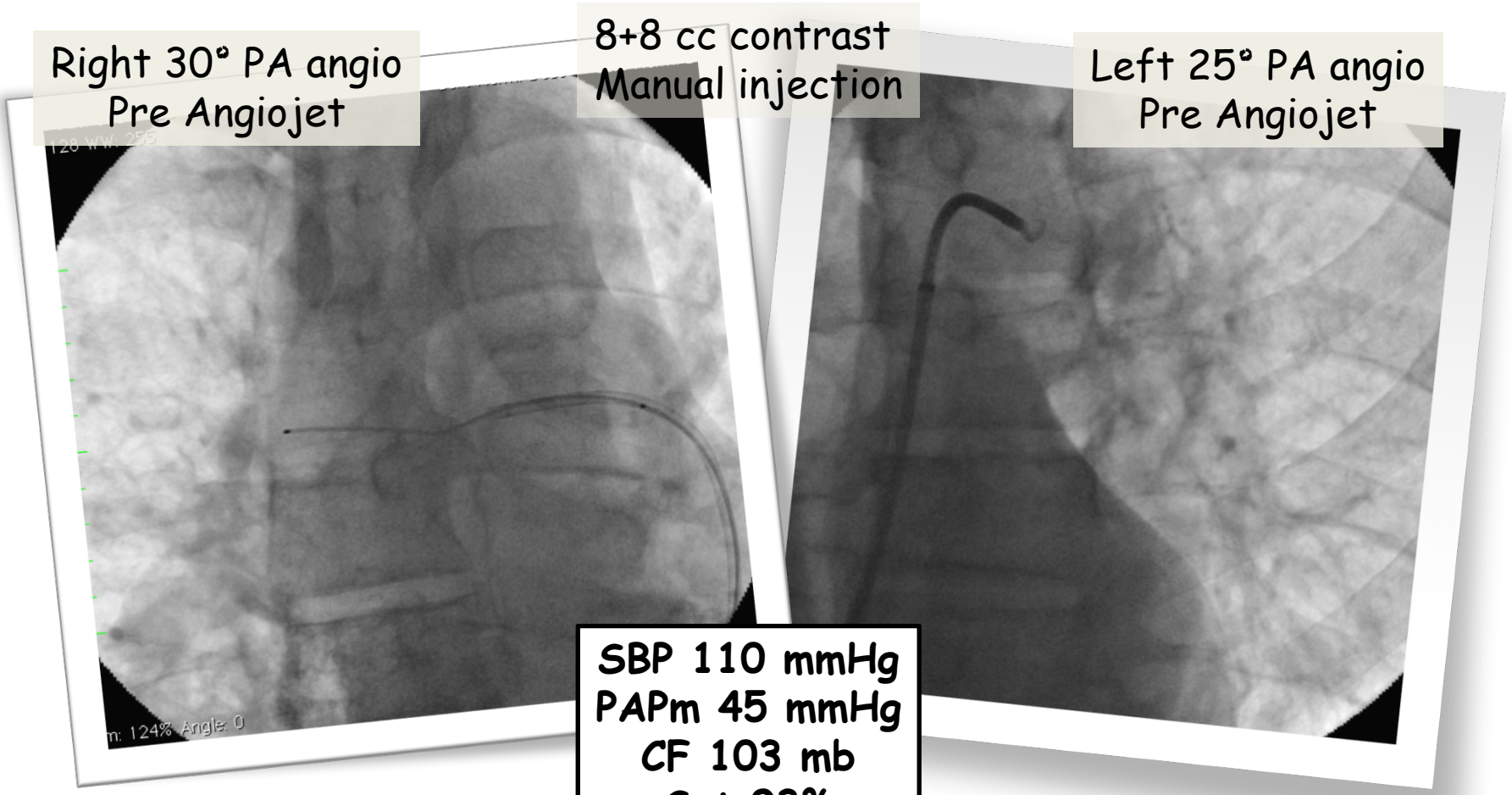


PMT in Intermediate-high-risk patients

Right 30° PA angio
Pre Angiojet

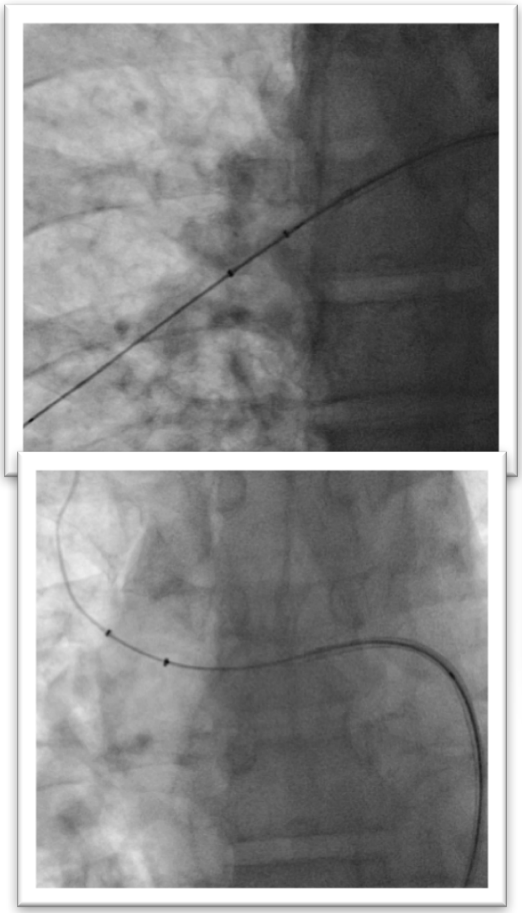
8+8 cc contrast
Manual injection

Left 25° PA angio
Pre Angiojet

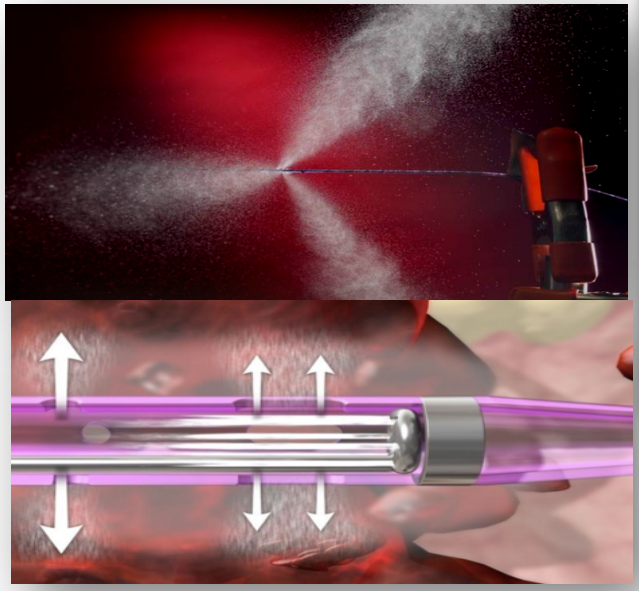


SBP 110 mmHg
PAPm 45 mmHg
CF 103 mb
Sat 93%

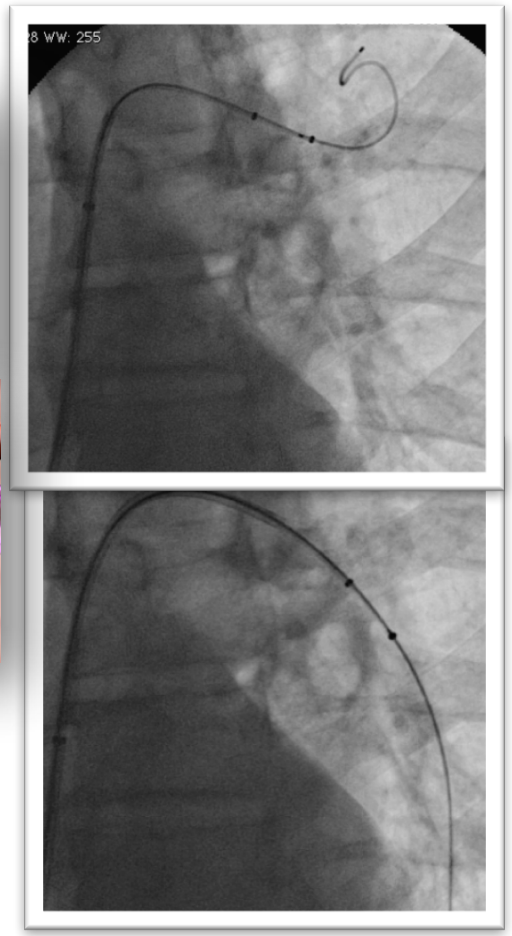
PMT in Intermediate-high-risk patients



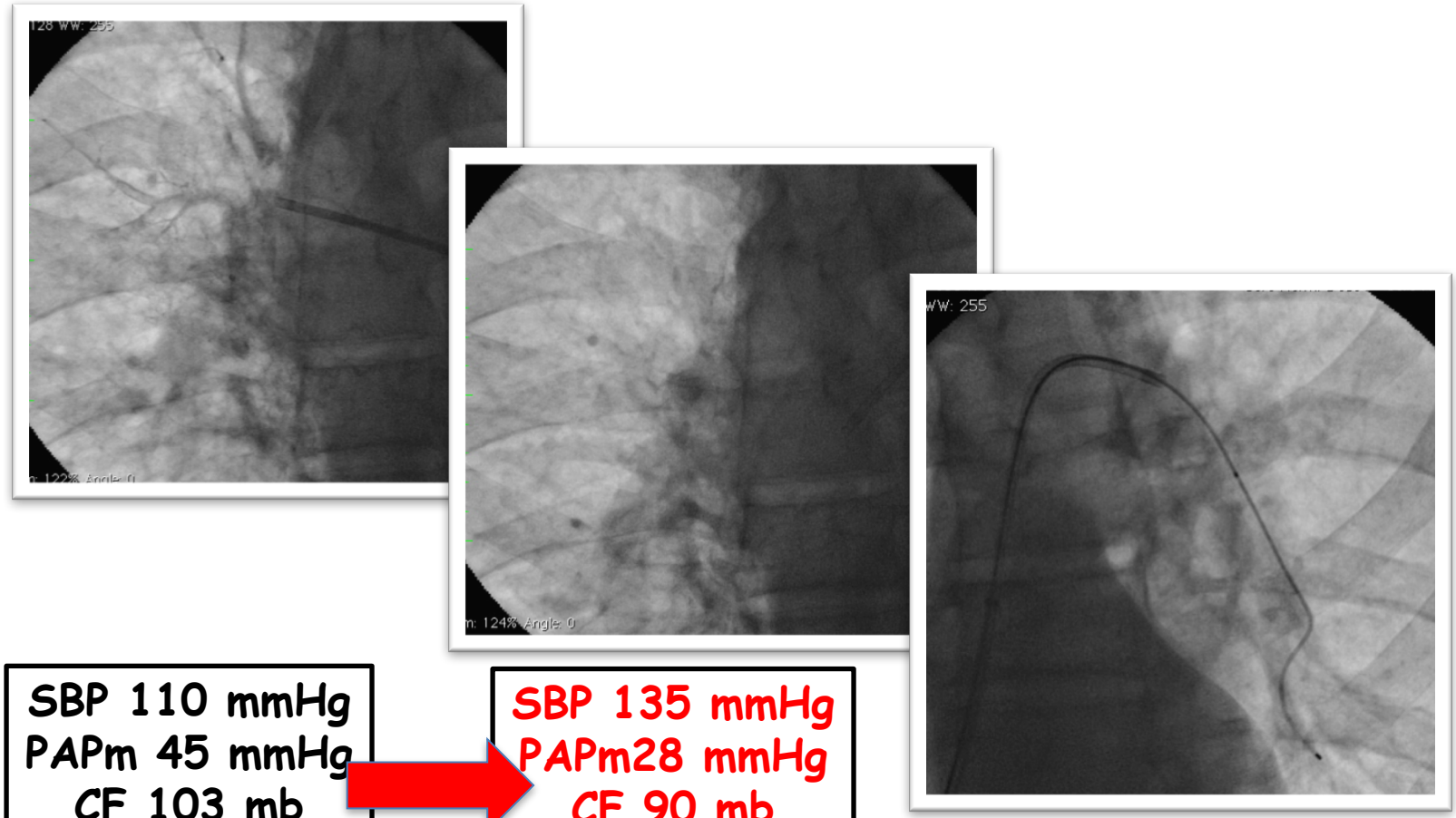
Power pulse technique



10mg Actilyse added to 50ml saline power pulse spray, then 15-20 minutes wait and after that thrombectomy



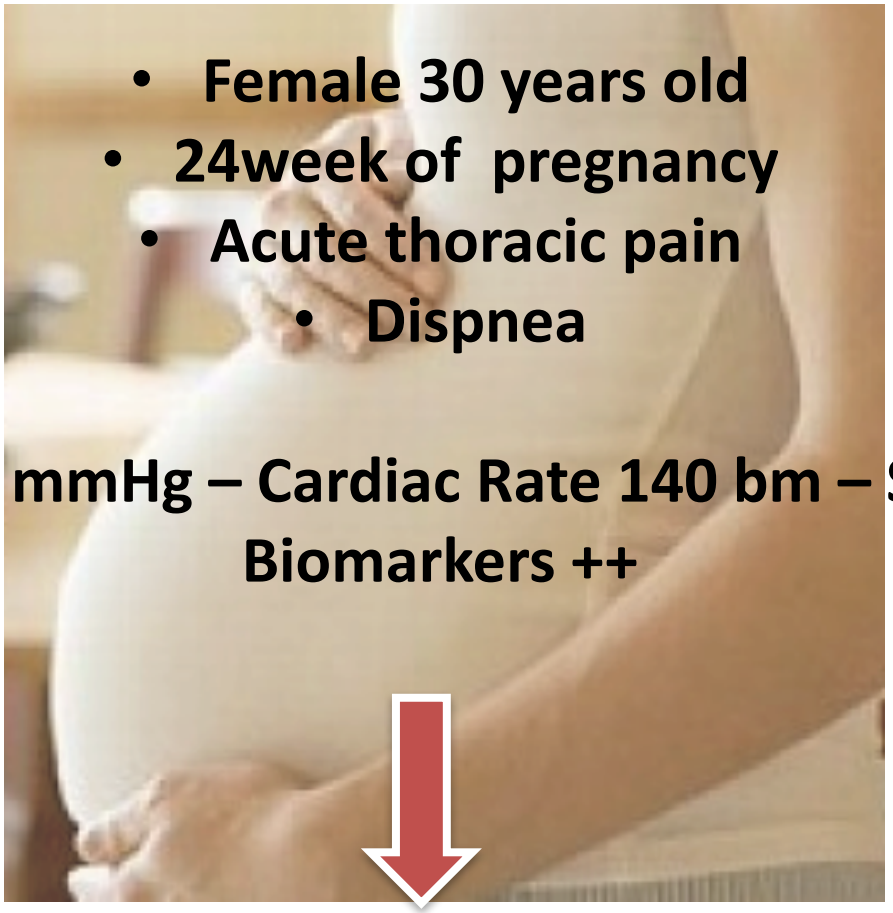
PMT in Intermediate-high-risk patients



SBP 110 mmHg
PAPm 45 mmHg
CF 103 mb
Sat 93%

SBP 135 mmHg
PAPm28 mmHg
CF 90 mb
Sat 99%

Intermediate-high risk patient



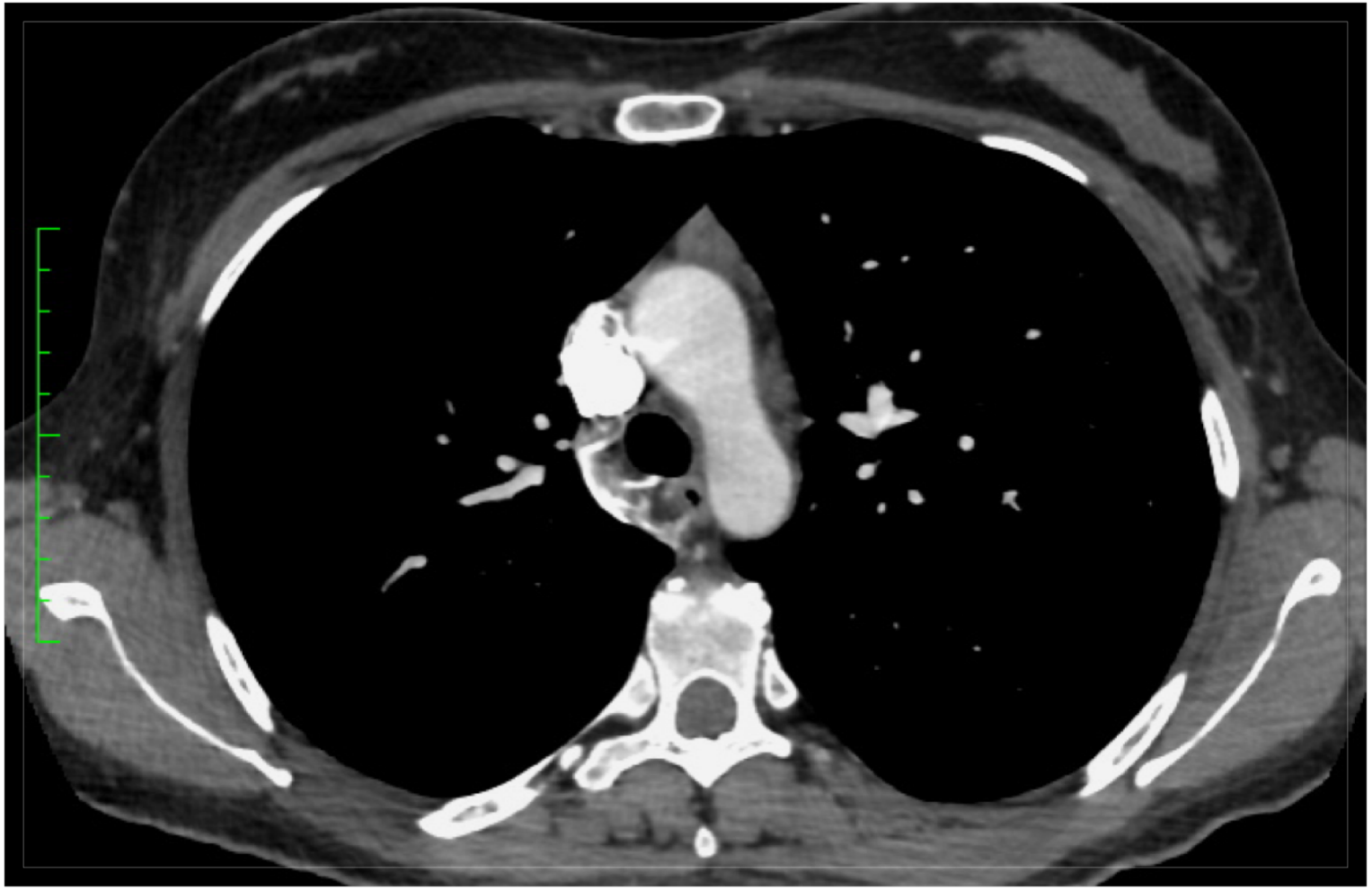
- Female 30 years old
- 24week of pregnancy
- Acute thoracic pain
- Dispnea

SBP 105 mmHg – Cardiac Rate 140 bm – Sat 90%

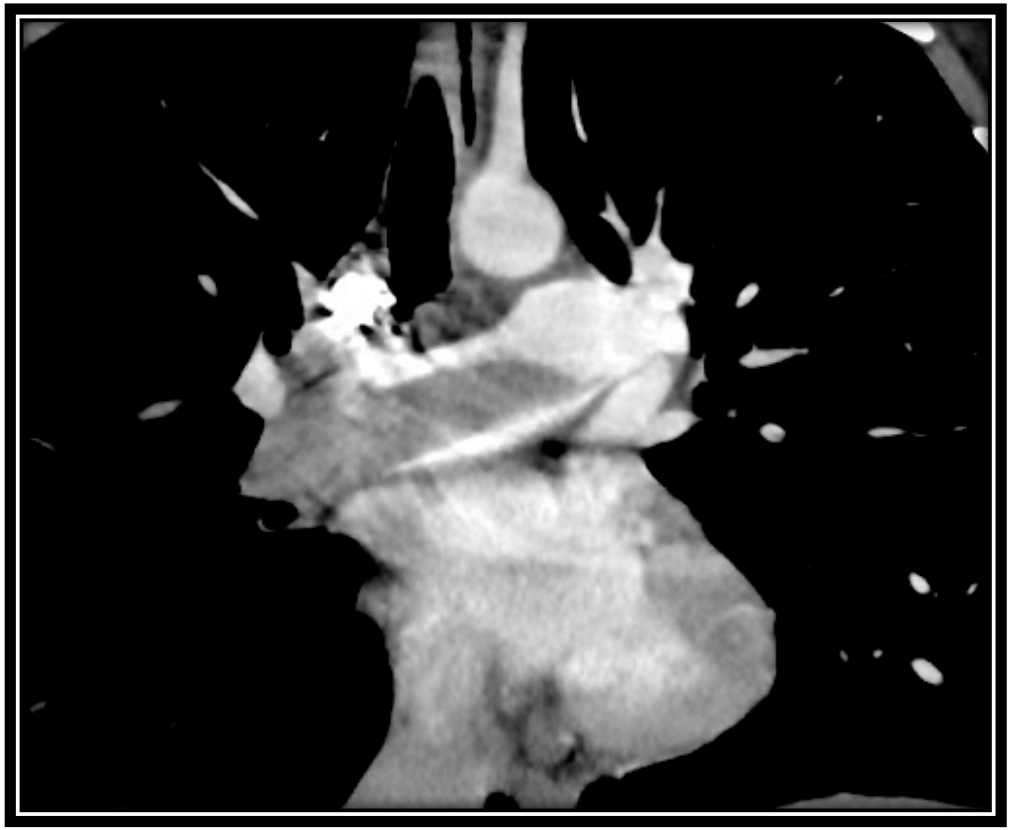
Biomarkers ++

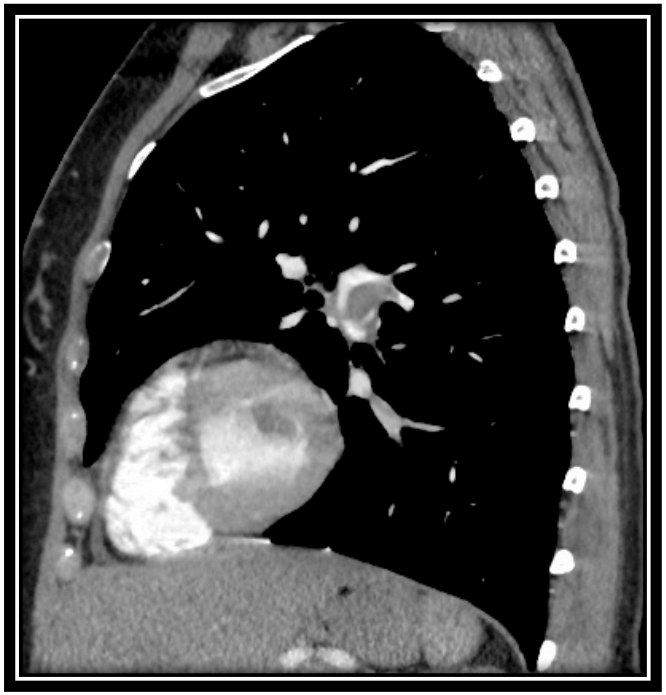
CT scan

Combined PMT in Intermediate-high-risk patients



Combined PMT in Intermediate-high-risk patients

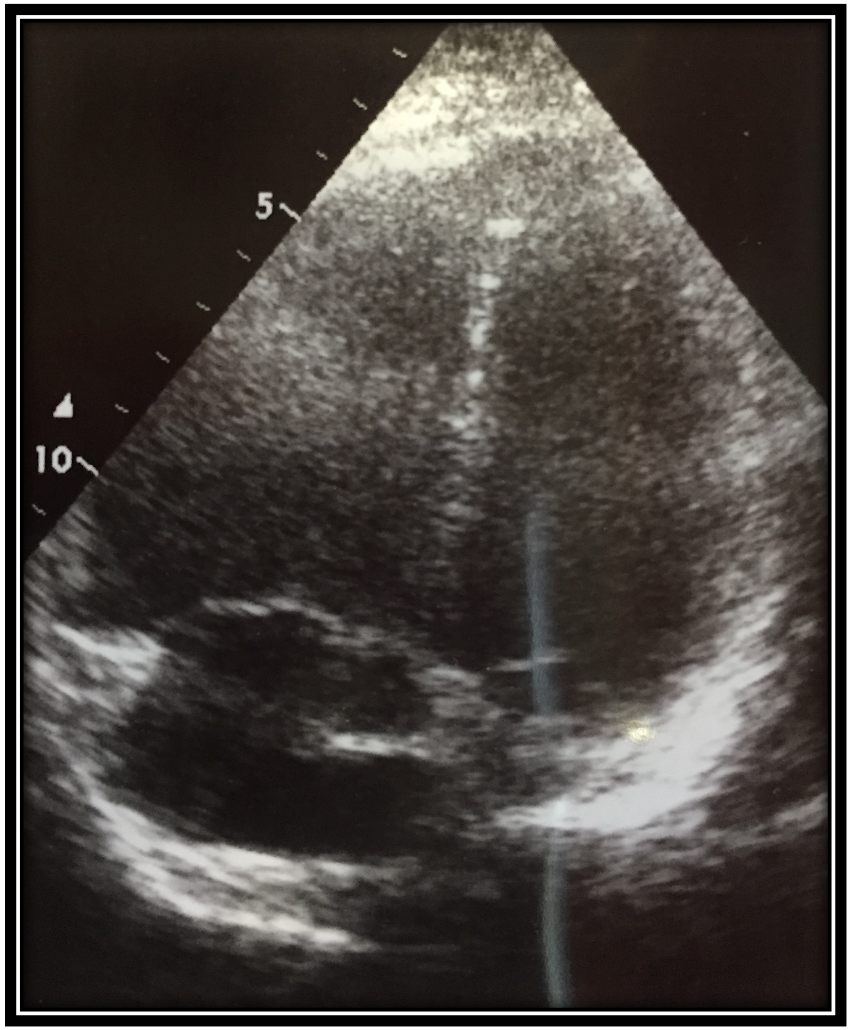




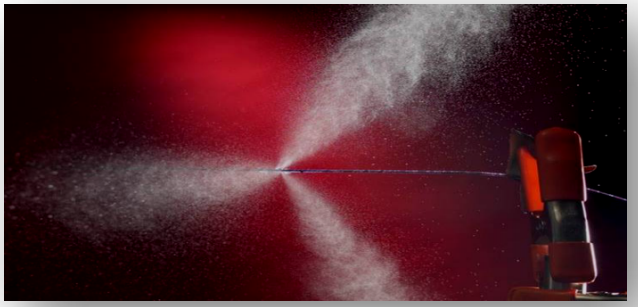

WHAT
WHO
HOW
?
WHEN
WHERE
WHY


RACEFACE
RACEFACE
RACEFACE

Combined PMT in Intermediate-high-risk patients



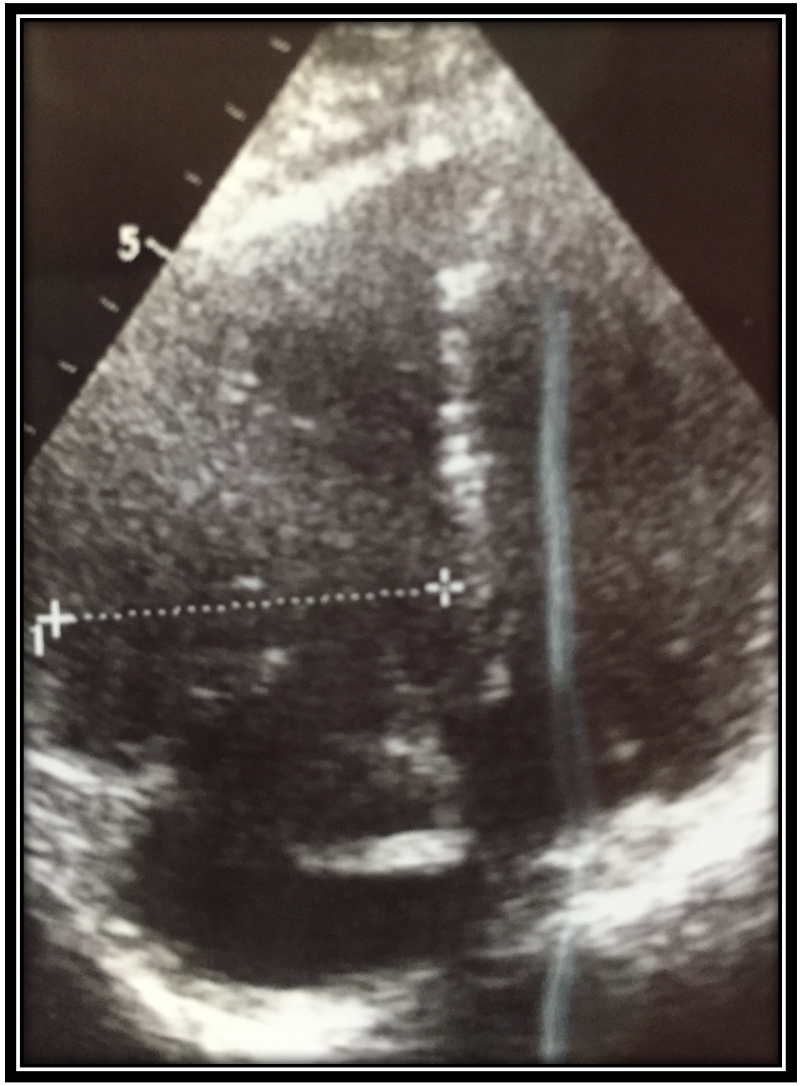
SBP 105 mmHg
PAPm 45 mmHg
CF 140 mb
Sat 91%



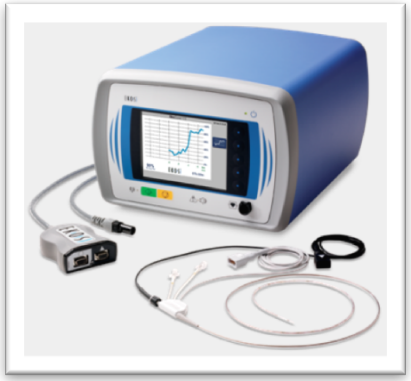
Power pulse technique

10 mg Actilyse added to 50ml saline
power pulse spray

Combined PMT in Intermediate-high-risk patients

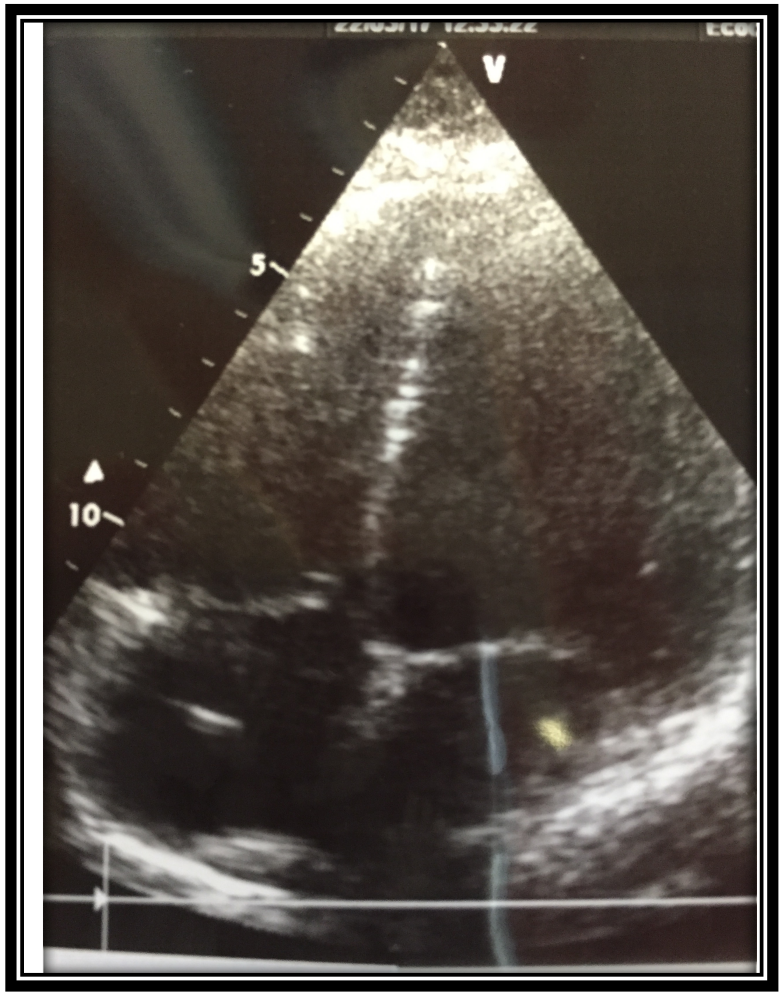


SBP 115 mmHg
PAPm 30 mmHg
CF 95 mb
Sat 99%

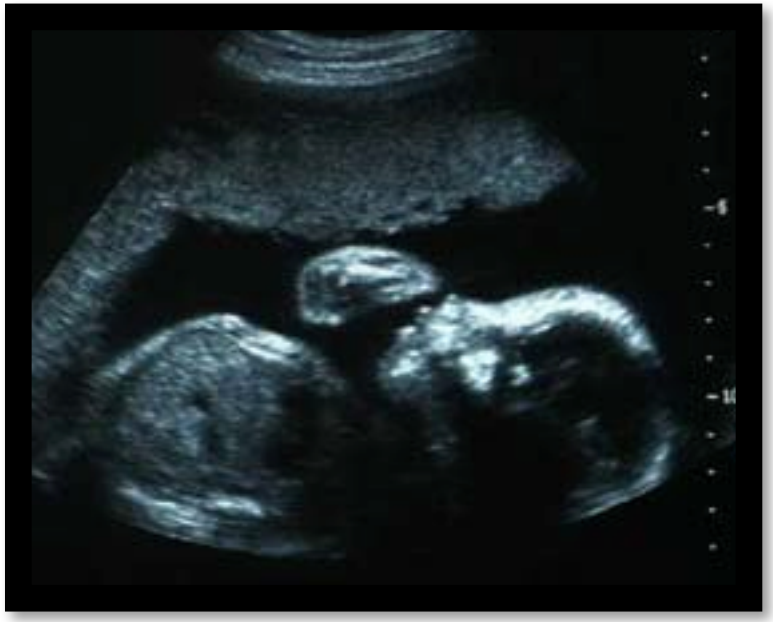


rtPa 1 mg /h x 12 h

Combined PMT in Intermediate-high-risk patients



Mobilizzazione in 24 h
EBPM 0.8 x 2
ECOcardio pre dimissione



Perché implementare il trattamento della TEP a rischio intermedio con Trattamento Farmaco Meccanico?

- Riduzione dosaggio trombolitico
- Riduzione complicanze emorragiche
- Efficacia terapia trombolitica

- Aumento pazienti eleggibili al trattamento
- Migliore outcome clinico
- Riduzione costi


BRAIN
IL CERVELLO
ISTRUZIONI PER L'USO
Thank You