CARDIO RUN 2024

16ème CONGRÈS DE PATHOLOGIE CARDIO-VASCULAIRE

Hôtel Saint Alexis
ILE DE LA RÉUNION
France

18-19-20 SEPTEMBRE 2024

COMITÉ SCIENTIFIQUE

Philippe MABO (Rennes)
Nicolas MENEVEAU (Besançon)
Pascal MOTREFF (Clermont-Ferrand)
Christophe POUILLOT (Sainte Clotilde - La Réunion)
Ashok TIROUVANZIAM (Nantes)

CARDIORUN.ORG

ORGANISATION GÉNÉRALE

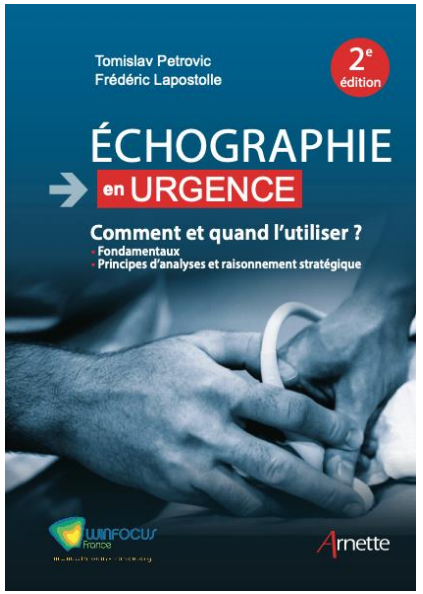
MCO CONGRÈS - **Contacts :** julie.faber@mcocongres.com - aurore.davy@mcocongres.com - www.mcocongres.com

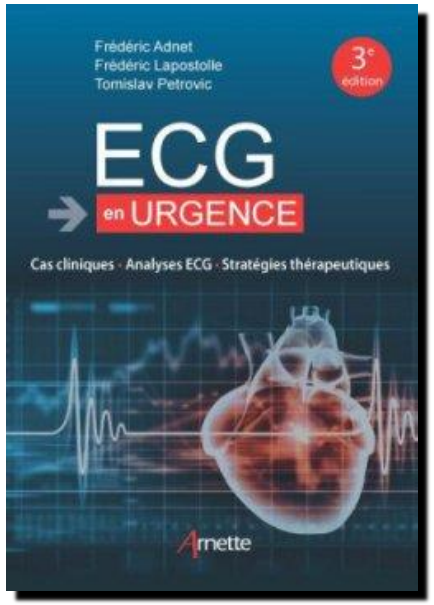
Disclosures

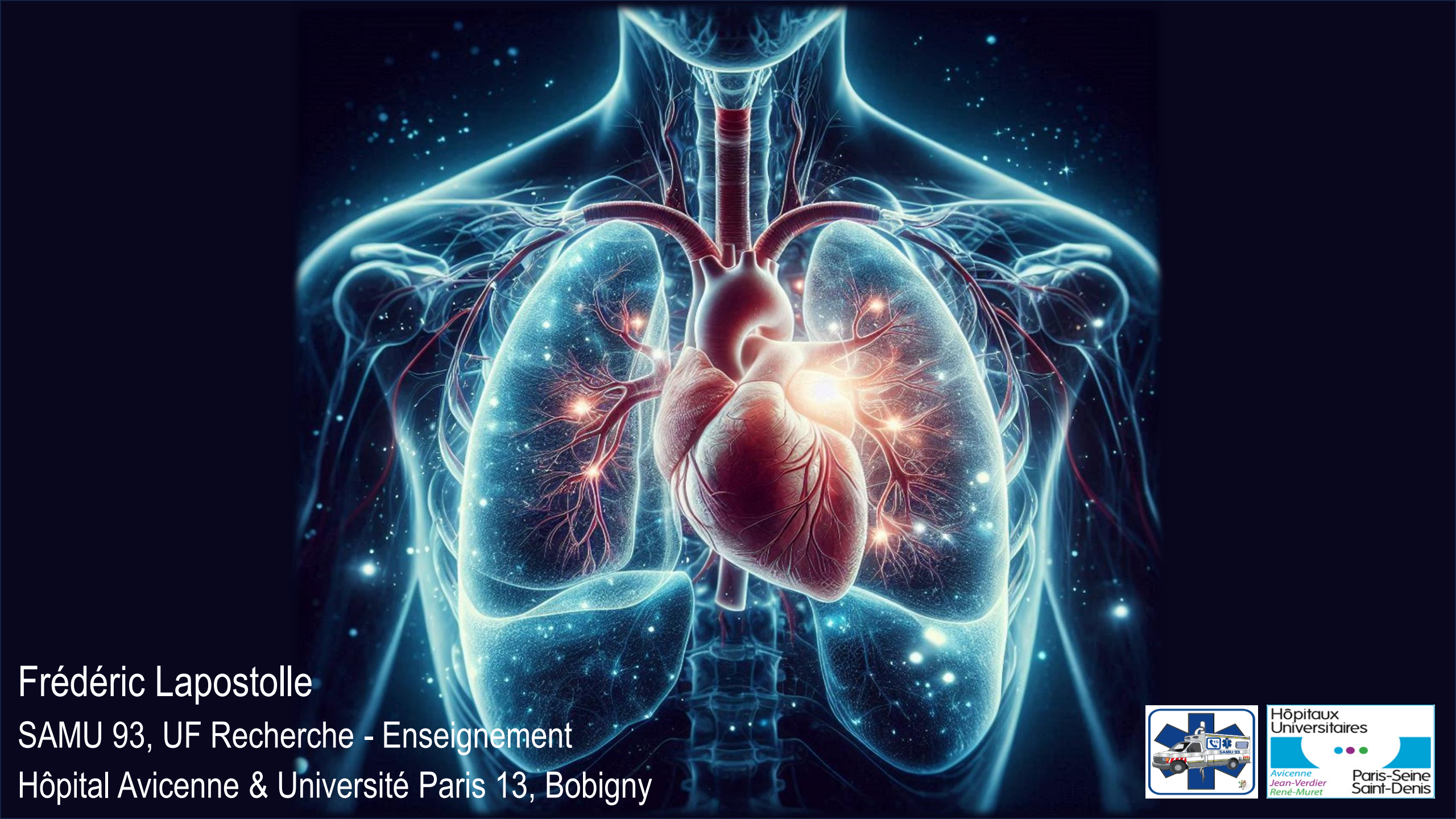
Conferences : Boehringer-Ingelheim, Mundipharma, Nova-Biomedical, Serb, Teleflex

Investigator – Researsh : Mundipharma, Serb, Teleflex

FORMATION SANTÉ EDUPRAT



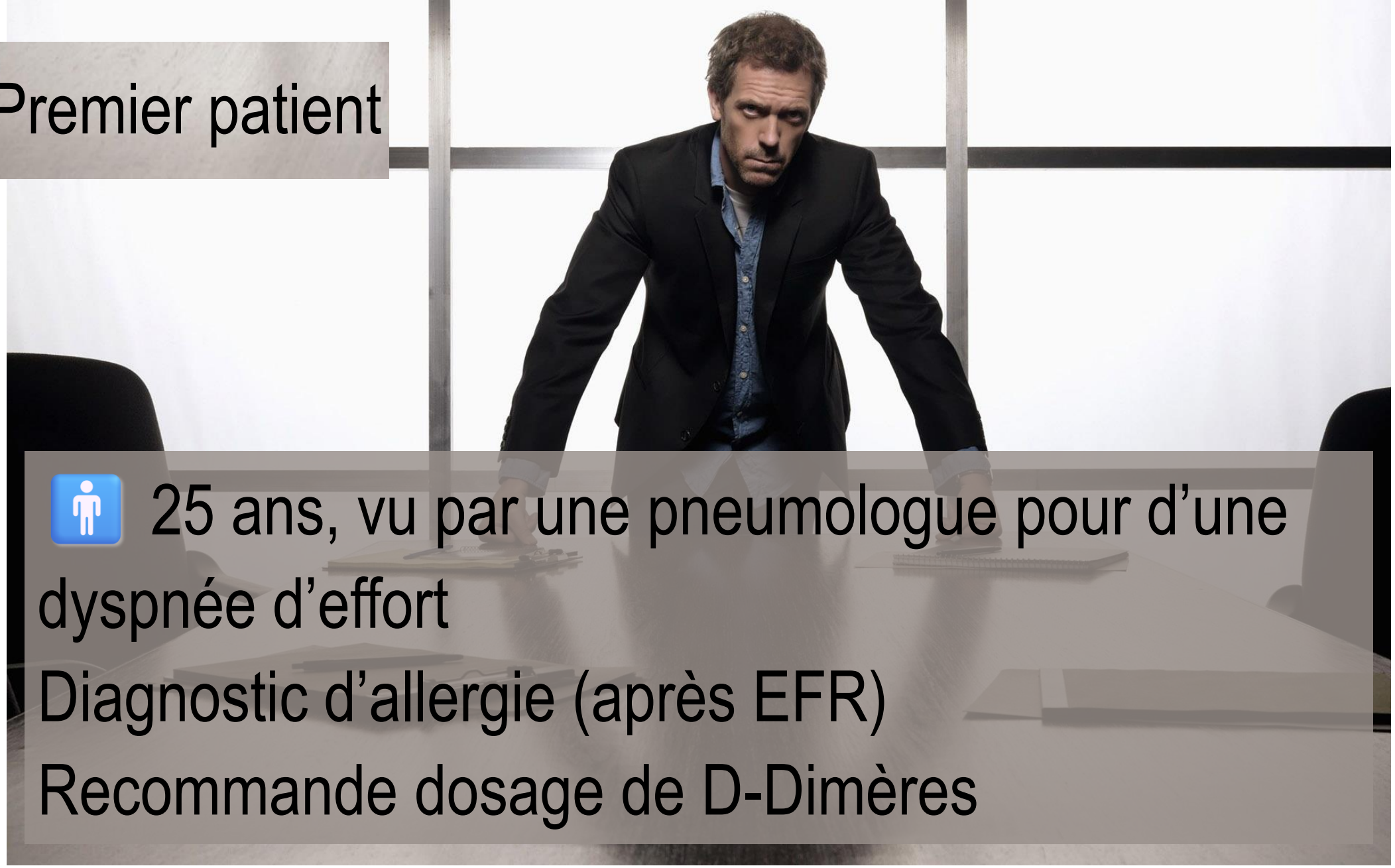




Frédéric Lapostolle
SAMU 93, UF Recherche - Enseignement
Hôpital Avicenne & Université Paris 13, Bobigny


Dr House

09:00 - Premier patient



🚹 25 ans, vu par une pneumologue pour d'une dyspnée d'effort

Diagnostic d'allergie (après EFR)

Recommande dosage de D-Dimères

09:01 - Premier patient

🚹 25 ans, vient pour **D-Dimères à 650 µg/L**

Pas d'antécédent thrombo-embolique

Pas de chirurgie ni de traumatisme récent

PA : 125/80 mm Hg ; FC : 95/min ; SpO_2 : 95%

Examen clinique sans particularité

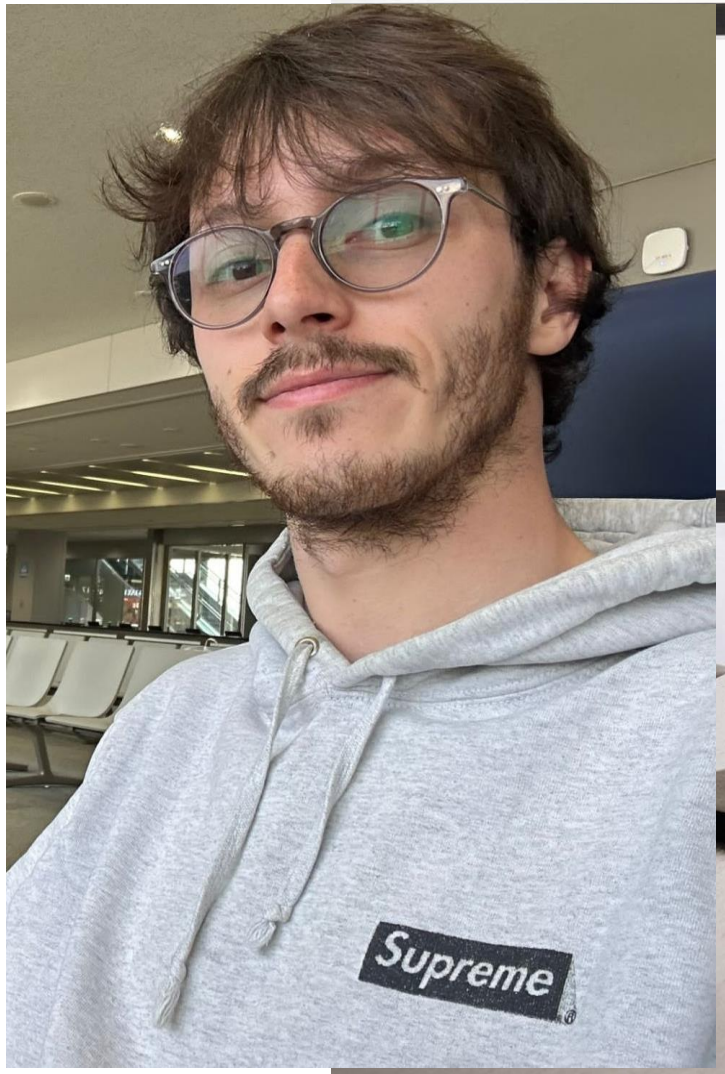
09:10 – Vous y croyez ?

Un peu	Beaucoup
Passionnément	A la folie

09:15 – Stratégie ?

D-dimères	Echo-Doppler MI
Angioscanner	Aucun

09:15 – Stratégie ?



D-dimères	Echo-Doppler MI
Angioscanner	Aucun

PERC : **P**ulmonary **E**mbolism **R**ule-Out **C**riteria

Age < 50 y
Initial heart rate < 100 beats/min
Initial oxygen saturation > 94% on room air
No unilateral leg swelling
No hemoptysis
No surgery or trauma within 4 wk
No history of venous thromboembolism
No estrogen use

🚹 25 ans, dyspnée

Pas d'antécédent thrombo-embolique, de chirurgie ni de traumatisme récent

PA : 125/80 mm Hg ; FC : 95/min ; SpO_2 : 95%

Examen clinique sans particularité

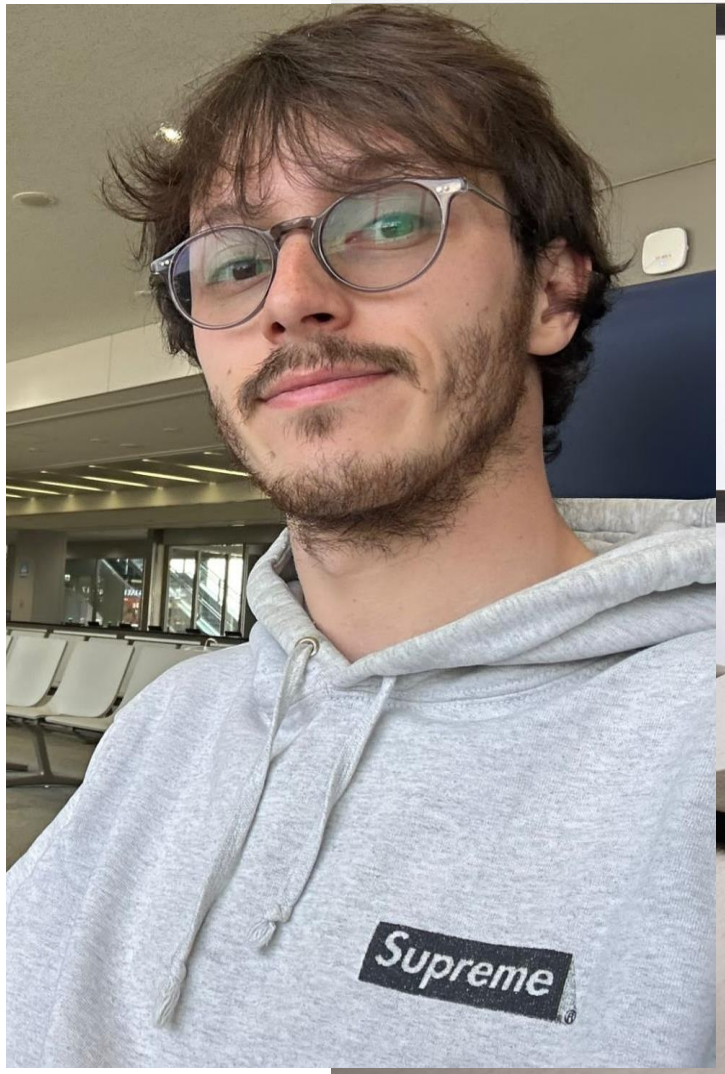
ACP American College of Physicians℠
Leading Internal Medicine, Improving Lives

CLINICAL GUIDELINE

Evaluation of Patients With Suspected Acute Pulmonary Embolism: Best Practice Advice From the Clinical Guidelines Committee of the American College of Physicians

Best Practice Advice 2: Clinicians should not obtain D-dimer measurements or imaging studies in patients with a low pretest probability of PE and who meet all Pulmonary Embolism Rule-Out Criteria.

09:15 – Stratégie ?



D-dimères = 650	Echo-Doppler MI
Angioscanner	Aucun

YEARS score ranges from 0 to 3, 1 point per item: PE is the most likely diagnosis, hemoptysis, and clinical sign of deep vein thrombosis

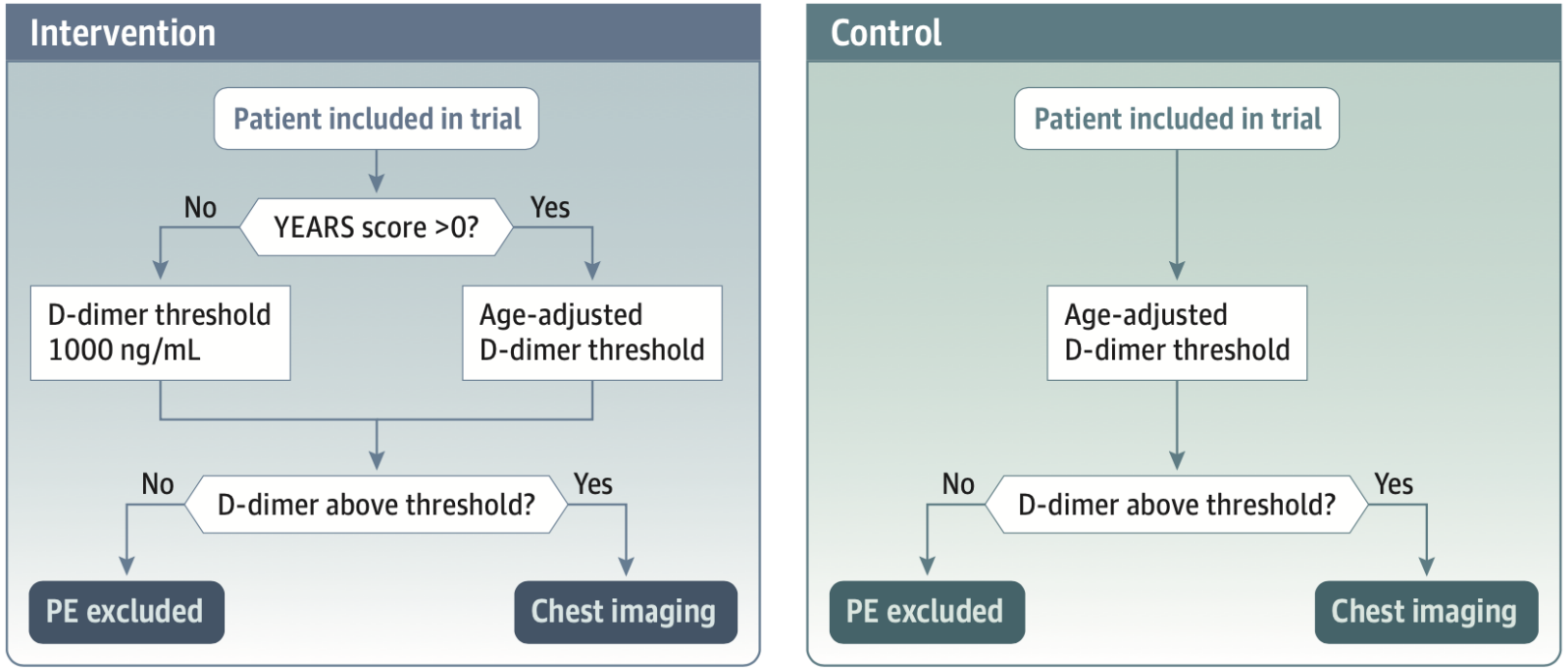
Research

Freund, JAMA, 2021

JAMA | Original Investigation

Effect of a Diagnostic Strategy Using an Elevated and Age-Adjusted D-Dimer Threshold on Thromboembolic Events in Emergency Department Patients With Suspected Pulmonary Embolism

A Randomized Clinical Trial



Freund, JAMA, 2021

JAMA | Original Investigation

Effect of a Diagnostic Strategy Using an Elevated and Age-Adjusted D-Dimer Threshold on Thromboembolic Events in Emergency Department Patients With Suspected Pulmonary Embolism

A Randomized Clinical Trial

Table 2. Primary End Point (Occurrence of a VTE Event at 3 Months)

Variable	Intervention group (n = 726)	Control group (n = 688)	Difference (97.5% 1-sided CI)	
			Adjusted[a]	Unadjusted
Per-protocol population[b]				
No.	648	623		
VTE at 3 mo, No. (%) [95% CI]	1 (0.15) [0.00 to 0.86]	5 (0.80) [0.26 to 1.86]	−0.64 (−∞ to 0.21)	−0.65 (−∞ to 0.17)
Randomized population[c]				
No.	726	688		
VTE at 3 mo, No. (%) [95% CI]	3 (0.41) [0.09 to 1.20]	6 (0.87) [0.32 to 1.89]	−0.49 (−∞ to 0.36)	−0.46 (−∞ to 0.45)
As-randomized population with multiple imputation[d]				
No.	726	688		
VTE at 3 mo	3.2[e]	6.1[e]		
% (95% CI)	0.42 (−0.06 to 0.90)	0.88 (0.18 to 1.58)	NA[f]	−0.46 (−∞ to 0.39)

Research

JAMA | Original Investigation

Effect of a Diagnostic Strategy Using an Elevated and Age-Adjusted D-Dimer Threshold on Thromboembolic Events in Emergency Department Patients With Suspected Pulmonary Embolism

A Randomized Clinical Trial

Variable	Intervention group (n = 726)		Control group (n = 688)		Difference (95% CI)	
	No.	No. (%) [95% CI]	No.	No. (%) [95% CI]	Adjusted[a]	Unadjusted
Chest imaging[b]	726	221 (30.4) [27.1 to 33.9]	688	275 (40.0) [36.3 to 43.7]	−8.7 (−13.8 to −3.5)	−9.5 (−14.5 to −4.3)

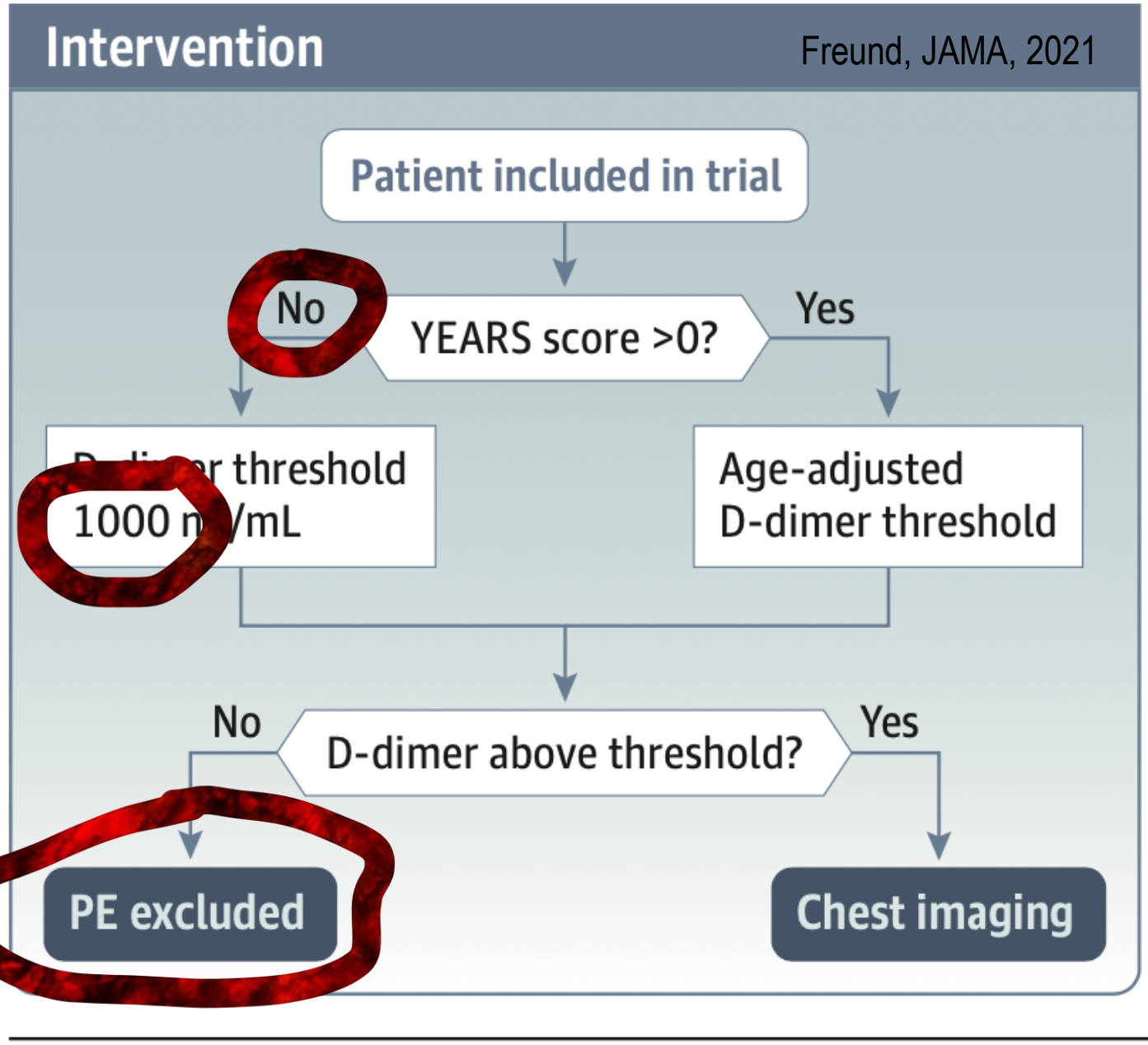
consisting of a combination of the YEARS rule with an age-adjusted D-dimer cutoff resulted in a noninferior proportion of VTEs at 3 months compared with a conventional strategy. The intervention was associated with a statistically significant reduction in chest imaging use.

Computed tomography. An increasing source of radiation exposure

Brenner, New Engl J Med, 2007 & Van Raden, Radiology, 2008

Cancer : 1% lié à scanner diagnostique

Décès : 1/2.000 pour irradiation par scanner abdominal (10 mSV) < 25 ans

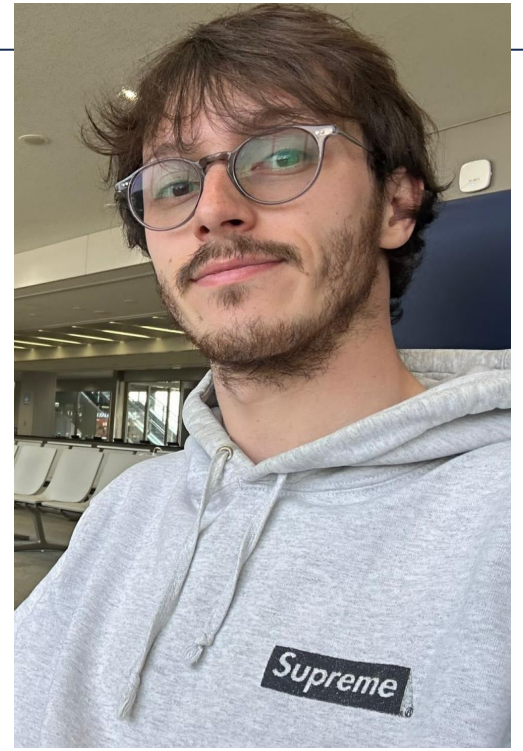


Research

JAMA | Original Investigation

Effect of a Diagnostic Strategy Using an Elevated and Age-Adjusted D-Dimer Threshold on Thromboembolic Events in Emergency Department Patients With Suspected Pulmonary Embolism
A Randomized Clinical Trial

YEARS score , 1 point per item: PE is the most likely diagnosis, hemoptysis, and clinical sign of deep vein thrombosis



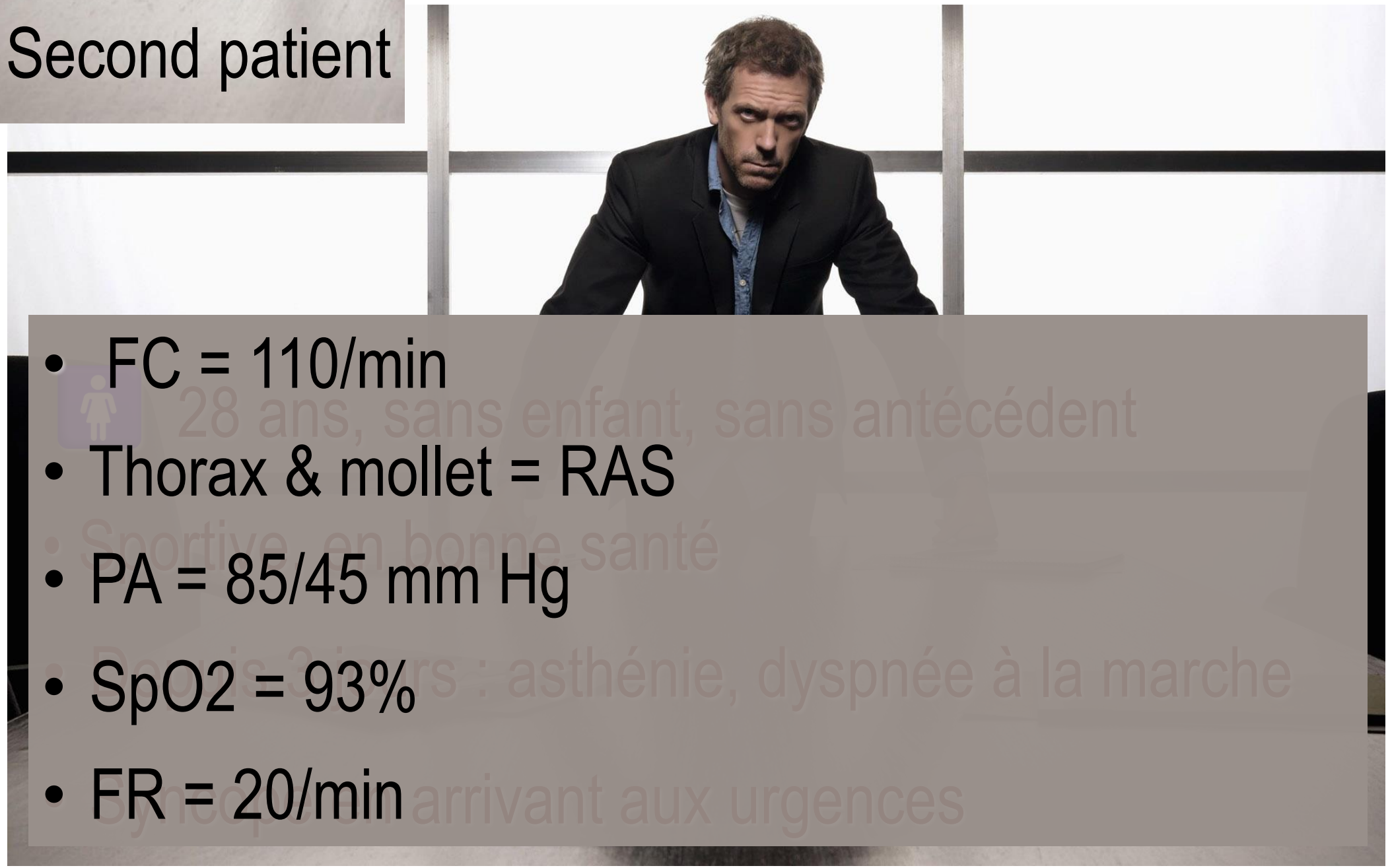

Team Orange
Running
orange


LE MARATHON POUR TOUS DE PARIS 2024
LA MYTHIQUE ÉPREUVE DES JEUX POUR LA PREMIÈRE FOIS OUVERTE À LA PARTICIPATION DU GRAND PUBLIC : PRÉPAREZ-VOUS POUR UNE COURSE EXCEPTIONNELLE
PARIS 2024
MARATHON POUR TOUS
orange

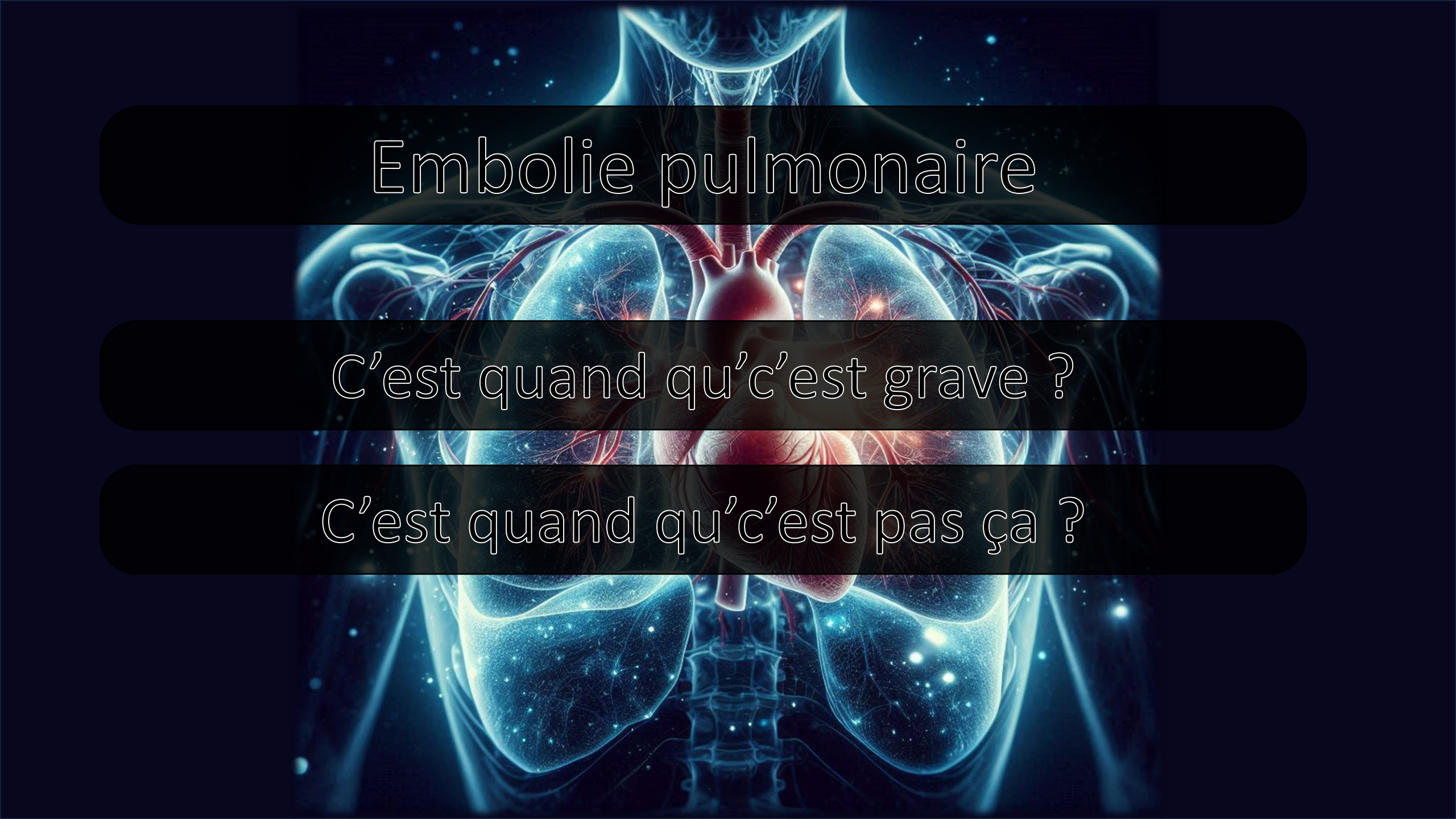
Embolie pulmonaire

C’est quand qu’c’est pas ça ?

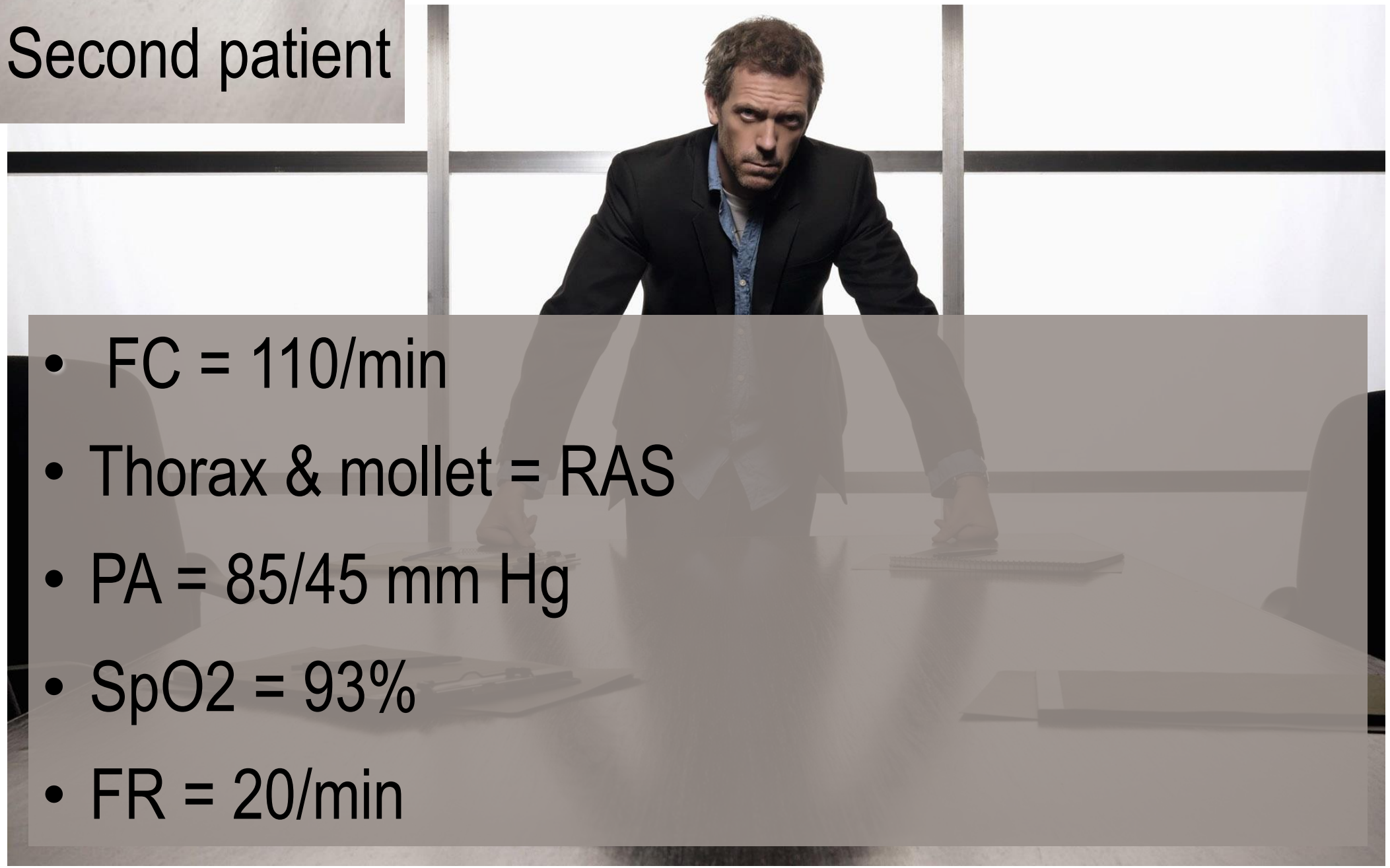
10:00 - Second patient



- FC = 110/min
- Thorax & mollet = RAS
- PA = 85/45 mm Hg
- SpO2 = 93%
- FR = 20/min


Embolie pulmonaire
C’est quand qu’c’est grave ?
C’est quand qu’c’est pas ça ?

10:00 - Second patient

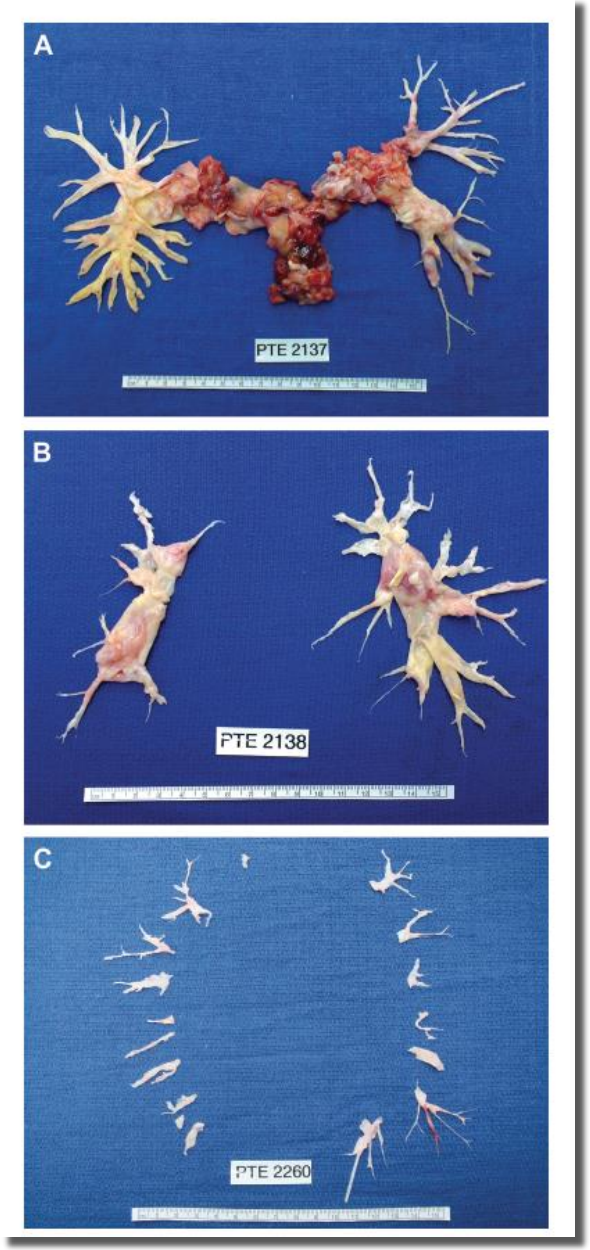


- FC = 110/min
- Thorax & mollet = RAS
- PA = 85/45 mm Hg
- SpO2 = 93%
- FR = 20/min

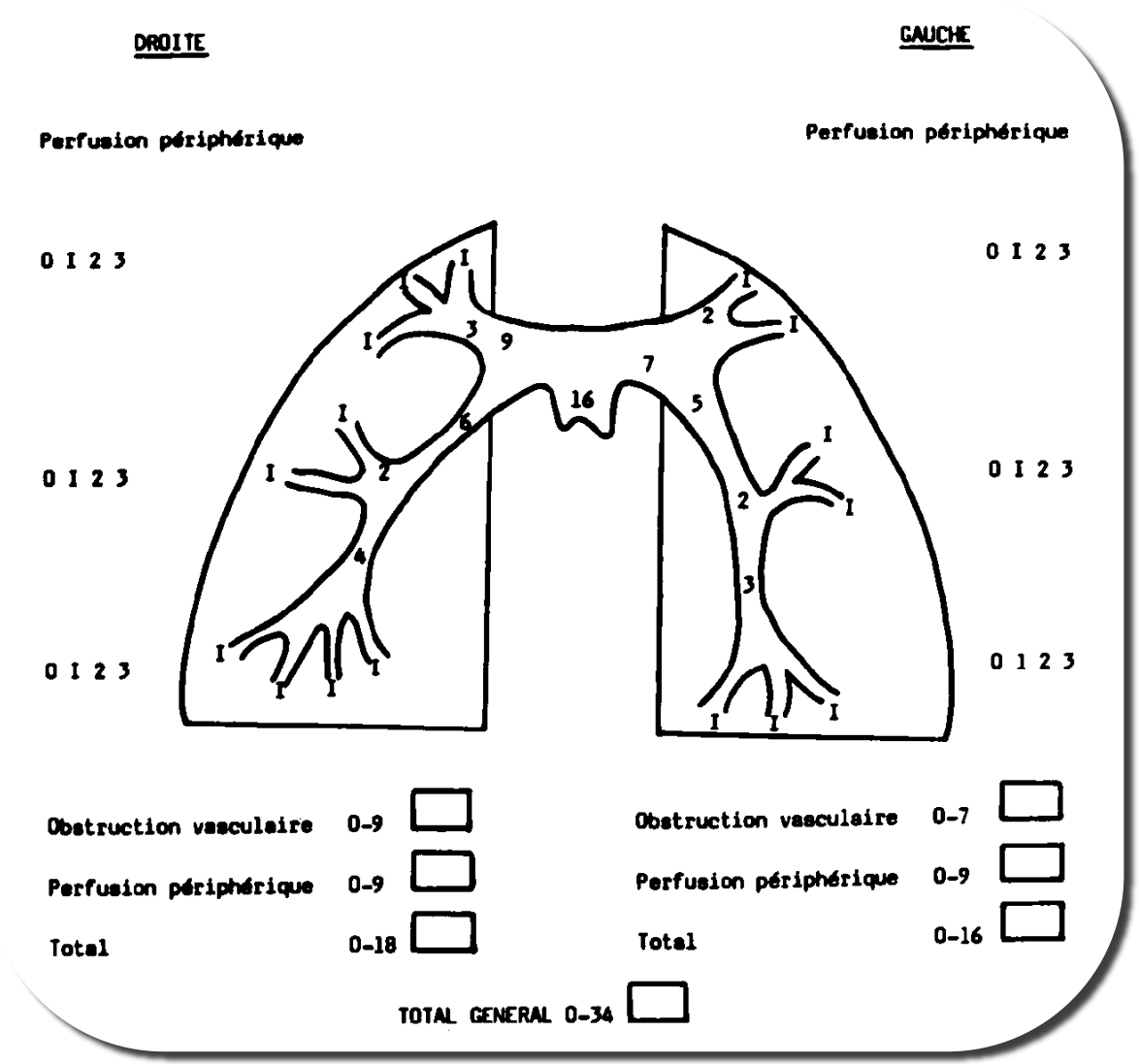
Alors, grave ou pas grave ?

Un peu	Beaucoup
Passionnément	A la folie

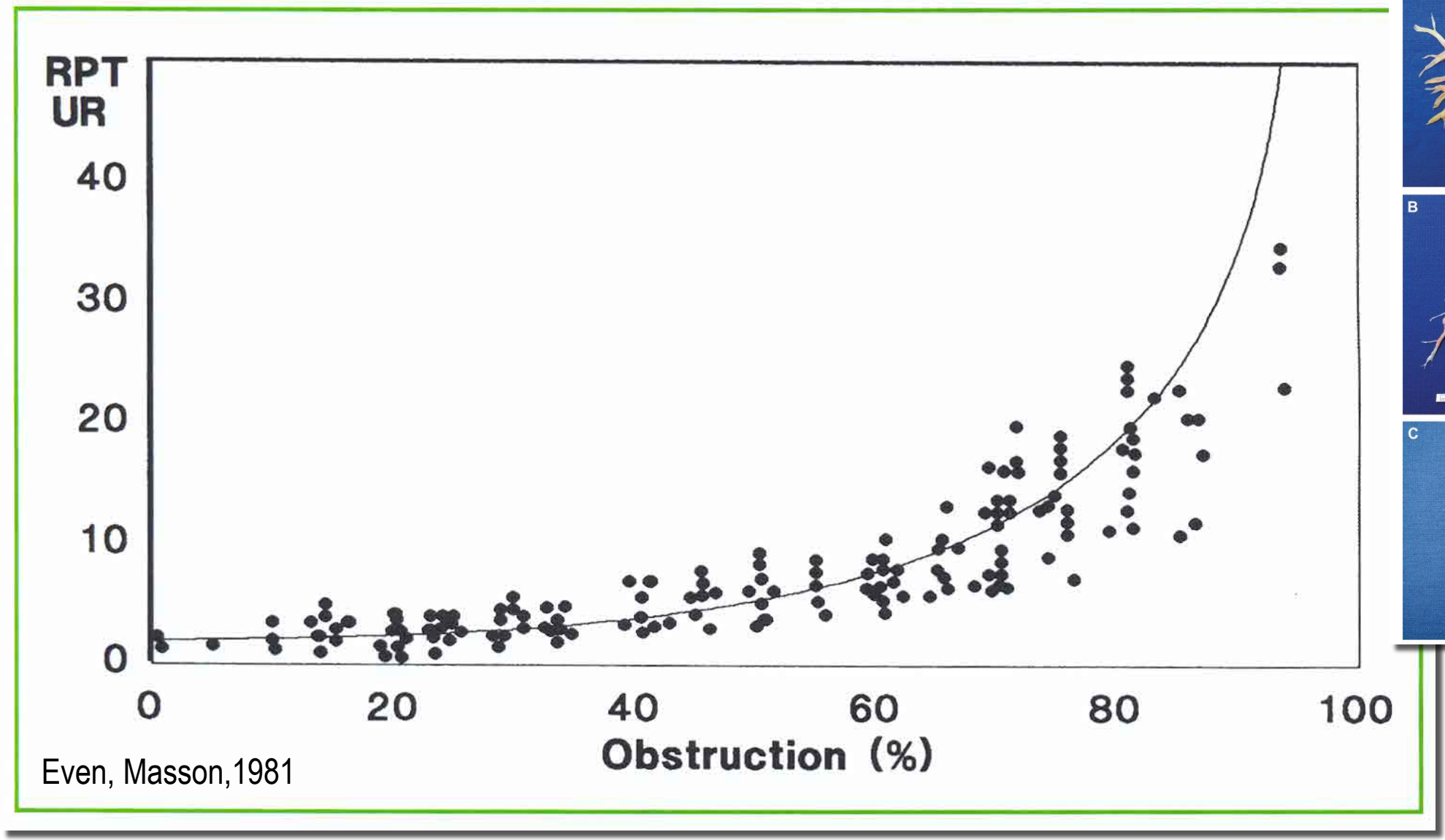
Jaff, *Circulation*, 2011



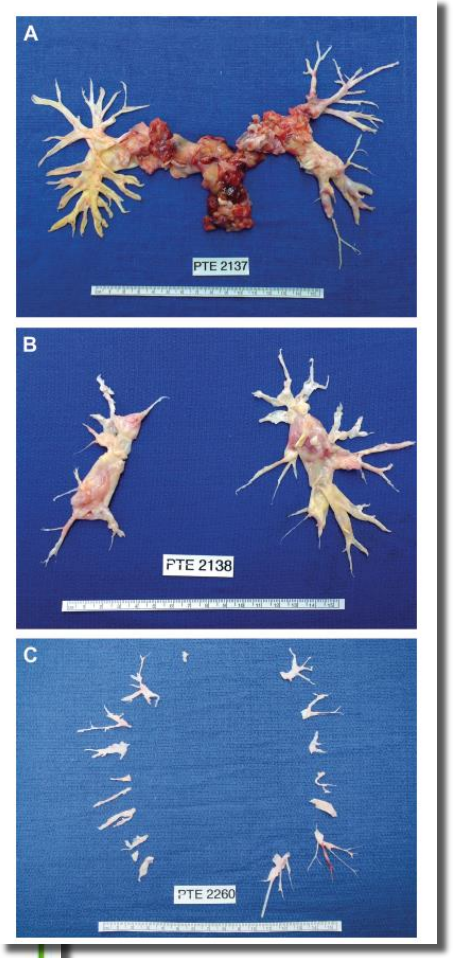
Stratification anatomique



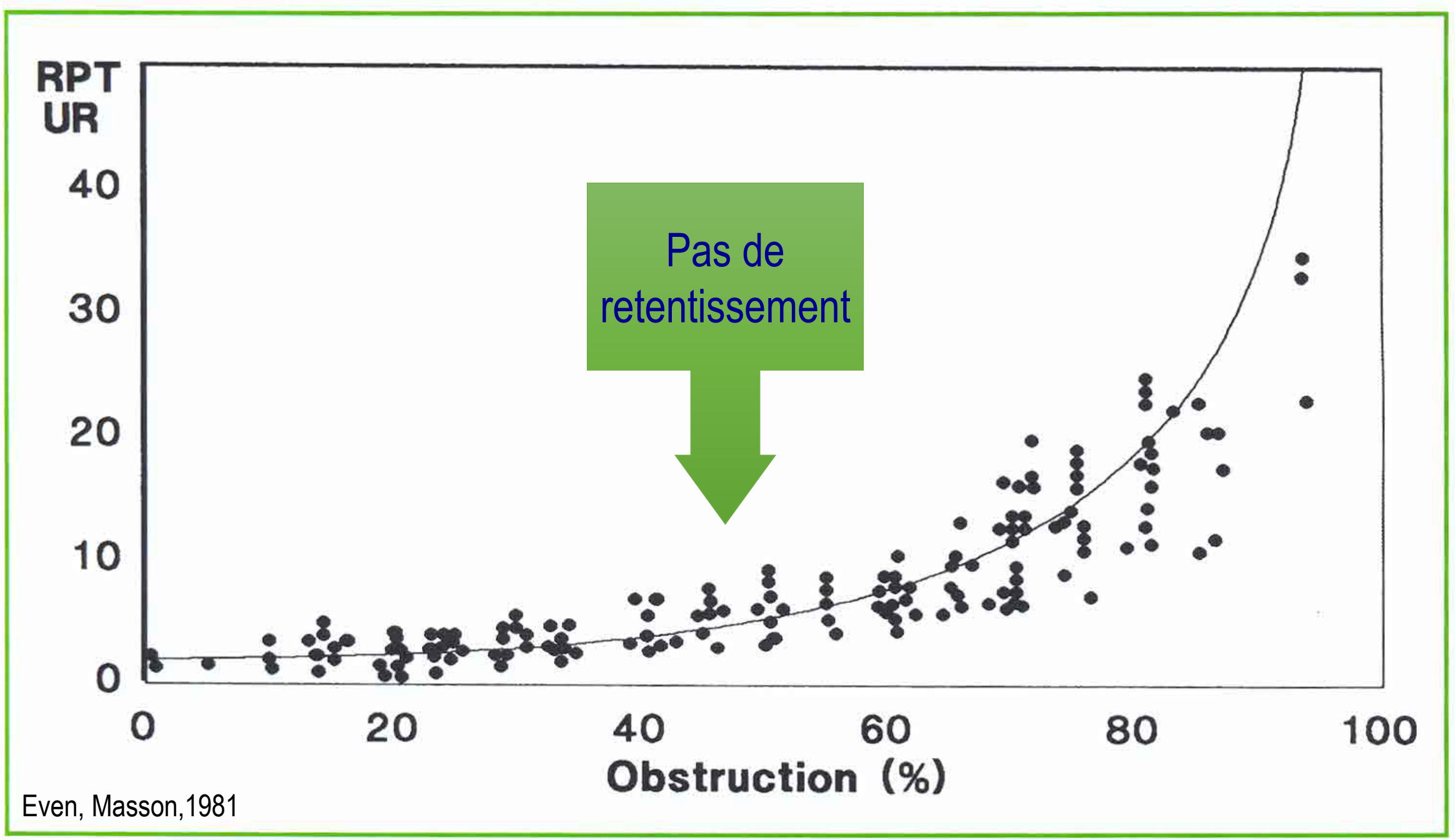
Relation between artery obstruction & pulmonary vascular resistance



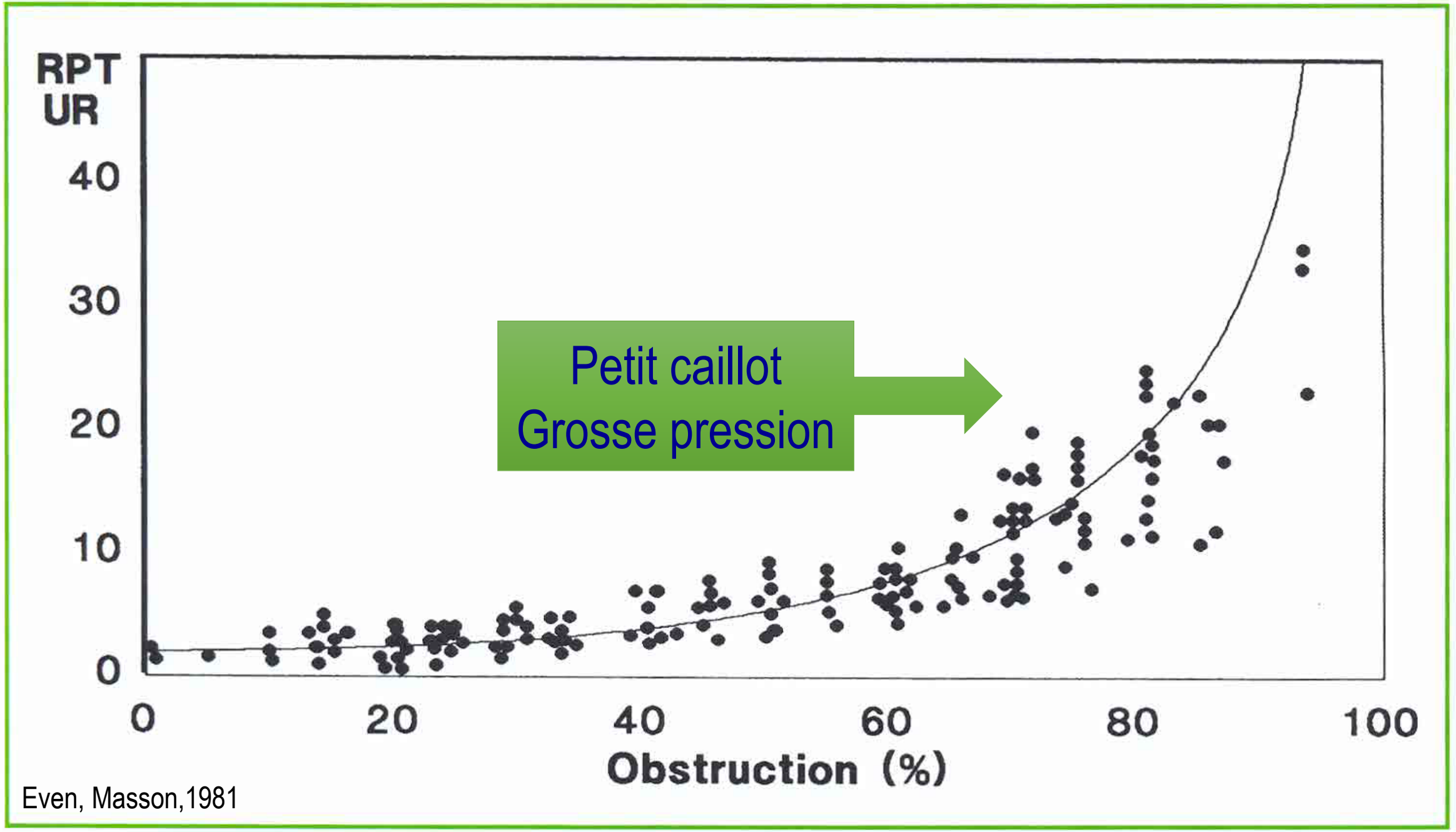
Even, Masson,1981



Jaff, Circulation, 2011



Even, Masson,1981



Even, Masson,1981

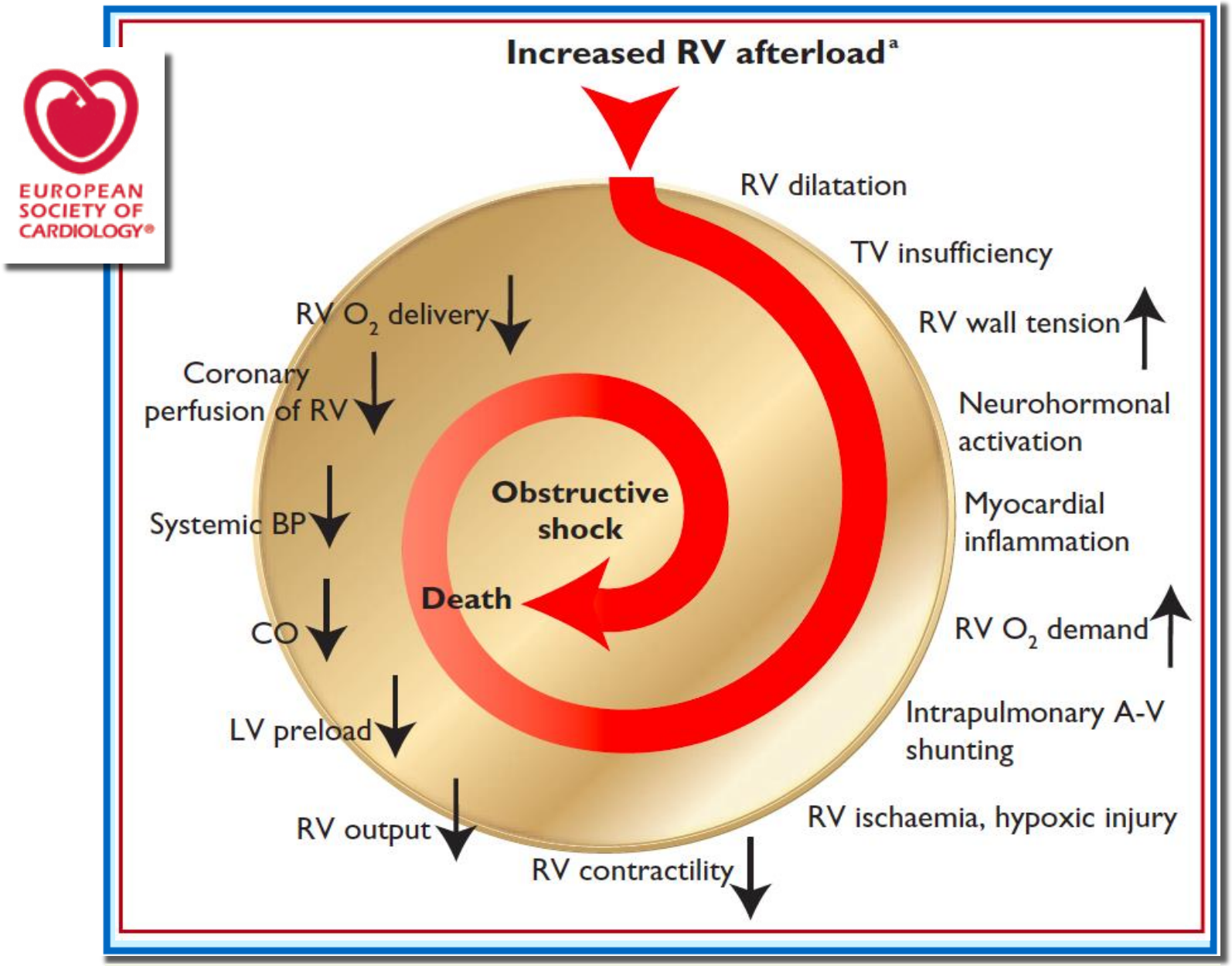
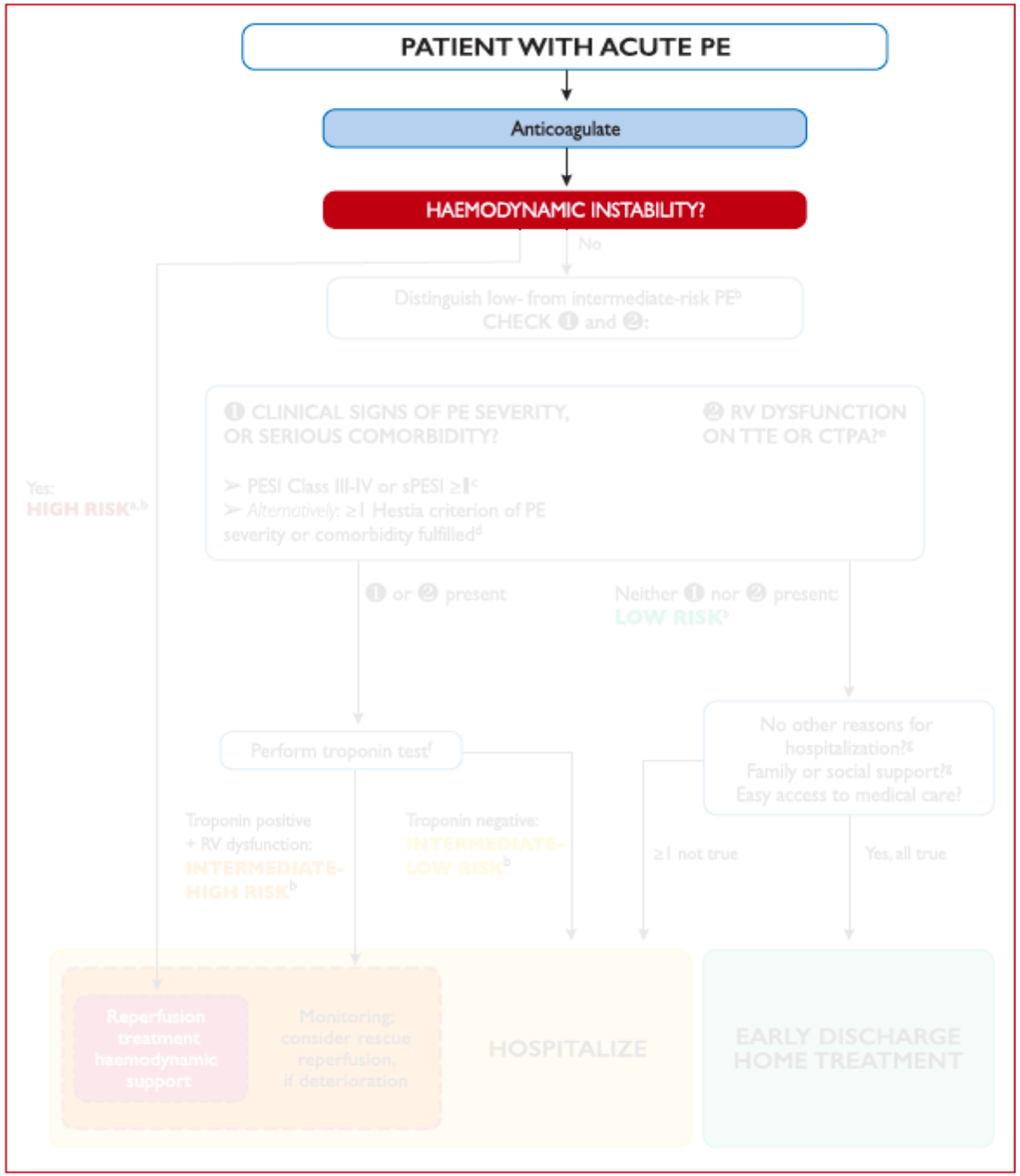


Figure 1 Key factors contributing to haemodynamic collapse in acute pulmonary embolism

Konstantinides, *Eur Heart J*, 2014 & 2019



ESC European Society of Cardiology
European Heart Journal (2019) **00**, 1–61
doi:10.1093/eurheartj/ehz405
ESC GUIDELINES

2019 ESC Guidelines for the diagnosis and management of acute pulmonary embolism developed in collaboration with the European Respiratory Society (ERS)

The Task Force for the diagnosis and management of acute pulmonary embolism of the European Society of Cardiology (ESC)

ESC, *Eur Heart J*, 2019

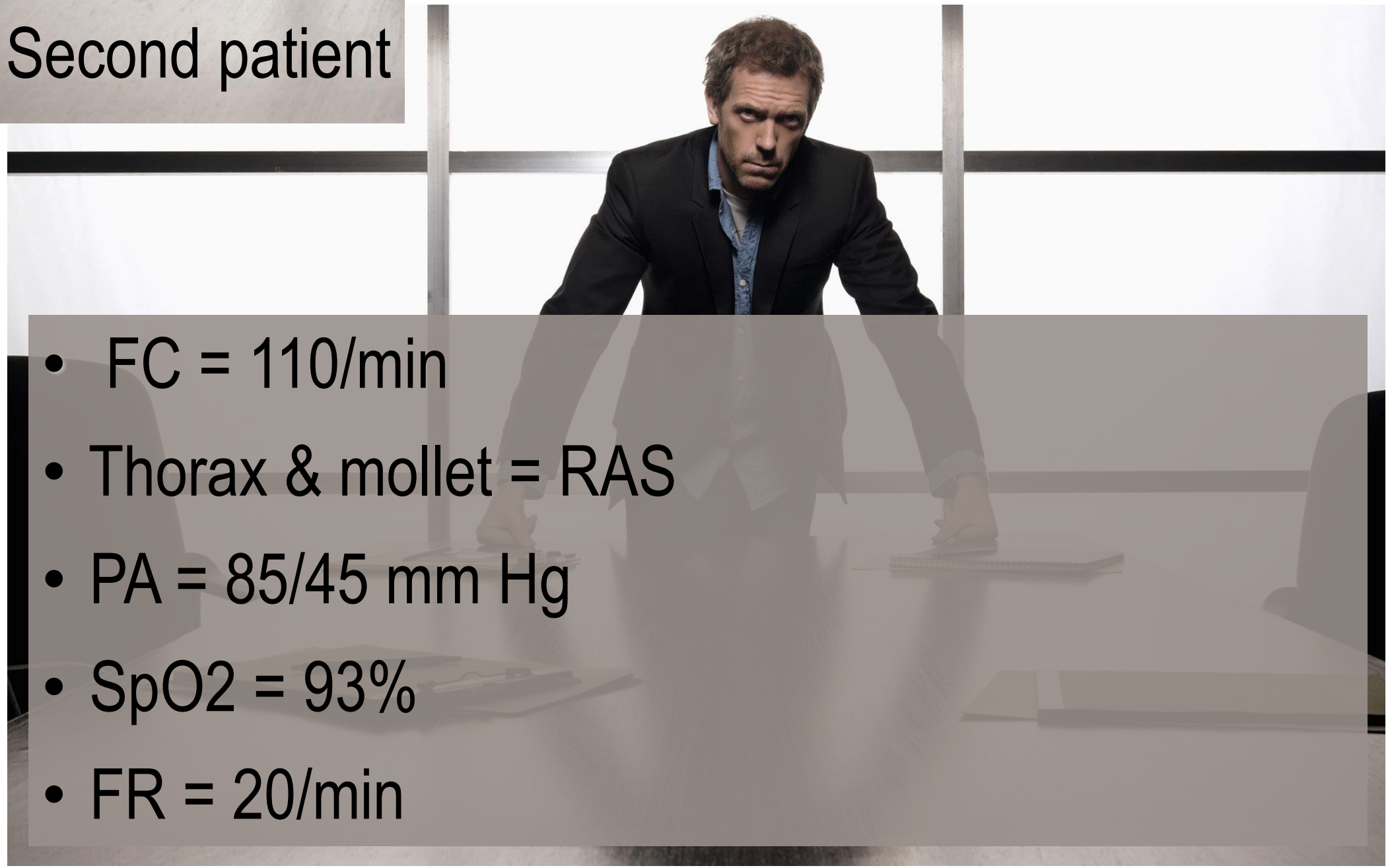
Stratégie diagnostique spécifique


GO


Metalyse®
10,000 U
Boehringer
Ingelheim
Solvent for parenteral use
10 ml water

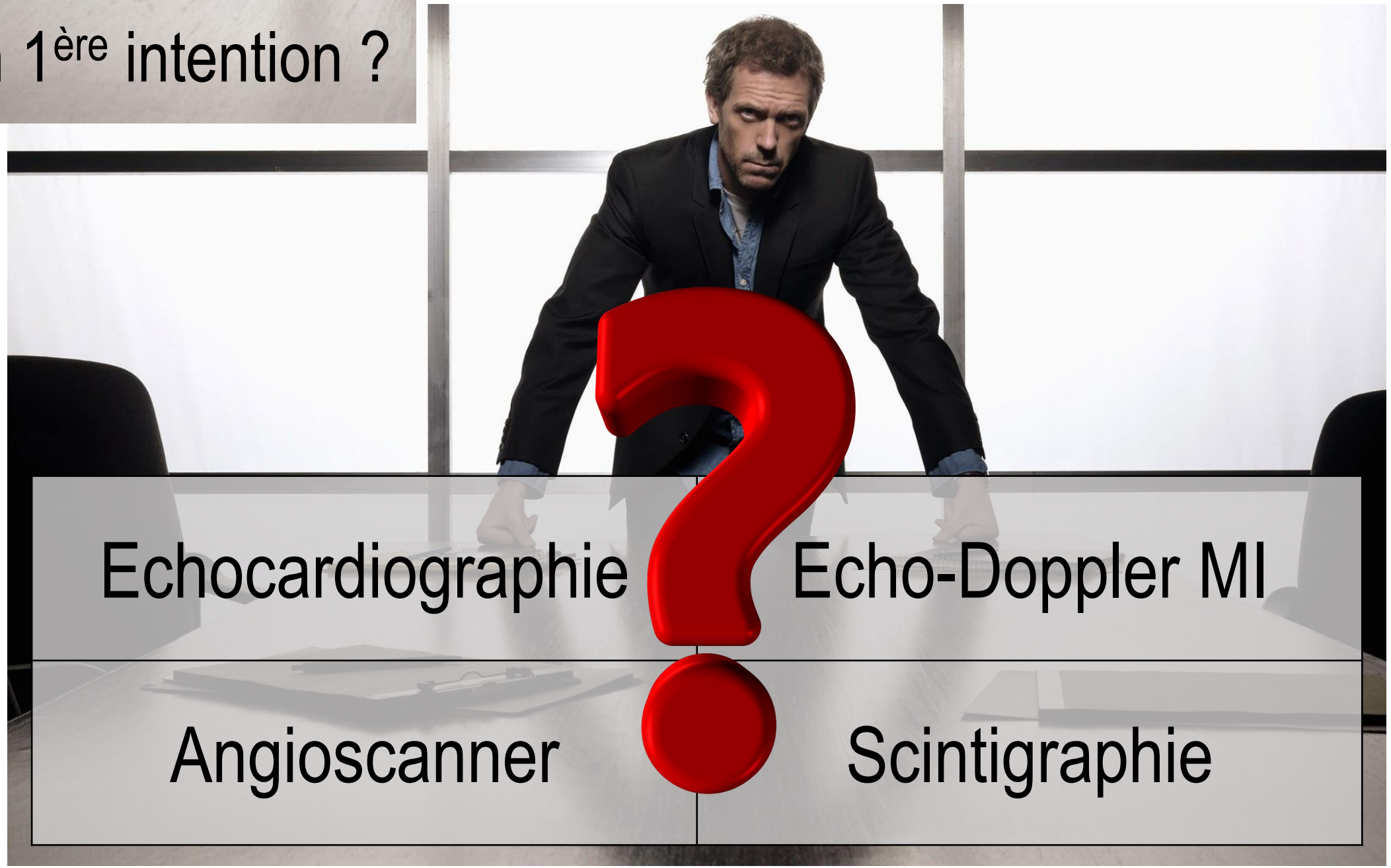

Metalyse®
Powder for solution for injection.
10,000 U tenecteplase per vial
For intravenous use after reconstitu
Do not store above 30°C. Keep the
Read the package leaflet
before use
Boehringer
Ingelheim

10:00 - Second patient



- FC = 110/min
- Thorax & mollet = RAS
- PA = 85/45 mm Hg
- SpO2 = 93%
- FR = 20/min

Examen 1ère intention ?



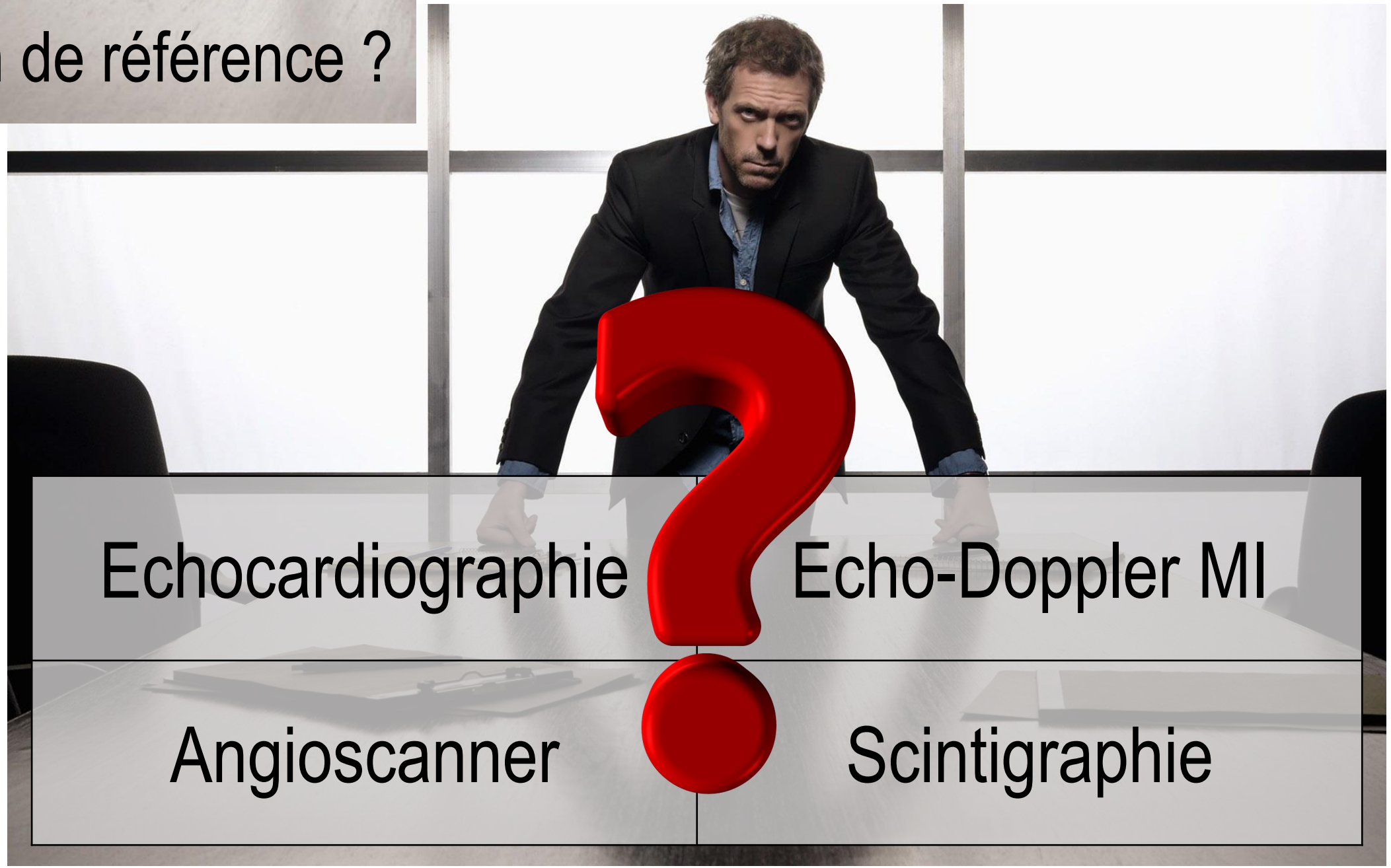
Echocardiographie

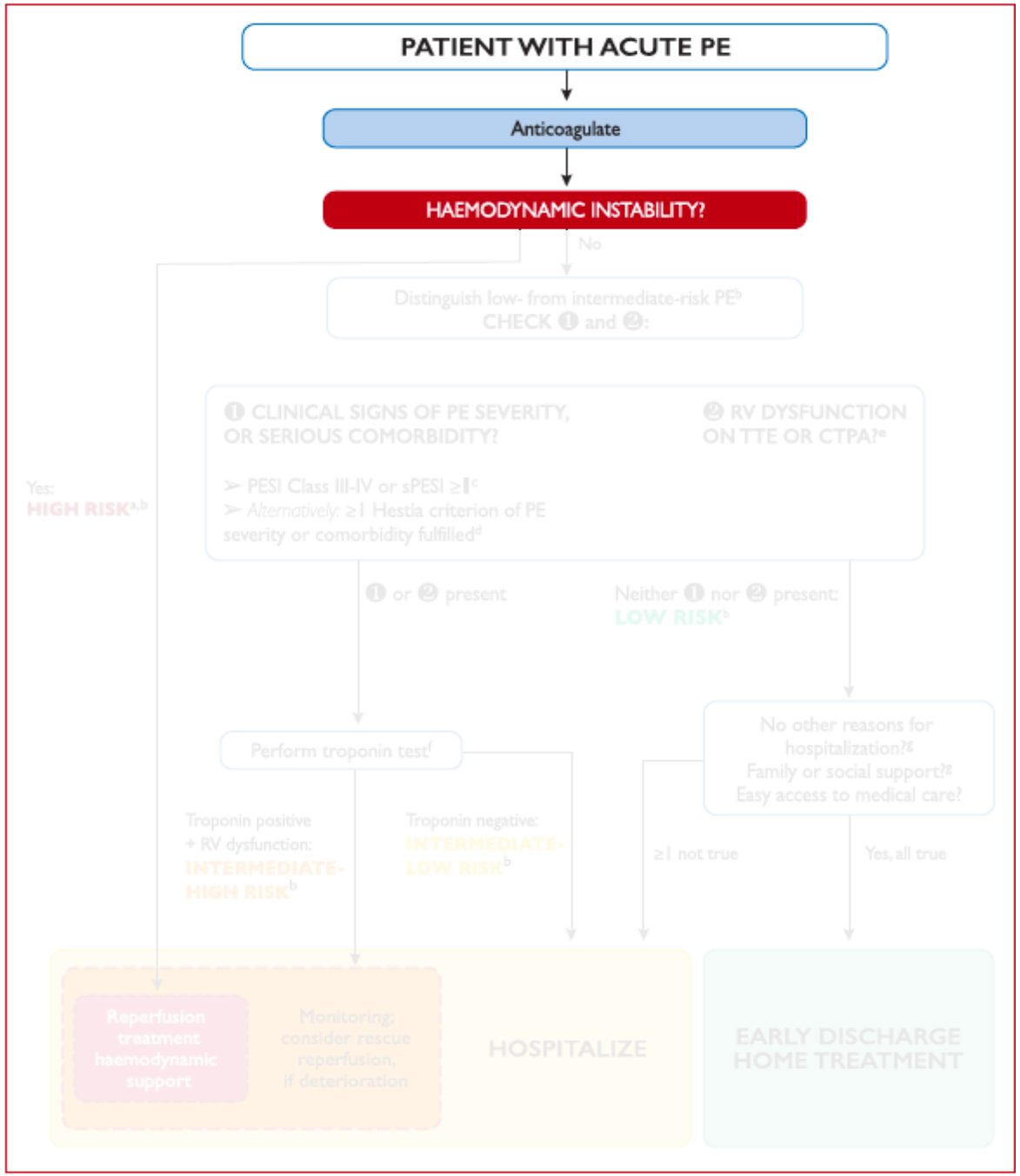
Echo-Doppler MI

Angioscanner

Scintigraphie

Examen de référence ?





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GE Healthcare
Vscan


Optima

Suspected PE in a patient with haemodynamic instability[a]

Treatment of high-risk PE[a]


Cardiac
MI: 0.8
TI: 0.5
GE Healthcare
Vscan

Agnelli, 2010

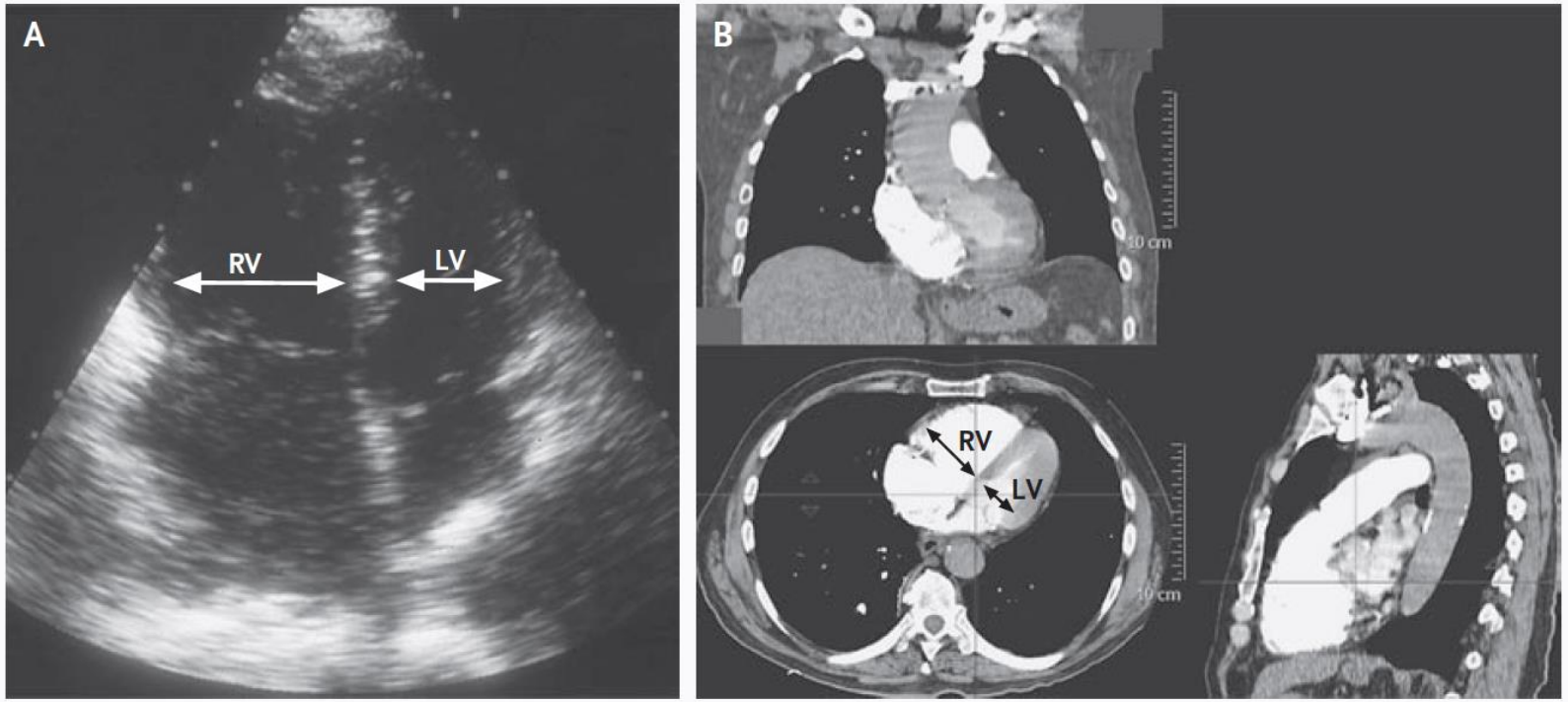


Figure 3. Right Ventricular Dilatation.

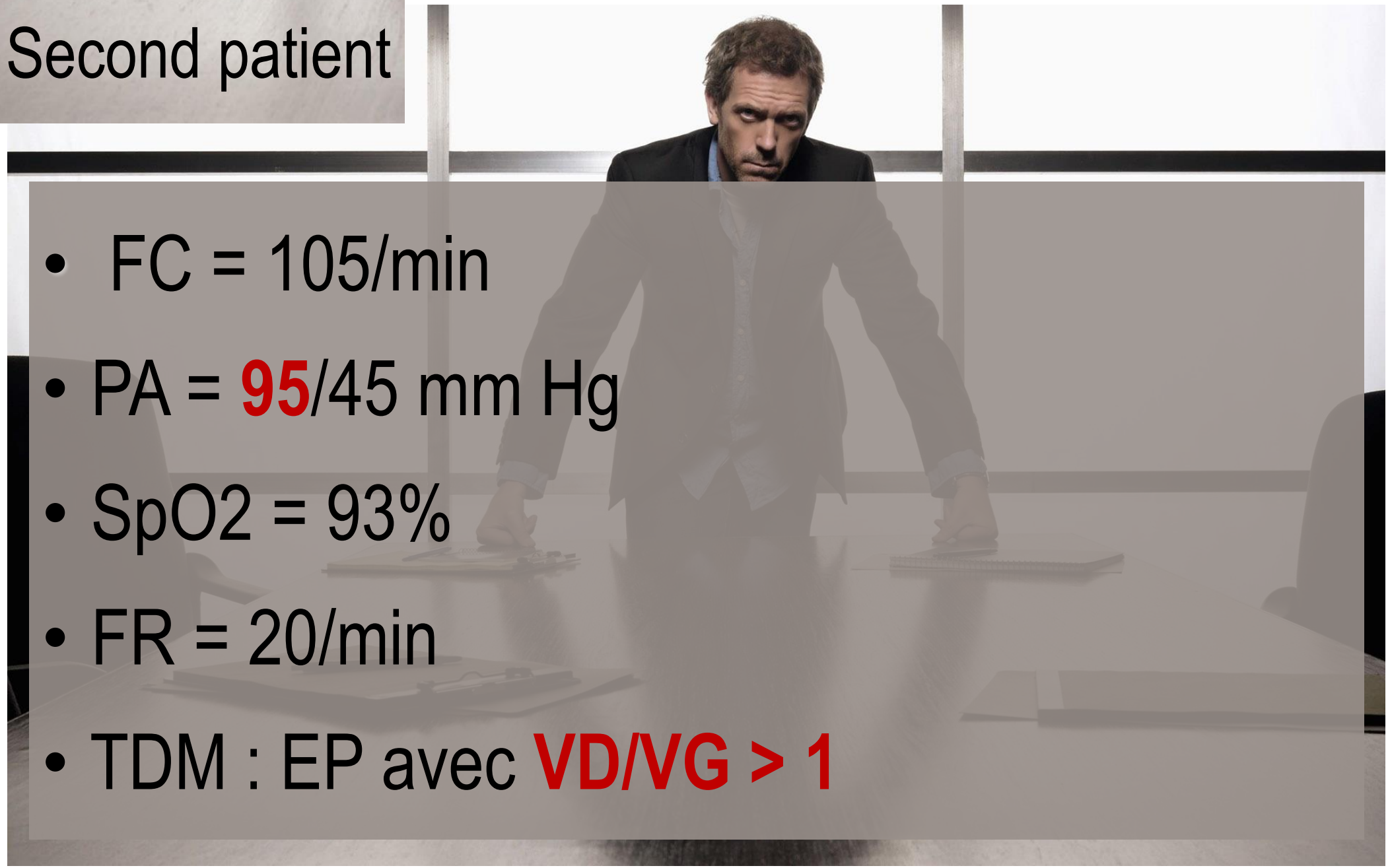
Right ventricular hypokinesis and dilatation have been shown to be independent predictors of 30-day mortality among hemodynamically stable patients with pulmonary embolism. In Panel A, right ventricular dilatation is clearly visible on echocardiography. In Panel B, images obtained on multiplanar reconstruction of multidetector CT angiography show the right and left heart chambers in the coronal view (at upper left), in the axial view (at lower left), and in the sagittal view (at lower right). Images obtained on multiplanar reconstruction at the valvular plane in the axial view allow the measurement of the diameter of the right ventricle (RV) and the left ventricle (LV) (at lower left). A ratio of more than 1.0 for the diameter of the right ventricle to that of the left ventricle indicates right ventricular dysfunction.

Lower-limb CUS		
It is recommended to accept the diagnosis of VTE (and PE) if a CUS shows a proximal DVT in a patient with clinical suspicion of PE.[164,165]	I	A
If CUS shows only a distal DVT, further testing should be considered to confirm PE.[177]	IIa	B
If a positive proximal CUS is used to confirm PE, assessment of PE severity should be considered to permit risk-adjusted management.[178,179]	IIa	C

D-dimer		
Plasma D-dimer measurement, preferably using a highly sensitive assay, is recommended in outpatients/emergency department patients with low or intermediate clinical probability, or those that are PE-unlikely, to reduce the need for unnecessary imaging and irradiation.[101–103,122,164,171,173,174]	I	A
As an alternative to the fixed D-dimer cut-off, a negative D-dimer test using an age-adjusted cut-off (age × 10 μg/L, in patients aged >50 years) should be considered for excluding PE in patients with low or intermediate clinical probability, or those that are PE-unlikely.[106]	IIa	B
As an alternative to the fixed or age-adjusted D-dimer cut-off, D-dimer levels adapted to clinical probability[c] should be considered to exclude PE.[107]	IIa	B
D-dimer measurement is not recommended in patients with high clinical probability, as a normal result does not safely exclude PE, even when using a highly sensitive assay.[175,176]	III	A

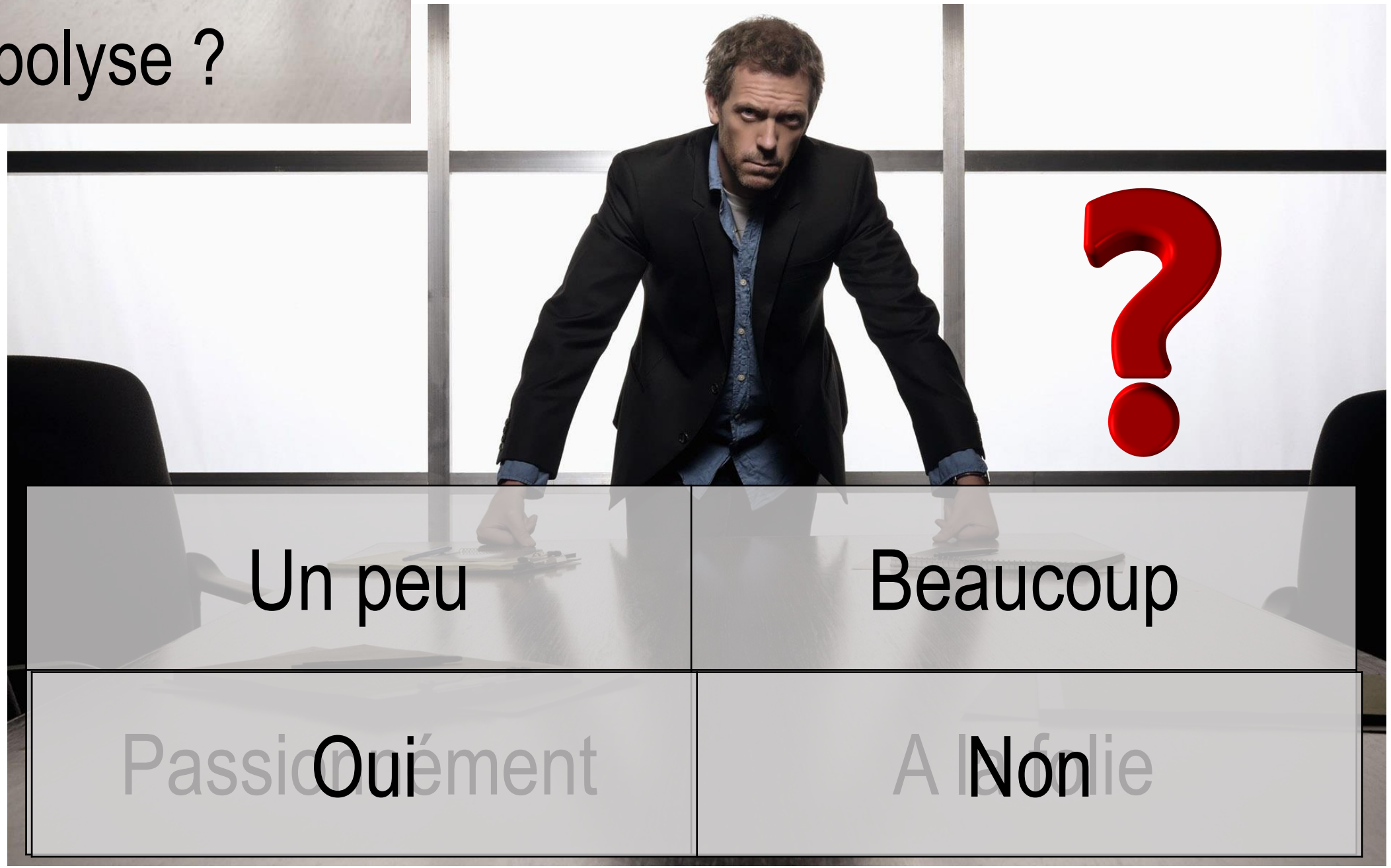
ESC, *Eur Heart J*, 2019

10:25 - Second patient



- FC = 105/min
- PA = **95**/45 mm Hg
- SpO2 = 93%
- FR = 20/min
- TDM : EP avec **VD/VG > 1**

Thrombolyse ?



Un peu	Beaucoup
Oui	Non

HEPARIN PLUS ALTEPLASE COMPARED WITH HEPARIN ALONE IN PATIENTS WITH SUBMASSIVE PULMONARY EMBOLISM

STAVROS KONSTANTINIDES, M.D., ANNETTE GEIBEL, M.D., GERHARD HEUSEL, PH.D., FRITZ HEINRICH, M.D., AND WOLFGANG KASPER, M.D., FOR THE MANAGEMENT STRATEGIES AND PROGNOSIS OF PULMONARY EMBOLISM-3 TRIAL INVESTIGATORS*

EVENT	HEPARIN PLUS ALTEPLASE (N=118)	HEPARIN PLUS PLACEBO (N=138)	P VALUE†
	no. (%)		
Primary end point	13 (11.0)	34 (24.6)	0.006
Death from all causes	4 (3.4)	3 (2.2)	0.71
Escalation of treatment	12 (10.2)	34 (24.6)	0.004
Catecholamine infusion (for persistent hypotension or shock)	3 (2.5)	8 (5.8)	0.33
Secondary thrombolysis	9 (7.6)	32 (23.2)	0.001
Endotracheal intubation	3 (2.5)	3 (2.2)	0.85
Cardiopulmonary resuscitation	0	1 (0.7)	1.0
Embolectomy or thrombus fragmentation	0	1 (0.7)	1.0
Secondary end points			
Recurrent pulmonary embolism‡	4 (3.4)	4 (2.9)	0.89
Major bleeding§	1 (0.8)	5 (3.6)	0.29
Fatal bleeding	0	1 (0.7)	1.0
Hemorrhagic stroke¶	0	0	—
Ischemic stroke¶	0	1 (0.7)	1.0

Konstantinides, *New Engl J Med*, 2002

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Fibrinolysis for Patients with Intermediate-Risk Pulmonary Embolism

Guy Meyer, M.D., Eric Vicaut, M.D., Thierry Danays, M.D., Giancarlo Agnelli, M.D., Cecilia Becattini, M.D., Jan Beyer-Westendorf, M.D., Erich Bluhmki, M.D., Ph.D., Helene Bouvaist, M.D., Benjamin Brenner, M.D., Francis Couturaud, M.D., Ph.D., Claudia Dellas, M.D., Klaus Empen, M.D., Ana Franca, M.D., Nazzareno Galiè, M.D., Annette Geibel, M.D., Samuel Z. Goldhaber, M.D., David Jimenez, M.D., Ph.D., Matija Kozak, M.D., Christian Kupatt, M.D., Nils Kucher, M.D., Irene M. Lang, M.D., Mareike Lankeit, M.D., Nicolas Meneveau, M.D., Ph.D., Gerard Pacouret, M.D., Massimiliano Palazzini, M.D., Antoniu Petris, M.D., Ph.D., Piotr Pruszczyk, M.D., Matteo Rugolotto, M.D., Aldo Salvi, M.D., Sebastian Schellong, M.D., Mustapha Sebbane, M.D., Bozena Sobkowicz, M.D., Branislav S. Stefanovic, M.D., Ph.D., Holger Thiele, M.D., Adam Torbicki, M.D., Franck Verschuren, M.D., Ph.D., and Stavros V. Konstantinides, M.D., for the PEITHO Investigators*

10 Avril 2014

Outcome	Tenecteplase (N=506)	Placebo (N=499)	Odds Ratio (95% CI)	P Value
Primary outcome — no. (%)	13 (2.6)	28 (5.6)	0.44 (0.23–0.87)	0.02
Death from any cause	6 (1.2)	9 (1.8)	0.65 (0.23–1.85)	0.42
Hemodynamic decompensation	8 (1.6)	25 (5.0)	0.30 (0.14–0.68)	0.002

Table 4. Safety Outcomes in the Intention-to-Treat Population.*

Outcome	Tenecteplase (N=506)	Placebo (N=499)	Odds Ratio (95% CI)	P Value
	no. (%)			
Bleeding between randomization and day 7				
Major extracranial bleeding	32 (6.3)	6 (1.2)	5.55 (2.3–13.39)	<0.001
Minor bleeding	165 (32.6)	43 (8.6)		
Major bleeding†	58 (11.5)	12 (2.4)		
Stroke between randomization and day 7	12 (2.4)	1 (0.2)	12.10 (1.57–93.39)	0.003
Ischemic stroke	2 (0.4)	0		
Hemorrhagic stroke‡	10 (2.0)	1 (0.2)		
Serious adverse events between randomization and day 30	55 (10.9)	59 (11.8)	0.91 (0.62–1.34)	0.63

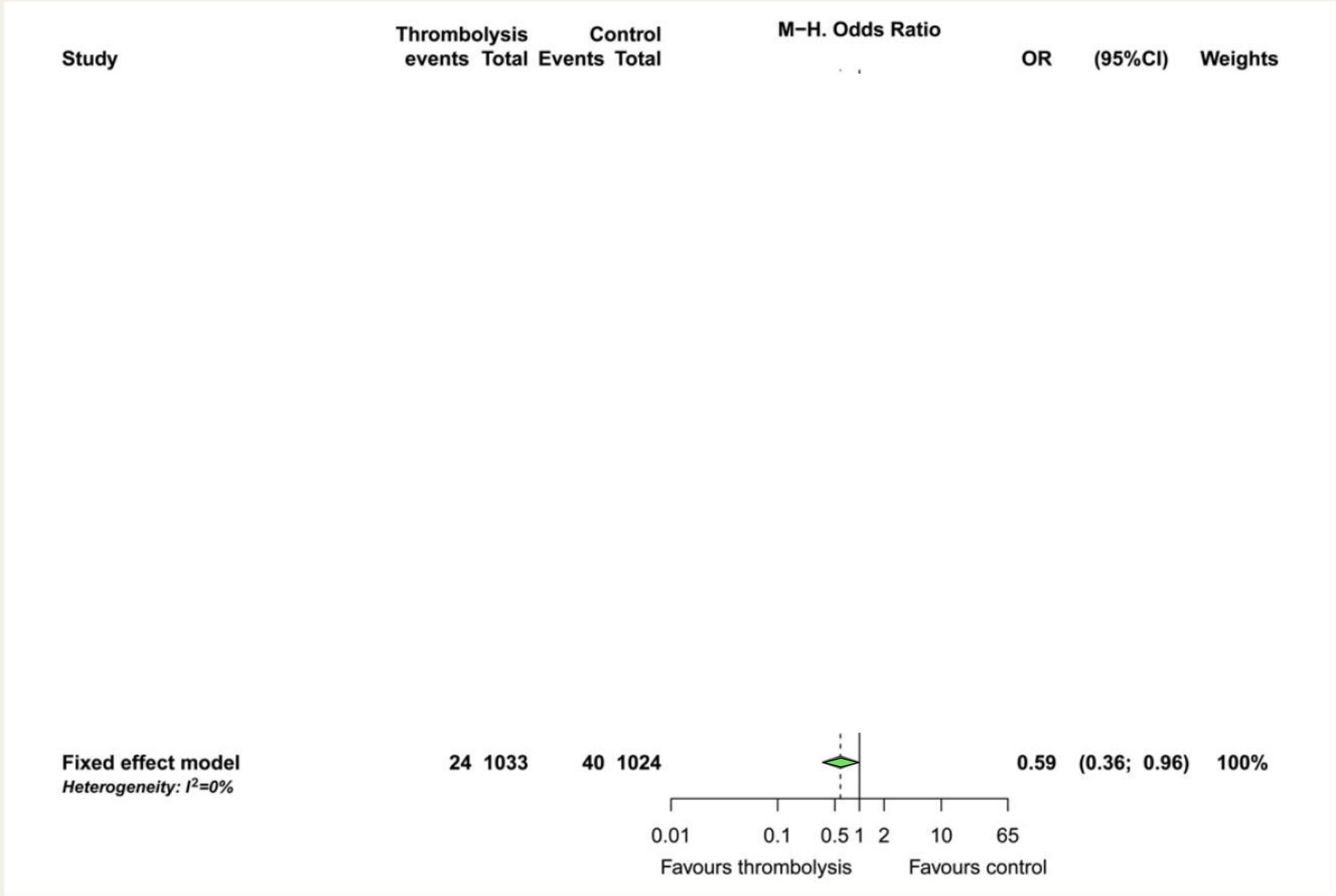
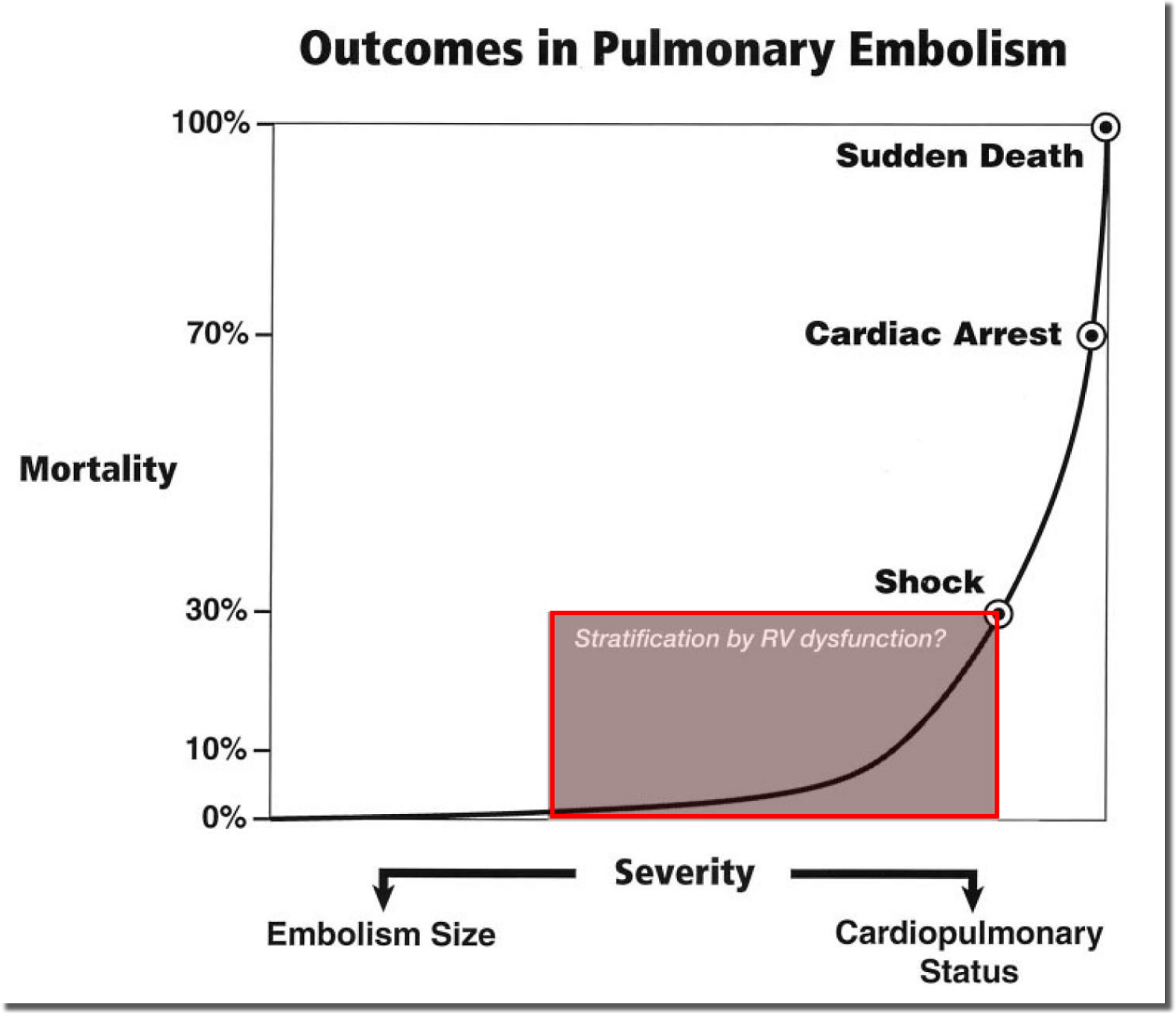
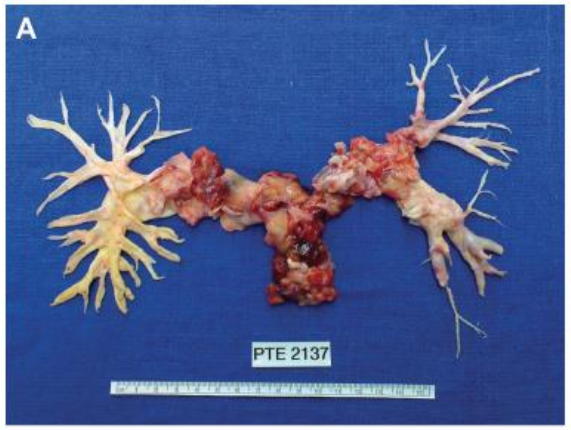


Figure 2 Early mortality by pulmonary embolism severity, Forest plot.

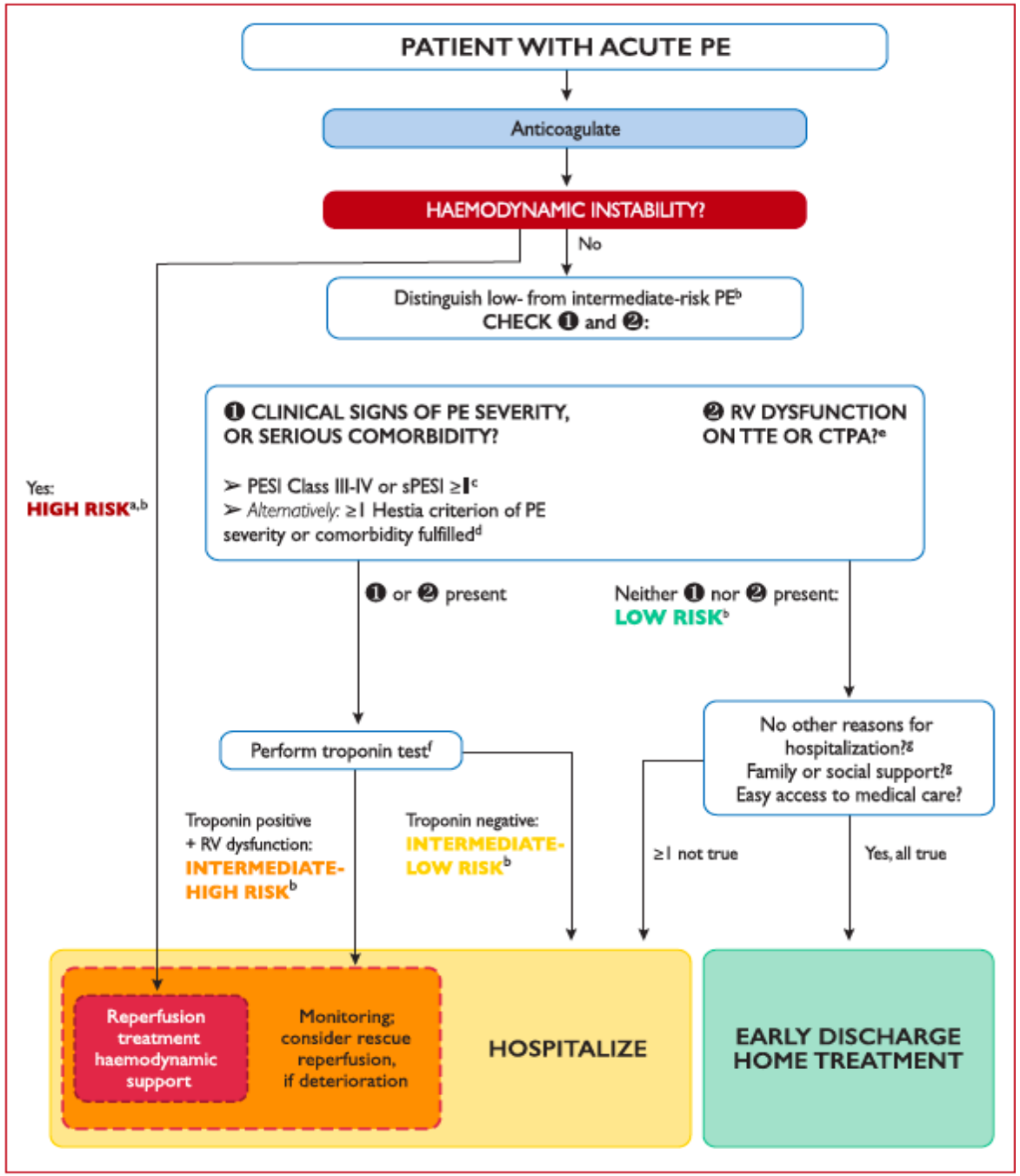
Konstantinides, *Eur Heart J*, 2014



Wood, *Chest*, 2002



Jaff, Circulation, 2011



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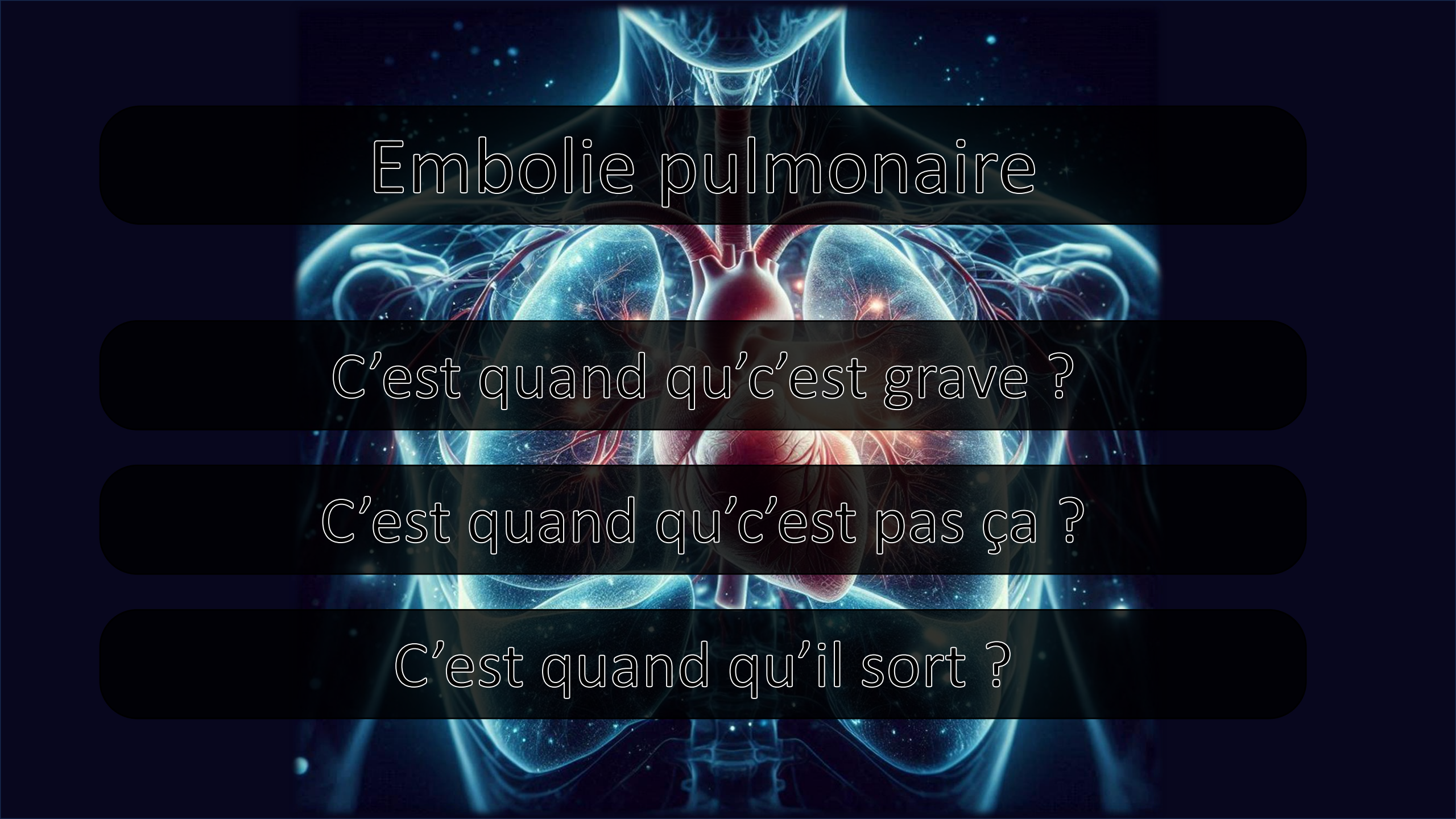
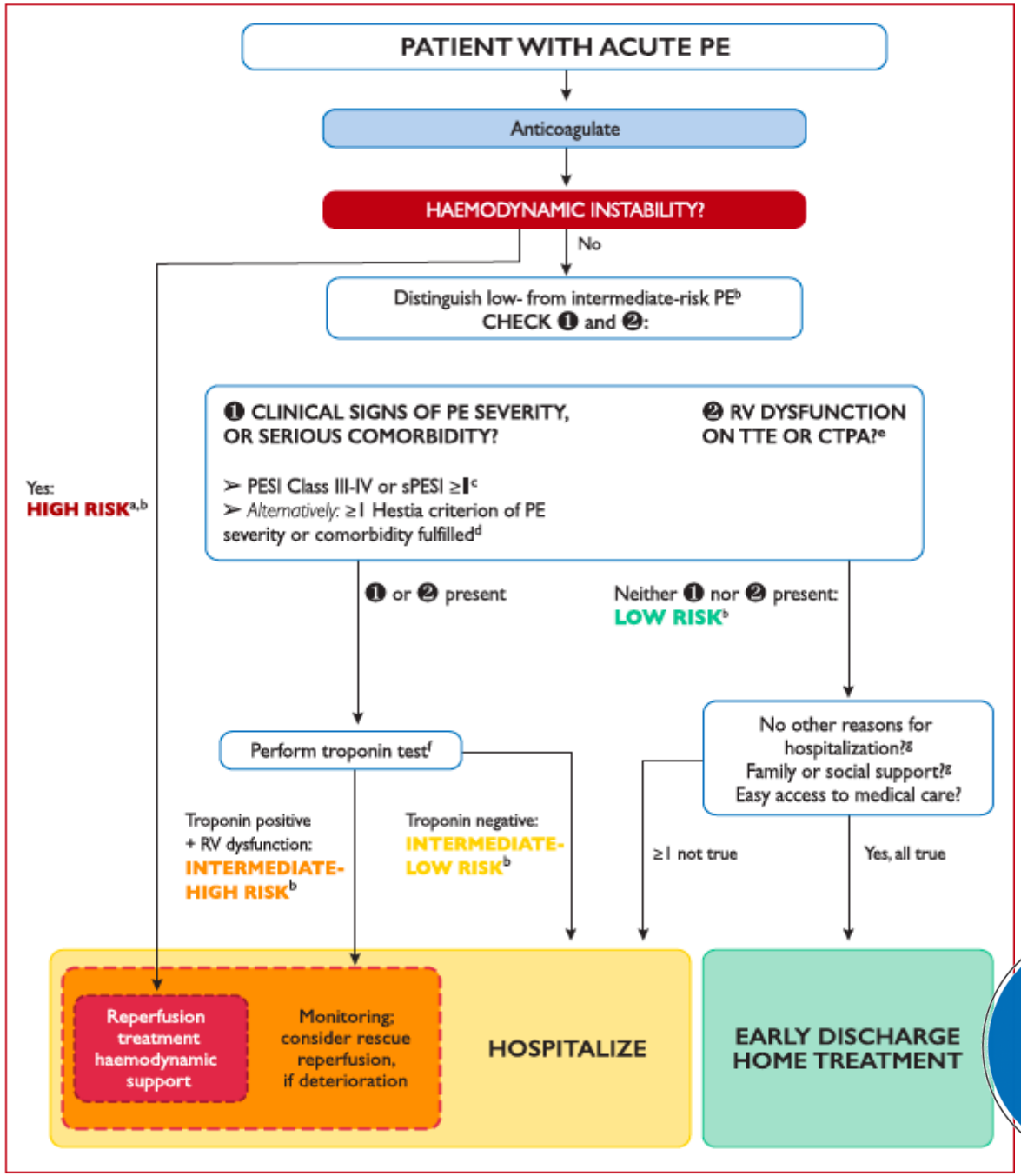

Embolie pulmonaire
C’est quand qu’c’est grave ?
C’est quand qu’c’est pas ça ?
C’est quand qu’il sort ?



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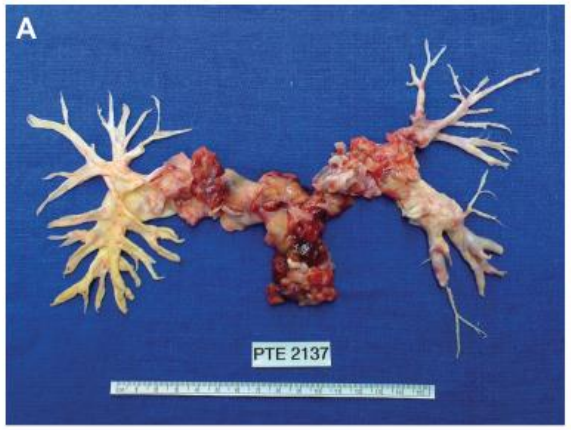


Jaff, Circulation, 2011

PESI

Troponine / BNP

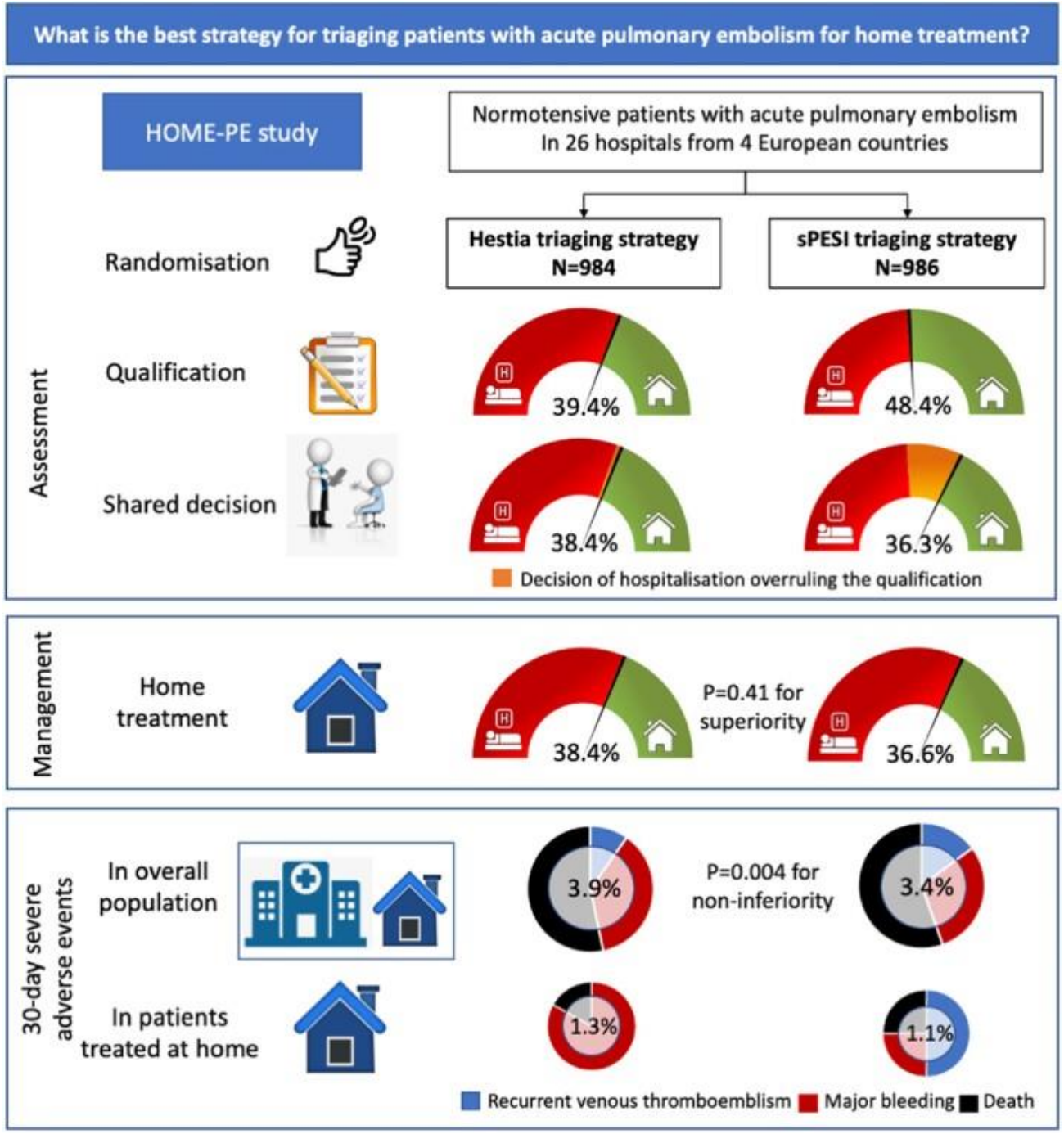
Rapport VD/VG

N=344	Outpatient group	Inpatient group	Difference in percentages ($\%_{outpatient}-\%_{inpatient}$)	Upper 95% CL for difference	p value*
Primary analysis outcomes within 90 days†					
Recurrent VTE	1 (0·6%)‡	0	0·6%	2·7%	0·011
Major bleeding	3 (1·8%)	0	1·8%	4·5%	0·086
Intramuscular	2 (1·2%)	0	1·2%	3·6%	0·031
Menometrorrhagia	1 (0·6%)	0	0·6%	2·7%	0·011
Overall mortality	1 (0·6%)§	1 (0·6%)¶	0%	2·1%	0·005
Primary analysis outcomes within 14 days†					
Recurrent VTE	0	0	0%	1·7%	0·003
Major bleeding	2 (1·2%)	0	1·2%	3·6%	0·031
Intramuscular	2 (1·2%)	0	1·2%	3·6%	0·031
Menometrorrhagia	0	0	0%	1·7%	0·003
Overall mortality	0	0	0%	1·7%	0·003
Per-protocol outcomes within 90 days‖					
Recurrent VTE	1 (0·6%)‡	0	0·6%	2·9%	0·014
Major bleeding	2 (1·2%)	0	1·2%	3·8%	0·040
Intramuscular	2 (1·2%)	0	1·2%	3·8%	0·040
Menometrorrhagia	0	0	0%	1·8%	0·004
Overall mortality	1 (0·6%)§	1 (0·6%)¶	0%	2·1%	0·007

CL=confidence limit. VTE=venous thromboembolism. *One-sided exact p value for non-inferiority; specified non-inferiority margin of 4%. †171 patients in the outpatient group and 168 patients in the inpatient group. ‡Patient had non-fatal pulmonary embolism. §Patient died from accident-related trauma with resultant aortic rupture. ¶Patient died from pneumonia and lung cancer. ‖163 patients in the outpatient group and 154 patients in the inpatient group.

***Table 4*: Effectiveness and safety outcomes**

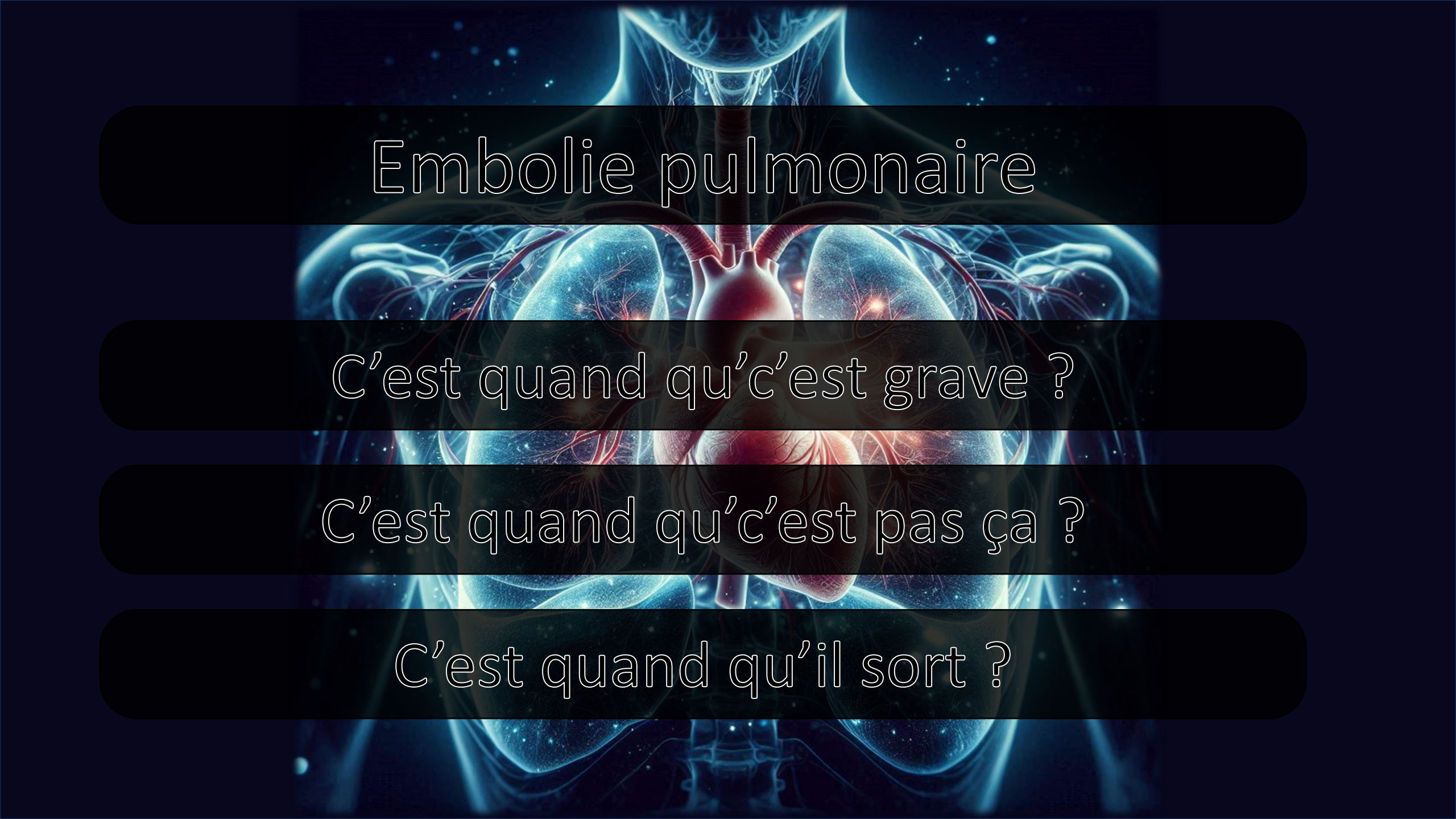
Aujesky, Lancet, 2011



Hestia Criteria

Is the patient hemodynamically instable?	Yes	No
Is trombolysis or embolectomy necessary?	Yes	No
Active bleeding or high risk for bleeding?	Yes	No
More than 24 hours of oxygen supply to maintain oxygen saturation >90%?	Yes	No
Is pulmonary embolism diagnosed during anticoagulant treatment?	Yes	No
Severe pain needing intravenous pain medication for more than 24 hours?	Yes	No
Medical or social reason for treatment in the hospital for more than 24 hours? (Infection, malignancy, no support system)	Yes	No
Does the patient have a creatinine clearance of less than 30 mL/min?	Yes	No
Does the patient have severe liver impairment?	Yes	No
Is the patient pregnant?	Yes	No
Does the patient have a documented history of heparin induced thrombocytopenia?	Yes	No
If one of the questions is answered with YES, the patient can not be treated at home in the Hestia study		

Roy, Eur Heart J, 2021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SAMU
SAMU 93
SAMU 93
SAMU
15
DL
957 HT
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