

# La Dimissione Del Paziente Con Embolia Polmonare dal PS: *Chimera o Realtà?*

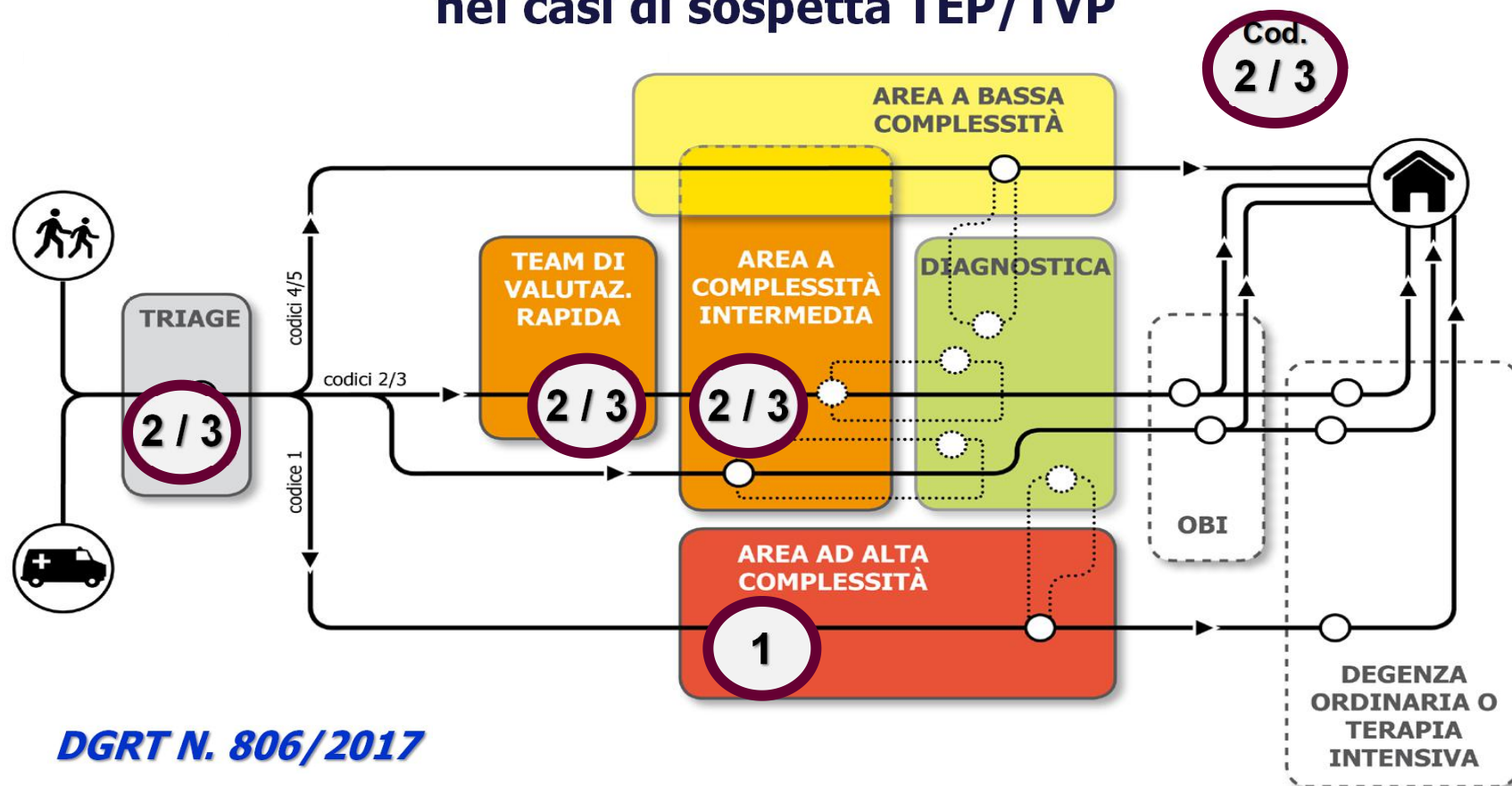
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## La **NOVITA'** LOGISTICA dei percorsi di diagnosi e stratificazione nei casi di sospetta TEP/TVP



**DGRT N. 806/2017**



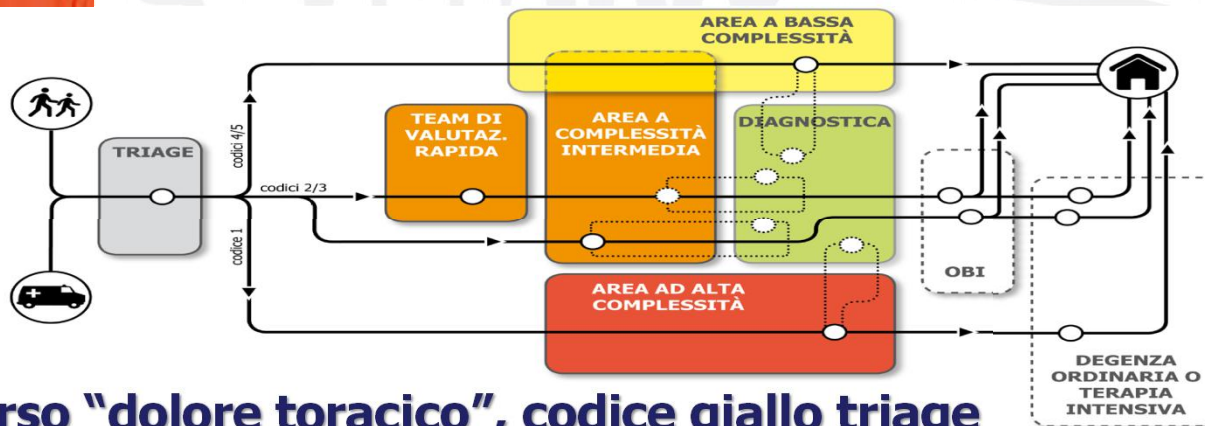
## Un caso clinico

F.L. - Maschio 56 anni

Accesso in PS per dolore toracico da circa 6 ore

Il dolore è continuo, in peggioramento, che si esacerba con gli atti del respiro

Non c'è febbre né tosse



**Percorso "dolore toracico", codice giallo triage**



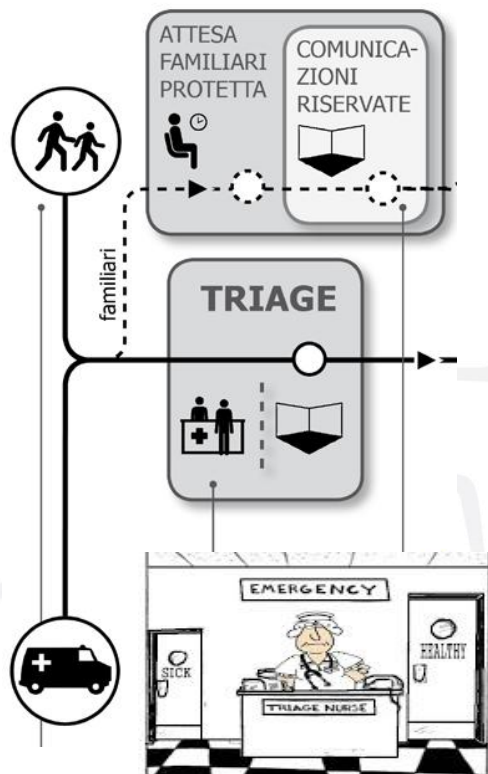
## Un caso clinico

Pressione arteriosa: 135/90 mmHg

Frequenza cardiaca: 80 bpm

SatO<sub>2</sub> 97% in aa

TC 36.5





## Un caso clinico



Anamnesi patologica:

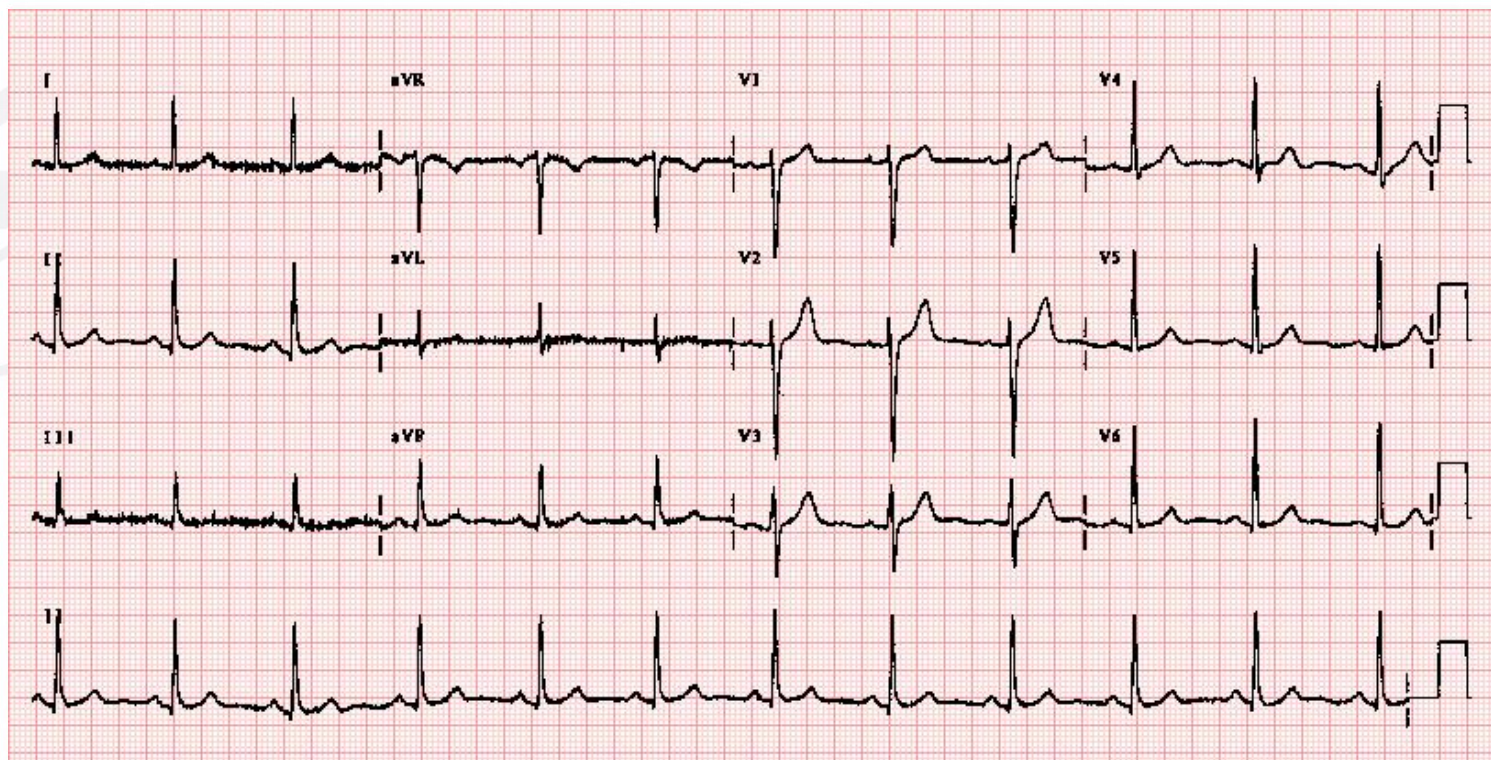
Diabete mellito, ipertensione arteriosa in terapia discontinua

No allergie

TD: metformina 1000 x 3, ASA 100 mg, altro non ricorda



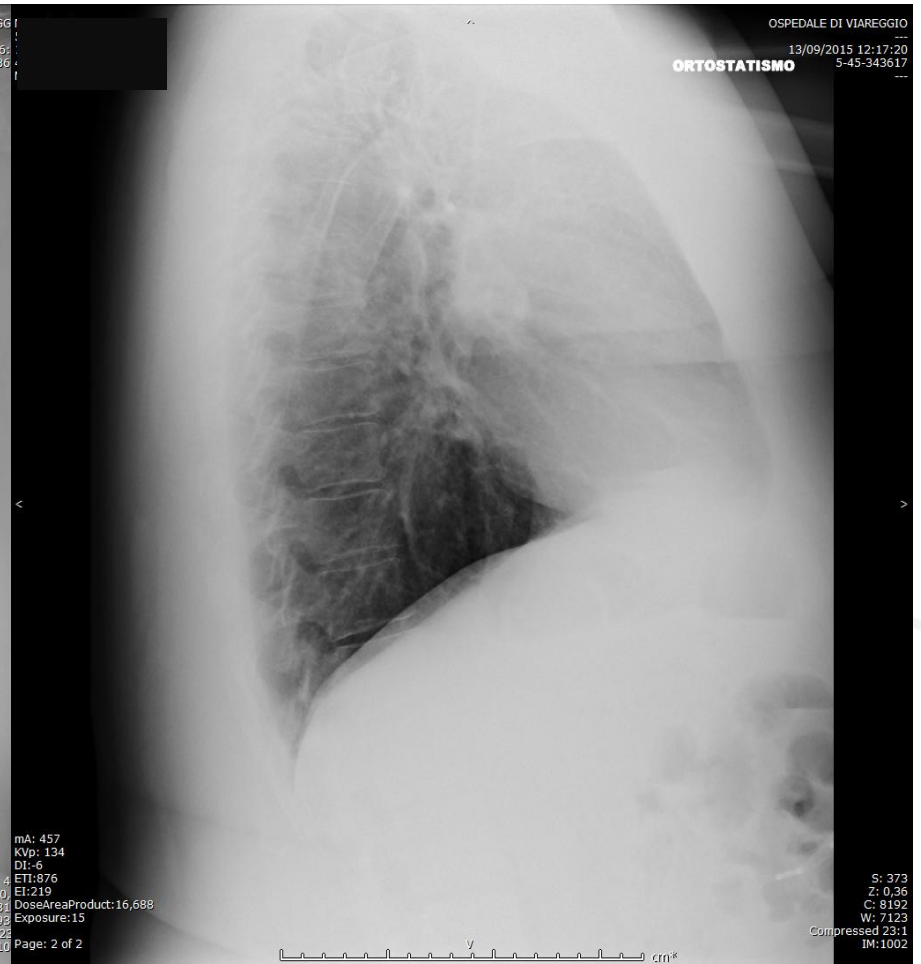
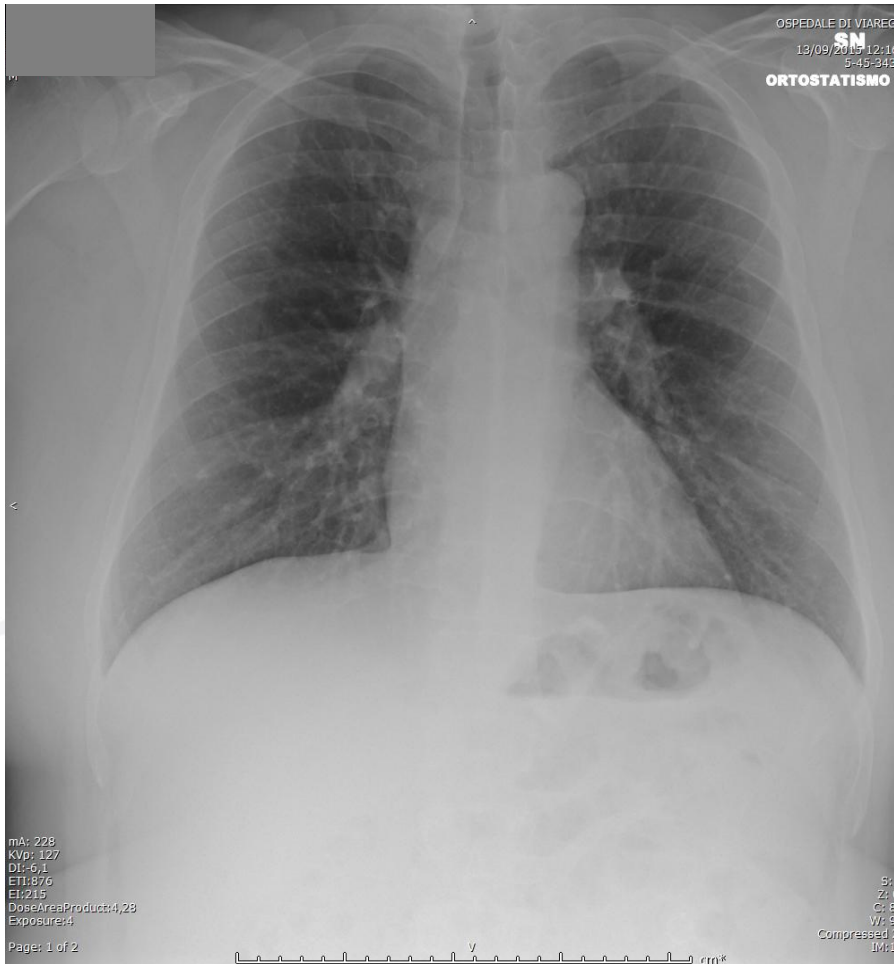
## ECG (AVR)



**LAB:** Troponina 4.6 pg/ml (0-14)



## RX torace (2 pr.)





## Un caso clinico



SCA non ancora esclusa, il paziente deve rimanere in PS per *proseguire "le troponine"*

Intanto si pensa alla diagnosi alternativa





## Lab (1)

Glicemia 110

GB 9.01

GR 5.90

Hb 15.8

HTC 48

PTL 190.000

Creatinina 0.74

GOT 21 (0-45)

GPT 23 (0-45)

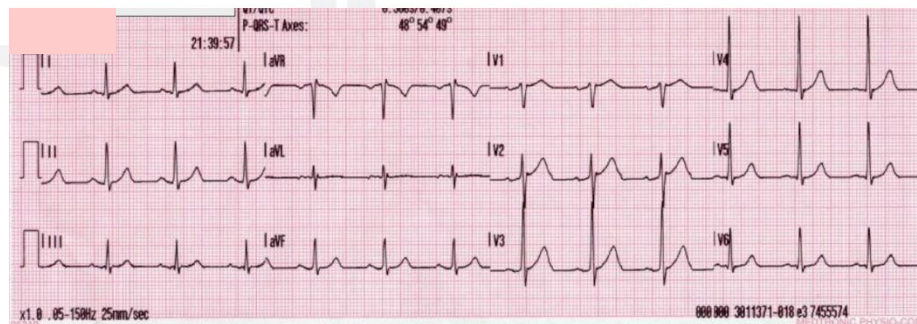


## Rivalutazione a 3 ore



Il paziente è stabile

Il dolore è ancora presente, imm modificato



**LAB (2°):** Troponina 3.9 pg/ml (0-14)

→ Paracetamolo 1 gr per os



## Rivalutazione a 3 ore



### EGA

pH 7.465  
pO<sub>2</sub> 75  
pCO<sub>2</sub> 37  
satO<sub>2</sub> 96%

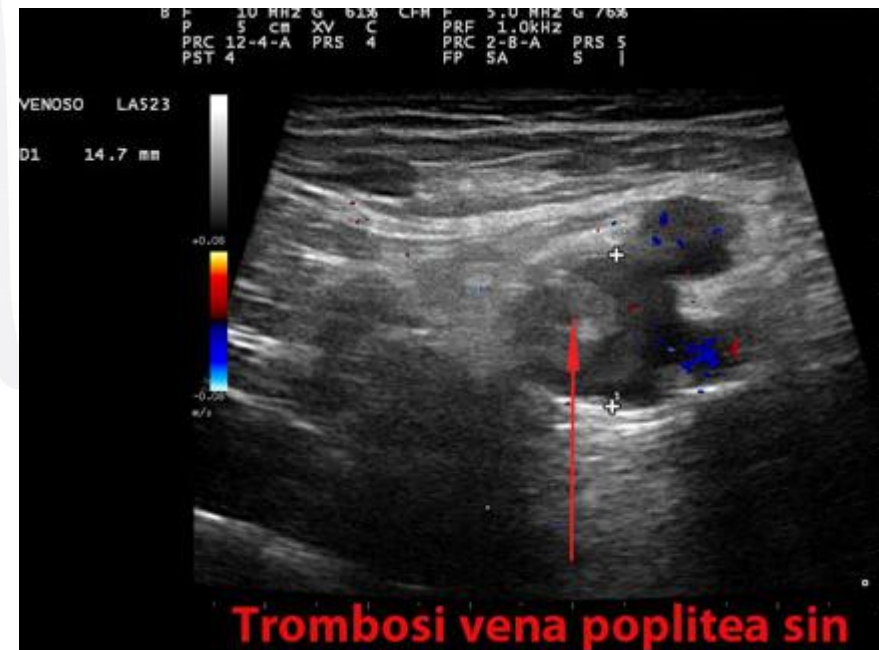
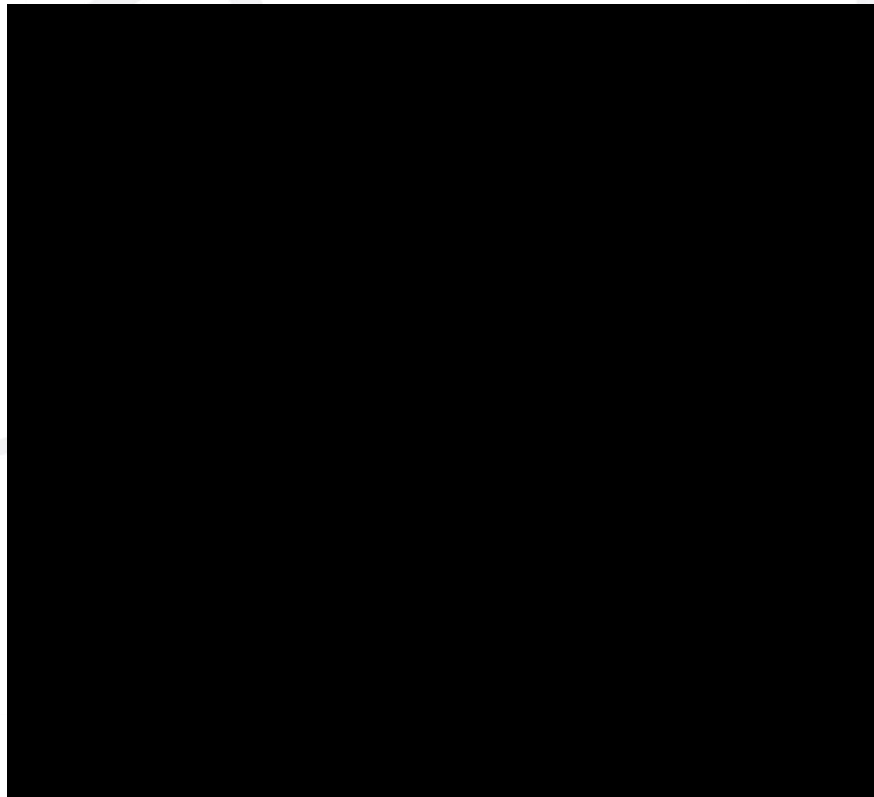
**Lattati:** 0.5

**D-dimero:** 1980 (<250)

**PCR** 1.3



## CUS arti inferiori





## Un caso clinico

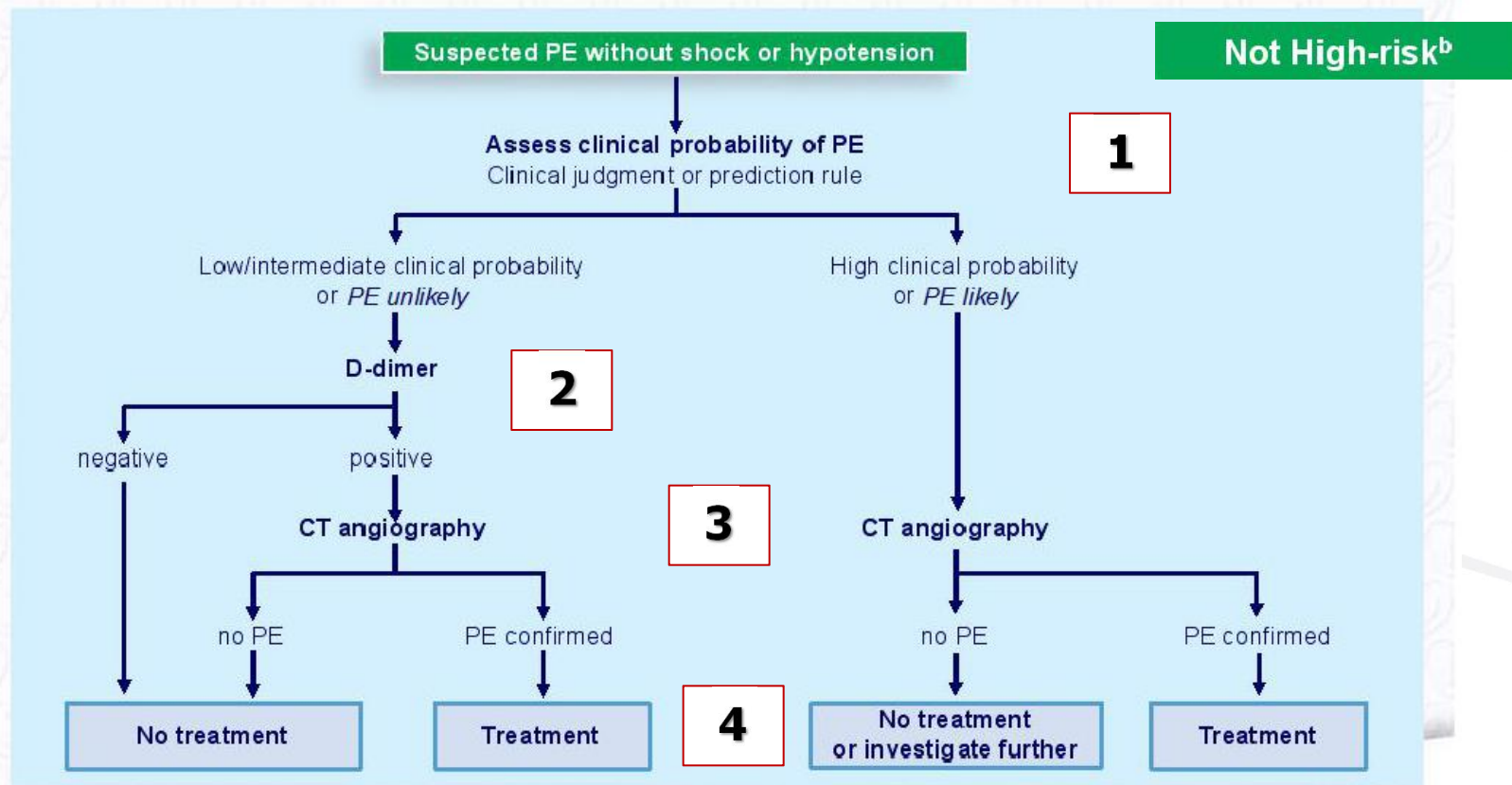


E' fatta diagnosi "clinica" di **embolia polmonare**

Si somministra prima dose di **EBPM**  
(dosaggio terapeutico)

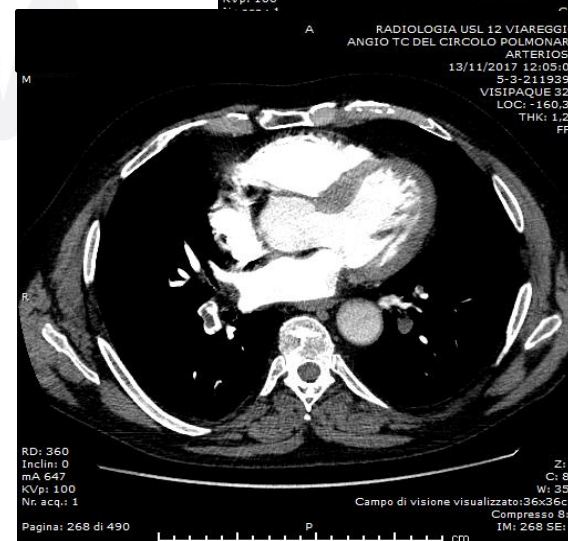
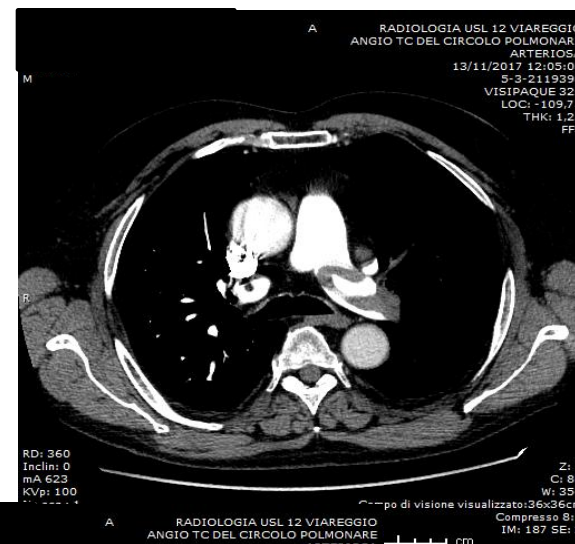
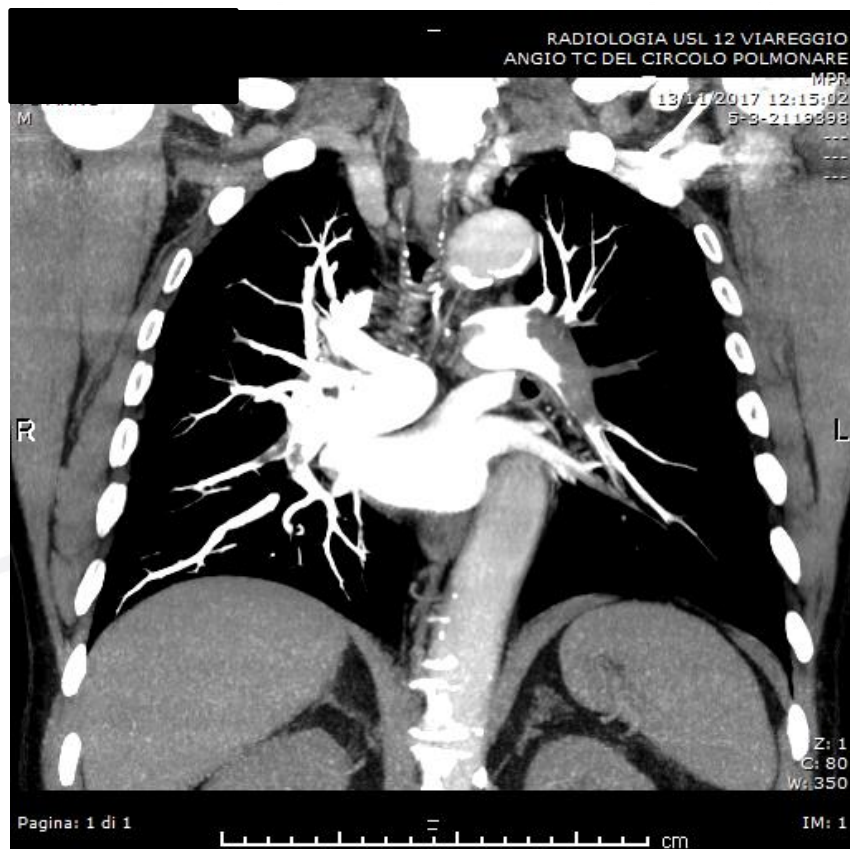


## Diagnostic algorithm: not high-risk PE



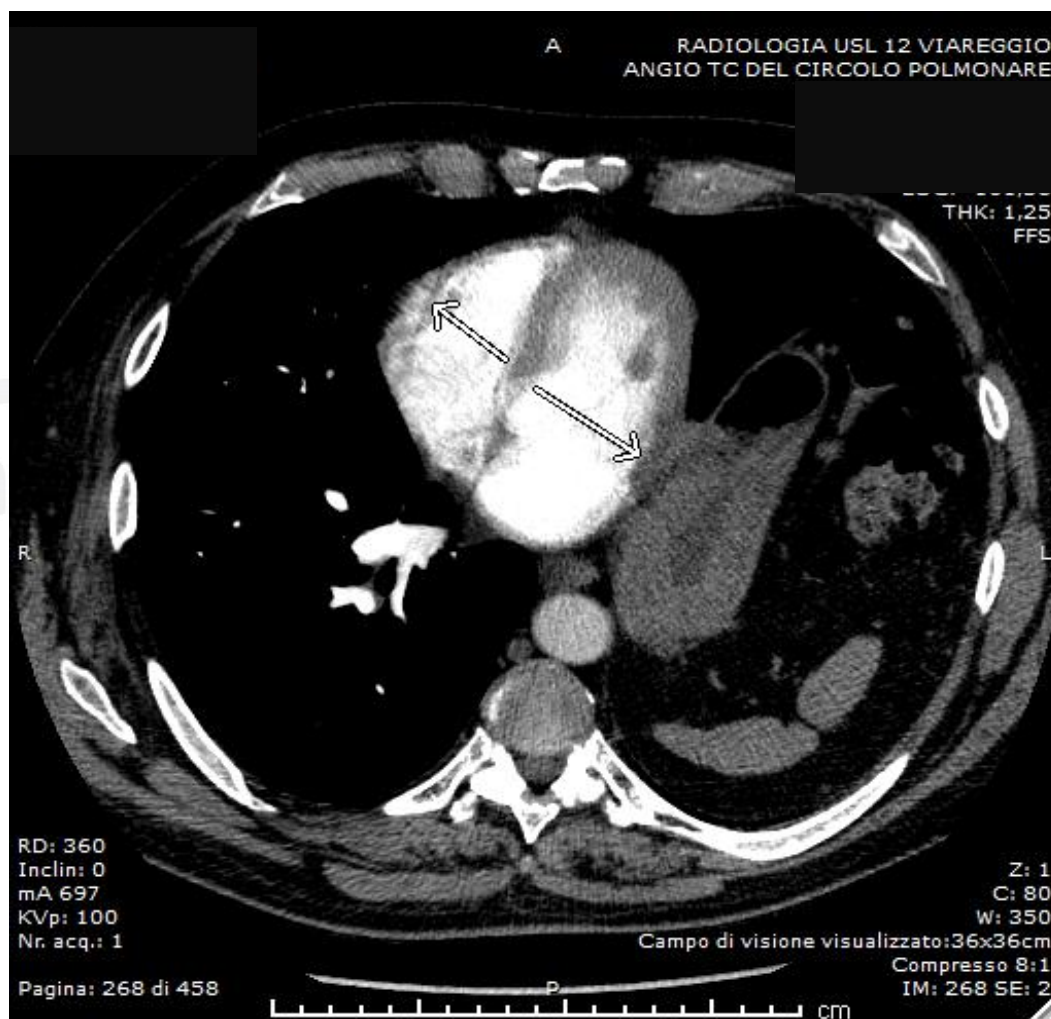


# Angio TC polmonare





# Angio TC polmonare







## PE: anatomical extent of PE as defined in NOACs trials

- Limited extent
  - $\leq 25\%$  of the vasculature of a single lobe
- Intermediate extent
  - $>25\%$  of vasculature of a single lobe or multiple lobes with  $\leq 25\%$  of entire vasculature
- Extensive extent
  - multiple lobes with  $\geq 25\%$  of entire vasculature



The Hokusai-VTE Investigators. N Engl J Med 2013



## Risk- and Severity-Adjusted Strategy



European Heart Journal (2008) 29, 2276–2315  
doi:10.1093/eurheartj/ehn310

# 2008

ESC GUIDELINES

Severity of PE should be understood as an individual estimate of PE-related early mortality risk, rather than anatomic burden, shape and distribution intrapulmonary emboli. Therefore current guidelines suggest replacing potential misleading terms such as “massive, sub-massive, non-massive” with the estimated levels of risk of PE-related early death.

PE-related early  
MORTALITY  
RISK

HIGH  
>15%

NON  
HIGH

Inter  
mediate  
3–15%

Low  
<1%

➔ **Abbandonare i termini embolia polmonare “massiva”, “sub-massiva” e “non massiva”,**

➔ **Adottare i livelli di rischio di mortalità “precoce” correlata ad EP, basati sulla presenza di markers di rischio (clinici, ecocardiografici, bio-umorali).**



## Domanda

**Nel nostro paziente, confermata la diagnosi di TEP alla angioTC polmonare valutiamo se possibile una gestione domiciliare ?**

- A) Sì, lo dimetto senza fare altro;
- B) Sì, ma eseguo prima una stratificazione del rischio;
- C) No, non vi ancora abbastanza consenso tra i colleghi per questa responsabilità e faccio cosa dice lo specialista
- D) non lo so, lo ricovero e basta.



## PE: home treatment

	Aujesky et al	Zondag et al	Agterof et al	Otero et al	HoT PE ongoing
<b>Design</b>	Open-label, RCT	Prospective cohort	Prospective cohort	Open-label, RCT	Prospective cohort, phase IV
<b>Eligibility criteria</b>					
<b>Systolic BP</b>	≥100 mmHg	≥100 mmHg	≥90 mmHg	≥90 mmHg	≥100 mmHg
<b>Clinical prediction rule</b>	PESI class I or II	Hestia	-	Uresandi 0-2	Modified Hestia
<b>Biomarkers</b>	No	No	NT-proBNP	Troponin T	No (analysis planned)
<b>Absence of RVD</b>	No	No	No	TTE	CT or TTE
<b>Renal function</b>	CrCl ≥30	CrCl ≥30	Creatinine <150 umol/L	No	CrCl ≥15
<b>Platelet count</b>	≥75 000/mm <sup>3</sup>	-	-	-	-
<b>Body weight</b>	≤150 kg	-	-	BMI <30 kg/m <sup>2</sup>	
<b>Respiratory function</b>	SaO <sub>2</sub> ≥90%, or PaO <sub>2</sub> ≥60 mmHg	SaO <sub>2</sub> >90% in air	SaO <sub>2</sub> >90% in air	SaO <sub>2</sub> ≥ 93%; NYHA I or II; severe COPD	SaO <sub>2</sub> >90% in air
<b>Others</b>	No history of HIT	No history of HIT; no hepatic impairment	-	No surgery <15 days	No history of HIT; no severe hepatic impairment
<b>Time of discharge</b>	<24 h vs inpatient management	<24 h	<24 h	3- to 5-day vs inpatient	≤48 h of admission



## Classification of early mortality risk

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





# La Dimissione EP in PS

G. Pepe

Not High-risk<sup>b</sup>

**Il medico d'emergenza-urgenza  
*si innervosisce* quando deve pronunciarsi sul  
"early mortality risk" nei pazienti che  
intende dimettere a domicilio (outpatients)**





# *ED evolution in the years*

***Nineties***

***"Admit  
to work  
up"***

***2000***

***"Work up  
to admit"***

***2014***

***"Work to  
discharge"***

***Internal wards***



***Emerg. rooms***



***Emerg. rooms***





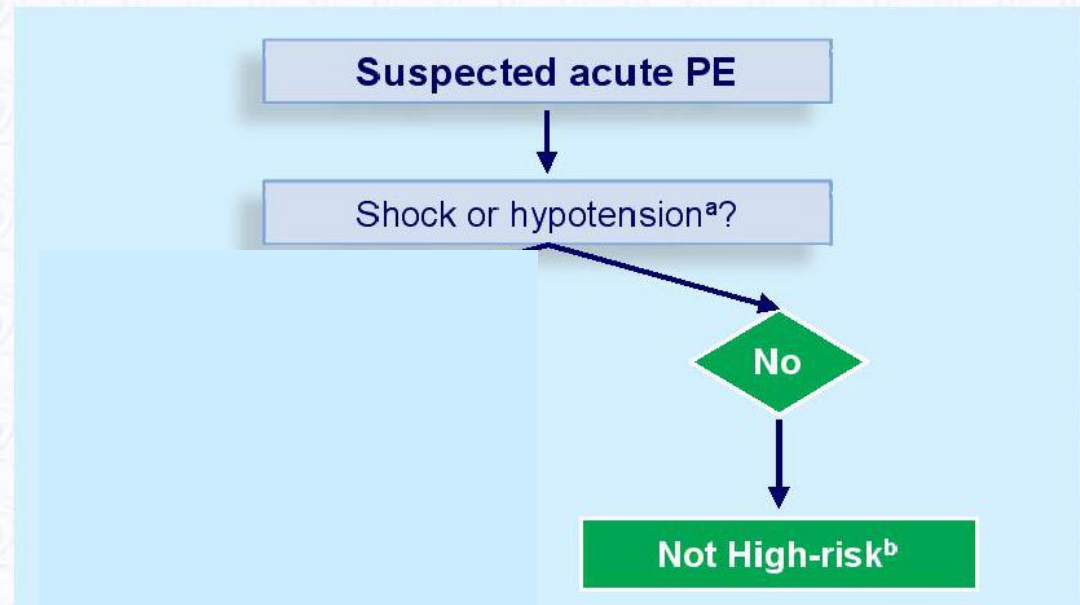
**2018**



**"Certified  
discharge"**

**"Emergency Room"**

## Initial risk stratification of acute PE



***Dimissione precoce "certificata" da  
stratificazione + competenza***





# Stratificazione del rischio "reale" - scores

	IMPACT	PESI	sPESI	Hestia
Mortality in low risk (%)	0.4	0.6	0	0
Sensitivity (95% CI)	95.2 (7.41-99.8)	90.5 (68.2-98.3)	100 (80.8-100)	100 (80.8-100)
Specificity (95% CI)	29.1 (26-32.5)	39.1 (35.6-42.6)	31.8 (28.6-35.2)	26.8 (23.8-30.1)
PPV (95% CI)	3.5 (2.2-5.4)	3.8 (2.4-6.0)	3.8 (2.4-5.8)	3.5 (2.2-5.4)
NPV (95% CI)	99.6 (97.2-100)	99.4 (97.4-99.9)	100 (98.1-100)	100 (97.8-100)

IMPACT= In-hospital Mortality for Pulmonary embolism using Claims data



## HESTIA Criteria

	Hestia
Mortality in low risk (%)	0
Sensitivity (95% CI)	100 (80.8-100)
Specificity (95% CI)	26.8 (23.8-30.1)
PPV (95% CI)	3.5 (2.2-5.4)
NPV (95% CI)	100 (97.8-100)
IMPACT= In-hospital Mortality	

**TABLE 2: HESTIA CRITERIA**

*If any of the below are answered "Yes," the patient should NOT be treated as an outpatient.*

1. Hemodynamically unstable?
2. Thrombolysis or embolectomy necessary?
3. Active bleeding or high risk of bleeding?
4. Oxygen supply to maintain oxygen > 90% > 24 hours?
5. Pulmonary embolism diagnosed during anticoagulant treatment?
6. In severe pain needing IV pain medication > 24 hr (or multiple doses in the ED)?
7. Medical or social reason for treatment in hospital > 24 hr?
8. Creatinine clearance less than 30 mL/min?
9. Severe liver impairment or disease?
10. Pregnant?
11. Documented history of heparin-induced thrombocytopenia?

**Se risposta sempre "NO" il pz è un basso rischio**



# Original and simplified pulmonary embolism severity index

**sPESI**

Parameter		Simplified version
Age	<b>" Emerg. Phisicians Love the simplified tools..."</b>	1 point (if age >80 years)
Male sex		-
Cancer		1
Chronic heart failure		1
Chronic pulmonary disease		1
Pulse rate $\geq 110$ b.p.m.		1
Systolic blood pressure <100 mmHg		1
Respiratory rate >30 breaths per minute		-
Temperature <36°C		-
Altered mental status		-
Arterial oxyhaemoglobin saturation <90%		1



# Severity index *by* "sPESI – triage/TVR"

- ➔ **Age**
- ➔ **Cancer**
- ➔ **Chronic pulmonary & heart disease**
- ➔ **Pulse rate b.p.m.**
- ➔ **SBP mmHg**
  
- ➔ **Sat.O2 %**





# Severity index *by* "sPESI – triage/TVR"

- ➔ **Age**
- ➔ **Cancer**
- ➔ **Chronic pulmonary & heart disease**
- ➔ **Pulse rate b.p.m.**
- ➔ **SBP mmHg**
  
- ➔ **Sat.O2 %**

**sPESI = 0**

**Franco, 56 anni**

Iperteso

Diabetico

PR 80 bpm

PAS 140/70 mmHg



SatO2 97%



# Original and simplified pulmonary embolism severity index (PESI)

Parameter	Original version	Simplified version
	Risk strata	
	<p><b>Class I: ≤65 points</b> very low 30-day mortality risk (0-1.6%)</p> <p><b>Class II: 66-85 points</b> low mortality risk (1.7-3.5%)</p> <p><b>Class III: 86-105 points</b> moderate mortality risk (3.2-7.1%)</p> <p><b>Class IV: 106-125 points</b> high mortality risk (4.0-11.4%)</p> <p><b>Class V: &gt;125 points</b> very high mortality risk (10.0-24.5%)</p>	<p><b>0 points = 30-day mortality risk 1.0%</b> (95% CI 0.0%-2.1%)</p> <p><b>≥1 point(s) = 30-day mortality risk 10.9%</b> (95% CI 8.5%-13.2%)</p>

**sPESI = 0**

**sPESI ≥ 1**

[www.escardio.org/guidelines](http://www.escardio.org/guidelines)

European Heart Journal (2014);doi:10.1093/eurheartj/ehu283



EUROPEAN SOCIETY OF CARDIOLOGY®





## DEA Versilia, ATNO

Dal 1.1.2017 al 31.12.2017



### La malattia trombo-embolica venosa (TVP + EP):

**N=218**

Intervallo temporale di selezione: 01/01/2017 - 31/12/2017

Condizioni: Diagnosi principale: EMBOLIA POLMONARE

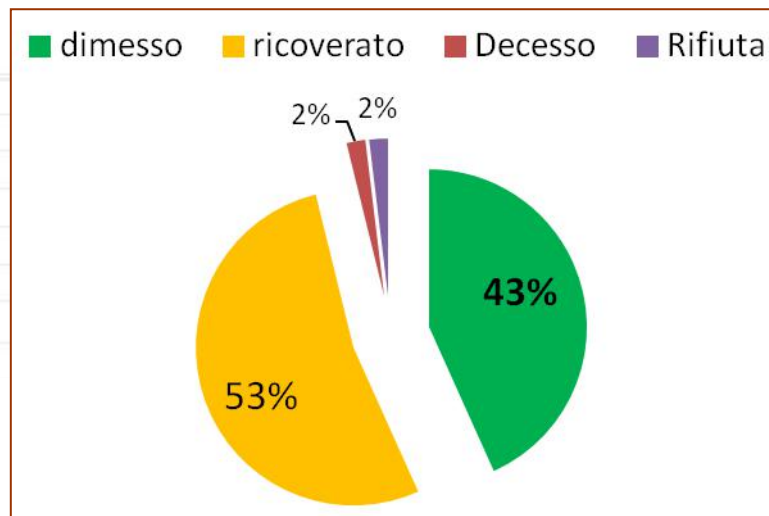
#### Esito Intervento

##### Esito Finale

Dimesso
Ricoverato
Deceduto in P.S.
Rifiuta il ricovero
Rifiuta osservazione
<b>Totali</b>

• **114 TVP**

• **104 EP** →





# DEA Versilia, ATNO

Dal 1.1.2017 al 17.11.2017



## La malattia trombo-embolica venosa (TVP + EP):

- **104 EP** → Sperimentazione **follow-up telefonico (7 gg) e clinico (30 gg)**





Full Length Article

## Early discharge of patients with pulmonary embolism in daily clinical practice: A prospective observational study comparing clinical gestalt and clinical rules

Simone Vanni<sup>a,\*</sup>, Cecilia Becattini<sup>b</sup>, Peiman Nazerian<sup>a</sup>, Carlo Bova<sup>c</sup>, Valerio Teodoro Stefanone<sup>a</sup>, Ludovica Anna Cimini<sup>b</sup>, Gabriele Viviani<sup>a</sup>, Cosimo Caviglioli<sup>a</sup>, Michela Sanna<sup>d</sup>, Giuseppe Pepe<sup>a</sup>, Stefano Grifoni<sup>a</sup>

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ARTICLE INFO

ABSTRACT

**Objectives:** To estimate the efficiency and safety of clinicians' gestalt in the identification of patients with pulmonary embolism (PE) candidates for early discharge and to compare the efficiency and safety of clinical gestalt with that of the Pulmonary Embolism Severity Index (PESI), the simplified PESI (sPESI) and the Hestia criteria (HC).

**Methods:** Consecutive adult patients presenting to the emergency department of four Italian hospitals with confirmed diagnosis of PE were included. Data for PESI, sPESI and HC assessment were prospectively collected. Patients were managed according to the clinical gestalt of the attending physician, independent of the results of PESI, sPESI and HC. Efficiency was defined as the prevalence of candidates to early discharge. The primary safety measure was the incidence of a composite of venous thromboembolic recurrence, major haemorrhage or all-cause mortality within 30 days.

**Results:** Out of 547 included patients, 178 (32.5%) were judged to be at low risk and discharged within 48 h from presentation. HC identified a higher proportion (41.7%) whereas both PESI (24.1%) and sPESI (18.3%) identified a lower proportion of candidates for early discharge when compared to clinical gestalt ( $P < 0.01$  for all). The incidence of the safety outcome was 2.8% in early-discharged patients according to clinical gestalt and 2.3%, 3.0% and 2.6% in candidates to early discharge according to PESI, sPESI and HC, without differences between strategies.

**Conclusions:** In our cohort, clinical gestalt identified one-third of PE patients for early discharge. Among different strategies HC showed the highest efficiency sharing similar safety with the other strategies.

1. Introduction

International guidelines on the diagnosis and management of patients with pulmonary embolism (PE) [1–3] suggest considering early discharge and outpatient treatment for patients judged to be at low risk of short-term adverse outcome. However, scarce data are available on the early discharge of PE patients in clinical practice [4]. In recent years several clinical rules have been published and at least three have been validated for the identification of low-risk patients who could be candidate for home treatment, the Pulmonary Embolism Severity Index

(PESI) [5,6], the simplified PESI (sPESI) [7] and the Hestia criteria (HC) [8]. Data about their efficiency and safety in every-day clinical practice are lacking and recent metaanalyses [9–11] suggest that more data are needed to confirm the feasibility and the impact of this strategy in the real world. Moreover, whether scores or clinical rules can identify candidates to early discharge better than clinical gestalt is controversial [9].

The aim of this study was to prospectively estimate the efficiency and safety of clinicians' gestalt to identify PE patients as suitable candi-

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# La Dimissione EP in PS

G. Pepe

## Early discharge of patients with pulmonary embolism in daily clinical practice: A prospective observational study comparing clinical gestalt and clinical rules

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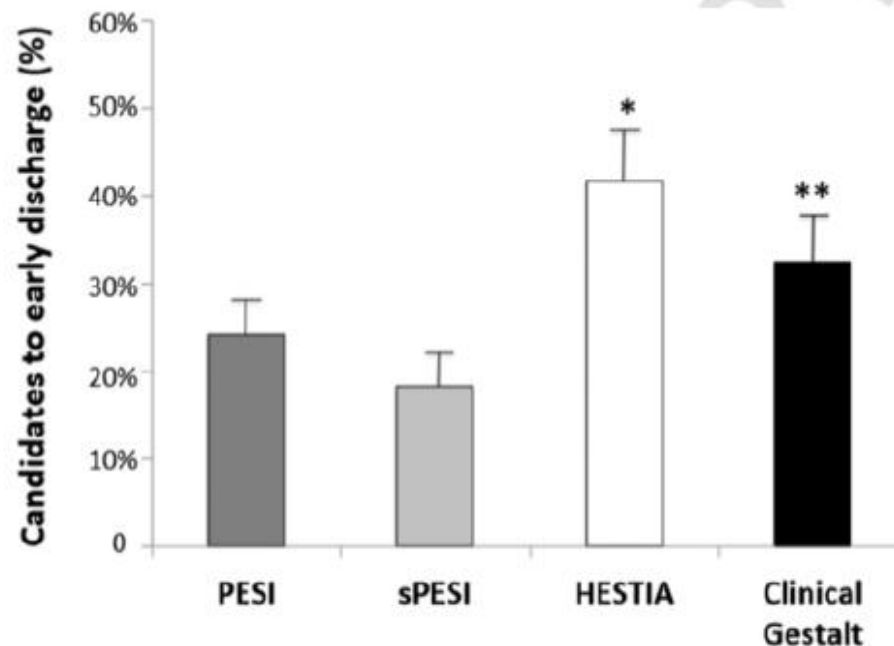


Fig. 2. Efficiency of clinical gestalt, PESI, sPESI and Hestia Criteria (HC) in the identification of candidates for early discharge. \* $P = 0.004$  vs clinical gestalt,  $P < 0.001$  vs PESI and sPESI. \*\* $P = 0.004$  vs HC and  $P = 0.008$  vs PESI and  $P < 0.001$  vs sPESI.



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**Table 3**

Details of different distribution of candidates for home treatment in sPESI and Hestia criteria.

Patients with sPESI  $\geq 1$  in those with Hestia criteria = 0

Total	165
Cancer	89 (62%)
Age > 80	62 (40%)
COPD/CHF	57 (37%)
HR $\geq 110$	28 (18%)
SatO <sub>2</sub> < 90%	5 (3%)
SBP < 100	3 (2%)

Patients with sPESI = 0 in those with Hestia criteria  $\neq 0$

Total	35
Medical or Social reason	19 (54%)
PE during anticoagulation	6 (17%)
Thrombolysis or embolectomy	5 (14.3%)
Oxygen supplementation	3 (10%)
Need of pain medications IV	2 (6%)
CrCl < 30 ml/min	2 (6%)
Pregnancy	1 (3%)
Active bleeding/high bleeding risk	1 (3%)
Heparin induced thrombocytopenia	1 (3%)

Abbreviations: sPESI, simplified Pulmonary Embolism Severity Index. COPD, Chronic obstructive pulmonary disease; CHF, Chronic heart failure; HR, heart rate; IV, intravenous; CrCl, Creatinine Clearance; PE, pulmonary embolism; SBP, systolic blood pressure.



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S. Vanni et al.

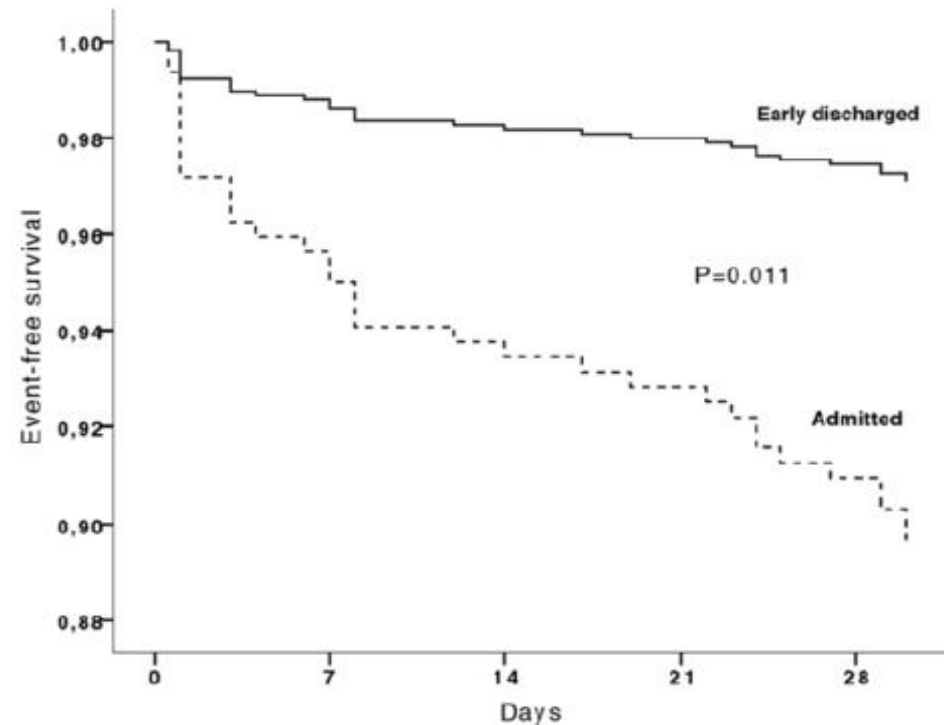
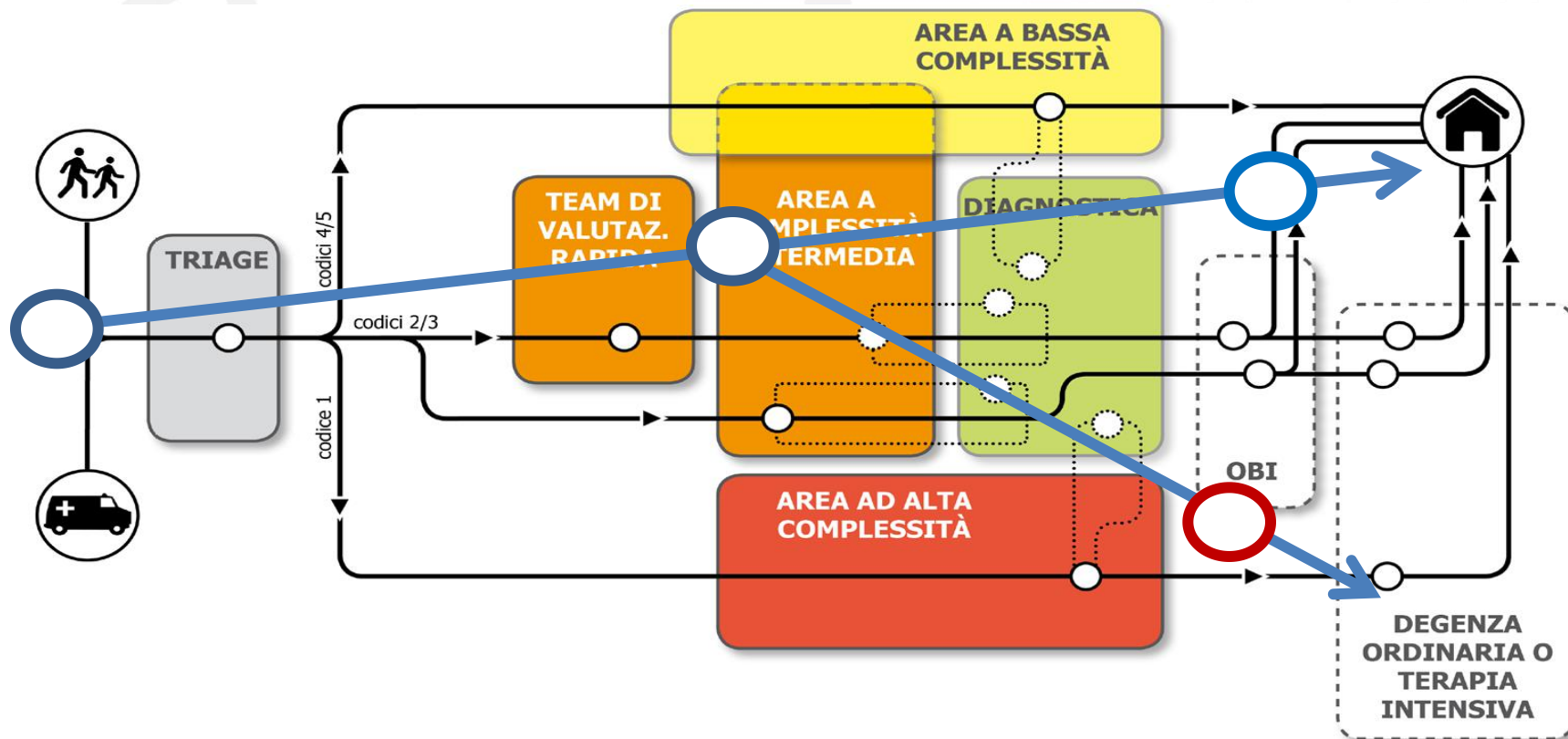


Fig. 3. Event-free survival curves of patients early discharged vs admitted patients according to the multivariate Cox regression analysis. This difference was significant also when comparing early discharged patients to those admitted to the hospital without overt hemodynamic instability, RVD or cardiac troponin elevation ( $P = 0.042$ ) (Table 4).



## Diagnosi + stratificazione prognostica → esito in Pronto Soccorso del tromboembolismo venoso





# "La dimissione (dal PS) del paziente con embolia polmonare è possibile"

ESC CONGRESS BARCELONA 2017 12:01 | Oslo INTERACTIVE SESSION VOTE ASK ESC Congress 365 ESC

**Early discharge and home treatment**

Patients with acute low-risk PE should be considered for early discharge and continuation of treatment at home if proper outpatient care and anticoagulant treatment can be provided.

Ila	B	217, 237, 347, 349
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ESC CONGRESS BARCELONA 2017 #esccongress www.escardio.org/ESC2017

Stavros V KONSTANTINIDES (Mainz - DE)



# ACCP Guidelines 2016

## Antithrombotic Therapy for VTE Disease

### CHEST Guideline and Expert Panel Report



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We suggest that patients who satisfy all of the following criteria are **suitable for treatment of acute PE out of the hospital**:

1. clinically stable with good cardiopulmonary reserve;
2. no contraindications such as recent bleeding, severe renal or liver disease, or severe thrombocytopenia;
3. expected to be compliant with treatment;
4. the patient feels well enough to be treated at home.

Clinical decision rules such as the Pulmonary Embolism Severity Index (PESI), the simplified form with score of 0, can help to identify low-risk patients who are suitable for treatment at home.



# ACCP Guidelines 2016

## Antithrombotic Therapy for VTE Disease CHEST Guideline and Expert Panel Report



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## Treatment of Acute PE Out of the Hospital

**\*20. In patients with low-risk PE and whose home circumstances are adequate, we suggest treatment at home or early discharge over standard discharge (eg, after the first 5 days of treatment) (Grade 2B).**





# BTS Guidelines 2018 – draft version



British Thoracic Society

## British Thoracic Society Guidelines for the outpatient management of pulmonary embolism Summary of recommendations

### Outcomes of Outpatient Care for Low-Risk Pulmonary Embolism

#### Recommendation

- Patients with pulmonary embolism should be assessed for suitability for management in an ambulatory care setting. **Grade B**
- Those patients assessed as low risk and suitable for outpatient management should be offered treatment in an outpatient setting where a robust pathway exists for follow-up and monitoring. **Grade B**

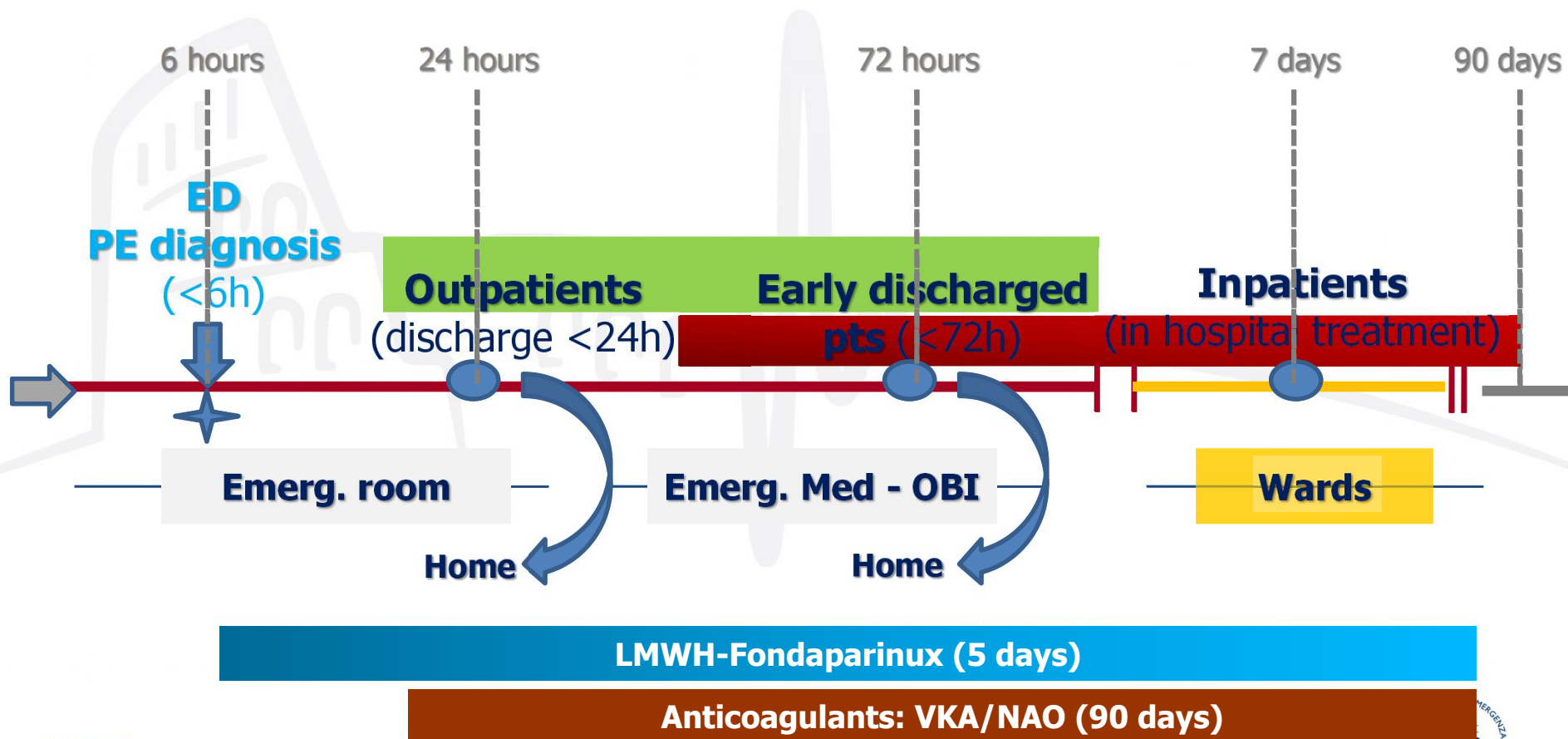
### Inclusion and exclusion criteria for outpatient management or early discharge

#### Recommendations

- Patients with confirmed pulmonary embolism should be risk-stratified using a validated clinical risk score. **Grade B**
- Patients in PESI Class I/II, sPESI 0 or meeting the Hestia criteria should be considered for outpatient management of PE. **Grade B.**
- Where PESI or s-PESI is used, a set of exclusion criteria should be applied to patients being considered for outpatient management of confirmed pulmonary embolism. **Grade B**



# PE ,“phenotypes”, timing and setting





# Realtà o chimera ?

« [...] Era il mostro di origine divina,  
leone la testa, il petto capra, e drago  
la coda; e dalla bocca orrende vampe  
vomitava di fuoco: e nondimeno,  
col favor degli Dei, l'eroe la spense [...] »  
(*Iliade*, VI, 180-184)





## LA BUONA SANITÀ

## «Io, salvato dai medici del Versilia»

David ha avuto un'embolia polmonare vivo grazie al pronto soccorso

PIETRASANTA

Oggi, David, 52 anni, sta meglio. Decisamente meglio. «Ma quando sono stato trasportato d'urgenza, in codice rosso, al pronto soccorso del Versilia, ho veramente pensato il peggio. Respiravo con difficoltà e avevo tutta una serie di problematiche: mi è stata subito diagnosticata un'embolia polmonare. Insomma, sono stati momenti difficili».

Ma David vuole raccontare la sua esperienza soprattutto per elogiare «i medici del pronto soccorso e tutto il reparto, anche infermieristico della medicina d'urgenza, che con il sottoscritto si sono comportati in modo professionale ed umano. Posso solamente ringraziarli. Spesso mi capita di leggere di critiche al sistema sanitario del Versilia: non so che dire. Io posso, come detto, solo parlarne bene: se oggi sono a casa mia dove continuo a seguire una terapia perché quello che ho pas-



L'ingresso del pronto soccorso dell'ospedale Versilia

sato non è stata proprio una sciocchezza, lo devo a loro. Ma l'importante è poterla raccontare e, soprattutto, potere ringraziare chi, in soli sei giorni, mi ha curato e seguito ora dopo ora per poi dimettermi, come il primario Giuseppe Pepe, la dottoressa Maria del Mar Oli-

van Roldan, il dottor Vincenzo Berti e più in generale tutto lo staff medico ed infermieristico del pronto soccorso. È stata – prosegue David – un'esperienza drammatica, ma nella sfortuna ho potuto toccare con mano la competenza e l'umanità dei nostri medici». (l. b.)



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# La Dimissione EP in PS

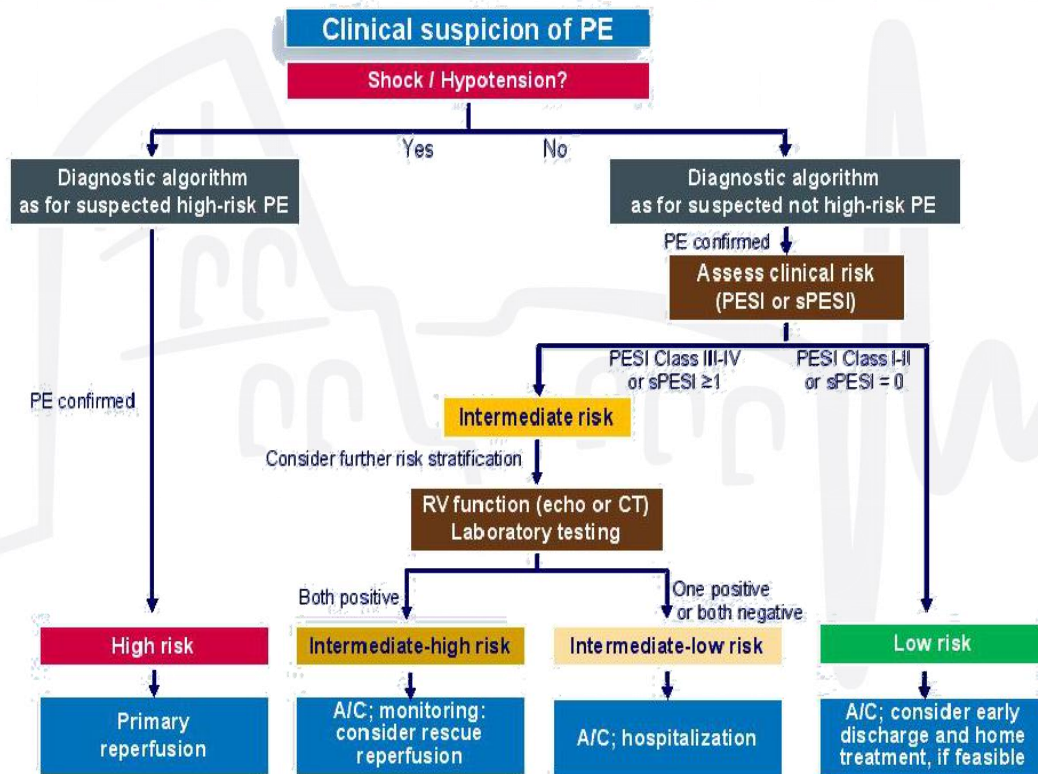
G. Pepe



# Grazie



# Le Linee Guida e la buona pratica



*Si presuppone che il medico che opera con **prudenza** sappia scegliere il modo più opportuno e tempestivo per attuare il proprio intervento, e soprattutto, sia in grado di **prevedere** quali possano essere le conseguenze del suo operato...*



# Screening "base" per TVP/TEP non provocata in DEA



- Rx Torace
- Eco addome completo

## Screening "base" differibili urgenti



- PSA
- Mammografia / ecografia ginecologica
- Markers neo (???)





# La Dimissione EP in PS

G. Pepe







# La Dimissione EP in PS

G. Pepe

