



ESTRATIFICACIÓN DE RIESGO EN PACIENTES NORMOTENSOS

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Importancia de la estratificación

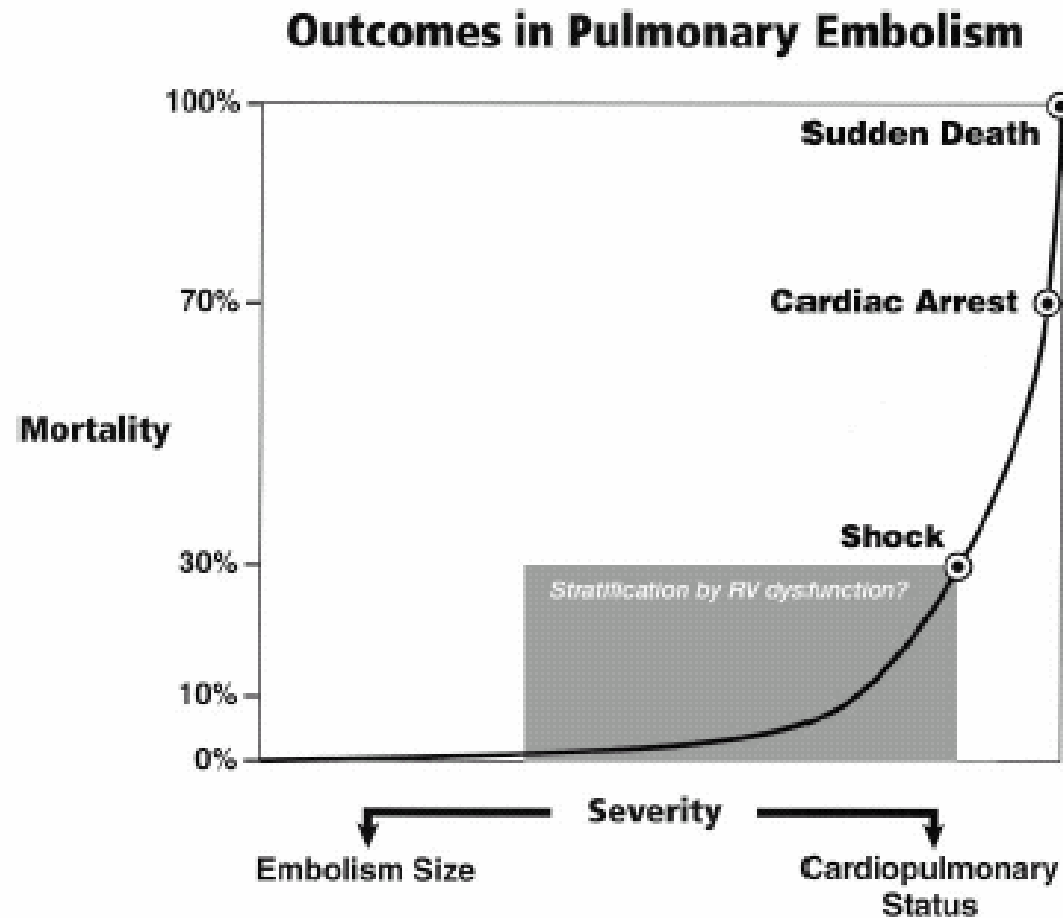
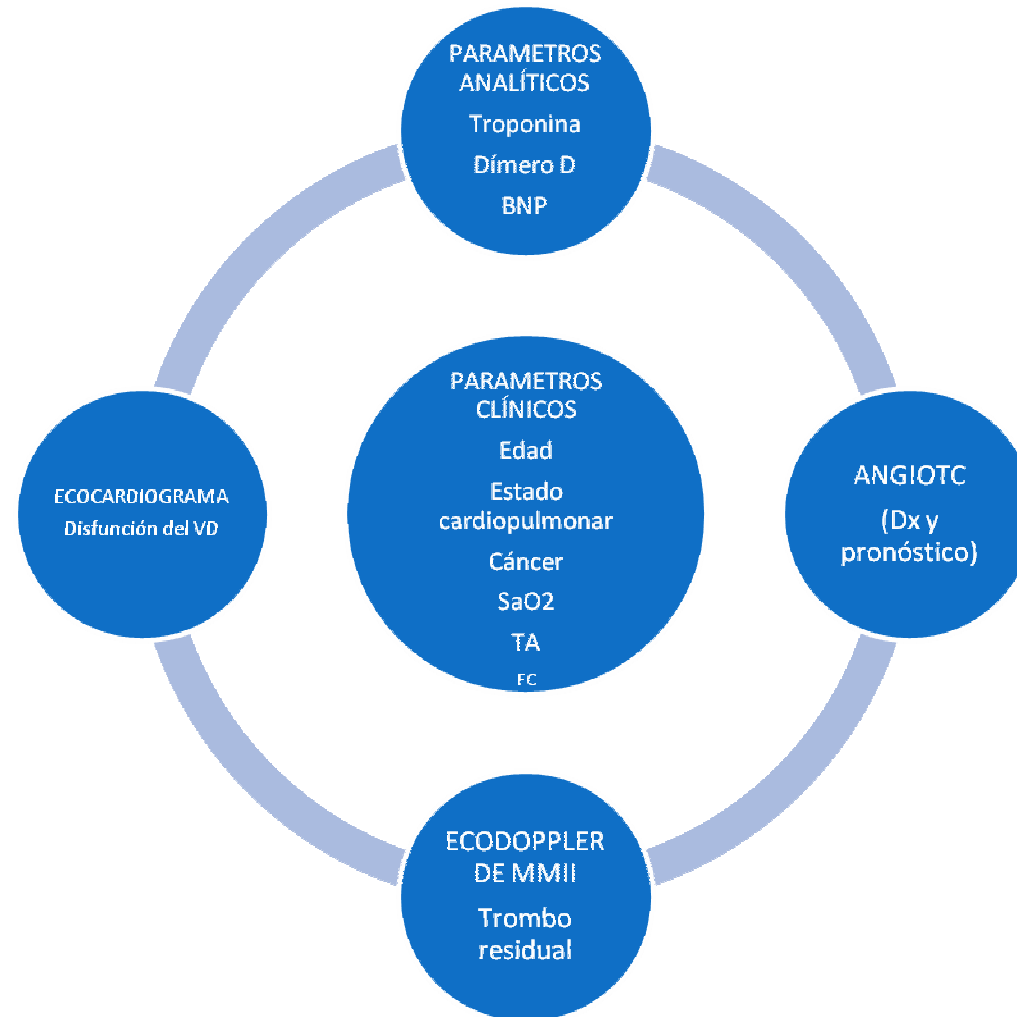


FIGURE 1. The relationship of severity and mortality in patients with MPE.

Herramientas útiles para el pronóstico



Predicting Adverse Outcome in Patients with Acute Pulmonary Embolism: A Risk Score

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Cohorte de derivación: 296 pacientes

6 variables

Mortalidad Sangrado Recurrencia (a 3 meses)

Table 3 Multivariate predictors of adverse outcomes and development of the clinical score*

	Logistic-regression coefficients	Adjusted odds ratio (95% CI)	p value	Point score
Cancer	2.25	9.5 (3.5-25.8)	< 0.001	+2
Heart failure	0.95	2.6 (1.0-6.6)	0.047	+1
Previous deep vein thrombosis	1.03	2.8 (1.0-7.6)	0.041	+1
Systolic blood pressure < 100 mmHg	2.71	15.1 (2.4-96.4)	< 0.005	+2
PaO2 < 8 kPa	0.94	2.6 (1.0-6.5)	0.047	+1
Deep vein thrombosis shown by ultrasound	1.33	3.8 (1.3-11.4)	0.017	+1
Total score				0-8

* Data from 268 patients : 27 patients had missing arterial blood oxygen analysis (PaO2) or performed while breathing oxygen; 1 patient had a missing systolic blood pressure on admission

	%	Eventos
Bajo riesgo (≤2)	61	2%
Alto riesgo (>2)	39	26%

Escala de Ginebra

Derivation and Validation of a Prognostic Model for Pulmonary Embolism

Drahomir Aujesky, D. Scott Obrosky, Roslyn A. Stone, Thomas E. Auble, Arnaud Perrier, Jacques Cornuz, Pierre-Marie Roy, and Michael J. Fine

TABLE 3. RISK CLASS DISTRIBUTIONS IN THE DERIVATION AND VALIDATION SAMPLES

Risk Class	Derivation Sample, % (95% CI) (n = 10,354)	Internal Validation Sample, % (95% CI) (n = 5,177)	External Validation Sample, % (95% CI) (n = 221)
Class I, very low risk	19.4 (18.7–20.2)	19.6 (18.5–20.7)	24.4 (18.9–30.7)
Class II, low risk	21.5 (20.7–22.3)	21.2 (20.1–22.4)	27.1 (21.4–33.5)
Class III, intermediate risk	21.7 (20.9–22.5)	22.2 (21.0–23.3)	28.1 (22.2–34.5)
Class IV, high risk	16.4 (15.7–17.1)	15.8 (14.8–16.8)	11.3 (7.5–16.2)
Class V, very high risk	21.0 (20.3–21.8)	21.3 (20.2–22.4)	9.0 (5.6–13.6)

TABLE 2. INDEPENDENT PREDICTORS OF 30-DAY MORTALITY IN THE DERIVATION SAMPLE AND POINTS ASSIGNED TO THE RISK SCORE

Predictors	β-Coefficients (95% CI)	Points Assigned
Demographic characteristics		
Age, per yr	0.03 (0.02–0.03)	Age, in yr
Male sex	0.17 (0.02–0.32)	+10
Comorbid illnesses		
Cancer	0.87 (0.71–1.03)	+30
Heart failure	0.31 (0.14–0.49)	+10
Chronic lung disease	0.30 (0.12–0.47)	+10
Clinical findings		
Pulse ≥ 110/min	0.60 (0.44–0.76)	+20
Systolic blood pressure < 100 mm Hg	0.86 (0.67–1.04)	+30
Respiratory rate ≥ 30/min	0.41 (0.23–0.58)	+20
Temperature < 36°C	0.42 (0.25–0.59)	+20
Altered mental status*	1.50 (1.30–1.69)	+60
Arterial oxygen saturation < 90%†	0.58 (0.37–0.79)	+20

TABLE 4. RISK CLASS-SPECIFIC MEDICAL OUTCOMES IN THE DERIVATION AND VALIDATION SAMPLES

Medical Outcomes	Derivation Sample, % (95% CI) (n = 10,354)	Internal Validation Sample, % (95% CI) (n = 5,177)	External Validation Sample, % (95% CI) (n = 221)	p Value [§]	p Value
30-day mortality					
Class I	1.1 (0.7–1.7)	1.6 (0.9–2.6)	0 (0–6.6)	0.32	0.66
Class II	3.1 (2.5–4.0)	3.5 (2.5–4.7)	1.7 (0–8.9)	0.63	0.72
Class III	6.5 (5.5–7.6)	7.1 (5.7–8.7)	3.2 (0.4–11.2)	0.51	0.43
Class IV	10.4 (9.0–11.9)	11.4 (9.3–13.8)	4.0 (0.1–20.4)	0.44	0.36
Class V	24.5 (22.7–26.4)	23.9 (21.4–26.5)	10.0 (1.2–31.7)	0.69	0.19

Escala PESI

Aujesky D et al. Am J Respir Crit Care Med. 2005



Escala de riesgo de eventos adversos a corto plazo en pacientes con tromboembolia pulmonar

Uresandi F, et al. Arch Bronconeumol 2007

Cohorte de derivación
681 pacientes

7 variables

Aplicación de la puntuación predictiva sobre la evolución de la tromboembolia pulmonar

	%	IC del 95%
Sensibilidad	82,9	68,7-91,5
Especificidad	49,1	44,9-53,4
Valor predictivo positivo	11,4	8,3-15,5
Valor predictivo negativo	97,3	94,6-98,7
Probabilidad preprueba estimada	7,3	
Probabilidad posprueba positiva	11,4	8,3-15,5
1-probabilidad posprueba positiva	88,6	84,5-91,7
1-probabilidad posprueba negativa	97,3	94,6-98,7
Probabilidad posprueba negativa	2,7	1,3-5,4

TABLA III

Desarrollo de una puntuación clínica de predicción

Variables	Puntuación
Antecedente de hemorragia reciente	4
Cáncer metastásico	4
Creatinina > 2 mg/dl	3
Cáncer sin metástasis	2
Antecedente de inmovilización médica	2
Ausencia de cirugía reciente	1
Edad > 60 años	1

Si un paciente presenta una puntuación de 2 o menor, tiene un riesgo bajo de desarrollar complicaciones a corto plazo por la tromboembolia pulmonar.

	%	Mortalidad 10 días %
Bajo riesgo (≤ 2)	47	2
Alto riesgo (> 2)	53	10

Escala española

Early discharge of patients with pulmonary embolism: a two-phase observational study

C.W.H. Davies^{*}, J. Wimperis[#], E.S. Green[¶], K. Pendry⁺, J. Killen[§], I. Mehdi^f, C. Tiplady^{**}, P. Kesteven^{###}, P. Rose^{¶¶} and W. Oldfield⁺⁺⁺

Fase 1: se establecen de forma prospectiva criterios de exclusión en 643 pacientes

Fase 2: se validan los criterios de exclusión en 225 pacientes

TABLE 1 Phase 1: reasons given for nonsuitability for early discharge[#]

Reason	Patients n (% reasons)
Patient required admission for additional monitoring, administration of any form of oxygen therapy for hypoxaemia or for another medical reason (e.g. significant respiratory and/or cardiovascular disease and/or treatment for active malignancy)	70 (43.2)
Likelihood of poor compliance or difficulty ensuring appropriate follow-up, including complex elderly patients, the infirm, and those with significant immobility, geographical inaccessibility or a history of noncompliance, and intravenous drug abusers	47 (29.0)
History of previous PE or further PE while currently on treatment	12 (7.4)
Co-existing major DVT (high-segment femoral and above)	8 (4.9)
Other (e.g. bleeding disorders or active bleeding and pregnancy)	25 (15.4)

PE: pulmonary embolism; DVT: deep venous thrombosis. #: n=127.

Categorías	%	Mortalidad 3 meses %
No adecuados	56	-
Adecuados	44	1.9

Escala de Davies

Escala HOME

(Home management exclusion)

Cohorte de derivación: 217
pacientes, en el S. de Urgencias.

Estudio retrospectivo.
Selecciona qué pacientes
pueden iniciar el tratº en
domicilio

Larga lista de variables

Seguimiento a 7 días (muerte,
sangrado, recurrencia)

Categorías	%	Eventos %
No elegibles	90.8	10
Elegibles	9.2	0

Simplification of the Pulmonary Embolism Severity Index for Prognostication in Patients With Acute Symptomatic Pulmonary Embolism

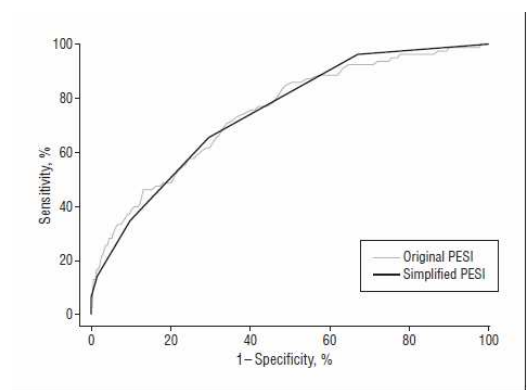
Muerte, hemorragia y recidiva a 30 días

Table 1. Original and Simplified Pulmonary Embolism Severity Index (PESI)

Variable	Score	
	Original PESI ^a	Simplified PESI ^b
Age >80 y	Age in years	1
Male sex	+10	
History of cancer	+30	1
History of heart failure	+10	1 ^c
History of chronic lung disease	+10	
Pulse ≥110 beats/min	+20	1
Systolic blood pressure <100 mm Hg	+30	1
Respiratory rate ≥30 breaths/min	+20	
Temperature <36°C	+20	
Altered mental status	+60	
Arterial oxyhemoglobin saturation level <90%	+20	1

Table 3. Thirty-Day Mortality Within Risk Strata Derived From the Original and the Simplified PESI in the Derivation and Validation Cohorts

PESI Risk Categories	Original PESI Derivation Cohort, % (95% CI)		Simplified PESI Derivation Study Cohort, % (95% CI)		Simplified PESI Validation (RIETE) Cohort, % (95% CI)	
	Patients (n=10 354)	Deaths ^a (n=953)	Patients (n=995)	Deaths (n=78)	Patients (n=7106)	Deaths (n=434)
Original						
I	19.4 (18.7-20.2)	1.1 (0.7-1.7)	14.3 (12.1-16.4) ^b	2.1 (0.2-4.5)		
II	21.5 (20.7-22.3)	3.1 (2.5-4.0)	22.0 (19.4-24.6)	2.7 (0.6-4.9)		
III	21.7 (20.9-22.5)	6.5 (5.5-7.6)	27.7 (25.0-30.5) ^b	5.4 (2.8-8.1)		
IV	16.4 (15.7-17.1)	10.4 (9.0-11.9)	21.5 (18.9-24.1) ^b	10.3 (6.2-14.3)		
V	21.0 (20.3-21.8)	24.5 (22.7-26.9)	14.5 (12.3-16.7) ^b	22.2 (15.4-29.0)		
Low ^d	40.9 (40.0-41.8)	2.1 (1.7-2.6)	36.3 (33.3-39.3) ^e	2.5 (0.9-4.1)		
High ^d	59.1 (58.1-60.0)	14.0 (13.1-14.9)	63.7 (60.7-66.7)	10.9 (8.5-13.3)		
Simplified						
Low			30.7 (27.8-33.5)	1.0 (0.0-2.1)	36.1 (35.0-37.3) ^a	1.1 (0.7-1.5)
High			69.3 (66.5-72.2)	10.9 (8.5-13.2)	63.9 (62.7-65.0)	8.9 (8.1-9.8)



Mortalidad 30 días

Table 4. Original and Simplified PESI Prediction Rule Test Characteristics for 30-Day Mortality in This Study's Derivation Cohort^a

Characteristic	Original PESI Variable (95% CI)	Simplified PESI Variable (95% CI)
Sensitivity, %	88.5 (81.4-95.5)	96.1 (91.9-100.0)
Specificity, %	38.4 (35.2-41.5)	32.9 (29.9-36.0)
Positive predictive value, %	10.9 (8.5-13.3)	10.9 (8.5-13.2)
Negative predictive value, %	97.5 (95.9-99.1)	99.0 (97.9-100.0)
Positive likelihood ratio	1.44 (1.31-1.58)	1.43 (1.35-1.53)
Negative likelihood ratio	0.30 (0.16-0.56)	0.12 (0.04-0.36)

Escala PESI simplificada

Criteria de Hestia

Once criteria predefinidos:

- Is the patient hemodynamically unstable?* Yes No
- Is thrombolysis or embolectomy necessary? Yes No
- Active bleeding or high risk of bleeding?† Yes No
- More than 24 h 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 h? Yes No
- Medical or social reason for treatment in the hospital for more than 24 h (infection, malignancy, no support system)? Yes No
- Does the patient have a creatinine clearance of < 30 mL min⁻¹?‡ 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

11 criteria

If the answer to one of the questions is 'yes', the patient cannot be treated at home in the Hestia Study

Cohorte de
validación
297 pacientes

Seguimiento 3
meses

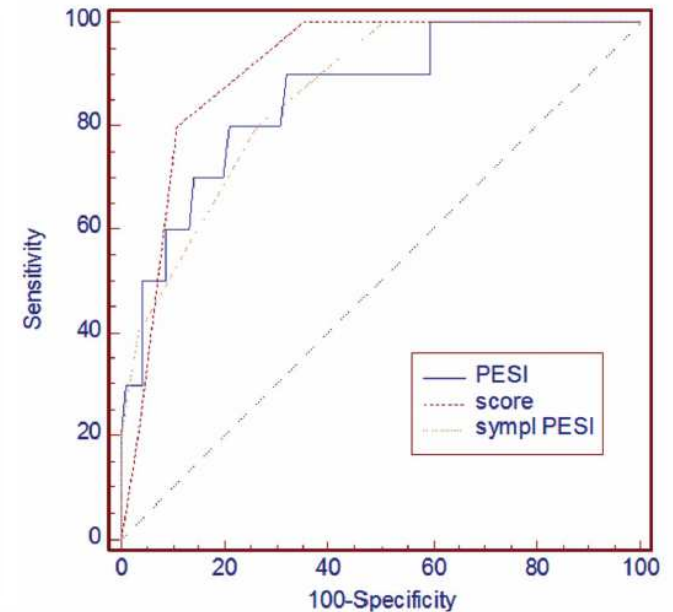
Mortalidad 1%
Recurrencia 2%
Hemorragias graves 0.7%

Predicting Short-Term Mortality in Patients with Pulmonary Embolism: A Simple Model

Papaioannou A et al. Amer J Med Scien 2012

TABLE 4. Variables and point values for the computation of the index in patients with pulmonary embolism

Variable	Points on index	
	0	1
Age (yr)	<67	≥67
Alveolar to arterial (A-a) gradient	<52.8	≥52.8
Charlson index	0–1	≥2
Congestive heart failure	Absent	Present
Diabetes mellitus	Absent	Present



Bajo riesgo (<3 puntos)
Alto riesgo (≥ 3 puntos)

Seguimiento a
1 mes

No validación

Table 5. Cox regression analysis for the probability of death using each of the three scores (our score, PESI index, simplified PESI index)

Score	Hazard ratio (95% confidence interval)	P-value
Our score	3.448 (1.902–6.250)	<0.001
PESI index	1.030 (1.017–1.042)	<0.001
Simplified PESI index	3.599 (1.996–6.250)	<0.001

Escala griega

LR-PED Rule (Low Risk Pulmonary Embolism Decision Rule)

Retrospectivo
142 pacientes

8 variables

Seguimiento
1 mes

Variables

Edad

Insuficiencia cardíaca
crónica

Fibrilación auricular

Fr cardíaca

Tn I

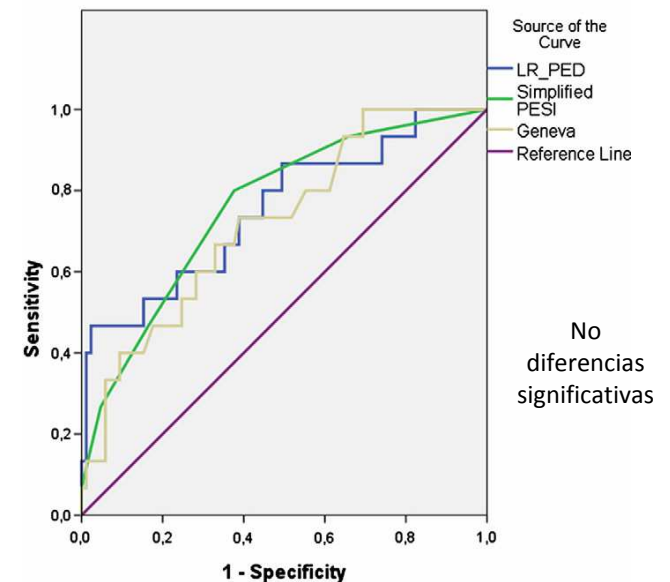
Creatinina

PCR

Glucemia

Riesgo	%	Mortalidad %
Bajo	17	0
Intermedio	27	1
Alto	55	3

AUC LR-PED 0.756 vs. AUC PESI 0.753 vs. AUC Geneva 0.741, p-value non-significant



GRACE

(Global Registry of Acute Coronary Events)

Cohorte de derivación
206 pacientes

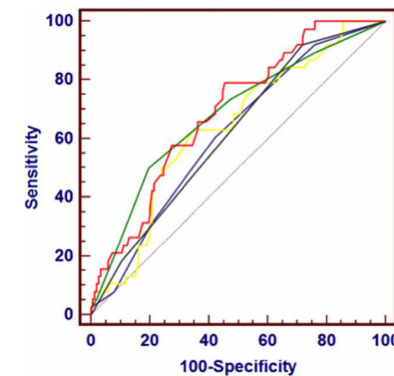
9 variables

Seguimiento
1 mes

Predictors of 30-day mortality on univariate analysis (categorical variables)

Variable	OR	95% CI	p Value
Age >80 yrs	2.03	0.98–4.24	0.055
Heart failure and/or chronic lung disease	2.11	1.02–4.37	0.041
Active or past malignancy	2.14	1.00–4.66	0.050
Heart rate \geq 110 beats/min	2.70	1.30–5.61	0.007
Respiratory rate >30 breaths/min	3.27	1.14–9.34	0.023
Arterial oxyhemoglobin saturation <90%	2.38	1.14–4.99	0.020
Shock	3.75	1.27–11.09	0.012
Troponin I >0.034 ng/ml	3.11	1.13–8.59	0.023
Right ventricular dysfunction	2.54	1.16–5.58	0.036

Riesgo	%	Mortalidad
Bajo	21.8	0
Intermedio	29.1	23.1
Alto	49	76.9



No
diferencias
Significativas
GINEBRA
GRACE
I. SHOCK

Qué exigimos a una escala pronóstica

- Que prediga:
 - Muerte temprana por cualquier causa
 - Sangrado
 - Recidiva tromboembólica
- Que utilice variables disponibles al hacer el Dx
- Que sea fácil de aplicar
- Que haya sido validada externamente

	Variables	Bajo riesgo %	Seguimiento (días)	Mortalidad %	Validación	Problemas
Ginebra (Sw)	6	61	90	2	Sí	Clasifica mal
PESI (USA)	11	41	30	2	Sí	Muchas variables con distinto peso
Uresandi (Sp)	7	47	10	2	Sí	Corto seguimiento
Davies (UK)	No definidas	44	90	1.9	Sí	Variables no definidas previamente
HOME (USA)	Larga lista	9.2	7	0	Sí	Muchas variables, complejo
sPESI (Sp)	6	30.6	30	1	Sí	
Hestia	11	-	90	1	No	Muchas variables, No validado
Griega	5	-	30	HR 3.44	No	No validado
LR-PED	8	17	30	0	No	No validado
GRACE	9	21.8	30	0	No	No validado