Guidelines on the diagnosis and management of acute pulmonary embolism

The Task Force for the Diagnosis and Management of Acute Pulmonary Embolism of the European Society of Cardiology (ESC)

Supplementary material

Table A Major trials reporting RV/LV diameter ratio assessed by CT as a risk marker for 30-day all-cause mortality in acute PE

Author	n	CT equipment	Cutoff	Positive (%)	Sensitivity (%)	Specificity (%)	NPV (%)	PPV (%)
Van der Meer et al.[1]	120	SDCT	RV/LV >1	57.5	NA	NA	100	10
Schoepf et al.[2]	431	4–16 MDCT	RV/LV >0.9	64	78.2	38	92.3	15.6

n = number of patients; SDCT = single-detector computed tomography; MDCT = multidetector computed tomography; RV/LV = ratio of diastolic diameters of RV and LV; NA = not available; NPV = negative predictive value; PPV = positive predictive value for all-cause 30-day mortality.

Table B Major trials on the prognostic value of BNP/NT-proBNP in acute pulmonary embolism

Author	n	Biomarker and test used	Threshold	Positive (%)	Sensitivity (%)	Specificity (%)	NPV (%)	PPV[a] (%)
Ten Wolde et al.[3]	110	BNP[b]	21.7 pmol/L	33	86	73	99	18
Kucher et al.[4]	73	NT-proBNP[c]	500 pg/mL	58	NA	NA	100	12
Kucher et al.[5]	73	BNP[d] Triage	50 pg/mL	58	NA	NA	100	12
Pruszczyk et al.[6]	79	NT-proBNP[c]	600 pg/mL	27	100	33	100	26
Binder et al.[7]	124	NT-proBNP[c]	1000 pg/mL	54	100	49	100	10
Kostrubiec et al.[8]	113	NT-proBNP[c]	NT-proBNP >7500 pg/mL[a]	16	65	93	94	61

[a]If not decreasing by 50% within 24 h
[b–d]Tests used: [b]Shionoria, CIS Bio International; [c]Elecsys, Roche Diagnostics; [d]Triage, Biosite Technologies.
n = number of patients; BNP = brain natriuretic peptide; NT-proBNP = N-terminal proBNP; NA = not available; NPV = negative predictive value; PPV = positive predictive value.

Table C Major studies on the prognostic value of biochemical markers of myocardial injury in pulmonary embolism

Author	n	Biomarker and test used	Threshold	Positive (%)	Sensitivity (%)	Specificity (%)	NPV (%)	PPV (%)
Troponins								
Giannitsis et al.[9]	56	cTnT[a]	0.10 ng/mL	32	89	79	97	44
Konstantinides et al.[10]	106	cTnI[b]	0.07 ng/mL	41	86	63	98	14
Konstantinides et al.[10]	106	cTnT[a]	0.04 ng/mL	37	71	66	97	12
Janata et al.[11]	106	cTnT[a]	0.09 ng/mL	11	80	92	99	34
Pruszczyk et al.[11]	64	cTnT[a]	0.01 ng/mL	50	100	57	100	25
Douketis et al.[13]	458	cTnI[c]	0.5 ng/mL	13.5	For all-cause 90-day mortality: odds ratio 3.5, 95% CI 1.0−11.9			
Other markers of injury								
Pruszczyk et al.[14]	46	Myoglobin[a]	58 ng/mL (women); 72 ng/ml (men)	46	100	64	100	33
Kaczynska et al.[15]	77	H-FABP[a]	6 ng/mL	39	Hazard risk 1.03, 95% CI 1.01−1.05, $P < 0.0001$			
					78	66	96	23
Puls et al.[16]	107	H-FABP[d]	6 ng/mL	27	100	83	100	37

If not specified otherwise, the data refer to in-hospital mortality.
n = number of patients; cTnI = cardiac troponin I; cTnT = cardiac troponin T; H-FABP = heart-type fatty acid binding protein; NA = not available; NPV = negative predictive value; PPV = positive predictive value.
[a–d]Tests used: [a]Elecsys, Roche Diagnostics, Mannheim, Germany; [b]Centaur, Bayer, Munich Germany; [c]AxSYM, Abbot, Abbott Park, IL, USA; [d]HyCult Biotechnology, Uden, Netherlands.

Table D Prognostic value of concomitant assessment of NT-proBNP and troponin in acute PE

Author	n	Biomarker/ assay used	Threshold	Positive (%)	Endpoint	Sensitivity (%)	Specificity (%)	NPV (%)	PPV (%)
Kostrubiec et al.[17]	100 with systolic blood pressure >90 mmHg	NT-proBNP[a], cTnT[a]	NT-proBNP <600 pg/mL and cTnT <0.07 μ/L	28	PE-related 40-day mortality	0[b]	70	89	0
			NT-proBNP >600 pg/mL and cTnT <0.07 μ/L	54	PE-related 40-day mortality	25	44	87	4
			NT-proBNP >600 pg/mL and cTnT >0.07 μ/L	18	PE-related 40-day mortality	75	87	98	33

[a]Test used: Elecsys, Roche Diagnostics; Mannheim, Germany.
[b]No death in this group.
n = number of patients; NT-proBNP = N-terminal proBNP; cTnT = cardiac troponin T; NPV = negative predictive value; PPV = positive predictive value.

Table E Prognostic value of concomitant assessment of echocardiography and troponin measurements in PE

Author	n	Troponin assay	Threshold	Echocardiography	Endpoint	Both tests positive (% of patients)	Parameter
Kucher et al.[18]	91	cTnI[a]	>0.06 ng/mL	At least moderate RVD	In-hospital mortality, catecholamines i.v., thrombolysis, CPR, intubation, embolectomy	26.3	Sensitivity 86% Specificity 91% NPV 96% PPV 75%
Binder et al.[7]	124	cTnT[b]	≥0.04 ng/mL	RV >30 mmm Parasternal view	In-hospital mortality, catecholamines iv, thrombolysis, CPR, intubation,	12.9	OR 10.00 (95% CI 2.1−46.8)
Scridon et al.[19]	141	cTnI[c]	≥0.1 ng/mL	RV/LV >0.9	All-cause 30-day mortality	32	OR 7.17 (95% CI 1.6−31.9)

[a−c]Tests used: [a]AxSYM, Abbott, Abbott Park, IL, USA; [b]Elecsys, Roche Diagnostics, Mannheim, Germany; [c]Baxter, Miami, FL, USA.
CI = confidence interval; CPR = cardiopulmonary resuscitation; cTnI = cardiac troponin I; cTnT = cardiac troponin T; LV = left ventricle; n = number of patients; OR = odds ratio; RV = right ventricle; RVD = right ventricular dysfunction.

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