

developing during hospitalization remained stable at low levels. In-hospital mortality further declined from 62.8% to below 40% in 2017.

PREDICTION OF ACUTE CORONARY SYNDROMES PROGNOSIS

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Elaboration and validation of a new score based on the PEGASUS-TIMI 54 criteria for 1-year risk stratification of patients with acute myocardial infarction

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Background: Patients with acute myocardial infarction (AMI) have a high risk of new cardiovascular events. Despite guidelines support the early weighting of the ischemic risk after AMI, no standardized tool exists for this purpose.

Purpose: The aim of the present study was to elaborate and validate a risk score to predict 1-year mortality and re-hospitalization for AMI in a real-world population, using the PEGASUS-TIMI 54 criteria, collected during the index event.

Methods: We evaluated the hazard ratios (HR) for the primary endpoint of each criterion, and converted them to the nearest integer number; the sum of the integers gave a value of risk score (Table 1). We calculated a cut-off value for the score and investigated its 1-year prognostic power. We externally validated our risk score assessing its performance in a similar set of patients hospitalized with AMI in a different center.

Results: One-thousand-two-hundred-fifty-seven AMI patients were included in the derivation cohort. A risk score of 13 was obtained (AUC 0.70) and a cut-off of 6 was identified for the primary endpoint prediction. Primary endpoint rate was 12.1% and 2.9% in patients with a score >6 and <6, respectively ($P<0.0001$). At multivariate analysis, the HR associated with a score >6 for the primary endpoint was 4.45 (95% CI 2.75–7.20; $P<0.0001$). Nine-hundred-thirteen consecutive AMI patients were included in the validation cohort. In them, the HR associated with a score >6 for the primary endpoint was 2.86 (95% CI 1.77–4.63; $P<0.0001$). No significant difference in major bleeding rates in the first year after AMI was observed between risk groups in the two cohorts.

Conclusions: We developed and validated a score, based on the PEGASUS-TIMI 54 criteria, for the prediction of 1-year death and non-fatal AMI in patients with AMI. Our score may identify AMI patients at high-risk of recurrent ischemic events, who deserve intensive preventive efforts.

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Trends in mortality and MACCE-rates between 2006 and 2016 in patients with ST-elevation myocardial infarctions and a low overall risk

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Introduction and objective: Extrapolation of results from randomized controlled trials (RCT) to clinical reality is often difficult since patient-cohorts from RCTs are highly selective and represent patients with a low overall risk. To facilitate comparability of clinical reality to RCTs this study extracted low risk patients with ST-elevation myocardial infarctions (STEMI) from a German STEMI-registry and analysed trends in mortality and MACCE (major adverse cardiac or cerebrovascular events) between 2006 and 2016.

Methods: All consecutive patients, admitted to a large heart center in northwest Germany between 2006–16 with STEMI and treated with percutaneous coronary intervention (PCI), were initially assessed. Patients with a TIMI-risk-score for STEMI ≥ 4 were categorised as medium or high overall risk and excluded from further analysis on mortality and MACCE-rates during time course.

Results: From 6258 patients with STEMI which entered analysis, 3067 (49%) could be categorised as low risk (<4), 2777 (44%) as moderate (risk score 4–7) and 414 (7%) as high overall risk. The proportion of low risk-patients was constant between 2006–16 (p (trend)=0.8). Patients with a low overall risk were on average younger than those with a moderate or high risk (55 ± 9 vs. 70 ± 12 yrs., $p<0.01$) and less likely to be female (18% vs. 36%, $p<0.01$). While 1-yr.-mortality did not decline significantly in the study period: 3.1% (2006–07) to 2.7% (2014–16), $p=0.8$, the 1-year-MACCE-rates (death, stroke, reinfarction) did: 10.0% (2006–07) to 5.0% (2014–16), $p<0.01$. The decrease in MACCE was more pronounced in women (12.8% to 2.9%, HR: 0.2, 95% CI: 0.06–0.73, $p<0.01$) compared to men (9.3% to 5.4%, HR: 0.58, 95% CI: 0.34–0.9, $p<0.01$). When adjusting outcome data in a Cox regression model (adjusted for age, gender and size of STEMI) the decrease in MACCE over time remained significant (table).

Trends in mortality and MACCE 2006–2016

	2006/2007	2008/2009	2010/2011	2012/2013	2014–2016	p (trend)
1-year mortality (%)	3.1	1.9	2.7	2.9	2.7	0.8
1-year MACCE rate (%)	9.9	6.7	5.8	5.2	5.0	<0.01
Adj. HR (MACCE)	reference	0.67	0.58	0.52	0.49	–
(95% CI)		(0.4–1.02)	(0.38–0.89)	(0.33–0.83)	(0.33–0.74)	
p (to ref.)	–	0.07	0.02	<0.01	<0.01	–

Conclusions: These data from a large STEMI registry show that for low-risk patients with STEMI a significant decline in MACCE could be observed during the last decade. The decrease was larger in women than in men and remained significant after adjustment in a Cox regression model. Further analysis is needed to clarify how innovations like new generation stents or modern P2Y12-inhibitors have contributed to this development.

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The high-risk ECG pattern of ST-elevation myocardial infarction: a substudy of the randomized trial of primary PCI with or without routine manual thrombectomy (TOTAL trial)

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Background: Both Q waves and inverted T waves in the presenting ECG are associated with a progressed stage of myocardial infarction (MI), possibly with less potential for myocardial salvage with reperfusion therapy in ST-elevation myocardial infarction (STEMI). The ECG pattern without Q waves and inverted T waves is defined as preinfarction syndrome (PIS), while ST elevation with Q waves and/or inverted T waves represents evolving myocardial infarction (EMI).

Methods: In a substudy of the international, multicenter, prospective, randomized Trial of Routine Aspiration Thrombectomy with PCI versus PCI Alone in Patients with STEMI (TOTAL), we studied the prognostic impact of the PIS and EMI ECG patterns ($n=7,860$). The primary outcome was a composite of death from cardiovascular causes, recurrent MI, cardiogenic shock, or New York Heart Association (NYHA) class IV heart failure within one year.

Results: The primary outcome occurred in 271 of 2,618 patients (10.4%) in the EMI group vs. 322 of 5,242 patients (6.1%) in the PIS group (hazard ratio [HR], 1.73; 95% confidence interval [CI], 1.47 to 2.03; $p<0.001$). The rates of cardiovascular death (5.0% with EMI vs. 2.4% with PIS; HR, 2.10; 95% CI, 1.64 to 2.68; $p<0.001$) and the primary outcome plus stent thrombosis or target-vessel revascularization (13.7% vs. 9.6%; HR, 1.46; 95% CI, 1.27 to 1.67; $p<0.001$) were also higher in the EMI patients. Stroke rate at one-year follow-up was similar (1.0% with EMI vs. 0.8% with PIS; HR, 1.16; 95% CI, 0.71 to 1.89; $p=0.559$). The dynamic ECG pattern (EMI vs. PIS) was independently predictive of primary outcome in multivariable analysis (adjusted HR, 1.60; 95% CI, 1.34 to 1.90; $p<0.001$).

Conclusions: In STEMI patients treated with primary PCI, those with Q waves and/or inverted T waves (the EMI pattern) proved to have an increased rate of cardiovascular death, recurrent MI, cardiogenic shock, or NYHA class IV heart failure within one year when compared to patients with ST elevation without Q waves or T-wave inversion (the PIS pattern).

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Syntax-I score can predict in-hospital mortality among the patients with ST segment elevation myocardial infarction and cardiogenic shock

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Background: In STEMI, cardiogenic shock (CS) still has high mortality rate. There have been reported only limited data with angiographic scoring systems to predict cardiovascular mortality in the STEMI with CS.

Purpose: The aim of our study is to predict in-hospital mortality with scoring systems of coronary angiography in patients with CS of ST-segment elevation myocardial infarction (STEMI).

Methods: A total 148 patients who underwent primary angioplasty and those with CS from 2010 and 2016 were retrospectively recruited. The patients were

Binary analysis for in-hospital death

	Unadjusted			Adjusted		
	95% CI	HR	P-value	95% CI	HR	P-value
Failed revascularization	1.319–96.247	11.265	0.006	0.126–20.110	1.589	0.720
No-reflow during PCI	2.003–8.450	4.114	0.000	1.022–7.151	2.703	0.045
Initial SBP ≤ 78 mm Hg	1.612–6.473	3.230	0.001	1.241–9.136	3.367	0.017
CPR duration ≥ 5 minute	1.973–8.402	4.071	0.000	1.291–10.194	3.628	0.014
Initial BNP ≥ 336 pg/mL	1.389–8.626	3.079	0.005	1.418–10.851	3.923	0.008
Serum glucose ≥ 273 mg/dL	1.363–5.454	2.726	0.004	0.523–3.827	1.415	0.494
Serum Cr ≥ 1.1 mg/dL	1.571–6.772	3.261	0.001	0.430–3.426	1.214	0.715
Serum total CO ₂ ≤ 19 mEq/L	2.248–12.380	5.276	0.000	0.928–9.850	3.024	0.006
+ (plus) added one factor among scoring systems described as below						
Syntax-I score ≥ 18.5	1.571–6.772	3.261	0.001	1.028–7.739	2.821	0.044
or APPROACH ≥ 56	1.565–8.109	3.563	0.002	0.629–6.855	2.077	0.230

In binary analysis, Syntax score was a powerful predictor for prediction of in-hospital-mortality.