The Egyptian Heart Journal

RESEARCH

Open Access

The value of PRECISE-DAPT score and lesion complexity for predicting all-cause mortality in patients with NSTEMI

Gökhan Alıcı[1*], Ömer Genç[2], Örsan Deniz Urgun[3], Tayfur Erdoğdu[1], Abdullah Yıldırım[1], Alaa Quisi[4] and İbrahim Halil Kurt[1]

Abstract

Background We aimed to evaluate the prognostic effects of stroke risk scores (SRS), SYNTAX score (SX score), and PRECISE-DAPT score on mortality in patients with non-ST-segment elevation myocardial infarction (NSTEMI). Three hundred forty-three patients hospitalized with a diagnosis of NSTEMI and underwent coronary angiography (CAG) between January 1, 2022, and June 1, 2022, were included retrospectively in this single-center study. Patients' demographic, clinical and routine biochemical parameters were recorded. The scores ($CHADS_2$, CHA_2DS_2-VASc, $R_2CHA_2DS_2$-VASc, ATRIA, SX score, PRECISE-DAPT) of each patient were calculated. Participants were then divided into two groups by in-hospital status; all-cause mortality (+) and all-cause mortality (−).

Results Overall, the mean age was 63.5 ± 11.8 years, of whom 63.3% ($n = 217$) were male. In-hospital mortality occurred in 31 (9.3%) patients. In the study population, those who died had significantly higher SX ($p < 0.001$), PRECISE-DAPT ($p < 0.001$), and ATRIA ($p = 0.002$) scores than those who survived. In logistic regression analysis, PRECISE-DAPT score [Odds ratio (OR) = 1.063, 95% CI 1.014–1.115; $p = 0.012$] and SX score [OR: 1.061, 95% CI 1.015–1.109, $p = 0.009$] were found to be independent predictors of in-hospital all-cause mortality among NSTEMI patients. In ROC analysis, the PRECISE-DAPT score performed better discriminative ability than the SX score in determining in-hospital mortality [Area under the curve = 0.706, 95% CI 0.597–0.814; $p < 0.001$].

Conclusions During the hospital stay, both PRECISE-DAPT and SX scores showed better performance than SRS in predicting all-cause mortality among NSTEMI patients undergoing CAG. Aside from their primary purpose, both scores might be useful in determining risk stratification for such patient populations.

Keywords Stroke risk scores, NSTEMI, PRECISE-DAPT score, SYNTAX score, In-hospital mortality

Background

The in-hospital prognosis and clinical consequences have become increasingly important as the frequency of acute myocardial infarction (AMI) has risen. Stroke risk scores (SRS), which are frequently used in clinical practice to predict stroke in patients with non-valvular atrial fibrillation, are scoring systems including risk factors similar to coronary artery disease (CAD) [1]. The relation of these scoring systems with mortality in patients with AMI has been shown in many studies [2, 3]. Although there are many thromboembolic risk scores, we only

*Correspondence:
Gökhan Alıcı
gokhan_alici1@hotmail.com
[1] Department of Cardiology, Adana City Training and Research Hospital, Dr. Mithat Özsan Boulevard, 4522 Yuregir, Adana, Turkey
[2] Department of Cardiology, Çam and Sakura City Hospital, Istanbul, Turkey
[3] Department of Cardiology, Çukurova State Hospital, Adana, Turkey
[4] Department of Cardiology, Adana Medline Hospital, Adana, Turkey

evaluated the four most commonly used ones ($CHADS_2$, CHA_2DS_2-VASc, $R_2CHA_2DS_2$-VASc, ATRIA) in our study.

PRECISE-DAPT score is another risk scheme developed to predict the risk of bleeding in patients treated with dual antiplatelet therapy after primary percutaneous coronary intervention. Only a few studies have focused on both in-hospital and long-term prognostic outcomes in AMI patients [4, 5]. SYNTAX score (SX score) is another scoring system that angiographically evaluates lesion complexity and severity of coronary artery tree. It has been also demonstrated that a high SX score is associated with poor clinical outcomes in patients with acute coronary syndromes [6, 7].

Although the effect of many risk factors on the development of mortality in NSTEMI patients has been proven, in this study, we aimed to overcome the lack of a study in the literature that examines and compares the effect of the PRECISE-DAPT, the SX score, and SRS on in-hospital all-cause mortality among patients with NSTEMI undergoing percutaneous coronary intervention.

Methods

Study population

This retrospective, single-center, cross-sectional and observational study was performed at the cardiology clinic of Adana City Training and Research Hospital between January 2022 and June 2022. The files of patients admitted to the coronary intensive care unit of the Department of Cardiology with a diagnosis of NSTEMI on the specified dates were retrospectively examined.

The diagnosis of NSTEMI has been made based on current clinical guidelines including positive cardiac markers including high-sensitivity cardiac troponin-I levels (hs-cTnT-I) (the upper limit of troponin-I in our laboratory was 0.16 ng/mL) without ST-segment elevation on routine electrocardiogram [8]. Clinical histories include hypertension (HT) and obstructive pulmonary disease, hyperlipidemia (HL), chronic renal disease (CKD), diabetes mellitus (DM), smoking, peripheral arterial disease, CAD, ischemic stroke/transient ischemic attack (TIA) were obtained and recorded in the national health record system, and medical files of each patient were also captured for retrospective evaluation. We excluded patients with coronary artery bypass graft, chronic obstructive pulmonary disease, severe liver and kidney disease, active cancer, and/or systemic infection (Fig. 1).

Routine blood samples were routinely obtained from all patients in the emergency triage unit or coronary intensive care unit. Laboratory analysis of routine venous blood samples was performed using an automated chemistry analyzer (Roche Diagnostic Modular Systems,

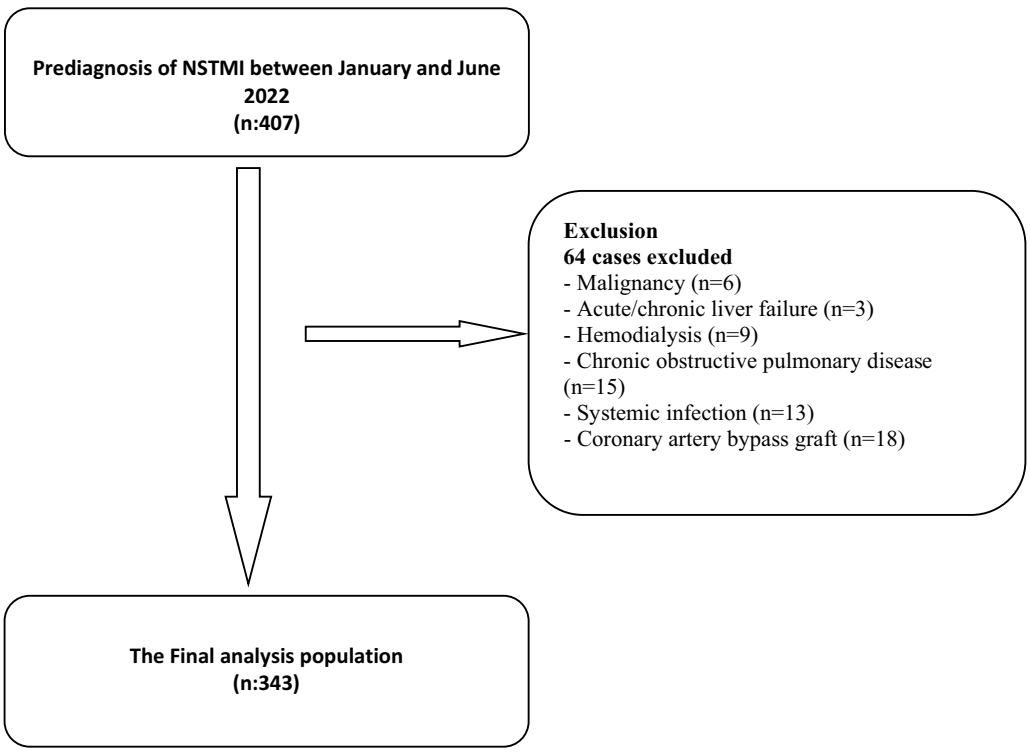


Fig. 1 Flowchart of inclusion in the study

Tokyo, Japan). The estimated glomerular filtration rate (eGFR) was measured using the Modification of Diet in Renal Disease formula.

The definitions of scores

The PRECISE-DAPT score was determined for each patient using the web calculator (http://www.precisedaptscore.com). Unfortunately, we did not have data on the patients' previous bleeding history; therefore, this parameter could not be included when calculating the score.

CAG was performed on all subjects in our research. The femoral route was used for standard angiograms of the left and right coronary arteries to collect images. Coronary lesions with lumen diameter > 1.5 mm and at least 50% stenosis were analyzed separately, and the SX score was calculated using www.syntaxscore.com (version 2.10) [9]. The $CHADS_2$ score consists of the following parameters; heart failure (HF) (1 point); HT (1 point); age ≥ 75 years (1 point); and history of stroke/TIA, or systemic embolism (2 points). The CHA_2DS_2-VASc score is calculated by assigning 2 points for age ≥ 75 years and history of stroke, TIA, or thromboembolism and 1 point for HF, HT, DM, vascular disease aged 65–75 years, and female gender [10]. The $R_2CHA_2DS_2$-VASc score is determined by adding 2 points to the CHA_2DS_2-VASc score for renal failure defined as eGFR below 60 calculated from the Chronic Kidney Disease Epidemiology equation [2]. The ATRIA score assigns one point for the female sex, DM, HT, HF, proteinuria, and kidney dysfunction (eGFR < 45 mL/min/1.73 m2 or end-stage renal disease), and age classes (< 65, 65–74, 75–84, and ≥ 85 years) are assigned different scores based on stroke history (between 0 and 9) [11]. All scores were determined as previously described by two cardiologists blinded to patient survival data. The study population was divided into two groups by in-hospital mortality status: mortality (+) ($n = 31$) and mortality (−) ($n = 312$).

Ethics approval and consent to participate

The study was carried out according to the recommendations set forth by the Declaration of Helsinki on biomedical research involving human subjects. The study was approved by the ethics committee of Adana City Training and Research Hospital (date: 08.08.2022, decision No: 2062). Due to the retrospective design, informed consent was not obtained by the ethics committee rules.

Statistical analysis

Data analyses were performed using IBM SPSS Statistics for Windows, Version 22.0 software (IBM Corp., Armonk, NY, USA). Continuous variables with normal distribution have been expressed as mean ± standard deviation, whereas those with abnormal distribution have been expressed as median and interquartile range (IQR). Categorical variables have been expressed as numbers (n) and percentages (%). Student t test or Mann–Whitney U-test was used to compare continuous variables. The Chi-square test or Fisher's exact test was used to compare categorical variables. The odds ratio (OR) and 95% confidence interval (CI) were calculated for each independent variable. Multivariate logistic regression analysis was performed to identify independent predictors of in-hospital all-cause mortality. Variables with significant p values (< 0.05) in univariate analysis were entered into multivariate analysis. The results of univariate and multivariate regression analyses were presented as OR with 95% CI. The area under the curve (AUC) and receiver operating characteristics (ROC) curve analyses were used to examine the prediction accuracy and performance of PRECISE-DAPT and SX scores for in-hospital mortality. Statistical significance has been defined as $p < 0.05$ throughout the study.

Results

A total of 343 hospitalized NSTEMI patients [63.3% ($n = 217$) males, mean age = 63.5 ± 11.8 years] have been included in the analysis. In-hospital mortality occurred in 31 (9.3%) patients. The mortality (+) group was older ($p = 0.003$) and had a higher rate of DM ($p = 0.016$) than the mortality (−) group. When laboratory parameters were compared, serum hemoglobin (Hgb) ($p < 0.001$) and eGFR ($p < 0.001$) were lower in the mortality group, whereas hs-cTnT-I levels were higher [2.6 (12.1) vs. 0.7 (4.9), $p = 0.004$]. The SX score [20.6 ± 11.3 vs. 12.5 ± 7.5, $p < 0.001$], PRECISE-DAPT score [22.0 ± 14.5 vs. 12.0 ± 10.6, $p < 0.001$], and only the ATRIA risk score [4.5 ± 2.8 vs. 3.0 ± 2.3, $p = 0.002$] from SRS were statistically significantly higher in the non-survivors than in the survivors. Detailed demographic, clinical characteristics, and laboratory data of the participants are summarized in Table 1.

On multivariate logistic regression analysis, PRECISE-DAPT score (OR: 1.063, 95% CI 1.014–1.115, $p = 0.012$) and SX score (OR: 1.061, 95% CI 1.015–1.109, $p = 0.009$) were found to be independent predictors of in-hospital all-cause mortality among NSTEMI patients (Table 2). In ROC curve analysis, the PRECISE-DAPT score had a better discriminatory performance than the SX score in determining in-hospital all-cause mortality [AUC = 0.706, 95% CI 0.597–0.814, $p < 0.001$] (Fig. 2).

Discussion

The main findings of the present study were as follows: (1) In-hospital mortality occurred in 31 (9.3%) patients with NSTEMI. Those who died were older and had a higher rate of DM. (2) No SRS had effectivity in

Table 1 Demographic and laboratory parameters of the study population

Variable	All ($n=343$)	Non-survivor ($n=31$)	Survivor ($n=312$)	*p*-value*
Age (year), mean ± SD	63.5 ± 11.8	69.6 ± 13.2	62.9 ± 11.5	**0.003**
Male gender, *n* (%)	217 (63.3)	24 (77.4)	193 (61.9)	0.087
Previous medical history				
HT, *n* (%)	182 (53.1)	14 (45.2)	168 (53.8)	0.355
CAD *n* (%)	34 (9.9)	2 (6.5)	32 (10.3)	0.499
DM, *n* (%)	83 (24.2)	13 (41.9)	70 (22.4)	**0.016**
Previous stroke/TIA, *n* (%)	19 (5.5)	1 (3.2)	18 (5.8)	0.555
Smoking, *n* (%)	100 (29.2)	7 (22.6)	93 (29.8)	0.398
Laboratory parameters				
hs-CRP	0.5 (1.4)	1.9 (5.7)	0.5(1.0)	0.069
Hgb (g/dl), mean ± SD	12.9 ± 1.9	11.6 ± 1.8	13.1 ± 1.8	**< 0.001**
WBC (nmol/L), mean ± SD	11.2 ± 7.0	12.3 ± 5.5	11.1 ± 7.2	0.346
eGFR, mean ± SD	100.3 ± 36.7	77.9 ± 40.9	102.5 ± 35.6	**< 0.001**
hs-cTnT-I, pg/mL, median, [IQR]	0.74 (5.9)	2.6 (12.1)	0.7 (4.9)	**0.004**
Platelet count, × 10^3/uL	264.2 ± 73.6	252.8 ± 77.6	265.7 ± 73.1	0.377
Scores				
$CHADS_2$, mean ± SD	1.3 ± 1.0	1.6 ± 0.8	1.3 ± 1.0	0.109
CHA_2DS_2-VASc, mean ± SD	2.2 ± 1.5	2.5 ± 1.3	2.2 ± 1.5	0.283
ATRIA, mean ± SD	3.1 ± 2.4	4.5 ± 2.8	3.0 ± 2.3	**0.002**
$R_2CHA_2DS_2$-VASc, mean ± SD	3.2 ± 1.8	3.7 ± 1.7	3.1 ± 1.7	0.073
SX, mean ± SD	13.3 ± 8.2	20.6 ± 11.3	12.5 ± 7.5	**< 0.001**
PRECISE-DAPT, mean ± SD	13.1 ± 11.4	22.0 ± 14.5	12.0 ± 10.6	**< 0.001**

**p* value was calculated using an independent samples *t* test or the Mann–Whitney *U*-test for continuous variables and a chi-squared test or the Fisher's exact test for categorical variables, as appropriate. **p* value < 0.05 was considered significant

Abbreviations: CAD, coronary artery disease; DM, diabetes mellitus; hs-cTnT-I, high-sensitivity cardiac troponin-I; Hgb, hemoglobin; hs-CRP, high-sensitivity C-reactive protein; HT, hypertension; SX, SYNTAX score; WBC, white blood cell. Values are *n* (%), median (interquartile range [IQR]), or mean ± standard deviation

p value < 0.05 was considered significant

Table 2 Univariate and multivariate analysis of in-hospital mortality

Variable	Univariate analysis		Multivariate analysis	
	OR (95% CI)	*p* value	OR (95% CI)	*p* value
PRECISE-DAPT	1.064 (1.033–1.095)	**< 0.001**	1.063 (1.014–1.115)	**0.012**
ATRIA	1.072 (1.023–1.123)	**0.004**		
SX score	1.100 (1.058–1.145)	< **0.001**	1.061 (1.015–1.109)	**0.009**
hs-cTnT-I	1.000 (0.995–1.005)	0.977		

Abbreviations: hs-cTnT-I, high-sensitivity cardiac troponin-I; SXscore, SYNTAX score; CI, confidence interval; OR, odds ratio

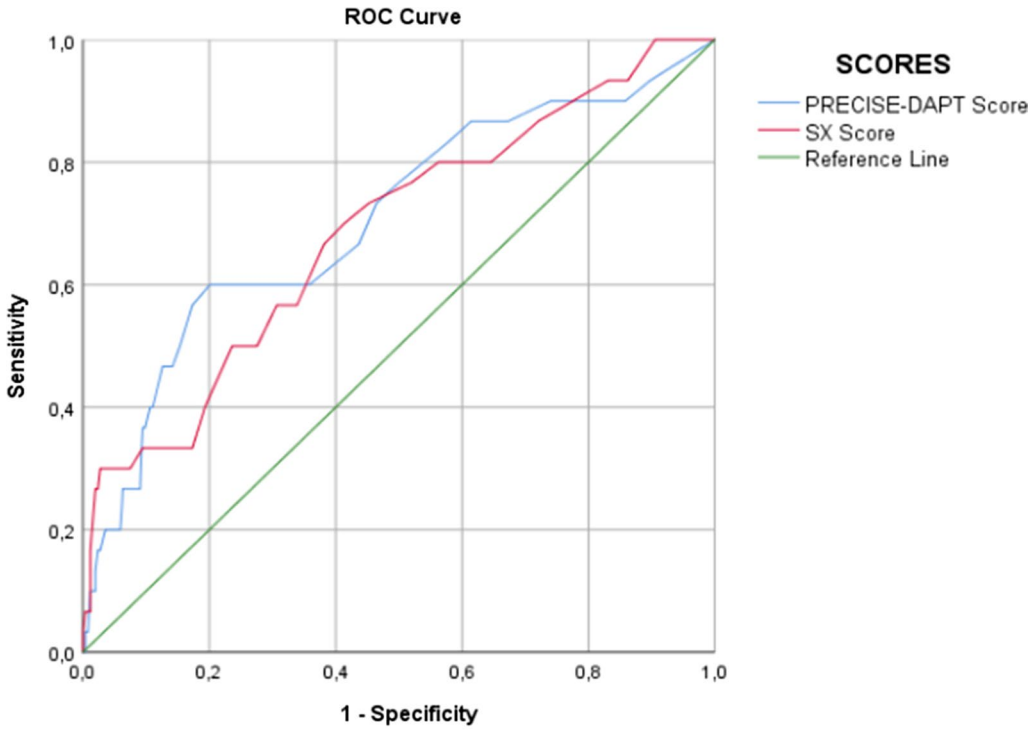
A *p* value < 0.05 was considered significant

determining the poor outcome during the hospital stay. PRECISE-DAPT and SX scores, on the other hand, were independent predictors of in-hospital all-cause mortality of NSTEMI patients.

Coronary artery disease-related deaths are among the most common causes of death worldwide. Of AMI patients, NSTEMI is approximately twice as common as ST-elevation myocardial infarction (STEMI) [12]. In-hospital mortality rates of patients with NSTEMI have been reported between 5.2 and 13.1% [13, 14]. The effect of many conditions on mortality has been described. Comorbidities such as multivessel disease, advanced age, low Hgb, atrial fibrillation (AF), CKD, diabetes, and history of HF have all been linked to a lower chance of survival in NSTEMI patients [15–17].

The PRECISE-DAPT score is determined by analyzing various values available from routine blood tests (Hgb, white blood cell count, and eGFR) and the risks associated with age. The utility of the PRECISE-DAPT score in contexts other than predicting bleeding risk has been investigated. For instance, it has been found that compelling evidence comparable to ours exists in two separate investigations on STEMI and NSTEMI patients that determine in-hospital mortality [5, 18]. It has also been researched to find out whether it has any effect on determining long-term prognosis in AMI patients [4].

Although the PRECISE-DAPT score was designed to assess bleeding risk in AMI patients, it was also found to



Variable	AUC	95% CI	SE	p-value
PRECISE-DAPT Score	0.706	0.597- 0.814	0.55	<0.001
SX Score	0.686	0.581-0.792	0.54	0.001

Fig. 2 Receiver operating characteristic curve analysis of PRECISE-DAPT and SX scores for predicting in-hospital mortality

be more predictive of mortality development than SRS in the present study. The influence of the PRECISE-DAPT score on many AMI complications other than mortality has also been studied in AMI patients. For example, the relationship with the development of periprocedural contrast-induced nephropathy [19], AF, and advanced atrioventricular block [20, 21] has been demonstrated in previous reports. Furthermore, the effect on the progression of the no-reflow phenomena in STEMI patients was identified [22]. Except for our study, there are no studies in the literature examining the relationship between PRECISE-DAPT and SRS, which are frequently used in routine cardiology practice, and mortality in NSTEMI patients.

The SX score has developed as a reproducible angiographic predictor for measuring the complexity of CAD based on coronary artery tree characteristics. In addition to the fact that the SX score simply represents the complexity of coronary artery lesions, extensive research has been conducted on its association with a variety of conditions in AMI patients [23–25]. We showed, similar to the existing literature, the SX score was found to be an independent predictor of mortality in AMI patients [26–29].

In our analysis, only the ATRIA score from SRS, which includes risk variables similar to CAD and has been used to predict the risk of thromboembolism in patients with non-valvular AF, was statistically higher in non-survivors than in survivors. However, the ATRIA score lost statistical significance in the multivariate regression analysis. Consequently, this is the first study to report that NSTEMI patients with high PRECISE-DAPT and SX scores had significantly higher in-hospital mortality than those with low scores, regardless of the prevalence of concomitant ischemic comorbidities.

Limitations

The retrospective, single-center with a small sample size was the central limitation of the study. Unfortunately, we did not have information on the patient's previous history of bleeding, which is a significant factor in calculating the PRECISE-DAPT score. However, the fact that the strongest

prediction among the scores included was in the PRECISE-DAPT score suggests that the result is underestimated at worst. As a result, the implications of the present study should be considered preliminary data. Prospective studies with larger populations should therefore be designed.

Conclusions

This study showed that PRECISE-DAPT and SX scores have more robust evidence than SRS to predict mortality in NSTEMI patients. Thus, using the simple, practical, and widely used PRECISE-DAPT and SX scores not only determines the bleeding risk and extent of the coronary lesion, which have specific applications in the first medical contact, but it may also facilitate prognostic stratification for this patient group.

Abbreviations

AF	Atrial fibrillation
AMI	Acute myocardial infarction
AUC	Area under the curve
CAD	Coronary artery disease
CAG	Coronary angiography
CKD	Chronic kidney disease
CI	Confidence interval
DM	Diabetes mellitus
eGFR	Estimated glomerular filtration rate
HF	Heart failure
Hgb	Hemoglobin
HL	Hyperlipidemia
HT	Hypertension
hs-cTnT-I	High-sensitivity cardiac troponin-I
IQR	Interquartile range
NSTEMI	Non-ST-segment elevation myocardial infarction
OR	Odds ratio
ROC	Receiver operating characteristics
SRS	Stroke risk scores
STEMI	ST-elevation myocardial infarction
SX score	SYNTAX score
TIA	Transient ischemic attack

Acknowledgements

Not applicable.

Author contributions

GA, ÖG, ÖDU carried out the studies, participated in collecting data, and drafted the manuscript. GA, AQ and ÖG performed the statistical analysis and participated in its design. GA, TE, AY, İHK participated in the acquisition, analysis, or interpretation of data and draft the manuscript. All authors read and approved the final manuscript.

Funding

No funding was received from any organization for this study.

Availability of data and materials

The analyzed datasets are available from the corresponding author on request.

Declarations

Ethics approval and consent to participate

The study was carried out according to the recommendations set forth by the Declaration of Helsinki on biomedical research involving human subjects. The study was approved by the ethics committee of Adana City Training and Research Hospital (date: 08.08.2022, decision No: 2062). Due to the retrospective design, informed consent was not obtained by the ethics committee rules.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Received: 1 September 2022 Accepted: 30 December 2022
Published online: 05 January 2023

References

1. Hindricks G, Potpara T, Dagres N et al (2021) 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS): The Task Force for the diagnosis and management of atrial fibrillation of the European Society of Cardiology (ESC) Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. Eur Heart J 42(5):373–498. https://doi.org/10.1093/EURHEARTJ/EHAA612
2. Huang FY, Huang BT, Pu XB et al (2017) CHADS 2, CHA 2 DS 2-VASc and R 2 CHADS 2 scores predict mortality in patients with coronary artery disease. Intern Emerg Med 12(4):479–486. https://doi.org/10.1007/S11739-017-1608-X
3. Keskin K, Yıldız SS, Çetinkal G et al (2017) The value of CHA 2 DS 2 VASC score in predicting all-cause mortality in patients with ST-segment elevation myocardial infarction who have undergone primary percutaneous coronary intervention. Acta Cardiol Sin 33(6):598–604. https://doi.org/10.6515/ACS20170723A
4. Ando T, Nakazato K, Kimishima Y et al (2020) The clinical value of the PRECISE-DAPT score in predicting long-term prognosis in patients with acute myocardial infarction. Int J Cardiol Heart Vasc. https://doi.org/10.1016/J.IJCHA.2020.100552
5. Tanik VO, Cinar T, Arugaslan E et al (2019) The predictive value of PRECISE-DAPT score for in-hospital mortality in patients with ST-elevation myocardial infarction undergoing primary percutaneous coronary intervention. Angiology 70(5):440–447. https://doi.org/10.1177/0003319718807057
6. Gao G, Feng L, Fu J et al (2021) Prognostic value of the SYNTAX score on myocardial injury and salvage in STEMI patients after primary percutaneous coronary intervention: a single-center retrospective observational study. BMC Cardiovasc Disord. https://doi.org/10.1186/S12872-021-02395-7
7. Wang G, Wang C, Zhang Y et al (2016) Usefulness of the SYNTAX score II to predict 1-year outcome in patients with primary percutaneous coronary intervention. Coron Artery Dis 27(6):483–489. https://doi.org/10.1097/MCA.0000000000000385
8. Collet JP, Thiele H, Barbato E et al (2021) 2020 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation. Eur Heart J 42(14):1289–1367. https://doi.org/10.1093/EURHEARTJ/EHAA575
9. Garg S, Sarno G, Garcia-Garcia HM et al (2010) A new tool for the risk stratification of patients with complex coronary artery disease: the Clinical SYNTAX Score. Circ Cardiovasc Interv 3(4):317–326. https://doi.org/10.1161/CIRCINTERVENTIONS.109.914051
10. Hindricks G, Potpara T, Dagres N et al (2021) 2020 ESC Guidelines for the diagnosis and management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS): The Task Force for the diagnosis and management of atrial fibrillation of the European Society of Cardiology (ESC) Developed with the special contribution of the European Heart Rhythm Association (EHRA) of the ESC. Eur Heart J 42(5):373–498. https://doi.org/10.1093/EURHEARTJ/EHAA612
11. Singer DE, Chang Y, Borowsky LH et al (2013) A new risk scheme to predict ischemic stroke and other thromboembolism in atrial fibrillation: the ATRIA study stroke risk score. J Am Heart Assoc 2(3):e000250. https://doi.org/10.1161/JAHA.113.000250

12. Case BC, Yerasi C, Wang Y et al (2020) Admissions rate and timing of revascularization in the United States in patients with non-ST-elevation myocardial infarction. Am J Cardiol 134:24–31. https://doi.org/10.1016/J.AMJCARD.2020.08.010
13. Rogers WJ, Frederick PD, Stoehr E, Canto JG, Ornato JP, Gibson CM, Pollack CV Jr, Gore JM, Chandra-Strobos N, Peterson ED, French WJ (2008) Trends in presenting characteristics and hospital mortality among patients with ST elevation and non-ST elevation myocardial infarction in the National Registry of Myocardial Infarction from 1990 to 2006. Am Heart J 156:1026–1034
14. McManus DD, Gore J, Yarzebski J, Spencer F, Lessard D, Goldberg RJ (2011) Recent trends in the incidence, treatment, and outcomes of patients with STEMI and NSTEMI. Am J Med 124(1):40–47. https://doi.org/10.1016/J.AMJMED.2010.07.023
15. Damarlı Ç, Yükselmesiz ST, İnfarktüsü M et al (2021) Mortality outcomes of single-staged versus multi-staged complete coronary revascularization in multivessel non-ST elevation myocardial infarction patients. Duzce Med J 23(2):129–136. https://doi.org/10.18678/dtfd.868952
16. Fukutomi M, Nishihira K, Honda S et al (2020) Difference in the in-hospital prognosis between ST-segment elevation myocardial infarction and non-ST-segment elevation myocardial infarction with high Killip class: Data from the Japan Acute Myocardial Infarction Registry. Eur Heart J Acute Cardiovasc Care 10(5):503–512. https://doi.org/10.1177/2048872620926681
17. Li Z, Huang S, Yang R, Li J, Chen G (2021) Long-term follow-up of diabetic patients with non-ST-segment elevation myocardial infarction. Am J Transl Res 13(12):13870–13877
18. Morici N, Tavecchia GA, Antolini L et al (2019) Use of PRECISE-DAPT score and admission platelet count to predict mortality risk in patients with acute coronary syndrome. Angiology 70(9):867–877. https://doi.org/10.1177/0003319719848547
19. Çınar T, Tanık VO, Aruğaslan E et al (2019) The association of PRECISE-DAPT score with development of contrast-induced nephropathy in patients with ST-elevation myocardial infarction undergoing primary percutaneous coronary intervention. Cardiovasc Interv Ther 34(3):207–215. https://doi.org/10.1007/S12928-018-0545-6
20. Yildirim E, Turkkan C, Ozcan KS, Ceylan US, Zengin A (2019) The predictive value of PRECISE-DAPT score for arrhythmic complications in patients with ST-elevation myocardial infarction. Coron Artery Dis 30(7):499–504. https://doi.org/10.1097/MCA.0000000000000788
21. Pamukcu HE, Tanık VO, Şimşek B, Güllü İH (2021) The association between the PRECISE-DAPT score and new-onset atrial fibrillation in patients with ST-elevation myocardial infarction. J Tehran Heart Cent 16(1):20–25. https://doi.org/10.18502/JTHC.V16I1.6596
22. Selçuk M, Çınar T, Şaylık F, Demiroz Ö, Yıldırım E (2022) The association of a PRECISE-DAPT score with no-reflow in patients with ST-segment elevation myocardial infarction. Angiology 73(1):68–72. https://doi.org/10.1177/00033197211010602
23. Magro M, Nauta ST, Simsek C et al (2012) Usefulness of the SYNTAX score to predict "no reflow" in patients treated with primary percutaneous coronary intervention for ST-segment elevation myocardial infarction. Am J Cardiol 109(5):601–606. https://doi.org/10.1016/J.AMJCARD.2011.10.013
24. Rencuzogullari I, Çagdas M, Karakoyun S et al (2018) Association of Syntax Score II with contrast-induced nephropathy and hemodialysis requirement in patients with ST segment elevation myocardial infarction undergoing primary percutaneous coronary intervention. Korean Circ J 48(1):59–70. https://doi.org/10.4070/KCJ.2017.0058
25. Cirakoglu OF, Aslan AO, Akyuz AR et al (2019) The value of syntax score to predict new-onset atrial fibrillation in patients with acute coronary syndrome. Ann Noninvasive Electrocardiol. https://doi.org/10.1111/ANEC.12622
26. Akboğa MK, Yılmaz S, Yalçın R (2021) Prognostic value of CHA2DS2-VASc score in predicting high SYNTAX score and in-hospital mortality for non-ST elevation myocardial infarction in patients without atrial fibrillation. Anatol J Cardiol 25(11):789–795. https://doi.org/10.5152/ANATOLJCARDIOL.2021.03982
27. Chichareon P, Onuma Y, van Klaveren D et al (2019) Validation of the updated logistic clinical SYNTAX score for all-cause mortality in the GLOBAL LEADERS trial. EuroIntervention 15(6):E539–E546. https://doi.org/10.4244/EIJ-D-19-00184
28. Kul S, Akgul O, Uyarel H et al (2012) High SYNTAX score predicts worse in-hospital clinical outcomes in patients undergoing primary angioplasty for acute myocardial infarction. Coron Artery Dis 23(8):542–548. https://doi.org/10.1097/MCA.0B013E3283599486
29. Akgun T, Oduncu V, Bitigen A et al (2015) Baseline SYNTAX score and long-term outcome in patients with ST-segment elevation myocardial infarction undergoing primary percutaneous coronary intervention. Clin Appl Thromb Hemost 21(8):712–719. https://doi.org/10.1177/1076029614521281

Publisher's Note