ORIGINAL RESEARCH

# Performance of DAPT Score and ESC Criteria for Predicting Clinical Outcomes in Chinese Patients with Acute Coronary Syndrome

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**Purpose:** The values of European Society of Cardiology (ESC) criteria and dual antiplatelet therapy (DAPT) score in the stratification of ischemic risk were assessed in this study.

**Methods:** A total of 489 patients with acute coronary syndrome who received DAPT at discharge between June 2020 and August 2020 were enrolled. The primary endpoint was the occurrence of major adverse cardiovascular events (MACE), which included recurrent ACS or unplanned revascularization, all-cause death, or ischemic stroke during a 27-month follow-up period.

**Results:** Patients with ESC-defined high-risk showed a significantly higher risk of MACE (HR 2.75, 95% CI 1.78–4.25), all-cause death (HR 2.49, 95% CI 1.14–5.43), and recurrent ACS or unplanned revascularization (HR 2.80, 95% CI 1.57–4.99) than those with ESC-defined low/medium-risk during follow-up. The results of landmark analysis showed that patients in the high-risk group had a significantly higher risk of MACE (HR 2.80,95 CI% 1.57–4.97), recurrent ACS or unplanned revascularization (HR 3.19,95 CI% 1.47–6.93) within one year, and a higher risk of MACE (HR 2.69,95 CI% 1.38–5.23) after one year. There was no significant difference in the incidence of MACE between patients with a DAPT score ≥2 and a DAPT score <2. The C-indices of ESC criteria and DAPT score for prediction of MACE were 0.63 (95% CI 0.57–0.70) and 0.54 (95% CI 0.48–0.61), respectively. The predictive value of ESC criteria for MACE was better than the DAPT score according to the DeLong test (z-statistic=2.30, P=0.020).

**Conclusion:** Patients with ESC-defined high-risk had a higher risk of MACE compared to those with ESC-defined low/medium-risk. The discriminant ability of the ESC criteria was better than the DAPT score for MACE. The ESC criteria demonstrated moderate discriminatory capacity of MACE in ACS patients treated with DAPT.

**Keywords:** acute coronary syndrome, ESC criteria, DAPT score, platelet inhibitors, clinical outcome

## Introduction

The 2020 European Society of Cardiology (ESC) guidelines on non-ST segment elevation acute coronary syndrome (NSTE-ACS)[1] recommend 12-month dual antiplatelet therapy (DAPT) for patients with NSTE-ACS, which includes aspirin and a potent P2Y12 receptor inhibitor (ticagrelor or prasugrel). However, under the standard antiplatelet strategy, the risk of residual ischemia in ACS patients remains high.[2] Some large randomized trials have demonstrated that after 12 months of DAPT, adding a second antithrombotic agent (clopidogrel,[3] prasugrel,[4] ticagrelor,[5–7] or rivaroxaban[8]) to aspirin can further reduce the incidence of all-cause death, myocardial infarction, and stroke. Therefore, according to the 2020 ESC guidelines, an intensified strategy for prolonging DAPT duration should be considered for patients with a high risk of ischemic events.[1]

However, distinguishing patients who might profit from an intensified strategy while avoiding the strategy in low-risk patients continues to pose a great challenge in current clinical practice. In order to identify patients with high thrombosis risk from NSTE-ACS patients, the ESC guidelines[1] proposed new criteria for thrombosis risk, consisting of a binary approach that includes one major criterion and multiple risk enhancers. These criteria have not yet been externally validated in real-world populations.

The DAPT score is a clinical decision tool that helps distinguish patients expected to benefit or harm from continuing DAPT beyond 1 year. Yeh et al[9] found that for patients with a DAPT score ≥ 2, extending the DAPT strategy reduced ischemic events without increasing the risk of major bleeding, which means that the DAPT score could help clinicians identify patients suitable for longer DAPT. However, in the real world, the discriminant ability of the DAPT score is controversial.[10–15]

This study evaluated the predictive value of ESC criteria and DAPT scores in patients with ACS.

# Methods
## Study Population
A total of 489 patients admitted to the Second Affiliated Hospital of Nanchang University for ACS who received DAPT at discharge were recruited between June and August 2020 (Figure 1). The inclusion criteria were as follows: (1) diagnosed with ACS (including unstable angina pectoris, ST-segment elevation myocardial infarction (STEMI), and non-ST segment elevation myocardial infarction) on admission; (2) Age ≥ 18 years old; (3) Who received one or more coronary angiography (CAG) during hospitalization and survived to discharge. The exclusion criteria were: (1) Complicated with a life-threatening malignant tumor; (2) Died during hospitalization or within 10 days after discharge; (3) Refused CAG and further drug treatment during hospitalization; (4) Diagnosed with stable angina pectoris or myocardial bridge; and (5) Did not use DAPT at discharge. Finally, 489 patients were included.

## Risk Stratification
The details of clinical data, including clinical characteristics, history of diseases, angiographic data, biochemistry, and medications, were retrospectively collected from the hospital's electronic database. Multivessel disease was defined as coronary angiography showing stenosis ≥50% in three-vessel coronary systems. The definition of complex coronary artery disease included severe stenosis of the left main trunk (diameter stenosis ≥ 50%) or severe stenosis of three large coronary arteries (diameter stenosis ≥ 70%), with or without the involvement of the proximal anterior descending branch.
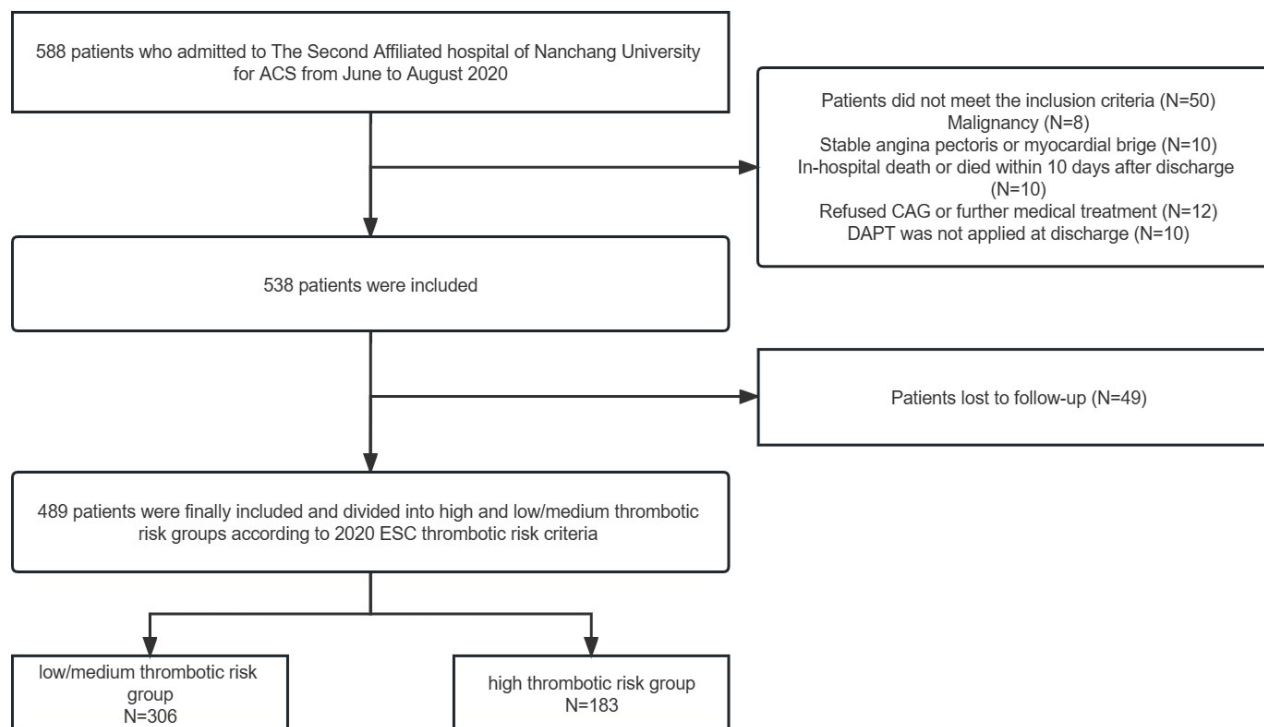


**Figure 1** The flowchart of study population selection.

According to the ESC criteria, the high ischemic risk was defined as complex coronary artery disease and at least 1 criterion, which included eight risk enhancers (diabetes mellitus requiring medication, history of recurrent MI (myocardial infarction), multivessel CAD (coronary artery disease), polyvascular disease, premature or accelerated CAD, concomitant systemic inflammatory disease, and CKD with eGFR (estimated glomerular filtration rate) 15–59 mL/min/1.73 m$^2$), and five technical aspects (history of stent thrombosis, history of complex revascularization, at least 3 stents implanted, at least 3 lesions treated, and total stent length >60 mm). The moderate ischemic risk was defined as non-complex coronary artery disease and at least 1 criterion (CKD with eGFR 15–59 mL/min/1.73 m2, history of recurrent MI, diabetes mellitus requiring medication, and polyvascular disease). The DAPT score consisted of 9 variables, including age (0 points for age <65 years, −1 points for 65 to <75 years, and −2 points for ≥75 years), cigarette smoking, diabetes mellitus, MI at presentation, prior PCI or prior MI, paclitaxel-eluting stent, stent diameter <3 mm (1 point each), congestive heart failure or left ventricular ejection fraction <30%, and vein graft stent (2 points each). Patients with a score ≥2 had a higher risk of ischemic events than those with a score <2, according to the DAPT score. The predictive values of ESC criteria and DAPT score were compared to further examine the clinical performance of the ESC criteria. Nine variables calculated the DAPT score. In the high score group (score ≥2), prolonged DAPT was associated with reduced ischemic events when compared with the low score group (score <2).

## Endpoint Definition and Follow-Up

Follow-up data were obtained through phone contact or medical records. The primary endpoint was defined as a major adverse cardiovascular event (MACE), which included all-cause death, recurrent ACS or unplanned revascularization (UR), and ischemic stroke. All patients were followed up for at least 24 months unless end events were observed. Recurrent ACS was defined as new-onset NSTE-ACS and STEMI. UR was defined as unplanned readmission for percutaneous transluminal coronary angioplasty (PTCA), PCI, or coronary artery bypass grafting (CABG) driven by coronary ischemia. The diagnosis of ischemic stroke was based on signs from neuroimaging studies and symptoms of the nervous system.

## Statistical Analysis

Continuous variables with normal and skewed distribution were analyzed using Student's $t$-test and Kruskal–Wallis test, respectively. Categorical variables were analyzed using the $\chi^2$ test. According to ESC criteria, patients were divided into high and low/medium-risk groups. Kaplan–Meier method and Cox proportional hazard analysis were performed to evaluate the correlation between the prediction models and the occurrence of adverse events. Additionally, landmark analyses of the Kaplan–Meier estimates of clinical outcomes at one year were performed. Receiver operating characteristic (ROC) curves were used to evaluate the discriminative capacities of the prediction models, and C-statistics > 0.6 was considered acceptable $P < 0.05$ represented statistical significance. All statistical analyses were performed using EmpowerStates (www.empowerstats.com).

## Results

Patients in the ESC-defined high-risk group were older and had a higher burden of comorbidity, including stroke, PAD, heart failure, hypertension, diabetes, previous myocardial infarction, and multiple coronary artery disease than patients in the low/medium-risk group. In addition, higher creatinine levels, lower ejection fractions, and lower eGFR levels were observed in high-risk patients. Considering information about the index procedure, most high-risk patients had the three-vessel disease (89.1%), while those with low/moderate risk had single- or two-vessel disease (87.9%). Left main disease, CTO, stent size < 3 mm, >3 stents, and total stent length > 60 mm were more common in high-risk patients (Table 1). In addition, drug-eluting stents (such as everolimus-eluting stent and rapamycin-eluting stents) were used in all patients undergoing coronary stent implantation.

According to the ESC criteria, 183 (37.4%) patients were classified as high-risk, 97 (19.8%) as medium-risk, and 209 (42.7%) as low-risk. There were 267 patients (54.6%) with a DAPT score≥2 and 222 patients (45.4%) with a DAPT score < 2. The number of patients satisfied with ESC high thrombotic risk and a DAPT score≥2 was 113 (23.1%).

**Table 1** Baseline Characteristics of the Two Groups

| | Low/Moderate Thrombotic Risk (n=306) | High Thrombotic Risk (n=183) | P* |
|---|---|---|---|
| Admission information | | | |
| Male, n (%) | 212 (69.3) | 131 (71.6) | 0.590 |
| Age (years) | 63.2±11.4 | 67.7±11.0 | <0.001 |
| STEMI, n (%) | 79 (25.8) | 38 (20.8) | 0.205 |
| LVEF (%) | 59.8±9.0 | 55.7±10.7 | <0.001 |
| Smoking, n (%) | 85 (27.8) | 51 (27.9) | 0.983 |
| History of disease, n (%) | | | |
| Stroke | 17 (5.6) | 31 (16.9) | <0.001 |
| Peripheral vascular disease | 5 (1.6) | 13 (7.1) | 0.002 |
| Hypertension | 166 (54.2) | 140 (76.5) | <0.001 |
| Diabetes mellitus | 82 (26.8) | 69 (37.7) | 0.012 |
| Concomitant systemic inflammatory disease | 2 (0.7) | 1 (0.5) | 0.883 |
| Previous PCI | 50 (16.3) | 54 (29.5) | 0.001 |
| Previous CABG | 1 (0.3) | 2 (1.1) | 0.294 |
| CKD | 13 (4.2) | 10 (5.5) | 0.539 |
| Heart failure | 3 (1.0) | 19 (10.4) | <0.001 |
| OMI | 19 (6.2) | 30 (16.4) | <0.001 |
| Atrial fibrillation | 14 (4.6) | 8 (4.4) | 0.916 |
| Laboratory test | | | |
| Uric acid (mmol/L) | 375.6±112.5 | 391.6±120.4 | 0.138 |
| Creatinine (μmol/L) [IQR] | 77.6 (64.3–91.2) | 83.8 (71.3–104.0) | <0.001 |
| eGFR (mL/min/1.73m$^2$) | 83.8±23.7 | 73.7±27.1 | <0.001 |
| Medication, n (%) | | | |
| Statin | 302 (98.7) | 182 (99.5) | 0.655 |
| Ticagrelor | 203 (66.3) | 126 (68.9) | 0.567 |
| β-blocker | 290 (94.8) | 174 (95.1) | 0.880 |
| ACEI/ARB | 180 (58.8) | 120 (65.6) | 0.138 |
| CCB | 65 (21.2) | 31 (16.9) | 0.246 |
| Angiography characteristics, n (%) | | | |
| 1-vessel disease, | 143 (46.7) | 2 (1.1) | <0.001 |
| 2-vessel disease | 126 (41.2) | 18 (9.8) | <0.001 |
| 3-vessel disease | 37 (12.1) | 163 (89.1) | <0.001 |
| Left main disease | 5 (1.6) | 45 (24.6) | <0.001 |
| In-stent restenosis | 2 (3.9) | 17 (9.3) | 0.015 |
| CTO | 16 (5.2) | 41 (22.4) | <0.001 |
| Patients with PCI | 256 (83.7) | 170 (92.9) | 0.003 |
| Stent diameter <3 mm | 103 (33.7) | 114 (62.3) | <0.001 |
| ≥3 stents implanted | 39 (12.7) | 102 (55.7) | <0.001 |
| Total stent length >60 mm | 77 (25.2) | 120 (65.6) | <0.001 |

**Notes**: Data are shown as the mean ± standard deviation, median value (interquartile range), or percentage when appropriate. *Student's *t*-test, Kruskal–Wallis test or $\chi^2$ test was done when appropriate.
**Abbreviations**: STEMI, ST-segment elevation myocardial infarction; LVEF, Left ventricular ejection fractions; PCI, Percutaneous coronary intervention; CABG, Coronary angioplasty bypass grafting; CKD, Chronic kidney disease; OMI, Old myocardial infarction; eGFR, Estimated glomerular filtration rate; ACEI, angiotensin converting enzyme inhibitors; ARB, Angiotensin receptor blocker; CCB, Calcium channel blocker; CTO, Chronic total occlusion.

## Clinical Outcomes

The median follow-up time was 27.2 months. The incidence and relative risks of end events are listed in Table 2. The event rates of MACE, all-cause death, recurrent ACS or UR, and ischemic stroke in the high-risk group were 51 (27.9%), 15 (8.2%), 29 (15.8%), and 7 (3.8%), respectively. In the low/moderate group, the event rates of MACE, all-cause death,

**Table 2** Clinical Outcomes at Follow-Up Time

| End Point | | Event Rate, % | HR (95% CI) | P* |
|---|---|---|---|---|
| MACE | | | | |
| ESC criteria | Low to moderate | 34 (11.1) | Ref | |
| | High | 51 (27.9) | 2.75 (1.78–4.25) | <0.001 |
| DAPT score | <2 | 32 (14.4) | Ref | |
| | ≥2 | 53 (19.9) | 1.43 (0.92–2.22) | 0.107 |
| All cause death | | | | |
| ESC criteria | Low to moderate | 11 (3.6) | Ref | |
| | High | 15 (8.2) | 2.49 (1.14–5.43) | 0.021 |
| DAPT score | <2 | 14 (6.3) | Ref | |
| | ≥2 | 12 (4.5) | 0.73 (0.34–1.59) | 0.443 |
| Recurrent ACS or UR | | | | |
| ESC criteria | Low to moderate | 19 (6.2) | Ref | |
| | High | 29 (15.8) | 2.80 (1.57–4.99) | <0.001 |
| DAPT score | <2 | 16 (7.2) | Ref | |
| | ≥2 | 32 (12.0) | 1.73 (0.95–3.15) | 0.073 |
| Stroke | | | | |
| ESC criteria | Low to moderate | 4 (1.3) | Ref | |
| | High | 7 (3.8) | 3.24 (0.94–11.08) | 0.060 |
| DAPT score | <2 | 2 (0.9) | Ref | |
| | ≥2 | 9 (3.4) | 3.94 (0.85–18.23) | 0.079 |

**Notes**: Data are shown as number and percentage. *Univariate COX regression analysis was done.
**Abbreviations**: MACE, Major adverse cardiovascular events; ACS, Acute coronary syndrome; UR, unplanned revascularization.

recurrent ACS or UR, and ischemic stroke were 34 (11.1%), 11 (3.6%), 19 (6.2%), and 4 (1.3%), respectively. Patients with ESC-defined high-risk had a significantly higher risk of MACE (HR 2.75, 95% CI 1.78–4.25, P < 0.001), all-cause death (HR 2.49, 95% CI 1.14–5.43, P=0.021), and recurrent ACS or UR (HR 2.80, 95% CI 1.57–4.99, P < 0.001) than patients with ESC-defined low/moderate-risk. The risk of stroke was similar between the two groups, which is consistent with the results of multivariate COX regression analysis (Table S1).

There was no significant difference in the risk of MACE (HR 1.43, 95% CI 0.92–2.22, P=0.107), all-cause death (HR 0.73, 95% CI 0.34–1.59, P=0.443), recurrent ACS or UR (HR 1.73, 95% CI 0.95–3.15, P=0.073), and ischemic stroke (HR 3.94, 95% CI 0.85–18.23, P=0.079) between patients with DAPT score ≥2 and those with DAPT score < 2.

## Landmark Analysis
Compared with low/moderate patients, patients with ESC-defined high-risk showed significantly higher rates of MACE (HR 2.80, 95% CI 1.57–4.97, P < 0.001) (Figure 2) and recurrent ACS or UR (HR 3.19, 95% CI 1.47–6.93, P=0.003) within one year and higher rates of MACE (HR 2.69, 95% CI 1.38–5.23, P=0.003) after one year (Figure S1). Conversely, the patients with DAPT scores ≥ 2 and those with DAPT scores < 2 showed similar incidence of clinical outcomes.

## Comparison of the Predictive Performance of ESC Criteria and DAPT Score
The C-statistic of the ESC criteria and DAPT score for prediction of MACE were 0.63 (95% CI 0.57–0.70) and 0.54 (95% CI 0.48–0.61), respectively (Figure 3). The sensitivity and specificity of the ESC criteria were 0.60 and 0.67, respectively. In sensitivity analyses, by separating patients with low/medium risk and DAPT score < 2, patients with ESC-defined high-risk and DAPT score ≥ 2 were defined as high-risk patients, while other patients were classified as medium/low-risk patients, improving the specificity of predicting MACE events (C index:0.60, 95% CI 0.53–0.67, sensitivity:0.40, specificity:0.80) (Table 3). As shown in Table 4, the discriminative power ESC criteria were better than the DAPT score (z statistic=2.300, P=0.020).
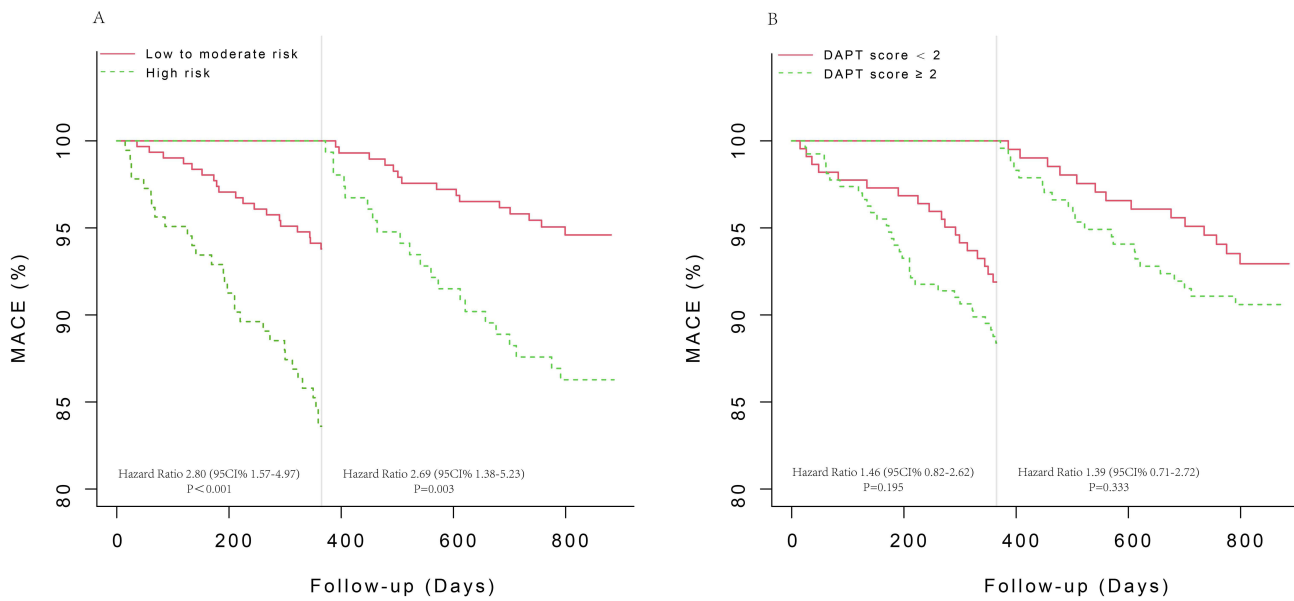
**Figure 2** Landmark analysis of the Kaplan–Meier estimates of MACE within one year and after one year. (**A**) MACE event rates in the ESC-defined high-risk and ESC-defined low/medium-risk groups and landmark analysis within and after one year. (**B**) MACE event rates in the DAPT score ≥ 2 and DAPT score < 2 groups and landmark analysis within and after one year.
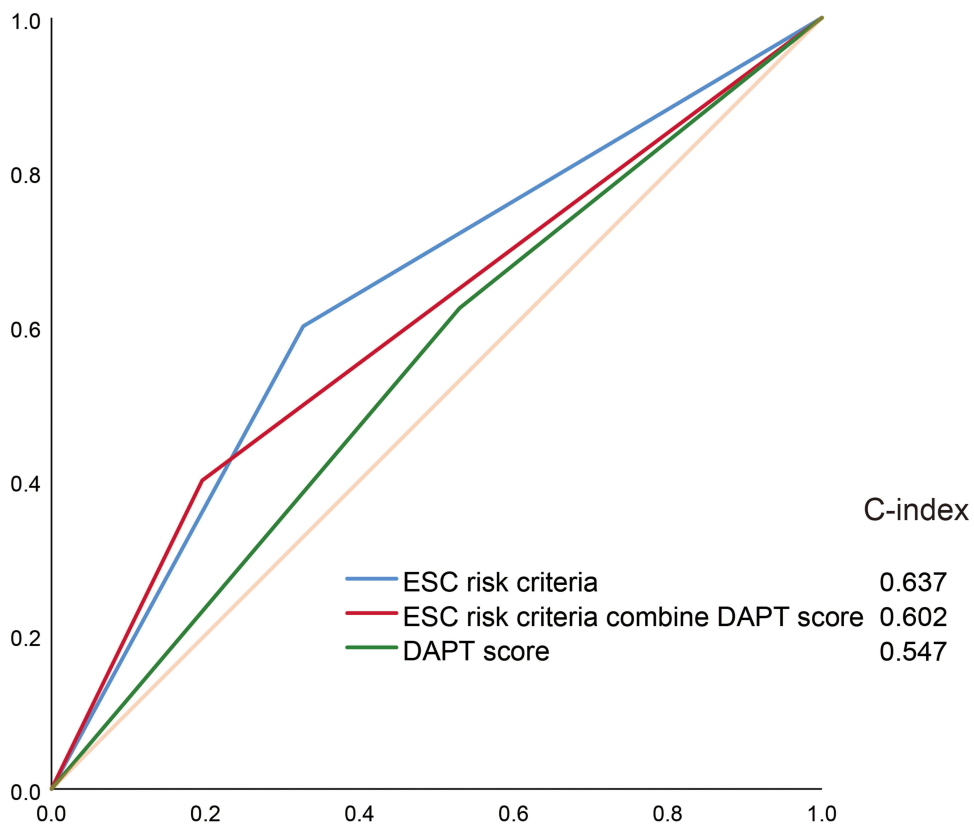


**Figure 3** The receiver operating characteristic (ROC) curve of the ESC criteria and DAPT score for MACE in patients with ACS.

## Subgroup Analysis

The risk factors in the ESC criteria were not evaluated in the subgroup analysis. The results of the interaction and subgroup analyses between the two groups according to sex, age, smoking, hypertension, STEMI at admission, and PCI

**Table 3** Areas Under the Receiver Operating Characteristic Curves for ESC Risk Criteria, DAPT Score, and the Combination of ESC Risk Criteria and DAPT Score in Identifying MACE

| | AUC (95% CI) | P-value | Sensitivity | Specificity |
|---|---|---|---|---|
| ESC risk criteria | 0.637 (0.571–0.703) | <0.001 | 0.600 | 0.673 |
| DAPT score | 0.547 (0.480–0.614) | 0.174 | 0.624 | 0.470 |
| ESC risk criteria combine DAPT score | 0.602 (0.532–0.672) | 0.003 | 0.400 | 0.804 |

**Abbreviation**: AUC, Area under curve.

**Table 4** To Compare the Ability of ESC Risk Criteria, DAPT Score to Predict MACE

| | Comparison | z | P* |
|---|---|---|---|
| All patients | DAPT vs ESC criteria | 2.300 | 0.020 |

**Note**: *The DeLong test was done.

during hospitalization are shown in Figure 4. The results showed that the correlation between ESC criteria and the risk of MACE was consistent among the different subgroups. No significant interaction was observed in this analysis.

## Discussion

Over the past few decades, the development of percutaneous coronary intervention (PCI) technology and drug therapy significantly decreased the short-term risk of fatal events in patients with ACS.[16] Currently, DAPT de-escalation, potent P2Y12 inhibitor monotherapy, and conventional DAPT are used as dominant strategies to reduce the risk of bleeding.[17–19] However, the heterogeneity of the ACS population is high, and many patients are at a high risk of residual ischemia.[20] Thus, a single treatment strategy does not apply to all patients. Antithrombotic therapy should combine the clinical characteristics of the patients to formulate individualized strategies in patients with ACS. Accurate identification of patients with a high risk of ischemic events is crucial in treatment allocation.
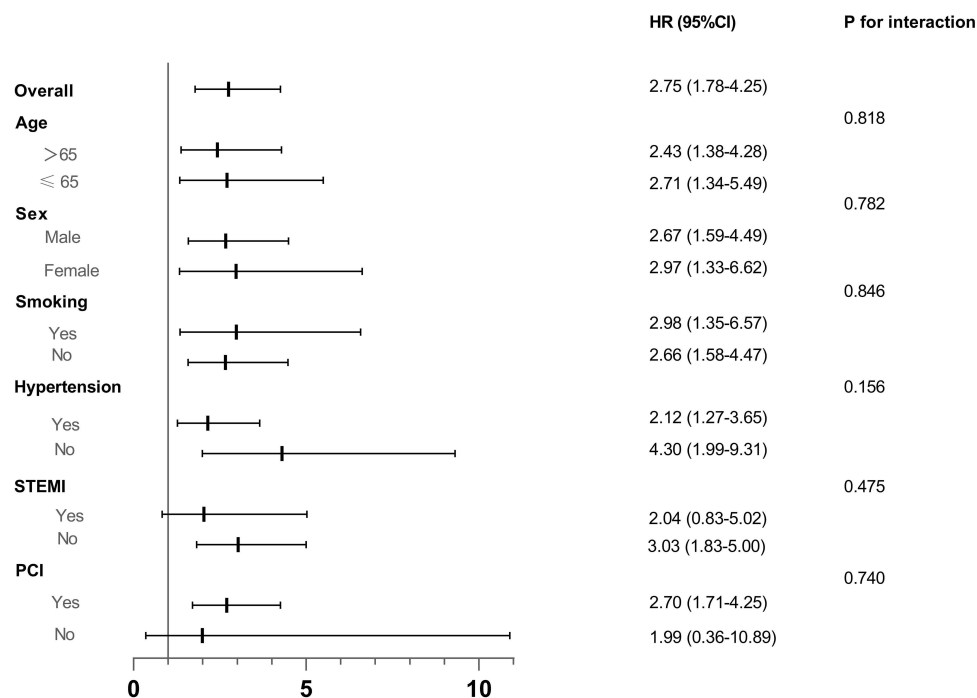


Figure 4 Subgroup analysis of the prognostic value of the ESC criteria in different subgroups for MACE.

New thrombotic risk criteria for patients with chronic coronary syndromes (CCS) have been proposed by 2019 ESC guidelines.[21] Also, a study conducted in Western Denmark[22] further examined the predictive value of these criteria, finding that the incidence of MACE was significantly higher in patients with ESC-defined high-risk (HR 1.9 95% CI 1.8 ~ 1.9), while the C-statistic for prediction of MACE was 0.58 (95% CI 0.57–0.58).

Compared with the 2019 ESC thrombotic risk criteria for CCS patients, the 2020 criteria include more risk enhancers, such as concomitant systemic inflammatory diseases, premature or accelerated CAD, and technical aspects. Also, there are different major criteria between the two. The present study evaluated the discriminative power of the 2020 ESC criteria for predicting MACE during 27 months of follow-up and further verified the ability of the criteria to stratify ischemic risk within one year and after one year by landmark analysis. Our results showed that the ESC criteria could determine ischemic risk in patients with ACS within one year and beyond. By stratifying the ischemic risk of ACS patients within one year, it is possible to identify patients at high risk of ischemia who are not eligible for the DAPT de-escalation strategy. By stratifying the ischemic risk of patients one year after the occurrence of ACS, clinicians can identify patients who could benefit the most from an intensified strategy while avoiding unnecessary treatment in patients at low risk.

By comparing the baseline characteristics of the two groups, we found that high-risk patients had more concomitant diseases (including stroke, PAD, hypertension, and diabetes), more complex diseased vessels, and more complex revascularization. Patients in the high-risk group had more ESC criteria-defined risk factors than patients in the low/moderate risk group (Table S2), which may explain the higher incidence of MACE in the high-risk group.

In the present study, the patients with DAPT scores ≥ 2 had similar incidence of clinical outcomes as those patients with DAPT scores < 2. The C-statistic of the DAPT score for the prediction of MACE was 0.54 (95% CI0.48–0.61), which means that the DAPT score could not fully identify the risk of MACE.

DAPT score may not identify patients with a higher incidence of MACE who could benefit from extended treatment with a second antithrombotic agent. Considering that the original study[9] of DAPT score did not include all-cause death as the study endpoint, the association between DAPT score and ischemic events, including recurrent ACS or UA, and ischemic stroke, was exploratorily evaluated. In the exploratory analysis, the risk of ischemic events was significantly increased in patients with a DAPT score ≥ 2 at follow-up (HR 1.97,95 CI% 1.13–3.43) and after one year (HR 2.40,95 CI% 1.01–5.72). The C-statistic for predicting ischemic events was 0.58 (95% CI 0.51–0.66), indicating a low discriminative capacity.

The validity of the DAPT score has been controversial since the start. Some studies have successfully verified the ability of DAPT scores to identify patients at a higher risk of ischemic events.[23,24] Others have found that the DAPT score could not adequately discriminate between ischemic and bleeding risks, and the score and its decision rule may not be generalizable to real-world populations.[14] A study that verified the DAPT score in the Chinese ACS population also reported the unsatisfactory ability of the DAPT score to discriminate ischemic events.[13] Several reasons may explain why the DAPT score did not fully distinguish the risk of adverse events in this study. First, Asians have significantly smaller total vessel diameters than Caucasians. It has been verified that Asians have smaller dimensions of all proximal coronary arteries than Caucasians, regardless of age, sex, or body size.[25,26] This difference explains the smaller stent diameter in Asians, which weakens the value of stent diameter < 3 mm and acts as a positive predictor of DAPT score, resulting in more patients being classified as having a high ischemia risk. Second, the use of paclitaxel-eluting stents greatly contributed to the parameters of DAPT scores. Yet, with the widespread use of newer generations of stents, paclitaxel-eluting stents are no longer applied in current clinical practice, leading to a different distribution of DAPT scores between this study and the DAPT study. Third, older age is an important risk enhancer for all-cause mortality.[27] However, it is regarded as a negative predictor of the DAPT score, which disturbs the relationship between the DAPT score and MACE. Finally, the relatively small sample size in this study may lack sufficient test efficiency.

In the present study, approximately 1/3 of the patients were classified as having a high thrombotic risk according to ESC criteria, and these patients showed a higher incidence of MACE, recurrent ACS or UA, and all-cause death during 27 months of follow-up. The C-statistic of the ESC criteria for the prediction of MACE was 0.63 (95% CI 0.57–0.70), showing moderate discriminatory capacity during a period of 27 months. It was less likely to perform better for simple risk criteria because of the high heterogeneity of the ACS population. On the other hand, risk scores with more clinical variables, such as the PRAISE score,[28] which is based on artificial intelligence computations and contains 25 clinical variables, have also been proposed. The score showed accurate discriminative capabilities for predicting all-cause death

and myocardial infarction, which may help guide clinical decision-making. However, the complexity of the PRAISE score may hinder its clinical application.

## Study Limitations

The present study has some limitations. First, this was a retrospective, observational study. Although subgroup and multivariate analyses were applied, unadjusted confounding factors were difficult to avoid. Second, although 12-month DAPT is recommended as a standard treatment strategy for patients with ACS according to Chinese guidelines, and most patients followed the recommendation, accurate information about the duration of DAPT was unavailable, which could affect the risk of MACE in patients. In addition, the sample size was small and was obtained from a single center. Therefore, the results of this study need to be further validated by large trail study.

## Conclusions

DAPT score could not stratify the MACE risk of patients with ACS. Compared with low-risk patients, patients with ESC-defined high-risk had an increased risk of MACE within one year and beyond. The ESC criteria had moderate discriminative ability for MACE in Asian patients with ACS. Considering the criteria's simplicity, reliability, and discriminating ability, they have certain prospects in clinical practice.

## Ethics Approval

This study was approved by the Institutional Review Board of the Second Affiliated Hospital of Nanchang University. Written informed consent was acquired from all participants for their participation in our study. We confirmed that our study complies with the Declaration of Helsinki.

## Consent to Participate

Informed consent was obtained from all individual participants included in the study.

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## Disclosure

The authors have no relevant financial or non-financial interests to disclose for this work.

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