Section: General Medicine

Original Research Article

COMPARISON OF PROGNOSTIC VALUE OF SYNTAX SCORE WITH VARIOUS CLINICAL SCORES IN PREDICTING OUTCOMES IN PATIENTS WITH ACUTE CORONARY SYNDROME REFERRED FOR INVASIVE MANAGEMENT IN TERTIARY CARE CENTRE

D. Chakkravarthi[1], Chris Shiny J[2], J. Nambirajan[3], J. Jegadeesh[1]

[1]Assistant Professor, Coimbatore Medical College, Tamil Nadu, India
[2]DM Resident, Coimbatore Medical College, Tamil Nadu, India
[3]Professor and HOD, Department of Cardiology, Coimbatore Medical College, Tamil Nadu, India

Received : 08/06/2025
Received in revised form : 24/07/2025
Accepted : 13/08/2025

Keywords: syntax score, Grace score, TIMI score, clinical syntax score.

Corresponding Author:
Dr. Chris shiny J
Email: chrisshiny@yahoo.in

DOI: 10.47009/jamp.2025.7.4.273

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2025; 7 (4); 1438-1444

ABSTRACT

Background: Coronary artery disease is the leading cause of death both in young and elderly patients. Risk stratification is necessary to assess the prognosis of the patient following an ACS. The clinical scores are compared with syntax score in assessing the prognosis. **Materials and Methods:** This study was undertaken among 53 patients with ACS who were admitted in Coimbatore medical college. Patients demographic profile, lab investigations, angiographic profile were taken and were assessed for the prognosis. The patients were followed up for one year. **Result:** Among the baseline characteristics, high syntax score was seen in patients with Diabetes. The SS had a mean of 24.3 (SD ± 7.5) and a median of 23, with an IQR of 18–27, reflecting a right-skewed distribution with most scores below 30, indicative of generally lower lesion complexity in the cohort. The CSS, accounting for clinical factors, had a higher mean of 31.6 (SD ± 9.2) and a median of 30 (IQR 27.4–35), showing broader risk variation. The GRACE score, indicative of overall cardiovascular risk, had a mean of 98.2 (SD ± 15.6) and median of 95, with an IQR of 85–112, with only a few scores above 112, marking a subset with elevated risk. **Conclusion:** Eventhough syntax score outnumber in predicting the prognosis of patient following Acute Coronary syndrome, the clinical scores when combined together improve the predictive value.

INTRODUCTION

Coronary artery disease (CAD) is still a leading cause of death for millions of individuals globally, despite advancements in prevention and treatment strategies.[1,2] Percutaneous coronary intervention (PCI) has revolutionised the treatment of coronary artery disease (CAD), particularly for patients with substantial coronary blockage, by offering a less invasive approach with promising outcomes.[3,4] However, because of patient-specific characteristics and lesion complexity, post-PCI results vary greatly, highlighting the significance of strong, customized risk classification techniques.[5]

By analysing the anatomical characteristics of coronary lesions, the SYNTAX (Synergy Between PCI with Taxus and Cardiac Surgery) score—which was created to evaluate lesion complexity—offers a thorough assessment of the severity of CAD.[6] It has received extensive validation as a major adverse cardiac event (MACE) predictor, especially in cases with left main coronary artery disease or complex multivessel disease.[7,8] The SYNTAX score has limits despite its usefulness because it mainly considers morphological aspects and ignores clinical factors that affect prognosis, such as age, comorbidities, or renal function.[9]

The Clinical SYNTAX Score (CSS), which integrates clinical and anatomical features for a more precise evaluation of PCI results, was developed to fill up these gaps.[10] Research shows that the CSS enhances the original SYNTAX score's predictive ability, leading to improved risk classification, especially for individuals with high-risk clinical characteristics.[9]

Additional risk scores, such as the TIMI (Thrombolysis in Myocardial Infarction) and GRACE (Global Registry of Acute Coronary Events) scores, are commonly used to assess the short- and long-term hazards of patients with acute coronary

ISSN (O): 2687-5365; ISSN (P): 2753-6556

syndrome (ACS).[11,12] While the TIMI score is helpful for risk classification in STEMI and NSTEMI scenarios, the GRACE score offers wider applicability by assessing hospital and long-term mortality in a range of ACS patients.[13] The applicability of these ratings to PCI populations is constrained, particularly in situations with low resources or heterogeneous patient populations, such those in India, where particular sociodemographic characteristics may affect the course of CAD.[14,15]

In order to predict post-PCI outcomes in an Indian population, this study compares and assesses the prognostic value of the SYNTAX, CSS, TIMI, and GRACE scores. A more individualized approach to CAD therapy may be made possible by an understanding of the predictive accuracy of these ratings in this particular context, which could lead to better patient outcomes in India and other comparable settings.

MATERIALS AND METHODS

Study Design and Population: This study comprised 53 patients with acute coronary syndromes who underwent successful PCI at a medical college in South India between June 2023 and May 2024. All these patients had at least one lesion with a diameter stenosis (DS) greater than 50% in a vessel suitable for stent implantation. There were no limits on the number of vessels, stents, or lesions treated. Any planned surgery within 6 months of PCI (unless the patient was receiving dual antiplatelet medication), pregnancy, contrast media allergy, a history of CABG, or participation in another trial prior to the primary outcome were the primary exclusion criteria.

Procedures: All patients were on anticoagulant medication with 150 mg of aspirin and 75 mg of clopidogrel before to PCI. During the procedure, 70–100 U/kg of unfractionated heparin was utilized. For emergency PCI, patients with acute coronary syndrome were administered glycoprotein IIb/IIIa inhibitors along with a loading dose of 150 mg of aspirin. The choice of drug-eluting stents and other devices was left up to the operator. High-pressure balloon dilatation was used to ensure optimal stent insertion. PCI was deemed successful if the remaining stenosis was less than 30% and the final coronary TIMI 3 flow was achieved. Aspirin (150 mg daily) and either ticagrelor (90 mg twice daily) or clopidogrel (75 mg twice daily) were given to discharged patients for a minimum of 12 months.

Calculation of Prognostic Scores: For every patient, we computed four risk assessment scores:: the SYNTAX Score (SS), Clinical SYNTAX Score (CSS), TIMI risk score for STEMI, and GRACE risk score for ACS mortality.

1. **SYNTAX Score (SS):** The SS was calculated by scoring all coronary lesions with a DS ≥ 50% in vessels ≥ 2.25 mm, using the methodology on the SYNTAX score website (www.syntaxscore.com). The score takes into account lesion location, length, and severity. The SYNTAX score is well-validated for predicting long-term outcomes, especially in complex coronary disease.[6,7]
2. **Clinical SYNTAX Score (CSS):** The CSS was calculated by multiplying the SYNTAX score by a modified ACEF score, which takes into account the patient's age, left ventricular ejection fraction (LVEF), and creatinine clearance.[5,9]
3. **TIMI Risk Score for STEMI:** The TIMI risk score was calculated using the online calculator available at https://www.mdcalc.com/calc/99/timi-risk-score-stemi. It includes factors like age, heart rate, blood pressure, Killip class, and the presence of diabetes. This score is widely used to predict short-term mortality in STEMI patients.[11,16]
4. **GRACE Risk Score for ACS Mortality:** The GRACE score for ACS mortality was calculated using the online tool at https://www.mdcalc.com/calc/1099/grace-acs-risk-mortality-calculator. This score includes clinical factors like age, heart rate, systolic blood pressure, serum creatinine, and biomarkers to predict 6-month mortality and adverse outcomes in ACS patients.[17,18]

Endpoint and Definitions

The primary endpoint of this study included cardiac death, stroke, myocardial infarction (MI), and any repeat revascularization (either PCI or CABG). Definitions for each endpoint were as follows:

- Cardiac Death: All deaths were considered cardiogenic unless a definite non-cardiogenic cause was recorded.
- Stroke: A focal neurological deficit of vascular origin lasting longer than 24 hours, diagnosed by neurologists.
- MI: Defined by new Q-waves of at least 0.4 s duration in ≥ 2 contiguous leads or elevation of cardiac enzymes.
- Repeat Revascularization: Either PCI or CABG performed on a vessel previously treated by PCI, when stenosis of the target vessel exceeded 50% with symptoms or signs of ischemia.

Statistical Analysis

STATA v17 was used for statistical analysis. Descriptive statistics, such as counts and percentages for categorical variables and mean and standard deviation for continuous data were caluculated. Chi-square tests were used for categorical variables. Time-to-event trends were presented using Kaplan–Meier curves, and the Log-rank test was used to assess differences in survival among subgroups. The prognostic performance of SS, CSS, TIMI, and GRACE scores was evaluated using receiver-operating characteristic (ROC) curves, and areas under the curve (AUCs) were compared using the DeLong method.

ISSN (O): 2687-5365; ISSN (P): 2753-6556

RESULTS

Baseline Clinical Characteristics

[Table 1] displays the baseline clinical parameters of the study cohort by SS tertile. 53 patients in all were split into three groups: SSlow (<22, n=17), SSmid (22–26, n=20), and SShigh (>26, n=16). Males made up the majority of the cohort (71.7%). There were no significant changes in age or BMI between tertiles; the population's mean age was 50.04 ± 11.60 years (p = 0.253), and its BMI was 28.19 ± 3.02 kg/m² (p = 0.237). Although it varied somewhat among tertiles, the left ventricular ejection fraction (LVEF) was mostly constant (p = 0.014). SShigh had a substantially greater prevalence of diabetes mellitus (DM) (93.8%) than SSlow (41.2%) and SSmid (50.0%), with a p-value of 0.004, indicating a correlation between higher SS and a higher prevalence of DM.

Table 1: Baseline characteristics of Patients Stratified by SYNTAX Score Tertiles

Variable	SS_{low} <22 (17)	SS_{mid} 22-26 (20)	SS_{high} >26 (16)	Total (53)	p-value
Male sex	13 (76.5%)	16 (80.0%)	9 (56.3%)	38 (71.7%)	0.260
Age (years)	48.18±12.80	51.30±13.50	50.44±7.39	50.04±11.60	0.253
BMI (kg/m2)	28.59±2.80	28.00±3.72	28.00±2.30	28.19±3.02	0.237
Risk factors					
LVEF	42.12±4.84	42.35±8.80	42.75±8.73	42.40±7.59	0.014
CC	72.86±6.88	74.98±6.16	75.12±8.70	74.34±7.16	0.067
HTN	4 (23.5%)	10 (50.0%)	7 (43.8%)	21 (39.6%)	0.240
DM	7 (41.2%)	10 (50.0%)	15 (93.8%)	32 (60.4%)	0.004
Hypercholesterolemia	12 (70.6%)	10 (50.0%)	7 (43.8%)	29 (54.7%)	0.261
Current smoker	10 (58.8%)	16 (80.0%)	9 (56.3%)	35 (66.0%)	0.245
COPD	3 (17.6%)	1 (5.0%)	1 (6.3%)	5 (9.4%)	0.369
Indication for treatment					
STEMI	16 (94.1%)	16 (80.0%)	14 (87.5%)	46 (86.8%)	0.448
NSTEMI	2 (11.8%)	5 (25.0%)	2 (12.5%)	9 (17.0%)	0.188

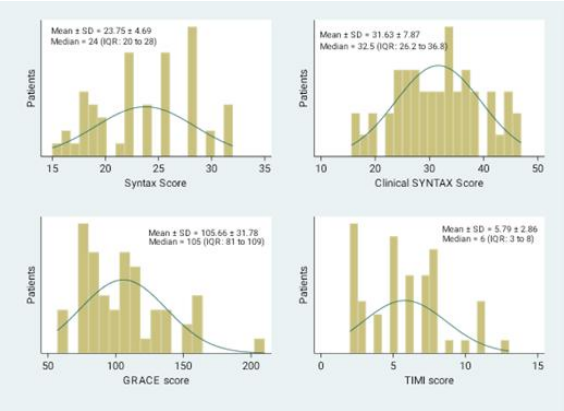

Figure 1: Distribution of SYNTAX, Clinical SYNTAX (CSS), GRACE, and TIMI Scores

[Figure 1] shows the distributions of SYNTAX (SS), clinical SYNTAX (CSS), and GRACE scores, highlighting key measures of central tendency and spread. The SS had a mean of 24.3 (SD ± 7.5) and a median of 23, with an IQR of 18–27, reflecting a right-skewed distribution with most scores below 30, indicative of generally lower lesion complexity in the cohort. The CSS, accounting for clinical factors, had a higher mean of 31.6 (SD ± 9.2) and a median of 30 (IQR 27.4–35), showing broader risk variation. The GRACE score, indicative of overall cardiovascular risk, had a mean of 98.2 (SD ± 15.6) and median of 95, with an IQR of 85–112, with only a few scores above 112, marking a subset with elevated risk. These distributions underscore the predominance of lower to moderate risk across the cohort, with some patients displaying higher risk scores.

Angiographic and Procedural Characteristics: [Table 2] provides a detailed breakdown of angiographic and procedural characteristics stratified by SS tertile. Patients in the SShigh group exhibited a higher mean number of diseased lesions (2.00 ± 0.894, p = 0.014) and had a greater frequency of 3-vessel disease (37.5%) compared to SSlow and SSmid groups, though not statistically significant (p = 0.075). Left main stem involvement was notably higher in the SShigh tertile (37.5%, p = 0.031), and lesions were more frequently located in the circumflex artery in this group (62.5%, p = 0.048). Procedurally, the total stent length per patient was significantly greater in the SShigh group (35.00 ± 10.6 mm, p = 0.019), reflecting higher lesion complexity. Despite these differences, post-procedural hospital stay did not vary significantly between groups (p = 0.092).

Table 2: Angiographic and Procedural Characteristics by SYNTAX Score Tertiles

Variable	SS_{low} ≤18 (17)	SS_{mid} >18-27 (20)	SS^{high} >27 (16)	Total (50)	p-value
Diseased lesions					
Number of disease lesions	1.12±0.332	1.35±0.671	2.00±0.894	1.47±0.53	0.014
1-vessel disease	15 (88.2%)	15 (75.0%)	6 (37.5%)	36 (67.9%)	0.112
2-vessel disease	2 (11.8%)	3 (15.0%)	4 (25.0%)	9 (17.0%)	0.855
3-vessel disease	0	2 (10.0%)	6 (37.5%)	8 (15.1%)	0.075
Lesion Location					
Left main stem	1 (5.9%)	2 (10.0%)	6 (37.5%)	9 (17.0%)	0.031
Left anterior artery	9 (52.9%)	15 (75.0%)	11 (68.8%)	35 (66.0%)	0.355

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Circumflex artery	5 (29.4%)	5 (25.0%)	10 (62.5%)	20 (37.7%)	0.048
Right artery	5 (29.4%)	7 (35.0%)	8 (50.0%)	20 (37.7%)	0.452
Lesion characteristics					
Bifurcated lesions	3 (17.6%)	5 (25.0%)	4 (25.0%)	12 (22.6%)	0.837
Trifurcated lesion	0	1 (5.0%)	0	1 (1.9%)	0.431
Ostial lesion	4 (23.5%)	7 (35.0%)	8 (50.0%)	19 (35.8%)	0.283
Lesion >20 mm	4 (23.5%)	7 (35.0%)	6 (37.5%)	17 (32.1%)	0.649
Lesion with thrombus	10 (58.8%)	10 (50.0%)	7 (43.8%)	27 (50.9%)	0.684
Calcified lesion	0	1 (5.0%)	0	1 (1.9%)	0.431
Total occlusion	1 (5.9%)	2 (10.0%)	2 (12.5%)	5 (9.4%)	0.805
Chronic total occlusion	0	1 (5.0%)	0	1 (1.9%)	0.431
Treated coronary					
Left main stem	1 (5.9%)	2 (10.0%)	3 (18.8%)	6 (11.3%)	0.493
Left Anterior descending	9 (52.9%)	11 (55.0%)	6 (37.5%)	26 (49.1%)	0.538
Circumflex	1 (5.9%)	3 (15.0%)	5 (31.3%)	9 (17.0%)	0.146
Right	4 (23.5%)	4 (20.0%)	4 (25.0%)	12 (22.6%)	0.933
Procedural characteristics					
Number of implanted stents	0.82±0.53	0.90±0.64	1.00±0.73	0.91±0.62	0.629
Total stent length/patient (mm)	29.38±4.92	31.07±9.43	35.00±10.6	31.7±8.74	0.019
Maximal pressure of stent deployment	14.62±1.50	14.4±1.55	14.33±2.06	14.45±1.66	0.323
Patients with complete revascularisation	13 (100.0%)	15 (100.0%)	10 (83.3%)	38 (95.0%)	0.086
Use of glycoprotein IIb/IIIa inhibitors	3 (23.1%)	6 (40.0%)	5 (41.7%)	14 (35.0%)	0.546
Post-procedural hospital stay, days	3.38±1.04	3.93±1.16	2.92±1.31	3.45±1.21	0.092

Clinical Outcomes at 1-Year Follow-Up: Clinical outcomes at the 1-year follow-up are detailed in Table 3, stratified by SS, CSS, GRACE, and TIMI scores. In the SS-based stratification, the MACCE rate was higher in the SShigh group (6.3%) compared to SSlow and SSmid groups, though the difference was not statistically significant (p = 0.302). Notably, hospitalization due to angina pectoris was significantly more frequent in the SSlow group (23.5%) compared to other groups (p = 0.010). CSS-based stratification showed a higher MACCE rate in the CSShigh group (17.6%, p = 0.034), suggesting that CSS may be more predictive of MACCE than SS. For GRACE score, high-risk patients exhibited a MACCE rate of 17.6% (p = 0.034).

Table 3: One-Year Clinical Outcomes by SYNTAX, Clinical SYNTAX (CSS), GRACE, and TIMI Scores

Clinical outcomes 1 year since the date of procedural according to SS					
Variable	**SS_{low} ≤18 (17)**	**SS_{mid} >18-27 (20)**	**SS_{high} >27 (16)**	**Total (50)**	**p-value**
MACCE	2 (11.8%)	0	1 (6.3%)	3 (5.7%)	0.302
Target vessel failure	0	0	1 (6.3%)	1 (1.9%)	0.308
Any repeat vascularistion	0	5 (25.0%)	0	5 (9.4%)	0.011
ARC Stent thrombosis	0	2 (10.0%)	0	2 (3.8%)	0.180
Hospitalisation due to AP	4 (23.5%)	0	0	4 (7.5%)	0.010
Cardiac death	0	0	1 (6.3%)	1 (1.9%)	0.308
Clinical outcomes 1 years since the date of procedural according to CSS					
Variable	**CSS_{low} <27.4 (17)**	**CSS_{mid} 27.4-35 (19)**	**CSS^{high} >35 (17)**	**Total (50)**	**p-value**
MACCE	0	0	3 (17.6%)	3 (5.7%)	0.034
Target vessel failure	0	0	1 (5.9%)	1 (1.9%)	0.340
Any repeat vascularistion	1 (5.9%)	2 (10.5%)	2 (11.8%)	5 (9.4%)	0.825
ARC Stent thrombosis	0	2 (10.5%)	0	2 (3.8%)	0.156
Hospitalisation due to AP	0	2 (10.5%)	2 (11.8%)	4 (7.5%)	0.357
Cardiac death	0	0	1 (5.9%)	1 (1.9%)	0.340
Clinical outcomes 1 years since the date of procedural according to GRACE					
Variable	**$GRACE_{low}$<85 (17)**	**$GRACE_{mid}$ 85-112 (19)**	**$GRACE_{high}$ >112 (17)**	**Total (50)**	**p-value**
MACCE	0	0	3 (17.6%)	3 (5.7%)	0.034
Target vessel failure	0	0	1 (5.9%)	1 (1.9%)	0.340
Any repeat vascularistion	2 (11.8%)	1 (5.3%)	2 (11.8%)	5 (9.4%)	0.740
ARC Stent thrombosis	2 (11.8%)	0	0	2 (3.8%)	0.111
Hospitalisation due to AP	0	0	4 (23.5%)	4 (7.5%)	0.010

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Cardiac death	0	0	1 (5.9%)	1 (1.9%)	0.340
Clinical outcomes 1 years since the date of procedural according to TIMI score					
Variable	**$TIMI_{low}$ <5 (17)**	**$TIMI_{mid}$ 5-7 (21)**	**$TIMI_{high}$ >7 (15)**	**Total (50)**	**p-value**
MACCE	0	1 (4.8%)	2 (13.3%)	3 (5.7%)	0.259
Target vessel failure	0	0	1 (5.9%)	1 (6.7%)	0.275
Any repeat vascularistion	1 (5.9%)	1 (4.8%)	3 (20.0%)	5 (9.4%)	0.253
ARC Stent thrombosis	0	0	2 (13.3%)	2 (3.8%)	0.072
Hospitalisation due to AP	0	1 (4.8%)	3 (20.0%)	4 (7.5%)	0.084
Cardiac death	0	0	1 (6.7%)	1 (1.9%)	0.275

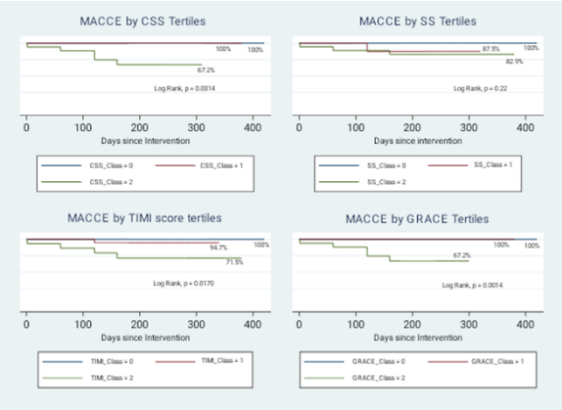

Figure 2: Kaplan-Meier Survival Curves for Major Adverse Cardiovascular Events (MACCE) by SYNTAX, CSS, GRACE, and TIMI Scores

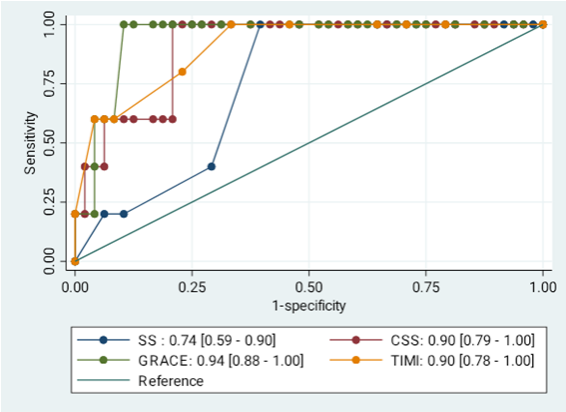

Figure 3: Receiver Operating Characteristic (ROC) Curves for SYNTAX, Clinical SYNTAX, GRACE, and TIMI Scores in Predicting One-Year MACCE

Kaplan-Meier Analysis: The Kaplan-Meier survival analysis [Figure 2] illustrated MACCE-free survival at 1-year follow-up across the different stratification scores. In panel A, patients in the SShigh tertile demonstrated reduced survival rates compared to SSlow, with MACCE-free survival percentages for SShigh, SSmid, and SSlow groups at approximately 93.7%, 100%, and 100%, respectively, though statistical significance was not reached. Panel B, which stratifies by CSS, shows a more pronounced separation: MACCE-free survival for CSShigh, CSSmid, and CSSlow groups was approximately 82.4%, 100%, and 100%, respectively, highlighting CSS's potential for more distinct risk differentiation. Panels C (GRACE) and D (TIMI) similarly show declining survival rates in high-risk tertiles, especially in GRACE high tertile, with MACCE-free survival rates of approximately 82.4%, suggesting that GRACE stratification may also aid in identifying high-risk patients effectively.

ROC Curve Analysis: [Figure 3] displays the ROC curves for SS, CSS, GRACE, and TIMI scores, evaluating each score's ability to predict 1-year adverse clinical outcomes, including MACCE. Both SS and CSS scores had areas under the curve (AUC) above 0.7, indicating moderate predictive accuracy. Specifically, for MACCE, SS achieved an AUC of approximately 0.74, while CSS had an AUC of 0.90. Similarly, AUCs for GRACE and TIMI scores were above the diagnostic indifference threshold, with GRACE showing the highest AUC among the scores, suggesting slightly better predictive utility in this cohort. These results imply that while SS and CSS provide meaningful risk stratification, GRACE may offer superior predictive capability for MACCE in this study population.

DISCUSSION

To predict the outcomes of patients receiving percutaneous coronary intervention (PCI) in India, the study sought to assess the prognostic value of the SYNTAX, Clinical SYNTAX, TIMI, and GRACE scores. Our results indicate that the SYNTAX and Clinical SYNTAX scores are the most reliable indicators of major adverse cardiovascular events (MACE) and mortality, demonstrating the applicability of these well-established risk stratification instruments in an Indian population. While the TIMI and GRACE scores are also predictive, they seem to offer a relatively weaker association compared to the SYNTAX-based scores. Prognostic Value of the SYNTAX Score

ISSN (O): 2687-5365; ISSN (P): 2753-6556

The SYNTAX score, assessing coronary artery disease (CAD) complexity, was found to significantly correlate with adverse outcomes. As shown in our results, patients with higher SYNTAX scores (SS > 26) exhibited a notable increase in major adverse cardiovascular events (MACCE) compared to those with lower scores (p = 0.302). This is consistent with other studies that have demonstrated higher SYNTAX scores as indicators of increased complexity and risk, particularly in multivessel disease, leading to elevated mortality and recurrent ischemia rates.[6,8,9,19] The AUC for SYNTAX in predicting MACCE at one year was 0.74, indicating moderate predictive power for identifying patients at high risk of adverse outcomes post-PCI. This finding consistent with the study by Girasis et.al, supports its application as an important prognostic tool in CAD, particularly when choosing between PCI and coronary artery bypass grafting (CABG) for patients with extensive lesions.[20]

Role of the Clinical SYNTAX Score (CSS): In our study, the Clinical SYNTAX Score (CSS), which incorporates clinical factors such as age and ejection fraction alongside the SYNTAX score, demonstrated improved predictive value compared to the SYNTAX score alone. The CSS showed a stronger association with MACCE, particularly in high-risk patients (CSS > 35), with a statistically significant p-value of 0.034 for MACCE prediction. Our Kaplan-Meier analysis revealed lower MACCE-free survival rates in patients with elevated CSS compared to those with lower CSS, reinforcing the clinical utility of CSS for risk stratification in patients with complex anatomical and clinical presentations.

This finding aligns with previous literature that highlights the superior predictive accuracy of CSS over SYNTAX alone, especially in populations with high-risk features such as diabetes mellitus and impaired ejection fraction.[21,22] The AUC for CSS in predicting one-year MACCE was 0.90, emphasizing its role in improving prognostic accuracy beyond anatomical complexity by integrating clinical factors.

TIMI and GRACE Scores in Acute Coronary Syndromes (ACS): The TIMI and GRACE scores, commonly applied in ACS risk assessment, showed distinct prognostic value in our study. The GRACE score, with an AUC of 0.94, exhibited the highest predictive accuracy for MACCE among all scores evaluated. Kaplan-Meier survival curves further illustrated that patients with high GRACE scores (>112) had significantly poorer outcomes (p = 0.0014). This finding supports existing evidence that the GRACE score is a powerful predictor of both short-term and long-term mortality in ACS populations, with its utility extending to PCI populations where long-term prognosis is crucial.[17] Conversely, the TIMI score, which is often employed for early risk stratification in ACS, demonstrated moderate predictive ability with an AUC of 0.90 in our study. It was also effective in predicting short-term adverse events, as Kaplan-Meier analysis showed a significantly poor prognosis with increasing scores (p= 0.0170). This aligns with studies that note the TIMI score's utility in early management decisions but relatively limited long-term prognostic power in stable PCI patients compared to GRACE.[16]

Implications for Clinical Practice: The study findings highlight the complementary roles of SYNTAX, CSS, GRACE, and TIMI scores in CAD and ACS management. The SYNTAX score's utility in assessing lesion complexity makes it valuable for guiding revascularization strategies, especially in PCI vs. CABG decisions for multivessel disease. CSS, on the other hand, provides a holistic assessment by integrating clinical parameters, enhancing the accuracy of patient-specific risk stratification. For ACS patients, the GRACE score proved to be the most reliable tool in our cohort, providing robust long-term prognostic insights, while the TIMI score is useful for initial risk assessment and short-term management decisions in high-risk ACS patients.

In clinical practice, the use of multiple scores may facilitate personalized treatment strategies by combining the unique strengths of each tool. For example, SYNTAX and CSS are beneficial in evaluating CAD complexity and determining eligibility for PCI, while GRACE and TIMI scores are effective for stratifying ACS risk and guiding follow-up care. This multi-score approach may optimize outcomes by allowing for a targeted and individualized therapeutic plan for each patient.

Limitations

This study has several limitations. As a single-center study, our findings may lack generalizability to broader, diverse populations. The sample size is relatively small, which could influence the statistical power for certain outcomes, particularly for subgroup analyses. Future studies with larger, multicenter populations and prospective data collection would provide further validation for these findings. The predictive value of the clinical scores improved by combining them.

CONCLUSION

Comparing the clinical score with that of the syntax score has given a clear perspective that the clinical scores eventhough predict the prognosis promptly, the syntax score which includes the angiographic profile, procedural and post procedural characteristics, has better profile in predicting the prognosis of the patient. The clinical scores when combined together showed improved predictive value in assessing the prognosis of the patient. However, syntax score is better in tertiary care centre in assessing the prognosis following Acute Coronary Syndrome when combined with the clinical score.

REFERENCES

1. Giovanni A, Enrico A, Aime B, Michael B, Marianne B, Jonathan C, Josef C, Michael C, Nicole D, Sophia EB,

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Joaquim FS. Global Burden of cardiovascular diseases and risk factors, 1990–2019: update from the GBD 2019 study. Journal of the American College of Cardiology. 2020 Dec 22;76(25):2982-3021.
2. Roth GA, Abate D, Abate KH, Abay SM, Abbafati C, Abbasi N, Abbastabar H, Abd-Allah F, Abdela J, Abdelalim A, Abdollahpour I. Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980–2017: a systematic analysis for the Global Burden of Disease Study 2017. The lancet. 2018 Nov 10;392(10159):1736-88.
3. Neumann FJ, Sousa-Uva M, Ahlsson A, Alfonso F, Banning AP, Benedetto U, Byrne RA, Collet JP, Falk V, Head SJ, Jüni P. 2018 ESC/EACTS Guidelines on myocardial revascularization. European heart journal. 2019 Jan 7;40(2):87-165.
4. Bangalore S, Guo Y, Samadashvili Z, Blecker S, Xu J, Hannan EL. Everolimus-eluting stents or bypass surgery for multivessel coronary disease. New England Journal of Medicine. 2015 Mar 26;372(13):1213-22
5. Farooq V, Serruys PW, Bourantas CV, Zhang Y, Muramatsu T, Feldman T, Holmes DR, Mack M, Morice MC, Ståhle E, Colombo A. Quantification of incomplete revascularization and its association with five-year mortality in the synergy between percutaneous coronary intervention with taxus and cardiac surgery (SYNTAX) trial validation of the residual SYNTAX score. Circulation. 2013 Jul 9;128(2):141-51.
6. Sianos G, Morel MA, Kappetein AP, Morice MC, Colombo A, Dawkins K, van den Brand M, Van Dyck N, Russell ME, Mohr FW, Serruys PW. The SYNTAX Score: an angiographic tool grading the complexity of coronary artery disease. EuroIntervention. 2005 Aug 1;1(2):219-27.
7. Mohr FW, Morice MC, Kappetein AP, Feldman TE, Ståhle E, Colombo A, Mack MJ, Holmes DR, Morel MA, Van Dyck N, Houle VM. Coronary artery bypass graft surgery versus percutaneous coronary intervention in patients with three-vessel disease and left main coronary disease: 5-year follow-up of the randomised, clinical SYNTAX trial. The lancet. 2013 Feb 23;381(9867):629-38.
8. Serruys PW, Onuma Y, Garg S, Sarno G, van den Brand M, Kappetein AP, Van Dyck N, Mack M, Holmes D, Feldman T, Morice MC. Assessment of the SYNTAX score in the Syntax study. EuroIntervention. 2009 May 1;5(1):50-6.
9. Capodanno D, Di Salvo ME, Cincotta G, Miano M, Tamburino C, Tamburino C. Usefulness of the SYNTAX score for predicting clinical outcome after percutaneous coronary intervention of unprotected left main coronary artery disease. Circulation: cardiovascular interventions. 2009 Aug;2(4):302-8.
10. Serruys PW, Farooq V, Vranckx P, Girasis C, Brugaletta S, Garcia-Garcia HM, Holmes DR, Kappetein AP, Mack MJ, Feldman T, Morice MC. A global risk approach to identify patients with left main or 3-vessel disease who could safely and efficaciously be treated with percutaneous coronary intervention: the SYNTAX Trial at 3 years. JACC: Cardiovascular Interventions. 2012 Jun;5(6):606-17.
11. Morrow DA, Antman EM, Charlesworth A, Cairns R, Murphy SA, de Lemos JA, Giugliano RP, McCabe CH, Braunwald E. TIMI risk score for ST-elevation myocardial infarction: a convenient, bedside, clinical score for risk assessment at presentation: an intravenous nPA for treatment of infarcting myocardium early II trial substudy. Circulation. 2000 Oct 24;102(17):2031-7.
12. Fox KA, Dabbous OH, Goldberg RJ, Pieper KS, Eagle KA, Van de Werf F, Avezum Á, Goodman SG, Flather MD, Anderson FA, Granger CB. Prediction of risk of death and myocardial infarction in the six months after presentation with acute coronary syndrome: prospective multinational observational study (GRACE). bmj. 2006 Nov 23;333(7578):1091.
13. Collet C, Capodanno D, Onuma Y, Banning A, Stone GW, Taggart DP, Sabik J, Serruys PW. Left main coronary artery disease: pathophysiology, diagnosis, and treatment. Nature Reviews Cardiology. 2018 Jun;15(6):321-31.
14. Sharma M, Ganguly NK. Premature coronary artery disease in Indians and its associated risk factors. Vascular health and risk management. 2005 Sep 30;1(3):217-25.
15. Gupta R, Wood DA. Primary prevention of ischaemic heart disease: populations, individuals, and health professionals. The Lancet. 2019 Aug 24;394(10199):685-96.
16. Antman EM, Cohen M, Bernink PJ, McCabe CH, Horacek T, Papuchis G, Mautner B, Corbalan R, Radley D, Braunwald E. The TIMI risk score for unstable angina/non–ST elevation MI: a method for prognostication and therapeutic decision making. Jama. 2000 Aug 16;284(7):835-42.
17. Eagle KA, Lim MJ, Dabbous OH, Pieper KS, Goldberg RJ, Van de Werf F, Goodman SG, Granger CB, Steg PG, Gore JM, Budaj A. A validated prediction model for all forms of acute coronary syndrome: estimating the risk of 6-month postdischarge death in an international registry. Jama. 2004 Jun 9;291(22):2727-33.
18. Granger CB, Goldberg RJ, Dabbous O, Pieper KS, Eagle KA, Cannon CP, Van de Werf F, Avezum A, Goodman SG, Flather MD, Fox KA. Predictors of hospital mortality in the global registry of acute coronary events. Archives of internal medicine. 2003 Oct 27;163(19):2345-53.
19. Valgimigli M, Serruys PW, Tsuchida K, Vaina S, Morel MA, van den Brand MJ, Colombo A, Morice MC, Dawkins K, de Bruyne B, Kornowski R. Cyphering the complexity of coronary artery disease using the syntax score to predict clinical outcome in patients with three-vessel lumen obstruction undergoing percutaneous coronary intervention. The American journal of cardiology. 2007 Apr 15;99(8):1072-81.
20. Girasis C, Garg S, Räber L, Sarno G, Morel MA, Garcia-Garcia HM, Lüscher TF, Serruys PW, Windecker S. SYNTAX score and Clinical SYNTAX score as predictors of very long-term clinical outcomes in patients undergoing percutaneous coronary interventions: a substudy of SIRolimus-eluting stent compared with pacliTAXel-eluting stent for coronary revascularization (SIRTAX) trial. European heart journal. 2011 Dec 1;32(24):3115-27.
21. Garg S, Serruys PW, Silber S, Wykrzykowska J, van Geuns RJ, Richardt G, Buszman PE, Kelbæk H, van Boven AJ, Hofma SH, Linke A. The prognostic utility of the SYNTAX score on 1-year outcomes after revascularization with zotarolimus-and everolimus-eluting stents: a substudy of the RESOLUTE All Comers Trial. JACC: Cardiovascular Interventions. 2011 Apr;4(4):432-41.
22. Brener SJ, Prasad AJ, Abdula R, Sacchi TJ. Relationship between the angiographically derived SYNTAX score and outcomes in high-risk patients undergoing percutaneous coronary intervention. The Journal of Invasive Cardiology. 2011 Feb 1;23(2):66-9.

ISSN (O): 2687-5365; ISSN (P): 2753-6556