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# Prognostic Value of SYNTAX Score in Patients with Infarct-related Cardiogenic Shock: Insights from the CULPRIT-SHOCK Trial

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**ABSTRACT**
**Objective:** To evaluate the prognostic value of the SYNTAX scores (SS) in patients undergoing percutaneous coronary intervention (PCI) for multivessel coronary disease with infarct-related cardiogenic shock (CS).
**Background:** The prognostic value of the SYNTAX scores (SS) in this high-risk setting remains unclear.
**Methods**: The CULPRIT-SHOCK trial was an international, open-label trial, where patients presenting with infarct-related CS and multivessel disease were randomized to a culprit-lesion-only or an immediate multivessel PCI strategy. Baseline SS was assessed by a central core laboratory and categorized as low SS (SS $\leq$22), intermediate SS (22<SS$\leq$32) and high SS (SS>32). Adjudicated endpoints of interest were the 30-day risk of death or renal replacement therapy (RRT) and 1-year death. Associations between baseline SS and outcomes were assessed using multivariate logistic regression.
**Results:** Pre-PCI SS was available in 624 patients, of whom 263 (42.1%), 207 (33.2%) and 154 (24.7%) presented with low, intermediate and high SS, respectively. A stepwise increase in the incidence of adverse events was observed from low to intermediate and high SS for the 30-day risk of death or RRT and the 1-year risk of death (p<0.001, for all). After multiple adjustments, intermediate and high SS remained strongly associated with 30-day risk of death or renal replacement therapy and 1-year risk of all-cause death. There was no significant interaction between SYNTAX score and the coronary revascularization strategy for any outcomes.
**Conclusion:** In patients presenting with multivessel disease and infarct-related CS, the SYNTAX score was strongly associated with 30-day death or RRT and 1-year mortality.

**KEY WORDS**: cardiogenic shock; percutaneous coronary intervention; SYNTAX score

**CONDENSED ABSTRACT**
We evaluated the prognosis value of angiographic core laboratory calculated baseline SYNTAX score (SS) in patients undergoing percutaneous coronary intervention (PCI) for multivessel coronary disease with infarct-related cardiogenic shock (CS) in the CULPRIT SHOCK trial. Of the 624 included patients, a low, intermediate and high SS was present in 263 (42.1%), 207 (33.2%) and 154 (24.7%) patients, respectively. After multiple adjustments, intermediate and high SS remained strongly associated with 30-day risk of death or renal replacement therapy and 1-year risk of all-cause death. There was no significant interaction between SS and the coronary revascularization strategy for any outcomes.

**ABBREVIATIONS AND ACRONYMS**
CI: Confidence interval
CS: Cardiogenic shock
CULPRIT-SHOCK: Culprit Lesion Only PCI versus Multivessel PCI in Cardiogenic Shock
MI: Myocardial infarction
OR: Odds Ratio
PCI: Percutaneous coronary intervention
SS: SYNergy between PCI with TAXUS and Cardiac Surgery (SYNTAX) score

## INTRODUCTION

The SYNergy between PCI with TAXUS and Cardiac Surgery (SYNTAX) score was created, more than a decade ago, to provide an angiographic tool grading the complexity of coronary artery disease in patient with left main (LM) or multivessel disease (1). In such patients, the value of SYNTAX score has become an essential element for the decision between revascularization options by the heart team (2). Moreover, in patients undergoing percutaneous coronary intervention (PCI), the SYNTAX score has been found to be an independent predictor of long-term major adverse cardiac and cerebrovascular events and death, in all-comers as in higher-risk patients presenting with acute coronary syndrome (3–9). Cardiogenic shock (CS) is a dreaded complication of acute myocardial infarction (MI) burdened with a high morbidity and mortality (10–12). The vast majority of patients presenting with infarct-related CS have multivessel coronary artery disease (13). There is, however, limited evidence on the prognostic impact of the SYNTAX score in this setting (14). Therefore, the purpose of this prespecified analysis was to investigate the association between baseline SYNTAX score and outcomes in patients randomized in the Culprit Lesion Only PCI versus Multivessel PCI in Cardiogenic Shock (CULPRIT-SHOCK) trial.

## METHODS

**Study design and study population.** The design of the CULPRIT-SHOCK trial has been previously described (15–17). Briefly, the CULPRIT-SHOCK trial was an investigator-initiated, international, multicenter, open-label trial where patients presenting with acute infarct-related CS and multivessel coronary artery disease were randomized, in a 1:1 ratio, to a strategy of culprit-lesion-only PCI (with optional staged revascularization) or immediate multivessel PCI. In all patients, the culprit lesion was treated first with the use of standard PCI techniques and with recommended use of drug-eluting stents. In the culprit-lesion-only group, staged revascularization was performed according to the patient clinical status and the presence of residual ischemia. In the multivessel PCI group, any >70% stenosis of major coronary arteries (i.e. ≥2 mm diameter), including chronic total occlusion, were recommended to be treated with immediate PCI following the treatment of the culprit lesion with a recommended maximum dose of contrast material of 300 mL. For the purpose of the prespecified analysis, all angiographic analyses were performed by a central angiographic core laboratory (ACTION-Coeur, Pitié-Salpêtrière Hospital, Paris, France) (13). Baseline SYNTAX score was calculated by consensus of two trained readers and categorized as previously described as low (≤22), intermediate (22<SYNTAX score<32) or high (≥33) (2, 13). In case of disagreement, the opinion of a third reviewer, and if necessary, a fourth reviewer was obtained and the final decision was achieved by consensus. The investigation was approved by the ethic committee or institutional review board of each participating center and written informed consent was obtained with the use of a prespecified process that varied slightly according to the country (15).

**Study endpoints.** The endpoints of interest were the composite of all-cause death or severe renal failure leading to renal-replacement therapy within 30 days after randomization, all-cause mortality and the composite of all-cause mortality, MI or stroke within 30 days and

1 year after randomization. Events were defined as previously reported and adjudicated by an independent clinical event committee (13, 15, 16). Specific follow-up was performed at 30 days, 6 months and 1 year by means of structured telephone interview, with any potential endpoint events verified by review of original records. Death registries were searched to identify or confirm all deaths.

**Statistical analysis**

Categorical variables were described as proportion and compared with Chi-square test or Fisher's exact test. Continuous variables were described as median (Q1-Q3) and compared using the Kruskal-Wallis test. As previously published, event rates were compared using Chi-square testing (15, 16). Kaplan-Meier curves were also used to show event rates over time with classification according to the baseline SYNTAX score and compared using long-rank test. Patients without event were censored at 30 days or 1 year according to the endpoint. Multivariate logistic regression models were used to evaluate the independent association between SYNTAX score (low SYNTAX score was used as the reference group) and outcomes. In each model, SYNTAX score was adjusted on baseline clinical and procedural characteristics possibly associated with outcomes in univariate analysis ($p<0.2$) and are detailed in **Online Table 1** and **2**. Sensitivity analyses were performed for each outcome, adjusting baseline SYNTAX score on consistent covariates as well as the effective revascularization strategy undergone by the patients to account for crossover among the groups of randomization. Results are interpreted in term of adjusted Odd Ratio (aOR) with their 95% confidence interval (95%CI). Interaction between baseline SYNTAX score, and revascularization strategy (randomization group) was evaluated for each outcome using logistic regression. A p-value $<0.05$ was considered significant unless otherwise specified. All statistical analyses were performed with SAS release 9.4 (SAS Institute Inc, Cary, NC) statistical software package.

## RESULTS

**Baseline and procedural characteristics.** A central core-laboratory evaluation of the baseline SYNTAX score was available in 624 (91.0%) of the 686 randomized patients with available informed consent. Baseline and procedural characteristics of patients with and without available SYNTAX score are detailed in **Online Table 3 and 4**. A low, intermediate and high SYNTAX score was present in 263 (42.1%; 95% CI [38.3-46.1]), 207 (33.2%%; 95% CI [29.6-37.0]) and 154 (24.7%%; 95% CI [21.5-28.2]) patients respectively. Baseline and procedural characteristics are detailed in **Table 1 and 2**. Patients with higher SYNTAX score were older, with more frequent peripheral artery disease and higher use of catecholamine or need for mechanical support. There were no differences between the groups in regard to discharge medication.

**Associations of baseline SYNTAX score with outcomes**. Median duration of follow-up for outcomes was 136.5 [2.0-365.0] days and one patient was lost to follow-up at one year. The 30-day and 1-year outcomes according to the baseline SYNTAX score are detailed in **Table 3** and **Figure 1 and 2**. In univariate analysis, a stepwise increase in the incidence of adverse events transitioning from low to intermediate and high SYNTAX score was observed with the 30-day rates of death, death or renal replacement therapy and death, MI or stroke. A consistent stepwise increase with higher baseline SYNTAX score was observed with 1-year rates of death and death, MI or stroke. After adjustment, results remained consistent with a stepwise increase of the risk of death, death or renal replacement therapy and the composite of death, MI or stroke at 30 days, as well as the 1-year risk of death and 1-year risk of death or MI or stroke with increasing SYNTAX score categories (**Figure 3**).

**Sensitivity analysis and interaction test**. Results remained consistent when adjusted for the effective revascularization strategy (**Online Figure 1**). No significant interaction were

observed between the baseline SYNTAX score value and the coronary revascularization strategy for all-cause death or renal replacement therapy at 30 days (p=0.61), renal replacement therapy at 30 days (p=0.47), all-cause death at 30 days and 1 year (p=0.72 and p=0.34, respectively), and the composite of all-cause death, MI or stroke at 30 days and 1-year (p=0.76 and p=0.39, respectively), as detailed in the Online Figure 2.

## DISCUSSION

The main results of the present study are as follows: in patients with infarct-related MI and multivessel disease undergoing PCI, baseline SYNTAX score is strongly associated with 30-day and 1-year all-cause death, all-cause death or renal replacement therapy and all-cause death, MI or stroke. There was no significant interaction between the baseline SYNTAX score and the coronary revascularization strategy for any of these outcomes.

Initially designed prospectively as an angiographic scoring system to evaluate the complexity of coronary artery disease, the SYNTAX score has also been validated as a prognosis tool for the risk of ischemic outcomes following PCI. In fact, the baseline SYNTAX score has been found to predict mortality in patient undergoing PCI in the setting of both chronic and acute coronary syndromes (5, 8, 18). The present study extends this finding to CS patients as the baseline SYNTAX score is strongly associated with all ischemic outcomes at both 30 days and 1 year (19, 20). There is only limited available data regarding the evaluation of the SYNTAX score in patients undergoing PCI in the setting of acute MI-related CS. Previous to our study, a prospective European observational study also reported baseline SYNTAX score to be independently associated with 90-day mortality (14). However, the study was limited by a small sample size and the relatively short duration of follow-up of 90 days.

Another interesting finding of our study is the strong association between the baseline SYNTAX score and renal replacement therapy. In a post-hoc analysis of the Acute Catheterization and Urgent Intervention Triage Strategy (ACUITY) trial, baseline SYNTAX score was reported to be independently associated with the risk of acute kidney injury following PCI (21). Higher baseline SYNTAX score is equivalent to more complex coronary artery disease, which may require longer procedure time, resulting in higher dose of contrast media or increased risk of periprocedural complications, thus potentially increasing the risk of acute kidney injury with or without the need for renal replacement therapy (22). In the present analysis, the duration of fluoroscopy and the total dose of contrast media were, in fact, increased in patients with the highest SYNTAX scores. However, we did not find an incremental risk of renal replacement therapy associated with increased SYNTAX score, conversely to other ischemic endpoints, suggesting that the dose of contrast media may only be one of several factors involved in this association. There is an association between the complexity of coronary artery disease, as estimated by the SYNTAX score, and the extent of atherosclerosis of other arterial beds (22–25). Thus, it is plausible that patients presenting with higher baseline SYNTAX scores may also present with more severe atherosclerosis of the aorta or renal arteries, resulting in higher rates of acute kidney injury, particularly in the setting of CS (26, 27).

The CULPRIT-SHOCK trial reported that a strategy of culprit-lesion-only PCI, compared to a multivessel PCI strategy, was associated with a reduction of the composite of death or renal replacement therapy at 30 days. In the present analysis, no significant interaction was present between baseline SYNTAX score and the revascularization strategy for any adverse outcomes. These results suggest that the choice of coronary revascularization strategy in patients with multivessel disease and infarct-related CS undergoing PCI should not

depend on the complexity of coronary artery disease, as evaluated by the SYNTAX score and that a culprit-lesion-only PCI should remain the preferred strategy.

We acknowledge several limitations to our study. First, baseline SYNTAX score was not available for all the patients randomized in the CULPRIT-SHOCK trial. Second, the present substudy was limited to the prognostic value of baseline SYNTAX score and did not include more updated and complete version of the score such as the logistic clinical SYNTAX score or SYNTAX score II, nor did it evaluate the prognosis value of the residual SYNTAX score, which would warrant further studies on these associated scores (28–31).

## CONCLUSION

In patients with multivessel coronary artery disease and infarct-related CS undergoing PCI, baseline SYNTAX score is strongly associated with early and late adverse outcomes. The coronary revascularization strategy in this setting should not depend on the complexity or extent of the baseline coronary artery disease.

## PERSPECTIVES

### WHAT IS KNOWN?

SYNTAX score has been found to be an independent predictor of long-term major adverse cardiac and cerebrovascular events and death in patients undergoing percutaneous coronary intervention (PCI).

### WHAT IS NEW?

In this prespecified subanalysis of the CULPRIT SHOCK trial, higher baseline SYNTAX score was strongly associated with early and late adverse outcomes in patients undergoing PCI for infarct-related cardiogenic shock with multivessel disease. The absence of significant interaction between baseline SYNTAX score, the revascularization strategy and any adverse outcomes suggests that a culprit lesion PCI only should remained the preferred strategy in this setting.

**WHAT IS NEXT?**

Future study evaluating the prognosis impact of more complete version of the score such as logistic clinical SYNTAX score or SYNTAX score II are warranted.

**REFERENCES**

1. Sianos G, Morel M-A, Kappetein AP, et al. The SYNTAX Score: an angiographic tool grading the complexity of coronary artery disease. EuroIntervention J. Eur. Collab. Work. Group Interv. Cardiol. Eur. Soc. Cardiol. 2005;1:219–227.

2. Neumann F-J, Sousa-Uva M, Ahlsson A, et al. 2018 ESC/EACTS Guidelines on myocardial revascularization. Eur. Heart J. 2019;40:87–165.

3. Kim Y-H, Park D-W, Kim W-J, et al. Validation of SYNTAX (Synergy between PCI with Taxus and Cardiac Surgery) score for prediction of outcomes after unprotected left main coronary revascularization. JACC Cardiovasc. Interv. 2010;3:612–623.

4. Palmerini T, Genereux P, Caixeta A, et al. Prognostic value of the SYNTAX score in patients with acute coronary syndromes undergoing percutaneous coronary intervention: analysis from the ACUITY (Acute Catheterization and Urgent Intervention Triage StrategY) trial. J. Am. Coll. Cardiol. 2011;57:2389–2397.

5. Garg S, Serruys PW, Silber S, et al. 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 Cardiovasc. Interv. 2011;4:432–441.

6. Capodanno D, Caggegi A, Miano M, et al. Global risk classification and clinical SYNTAX (synergy between percutaneous coronary intervention with TAXUS and cardiac surgery) score in patients undergoing percutaneous or surgical left main revascularization. JACC Cardiovasc. Interv. 2011;4:287–297.

7. De Servi S, Crimi G, Calabrò P, et al. Relationship between diabetes, platelet reactivity, and the SYNTAX score to one-year clinical outcome in patients with non-ST-segment elevation acute coronary syndrome undergoing percutaneous coronary intervention.

EuroIntervention J. Eur. Collab. Work. Group Interv. Cardiol. Eur. Soc. Cardiol. 2016;12:312–318.

8. Wykrzykowska JJ, Garg S, Girasis C, et al. Value of the SYNTAX score for risk assessment in the all-comers population of the randomized multicenter LEADERS (Limus Eluted from A Durable versus ERodable Stent coating) trial. J. Am. Coll. Cardiol. 2010;56:272–277.

9. Yadav M, Palmerini T, Caixeta A, et al. Prediction of coronary risk by SYNTAX and derived scores: synergy between percutaneous coronary intervention with taxus and cardiac surgery. J. Am. Coll. Cardiol. 2013;62:1219–1230.

10. Wayangankar SA, Bangalore S, McCoy LA, et al. Temporal Trends and Outcomes of Patients Undergoing Percutaneous Coronary Interventions for Cardiogenic Shock in the Setting of Acute Myocardial Infarction: A Report From the CathPCI Registry. JACC Cardiovasc. Interv. 2016;9:341–351.

11. Dangas G, Guedeney P. Prediction, staging, and outcomes of ischaemic cardiogenic shock after STEMI: a complex clinical interplay. Eur. Heart J. 2018;39:2103–2105.

12. Zeymer U, Hochadel M, Karcher A-K, et al. Procedural Success Rates and Mortality in Elderly Patients With Percutaneous Coronary Intervention for Cardiogenic Shock. JACC Cardiovasc. Interv. 2019;12:1853–1859.

13. Thiele H, Desch S, Piek JJ, et al. Multivessel versus culprit lesion only percutaneous revascularization plus potential staged revascularization in patients with acute myocardial infarction complicated by cardiogenic shock: Design and rationale of CULPRIT-SHOCK trial. Am. Heart J. 2016;172:160–169.

14. Javanainen T, Sans-Roselló J, Harjola V-P, et al. Prognostic impact of baseline and residual SYNTAX scores in cardiogenic shock. Catheter. Cardiovasc. Interv. Off. J. Soc. Card. Angiogr. Interv. 2019;93:1–8.

15. Thiele H, Akin I, Sandri M, et al. PCI Strategies in Patients with Acute Myocardial Infarction and Cardiogenic Shock. N. Engl. J. Med. 2017;377:2419–2432.

16. Thiele H, Akin I, Sandri M, et al. One-Year Outcomes after PCI Strategies in Cardiogenic Shock. N. Engl. J. Med. 2018;379:1699–1710.

17. Zeitouni M, Barthélémy O, Hauguel-Moreau M, et al. Investigator Versus Core Laboratory Evaluation of Coronary Flow and Related Mortality in the CULPRIT-SHOCK Trial. Circ. Cardiovasc. Interv. 2019;12:e008296.

18. Holmes DR, Taggart DP. Revascularization in stable coronary artery disease: a combined perspective from an interventional cardiologist and a cardiac surgeon. Eur. Heart J. 2016;37:1873–1882.

19. Mohr FW, Morice M-C, Kappetein AP, et al. 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. Lancet Lond. Engl. 2013;381:629–638.

20. Head SJ, Holmes DR, Mack MJ, et al. Risk profile and 3-year outcomes from the SYNTAX percutaneous coronary intervention and coronary artery bypass grafting nested registries. JACC Cardiovasc. Interv. 2012;5:618–625.

21. Madhavan MV, Généreux P, Rubin J, et al. Usefulness of the SYNTAX score to predict acute kidney injury after percutaneous coronary intervention (from the Acute Catheterization and Urgent Intervention Triage Strategy Trial). Am. J. Cardiol. 2014;113:1331–1337.

22. Guedeney P, Sorrentino S, Vogel B, Baber U, Claessen BE, Mehran R. Assessing and minimizing the risk of percutaneous coronary intervention in patients with chronic kidney disease. Expert Rev. Cardiovasc. Ther. 2018;16:825–835.

23. Dumaine RL, Montalescot G, Steg PG, et al. Renal function, atherothrombosis extent, and outcomes in high-risk patients. Am. Heart J. 2009;158:141-148.e1.

24. Yammine M, Itagaki S, Pawale A, Toyoda N, Reddy RC. SYNTAX score may predict the severity of atherosclerosis of the ascending aorta. J. Thorac. Dis. 2017;9:3859–3865.

25. Ikeda N, Kogame N, Iijima R, Nakamura M, Sugi K. Carotid artery intima-media thickness and plaque score can predict the SYNTAX score. Eur. Heart J. 2012;33:113–119.

26. Bartholomew BA, Harjai KJ, Dukkipati S, et al. Impact of nephropathy after percutaneous coronary intervention and a method for risk stratification. Am. J. Cardiol. 2004;93:1515–1519.

27. Sarnak MJ, Amann K, Bangalore S, et al. Chronic Kidney Disease and Coronary Artery Disease: JACC State-of-the-Art Review. J. Am. Coll. Cardiol. 2019;74:1823–1838.

28. Chichareon P, Onuma Y, van Klaveren D, et al. Validation of the updated logistic clinical SYNTAX score for all-cause mortality in the GLOBAL LEADERS trial. EuroIntervention J. Eur. Collab. Work. Group Interv. Cardiol. Eur. Soc. Cardiol. 2019;15:e539–e546.

29. Serruys PW, Kogame N, Katagiri Y, et al. Clinical outcomes of state-of-the-art percutaneous coronary revascularisation in patients with three-vessel disease: two-year

follow-up of the SYNTAX II study. EuroIntervention J. Eur. Collab. Work. Group Interv. Cardiol. Eur. Soc. Cardiol. 2019;15:e244–e252.

30. Iqbal J, Vergouwe Y, Bourantas CV, et al. Predicting 3-year mortality after percutaneous coronary intervention: updated logistic clinical SYNTAX score based on patient-level data from 7 contemporary stent trials. JACC Cardiovasc. Interv. 2014;7:464–470.

31. Xu B, Généreux P, Yang Y, et al. Validation and comparison of the long-term prognostic capability of the SYNTAX score-II among 1,528 consecutive patients who underwent left main percutaneous coronary intervention. JACC Cardiovasc. Interv. 2014;7:1128–1137.

## FIGURE LEGENDS

**Figure 1. Kaplan-Meier curves of survival without adverse events within 30-days of randomization according to baseline SYNTAX score category: all-cause death or renal replacement therapy (A), all-cause death, myocardial infarction or stroke (B) and all-cause death (C).**

No: number

**Figure 2. Kaplan-Meier curves of survival without adverse event within 1-year of randomization according to the baseline SYNTAX score: all-cause death, myocardial infarction or stroke (A), all-cause death (B).**

No: Number

**Central Illustration. Association of SYNTAX score with 30-day and one-year outcomes after multivariable adjustment**

RRT: renal replacement therapy; MI: myocardial infarction; aOR: Adjusted odd ratio; CI: confidence interval;. Covariables of adjustment for each outcome are detailed in Online Table 1 and 2

**Table 1. Baseline characteristics**

| | Total (n=624) | Low SS (n=263) | Intermediate SS (n=207) | High SS (n=154) | p-value |
|---|---|---|---|---|---|
| Age, years | 69.0 (60.0-78.0) | 67.0 (58.0-76.0) | 69.0 (60.0-78.0) | 71.0 (63.0-79.0) | 0.01 |
| Male sex | 475/624 (76.1%) | 195/263 (74.1%) | 158/207 (76.3%) | 122/154 (79.2%) | 0.50 |
| Body mass index | 26.6 (24.5-29.4) | 26.3 (24.5-29.4) | 27.1 (24.5-29.4) | 26.8 (24.6-29.4) | 0.83 |
| *Cardiovascular risk factors* | | | | | |
| Current smoking | 163/600 (27.2%) | 80/256 (31.3%) | 54/196 (27.6%) | 29/148 (19.6%) | 0.04 |
| Hypertension | 363/613 (59.2%) | 144/260 (55.4%) | 128/203 (63.1%) | 91/150 (60.7%) | 0.23 |
| Hypercholesterolemia | 197/610 (32.3%) | 76/260 (29.2%) | 71/200 (35.5%) | 50/150 (33.3%) | 0.35 |
| Diabetes mellitus | 189/611 (30.9%) | 71/260 (27.3%) | 63/200 (31.5%) | 55/151 (36.4%) | 0.15 |
| Previous myocardial infarction | 93/614 (15.1%) | 33/259 (12.7%) | 28/204 (13.7%) | 32/151 (21.2%) | 0.06 |
| Previous stroke | 40/615 (6.5%) | 13/261 (5.0%) | 11/203 (5.4%) | 16/151 (10.6%) | 0.06 |
| Known peripheral artery disease | 70/616 (11.4%) | 23/261 (8.8%) | 22/204 (10.8%) | 25/151 (16.6%) | 0.06 |
| Known renal insufficiency | 40/615 (6.5%) | 19/261 (7.3%) | 11/204 (5.4%) | 10/150 (6.7%) | 0.71 |
| Previous percutaneous coronary intervention | 101/614 (16.4%) | 39/259 (15.1%) | 35/204 (17.2%) | 27/151 (17.9%) | 0.72 |
| Resuscitation before randomization | 330/623 (53.0%) | 152/263 (57.8%) | 105/207 (50.7%) | 73/153 (47.7%) | 0.10 |
| Fibrinolysis before randomization | 32/622 (5.1%) | 15/262 (5.7%) | 10/207 (4.8%) | 7/153 (4.6%) | 0.85 |
| Arterial lactate > 2 mmol/L | 400/607 (65.9%) | 162/259 (62.5%) | 134/198 (67.7%) | 104/150 (69.3%) | 0.31 |
| Anterior ST-segment elevation myocardial infarction | 207/601 (34.4%) | 70/253 (27.7%) | 81/200 (40.5%) | 56/148 (37.8%) | 0.01 |
| Systolic blood pressure, mmHg | 100.0 (85.0-125.0) | 100.5 (86.0-125.5) | 100.0 (85.0-126.0) | 100.0 (80.0-120.0) | 0.70 |
| Diastolic blood pressure, mmHg | 60.0 (50.0-80.0) | 60.0 (50.0-80.0) | 60.0 (50.5-80.0) | 62.0 (50.0-80.0) | 0.73 |
| Mean blood pressure, mmHg | 76.0 (63.3-93.3) | 76.7 (63.3-92.3) | 73.8 (63.3-95.0) | 76.2 (62.3-93.3) | 0.69 |
| Use of catecholamine | 558/621 (89.9%) | 230/262 (87.8%) | 183/206 (88.8%) | 145/153 (94.8%) | 0.06 |
| Duration of catecholamine, days | 2.0 (1.0-5.0) | 2.0 (1.0-4.5) | 2.0 (1.0-6.0) | 2.0 (1.0-5.0) | 0.36 |
| Number of affected vessels | | | | | <0.001 |
| 1 | 5/624 (0.8%) | 4/263 (1.5%) | 1/207 (0.5%) | 0 | |
| 2 | 231/624 (37.0%) | 141/263 (53.6%) | 69/207 (33.3%) | 21/154 (13.6%) | |
| 3 | 388/624 (62.2%) | 118/263 (44.9%) | 137/207 (66.2%) | 133/154 (86.4%) | |
| Vessel related to the infarction* | | | | | <0.001 |

| | | | | | |
|---|---|---|---|---|---|
| Left anterior descending artery | 270/624 (43.3%) | 92/263 (35.0%) | 109/207 (52.7%) | 69/154 (44.8%) | |
| Left circumflex artery | 129/624 (20.7%) | 58/263 (22.1%) | 42/207 (20.3%) | 29/154 (18.8%) | |
| Right coronary artery | 173/624 (27.7%) | 104/263 (39.5%) | 40/207 (19.3%) | 29/154 (18.8%) | |
| Left main artery | 52/624 (8.3%) | 9/263 (3.4%) | 16/207 (7.7%) | 27/154 (17.5%) | |
| ≥1 Chronic total occlusion* | 134/624 (21.5%) | 21/263 (8.0%) | 39/207 (18.8%) | 74/154 (51.9%) | <0.001 |
| SS* | 25.0 (17.5-32.0) | 16.0 (12.5-19.0) | 26.5 (25.0-29.5) | 38.8 (35.5-44.5) | <0.001 |
| Left ventricular ejection fraction | n=236 | n=96 | n=77 | n=63 | |
| | 32.5 (25.0-40.0) | 38.0 (29.0-45.0) | 30.0 (25.0-40.0) | 30.0 (20.0-39.0) | <0.001 |

* Core Laboratory data; SS: SYNTAX score

**Table 2. Procedural characteristics**

| | Total (n=624) | Low SS (n=263) | Intermediate SS (n=207) | High SS (n=154) | p-value |
|---|---|---|---|---|---|
| Arterial access | | | | | |
| Femoral | 510/624 (81.7%) | 216/263 (82.1%) | 166/207 (80.2%) | 128/154 (83.1%) | 0.76 |
| Radial | 119/624 (19.1%) | 49/263 (18.6%) | 43/207 (20.8%) | 27/154 (17.5%) | 0.72 |
| Brachial | 3/624 (0.5%) | 2/263 (0.8%) | 1/207 (0.5%) | 0 | 0.79 |
| Stent in culprit lesion | | | | | |
| Any | 596/624 (95.5%) | 259/263 (98.5%) | 196/207 (94.7%) | 141/154 (91.6%) | 0.003 |
| Bare-metal stent | 34/596 (5.7%) | 16/259 (6.2%) | 9/196 (4.6%) | 9/141 (6.4%) | 0.71 |
| Drug-eluting stent | 561/596 (94.1%) | 241/259 (93.1%) | 186/196 (94.9%) | 134/141 (95.0%) | 0.62 |
| Bioresorbable scaffold in culprit lesion | 5/596 (0.8%) | 3/259 (1.2%) | 1/196 (0.5%) | 1/141 (0.7%) | 0.85 |
| Aspiration thrombectomy of culprit lesion | 90/624 (14.4%) | 32/263 (12.2%) | 31/207 (15.0%) | 27/154 (17.5%) | 0.31 |
| TIMI grade for blood flow | | | | | |
| Before PCI of culprit lesion* | | | | | <0.001 |
| 0 | 285/620 (46.0%) | 83/261 (31.8%) | 115/207 (55.6%) | 87/152 (57.2%) | |
| I | 57/620 (9.2%) | 22/261 (8.4%) | 25/207 (12.1%) | 10/152 (6.6%) | |
| II | 75/620 (12.1%) | 40/261 (15.3%) | 22/207 (10.6%) | 13/152 (8.6%) | |
| III | 203/620 (32.7%) | 116/261 (44.4%) | 45/207 (21.7%) | 42/152 (27.6%) | |
| After PCI of culprit lesion | | | | | <0.001 |
| 0 | 43/600 (7.2%) | 7/256 (2.7%) | 18/202 (8.9%) | 18/142 (12.7%) | |
| I | 26/600 (4.3%) | 5/256 (2.0%) | 10/202 (5.0%) | 11/142 (7.7%) | |
| II | 60/600 (10.0%) | 20/256 (7.8%) | 32/202 (15.8%) | 8/142 (5.6%) | |
| III | 471/600 (78.5%) | 224/256 (87.5%) | 142/202 (70.3%) | 105/142 (73.9%) | |
| Immediate PCI of non-culprit lesions | 328/624 (52.6%) | 142/263 (54.0%) | 101/207 (48.8%) | 85/154 (55.2%) | 0.40 |
| Total dose of contrast material, mL | 220.0 (155.0-300.0) | 200.0 (150.0-271.0) | 202.5 (154.0-280.0) | 260.0 (200.0-350.0) | <0.001 |
| Total duration fluoroscopy, min | 15.1 (9.2-24.0) | 13.0 (8.0-19.3) | 14.3 (9.2-23.0) | 21.7 (14.6-32.0) | <0.001 |
| Staged PCI of non-culprit lesions | 60/624 (9.6%) | 27/263 (10.3%) | 23/207 (11.1%) | 10/154 (6.5%) | 0.30 |
| Mechanical circulatory support | 172/624 (27.6%) | 44/263 (16.7%) | 67/207 (32.4%) | 61/154 (39.6%) | <0.001 |
| Mild hypothermia | 209/622 (33.6%) | 102/262 (38.9%) | 67/206 (32.5%) | 40/154 (26.0%) | 0.02 |
| Mechanical ventilation | 504/621 (81.2%) | 205/262 (78.2%) | 168/206 (81.6%) | 131/153 (85.6%) | 0.18 |

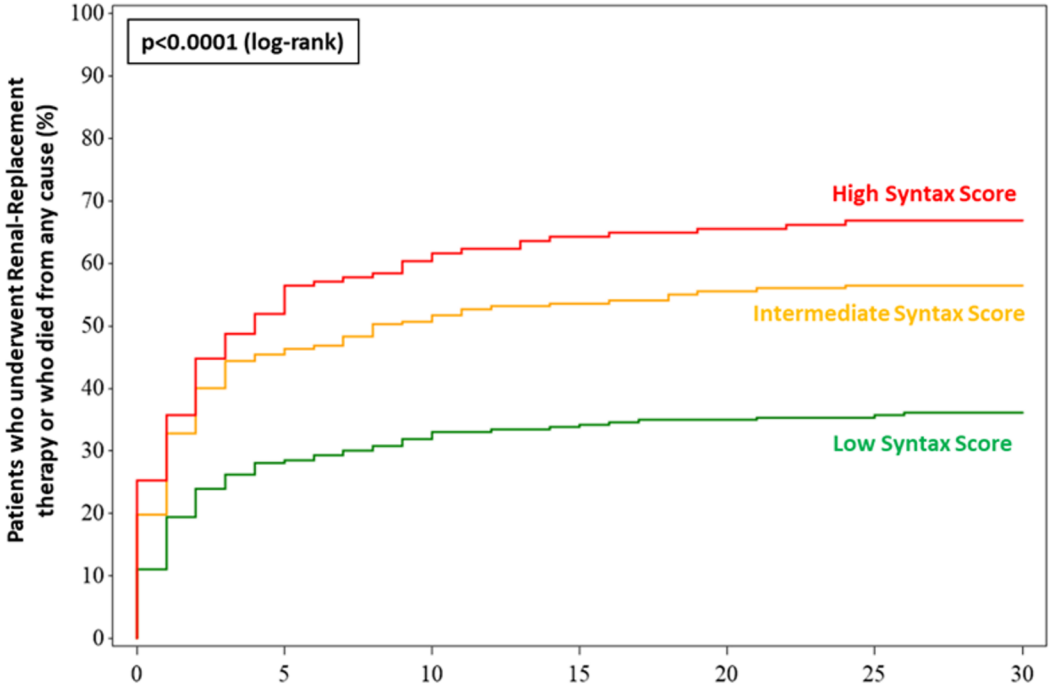
| | | | | | |
|---|---|---|---|---|---|
| Duration of mechanical ventilation, days | 3.0 (1.0-8.0) | 3.0 (1.0-7.0) | 3.0 (1.0-8.0) | 2.5 (1.0-7.0) | 0.62 |
| Subsequent medications in patients who survived until hospital discharged | | | | | |
| Statin | 307/330 (93.0%) | 165/176 (93.8%) | 88/97 (90.7%) | 54/57 (94.7%) | 0.64 |
| Beta-blocker | 301/330 (91.2%) | 160/176 (90.9%) | 89/97 (91.8%) | 52/57 (91.2%) | 0.97 |
| ACE inhibitors or ARB | 288/330 (87.3%) | 148/176 (84.1%) | 89/97 (91.8%) | 51/57 (89.5%) | 0.17 |
| Aspirin | 325/330 (98.5%) | 173/176 (98.3%) | 95/97 (97.9%) | 57/57 (100%) | 0.84 |
| Clopidogrel | 143/330 (43.3%) | 74/176 (42.0%) | 46/97 (47.4%) | 23/57 (40.4%) | 0.61 |
| Prasugrel | 117/330 (35.5%) | 69/176 (39.2%) | 27/97 (27.8%) | 21/57 (36.8%) | 0.17 |
| Ticagrelor | 132/330 (40.0%) | 65/176 (36.9%) | 43/97 (44.3%) | 24/57 (42.1%) | 0.46 |

* Core Laboratory data; SS: Syntax score; PCI: percutaneous coronary intervention; ACE: angiotensin converting enzyme ARB: Angiotensin II receptor blockers

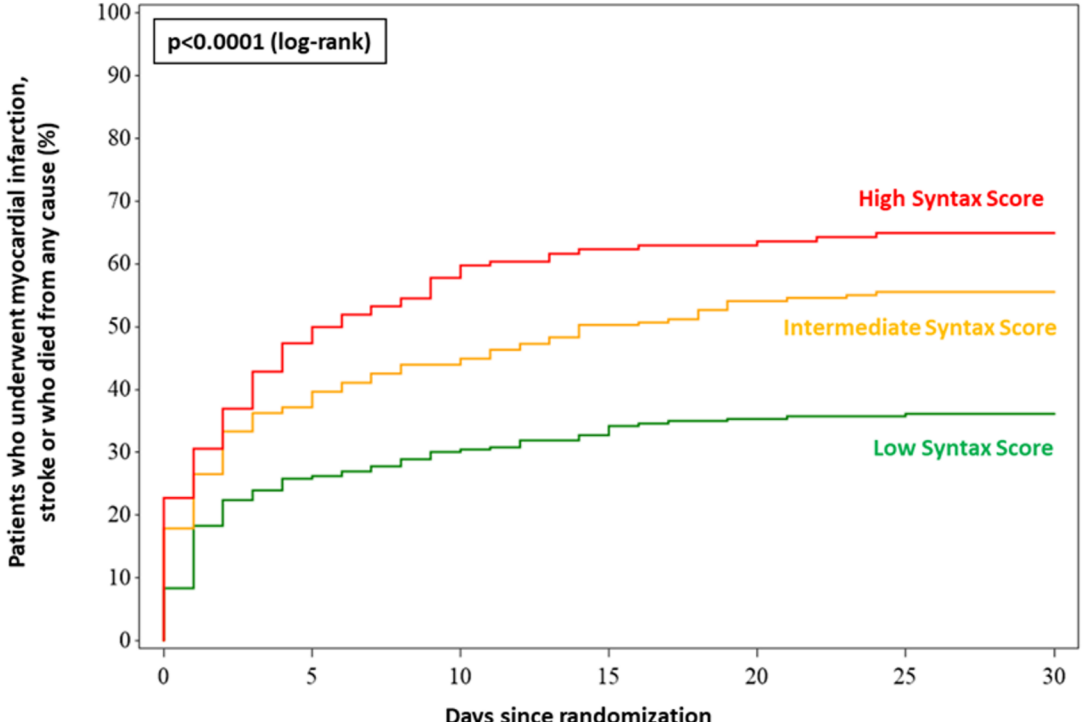
**Table 3. Early and late outcomes according to the baseline syntax score**

| | Low SS (n=263) | Intermediate SS (n=207) | High SS (n=154) | p-value |
|---|---|---|---|---|
| **30-day outcomes** | | | | |
| All-cause death or renal replacement therapy | 36.1% (95) | 56.5% (117) | 66.9% (103) | <0.001 |
| All-cause death | 33.1% (87) | 53.1% (110) | 63.0% (97) | <0.001 |
| Renal replacement therapy | 9.1% (24) | 17.4% (36) | 16.9% (26) | 0.016 |
| All-cause death, myocardial infarction or stroke | 36.1% (95) | 55.6% (115) | 64.9% (100) | <0.001 |
| **1-year outcomes** | | | | |
| All-cause death, myocardial infarction or stroke | 41.8% (110) | 60.9% (126) | 72.7% (112) | <0.001 |
| All-cause death | 38.4% (101) | 57.5% (119) | 68.8% (106) | <0.001 |

Results are provided as number (observed incidence); SS: SYNTAX score

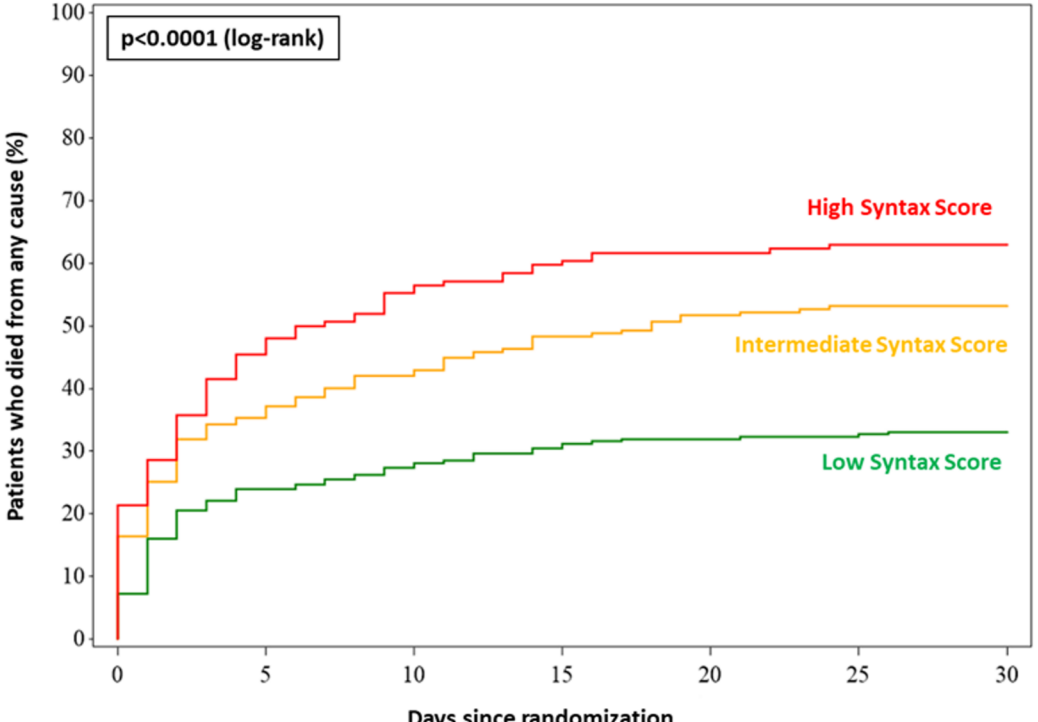



| No. at risk | | | | | | | |
|---|---|---|---|---|---|---|---|
| High Syntax Score | 154 | 74 | 61 | 55 | 53 | 51 | 51 |
| Intermediate Syntax Score | 207 | 113 | 102 | 96 | 92 | 90 | 90 |
| Low Syntax Score | 263 | 189 | 179 | 174 | 171 | 170 | 168 |



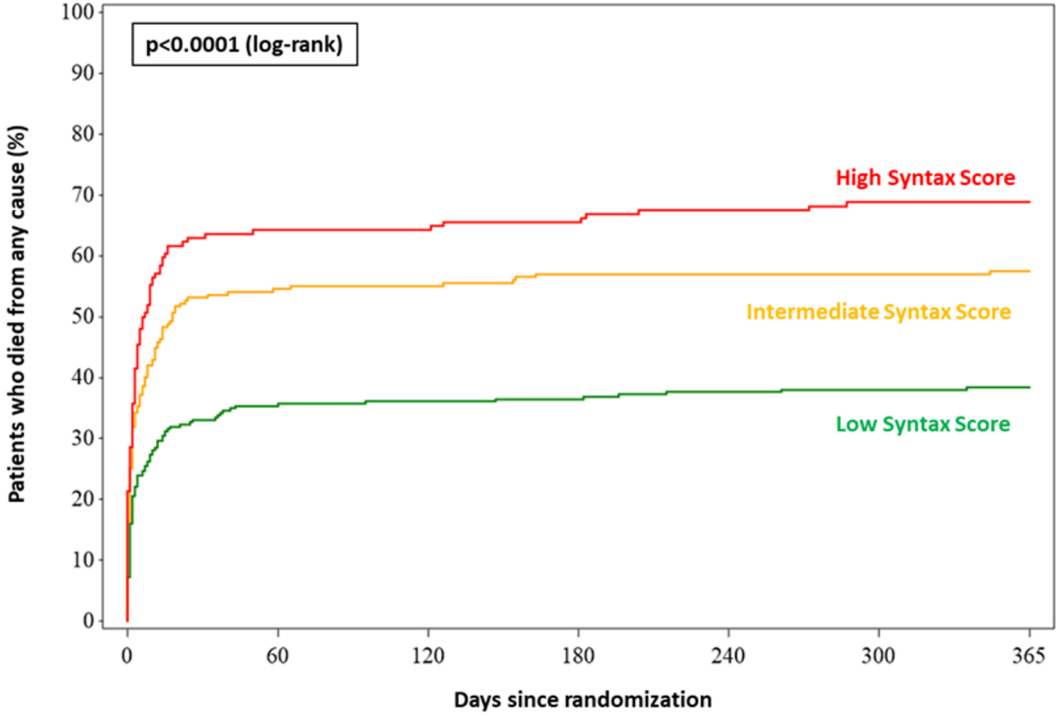

No. at risk

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| High Syntax Score | 154 | 81 | 65 | 58 | 57 | 54 | 54 |
| Intermediate Syntax Score | 207 | 130 | 116 | 103 | 95 | 92 | 92 |
| Low Syntax Score | 263 | 195 | 184 | 177 | 170 | 169 | 168 |

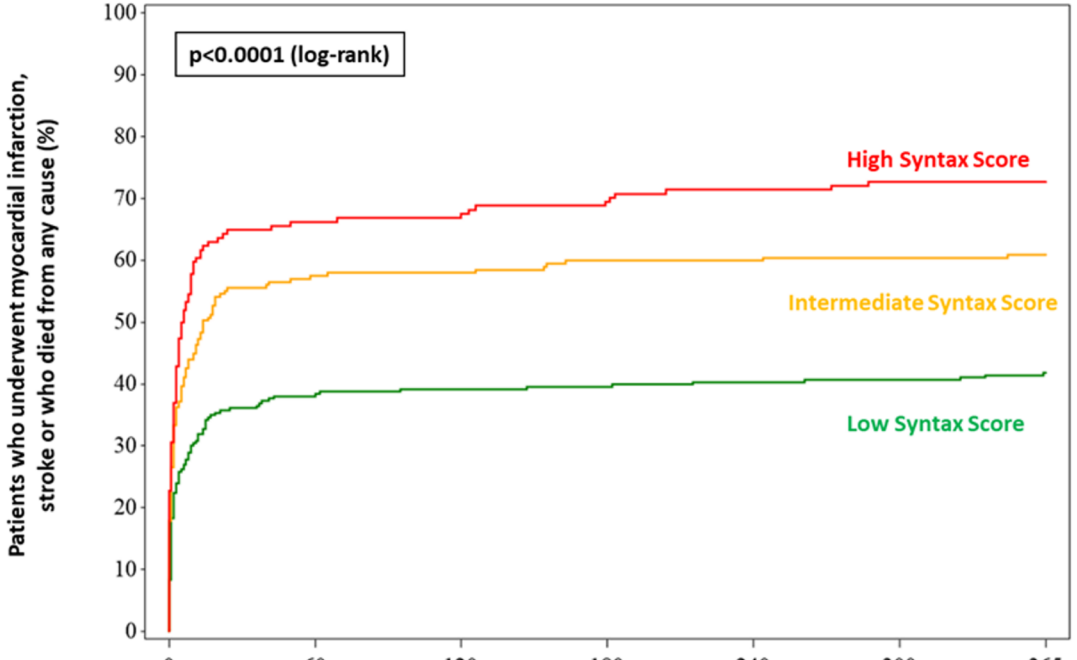



**No. at risk**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| High Syntax Score | 154 | 84 | 69 | 62 | 59 | 57 | 57 |
| Intermediate Syntax Score | 207 | 134 | 120 | 107 | 100 | 97 | 97 |
| Low Syntax Score | 263 | 200 | 191 | 183 | 179 | 178 | 176 |



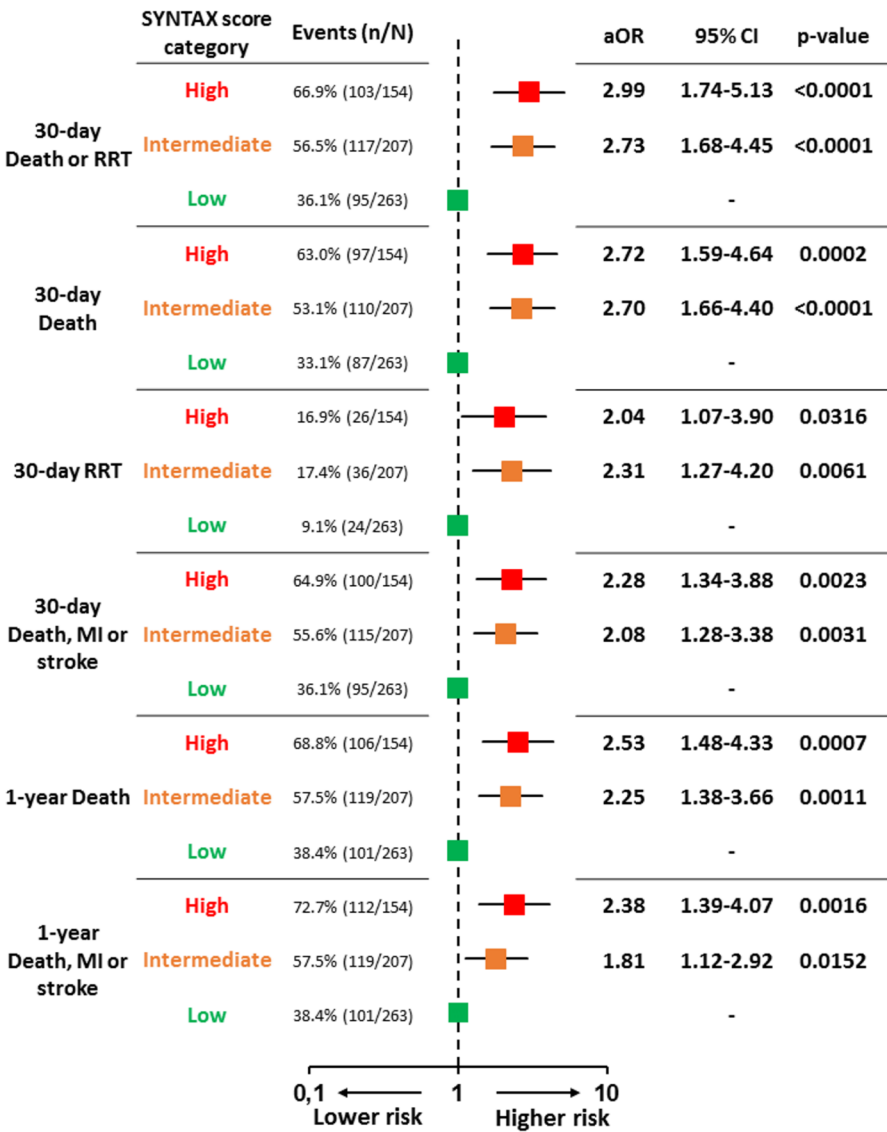

| No. at risk | | | | | | | |
|---|---|---|---|---|---|---|---|
| High Syntax Score | 154 | 55 | 55 | 53 | 50 | 48 | 43 |
| Intermediate Syntax Score | 207 | 93 | 92 | 88 | 88 | 88 | 74 |
| Low Syntax Score | 263 | 170 | 168 | 167 | 164 | 163 | 142 |




| No. at risk | | | | | | | |
|---|---|---|---|---|---|---|---|
| High Syntax Score | 154 | 52 | 51 | 47 | 44 | 42 | 38 |
| Intermediate Syntax Score | 207 | 87 | 86 | 82 | 82 | 81 | 69 |
| Low Syntax Score | 263 | 163 | 160 | 159 | 157 | 156 | 133 |

**Prognostic Value of SYNTAX Score in Patients with Infarct-related Cardiogenic Shock**

*a predefined analysis of the CULPRIT SHOCK trial*



# Prognostic Value of SYNTAX Score in Patients with Multivessel Coronary Artery Disease and Infarct-related Cardiogenic Shock:

## *Insight from the CULPRIT-SHOCK Trial*

## Online documents

**Online Figures legend and title**

**Online Figure 1. Associations of SYNTAX score with 30-day and 1-year outcomes after multivariable adjustment including the effective revascularization strategy.**

RRT: renal replacement therapy; MI: myocardial infarction; aOR: Adjusted odd ratio; CI: confidence interval. Number of included patients for each outcomes are: 30-day death or RRT, N=567; 30-day death, N=567; 30-day RRT, N=585; 30-day death, MI or stroke, N=568; 1 year Death, N=567; 1 year death, MI or stroke, N=569. Covariables of adjustment for each outcome are detailed in Online Table 1 and 2.

**Online Figure 2. Clinical outcomes according to the baseline SYNTAX score and the revascularization strategy**

PCI: percutaneous coronary intervention; OR: odds ratio; CI: confidence interval; RRT : renal replacement therapy

**Online Table 1. Variables associated with 30-day outcomes - univariate analysis**

| | All-cause death or renal replacement therapy | All-cause death | Renal replacement therapy | All-cause death or Myocardial infarction or Stroke |
|---|---|---|---|---|
| Age (years) | <.0001 | <.0001 | 0.3361 | <.0001 |
| Sex | 0.2778 | 0.0985 | 0.6759 | 0.1347 |
| Body Mass Index (kg/m²) | 0.0905 | 0.1822 | 0.1048 | 0.2319 |
| Smoking status | <.0001 | <.0001 | 0.3467 | <.0001 |
| Hypertension | 0.6243 | 0.8155 | 0.1793 | 0.9923 |
| Hypercholesterolemia | 0.0005 | 0.0002 | 0.5403 | 0.0002 |
| Diabetes mellitus | 0.0077 | 0.0392 | 0.0911 | 0.0389 |
| Prior myocardial infarction | 0.9646 | 0.8188 | 0.4890 | 0.7460 |
| Prior stroke | 0.1901 | 0.2674 | 0.2404 | 0.2651 |
| Known peripheral artery disease | 0.5920 | 0.7021 | 0.8084 | 0.9356 |
| Known renal insufficiency | 0.0496 | 0.0372 | 0.0384 | 0.0076 |
| Prior percutaneous coronary intervention | 0.1195 | 0.0582 | 0.3425 | 0.0251 |
| Arterial lactate >2mmol/l | 0.0044 | 0.0047 | 0.2200 | 0.0026 |
| Fibrinolysis before randomization | 0.7593 | 0.7359 | 0.7623 | 0.9702 |
| Resuscitation before randomization | 0.6675 | 0.7723 | 0.5525 | 0.4877 |
| Anterior ST-segment elevation | 0.2527 | 0.3388 | 0.4180 | 0.1676 |
| Femoral access | 0.0054 | 0.0088 | 0.0118 | 0.0468 |
| Mechanical circulatory support | <.0001 | <.0001 | 0.0003 | <.0001 |
| Mild hypothermia | 0.4461 | 0.9388 | 0.0006 | 0.9767 |
| Mechanical ventilation | <.0001 | <.0001 | 0.0361 | <.0001 |
| Catecholamine therapy | <.0001 | <.0001 | 0.0205 | <.0001 |
| Post-PCI TIMI flow at 3 in culprit lesion | 0.0006 | 0.0002 | 0.8554 | 0.0005 |
| Randomized coronary revascularization strategy | 0.0253* | 0.0633*- | 0.0271* | 0.1285* |
| Effective coronary revascularization strategy | 0.0136** | 0.0659* | 0.0067** | 0.1474** |

Gray cell are covariates of adjustment (p<0.2)

* Covariate of adjustment for primary analysis

** Covariate of adjustment for sensitivity analysis

**Online Table 2. Variables associated with 1-year outcomes - univariate analysis**

| | All-cause death | All-cause death or Myocardial infarction or Stroke |
|---|---|---|
| Age (years) | <.0001 | <.0001 |
| Sex | 0.2475 | 0.1924 |
| Body Mass Index (kg/m²) | 0.1816 | 0.3388 |
| Smoking status | <.0001 | <.0001 |
| Hypertension | 0.5687 | 0.4635 |
| Hypercholesterolemia | 0.0022 | 0.0255 |
| Diabetes mellitus | 0.0008 | 0.0007 |
| Prior myocardial infarction | 0.3520 | 0.3897 |
| Prior stroke | 0.0856 | 0.1074 |
| Known peripheral artery disease | 0.6368 | 0.5465 |
| Known renal insufficiency | 0.0402 | 0.0113 |
| Prior percutaneous coronary intervention | 0.3863 | 0.3147 |
| Arterial lactate>2mmol/l | 0.0042 | 0.0167 |
| Fibrinolysis before randomization | 0.1245 | 0.2532 |
| Resuscitation before randomization | 0.7664 | 0.6055 |
| Anterior ST-segment elevation | 0.3700 | 0.0961 |
| Femoral access | 0.0172 | 0.1149 |
| Mechanical circulatory support | <.0001 | <.0001 |
| Mild hypothermia | 0.8924 | 0.7848 |
| Mechanical ventilation | <.0001 | <.0001 |
| Catecholamine therapy | <.0001 | <.0001 |
| Post-PCI TIMI flow at 3 in culprit lesion | 0.0006 | 0.0033 |
| Randomized coronary revascularization strategy | 0.0947* | 0.0471* |
| Effective coronary revascularization strategy | 0.0879** | 0.0740** |

Gray cell are covariates of adjustment ($p<0.2$)

* Covariate of adjustment for primary analysis

** Covariate of adjustment for sensitivity analysis

**Online Table 3. Baseline characteristics of patients with and without available baseline SYNTAX score**

| | Available baseline SYNTAX score (n=624) | No available baseline SYNTAX score (n=62) | p-value |
|---|---|---|---|
| Age, years | 69.0 (60.0-78.0) | 75.0 (68.0-78.0) | 0.01 |
| Male sex | 475/624 (76.1%) | 49/61 (80.3%) | 0.46 |
| Body mass index | 26.6 (24.5-29.4) | 27.1 (24.7-30.0) | 0.55 |
| *Cardiovascular risk factors* | | | |
| Current smoking | 163/600 (27.2%) | 11/59 (18.6%) | 0.16 |
| Hypertension | 363/613 (59.2%) | 43/61 (70.5%) | 0.09 |
| Hypercholesterolemia | 197/610 (32.3%) | 31/61 (50.8%) | 0.004 |
| Diabetes mellitus | 189/611 (30.9%) | 29/61 (47.5%) | 0.008 |
| Previous myocardial infarction | 93/614 (15.1%) | 20/60 (33.3%) | <0.001 |
| Previous stroke | 40/615 (6.5%) | 9/62 (14.5%) | 0.03 |
| Known peripheral artery disease | 70/616 (11.4%) | 10/62 (16.1%) | 0.27 |
| Known renal insufficiency | 40/615 (6.5%) | 6/61 (9.8%) | 0.29 |
| Previous percutaneous coronary intervention | 101/614 (16.4%) | 26/60 (43.3%) | <0.001 |
| Resuscitation before randomization | 330/623 (53.0%) | 36/60 (60.0%) | 0.30 |
| Fibrinolysis before randomization | 32/622 (5.1%) | 2/60 (3.3%) | 0.76 |
| Arterial lactate > 2 mmol/L | 400/607 (65.9%) | 40/57 (70.2%) | 0.51 |
| Anterior ST-segment elevation myocardial infarction | 207/601 (34.4%) | 15/60 (25.0%) | 0.14 |
| Systolic blood pressure, mmHg | 100.0 (85.0-125.0) | 99.0 (82.0-123.0) | 0.44 |
| Diastolic blood pressure, mmHg | 60.0 (50.0-80.0) | 60.0 (50.0-77.0) | 0.51 |
| Mean blood pressure, mmHg | 76.0 (63.3-93.3) | 73.3 (61.2-87.8) | 0.45 |
| Use of catecholamine | 558/621 (89.9%) | 55/62 (88.7%) | 0.78 |
| Duration of catecholamine, days | 2.0 (1.0-5.0) | 2.0 (1.0-5.0) | 0.61 |
| Number of affected vessels | | | 0.14 |
| 1 | 5/624 (0.8%) | 0 | |
| 2 | 231/624 (37.0%) | 15/61 (24.6%) | |
| 3 | 388/624 (62.2%) | 46/61 (75.4%) | |
| Left ventricular ejection fraction | n=236<br>32.5 (25.0-40.0) | n=19<br>28.0 (20.0-40.0) | 0.09 |

**Online Table 4. Procedural characteristics of patients with and without available baseline SYNTAX score**

| | Available baseline SYNTAX score (n=624) | No available baseline SYNTAX score (n=62) | p-value |
|---|---|---|---|
| Arterial access | | | |
| Femoral | 510/624 (81.7%) | 54/61 (88.5%) | 0.18 |
| Radial | 119/624 (19.1%) | 8/61 (13.1%) | 0.25 |
| Brachial | 3/624 (0.5%) | 0 | 1.00 |
| Stent in culprit lesion | | | |
| Any | 596/624 (95.5%) | 54/61 (88.5%) | 0.03 |
| Bare-metal stent | 34/596 (5.7%) | 3/54 (5.6%) | 1.00 |
| Drug-eluting stent | 561/596 (94.1%) | 52/54 (96.3%) | 0.76 |
| Bioresorbable scaffold in culprit lesion | 5/596 (0.8%) | 0 | 1.00 |
| Aspiration thrombectomy of culprit lesion | 90/624 (14.4%) | 9/62 (14.8%) | 0.94 |
| Randomized to culprit lesion only PCI | 309/624 (49.5%) | 35/62 (56.5%) | 0.30 |
| Immediate PCI of non-culprit lesions | 328/624 (52.6%) | 25/62 (40.3%) | 0.07 |
| Total dose of contrast material, mL | 220.0 (155.0-300.0) | 235.0 (150.0-350.0) | 0.37 |
| Total duration fluoroscopy, min | 15.1 (9.2-24.0) | 19.4 (11.4-27.6) | 0.24 |
| Staged PCI of non-culprit lesions | 60/624 (9.6%) | 8/61 (13.1%) | 0.38 |
| Mechanical circulatory support | 172/624 (27.6%) | 22/62 (35.5%) | 0.19 |
| Mild hypothermia | 209/622 (33.6%) | 20/62 (32.3%) | 0.83 |
| Mechanical ventilation | 504/621 (81.2%) | 51/62 (82.3%) | 0.83 |
| Duration of mechanical ventilation, days | 3.0 (1.0-8.0) | 2.0 (1.0-5.0) | 0.15 |
| Subsequent medications in patients who survived until hospital discharged | | | |
| Statin | 307/330 (93.0%) | 29/30 (96.7%) | 0.71 |
| Beta-blocker | 301/330 (91.2%) | 28/30 (93.3%) | 1.00 |
| ACE inhibitors or ARB | 288/330 (87.3%) | 28/30 (93.3%) | 0.56 |
| Aspirin | 325/330 (98.5%) | 29/30 (96.7%) | 0.41 |
| Clopidogrel | 143/330 (43.3%) | 19/30 (63.3%) | 0.04 |
| Prasugrel | 117/330 (35.5%) | 6/30 (20.0%) | 0.09 |
| Ticagrelor | 132/330 (40.0%) | 11/30 (36.7%) | 0.72 |

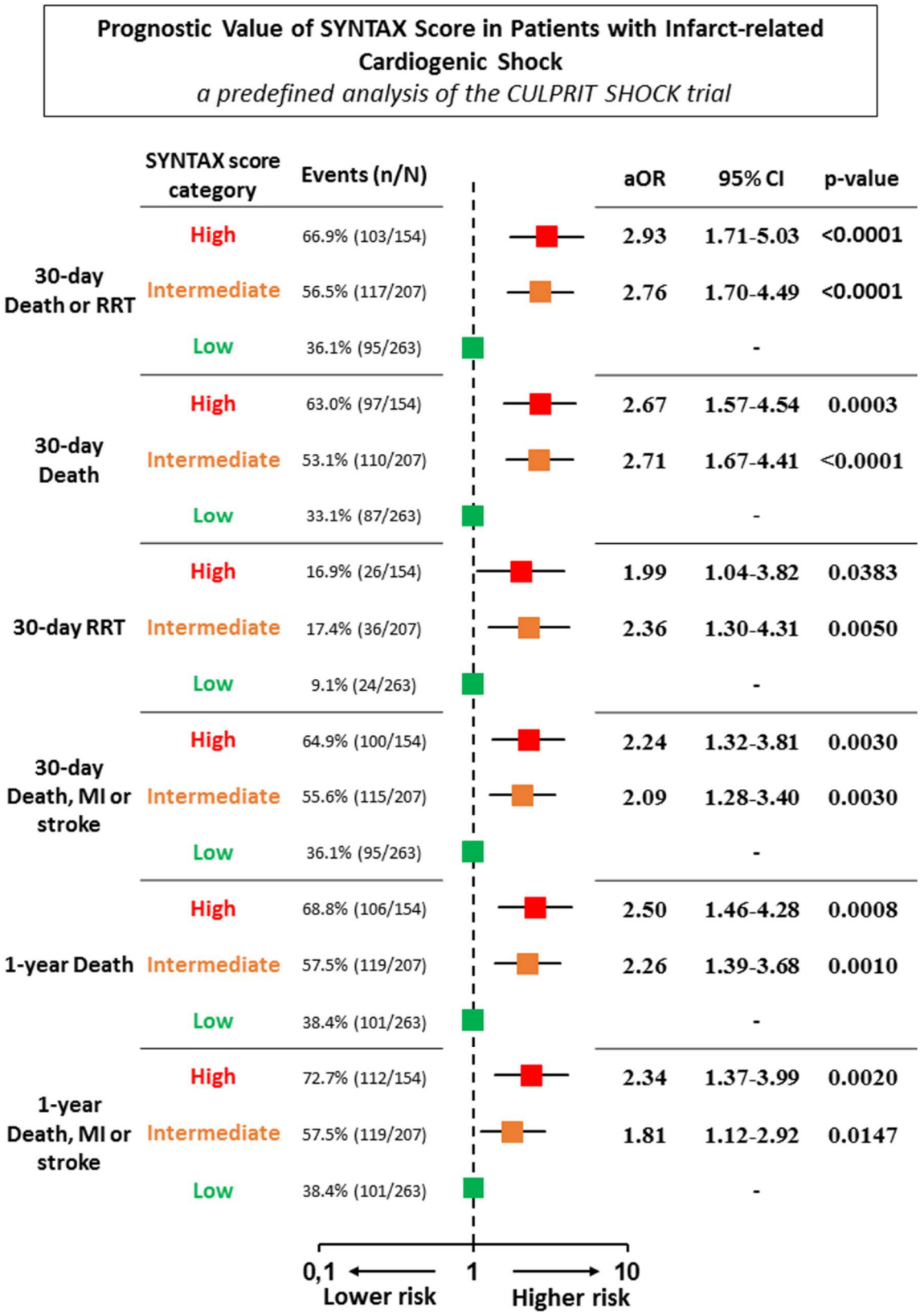
PCI: percutaneous coronary intervention, ACE: angiotensin converting enzyme, ARB: Angiotensin II receptor blockers

**Online Table 5. Early and late outcomes in patients with and without available baseline SYNTAX score**

| | Available baseline SYNTAX score (n=624) | No available baseline SYNTAX score (n=61*) | p-value |
|---|---|---|---|
| **30-day outcomes** | | | |
| All-cause death or renal replacement therapy | 50.5% (315) | 52.5% (32) | 0.768 |
| All-cause death | 47.1% (294) | 50.8% (31) | 0.580 |
| Renal replacement therapy | 13.8% (86) | 16.4% (10) | 0.575 |
| All-cause death, myocardial infarction or stroke | 49.7% (310) | 55.7% (34) | 0.366 |
| **1-year outcomes** | | | |
| All-cause death, myocardial infarction or stroke | 52.2% (326) | 65.6% (40) | 0.046 |
| All-cause death | 55.8% (348) | 68.9% (42) | 0.049 |

*One patient was lost to follow within 30 days of randomization and was excluded of the original analysis

**Online Figure 1. Associations of SYNTAX score with 30-day and 1-year outcomes after multivariable adjustment including the effective revascularization strategy.**



**Online Figure 2. Clinical outcomes according to the baseline SYNTAX score and the revascularization strategy**