A comparative study of the prognostic value of Independent SYNTAX score, GRACE score and a new scoring system combining SYNTAX and GRACE for patients with ACS undergoing PCI

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**Introduction**: With the progress of population aging in our country and the incidence of coronary heart disease increased year by year, coronary heart disease has become a common and detrimental disease. The advantage of using risk score system to quantify risk to evaluate the prognosis of patients is to help doctors to choose a reasonable and appropriate treatment so as to strengthen the patient’s long-term management which can further reduce the incidence of cardiovascular adverse events.

**Methods**: In this study, we collected 670 patients with ACS undergoing PCI admitted from October 2011 to March 2014 Department of Cardiology of affiliated HaiKou hospital Xiangya school of medicine Central South University. This research collected patients’ coronary angiography data and clinical data including age, heart rate, systolic blood pressure, Killip classification, ST segment changes, myocardial marker and cardiac arrest and so on. The next step is to calculate SYNTAX and GRACE risk score respectively, followed patients for 1 year of time after the onset of the disease. On the basis of GRACE and SYNTAX score system, building the data model by random forest statistical method and developing a NewScore that combines coronary anatomy with clinical data. And then compare the difference between the three risk score system incidence of adverse events, depict the receiver-operating characteristic curve of the three risk score (Area under the receiver-operating characteristic curve, the ROC) and calculate the Area under the curve (Area under the curve, AUC). Finally, comparing the predictive value of the three risk scoring systems to the patients’ incidence of adverse events and mortality during follow-up 1 year after PCI.

**Result**: The higher the SYNTAX and the GRACE risk score, the higher incidence of adverse cardiovascular events. Based on the SYNTAX and the GRACE risk score, a new score system has been developed by random forest statistical methods, which combines clinical data and coronary artery anatomy, low-risk group ≤34 points; High risk group >34 points. NewScore, SYNTAX and GRACE risk score of the area under the ROC curve is 0.6807, 0.5564, and 0.5577 respectively, the NewScore and SYNTAX, GRACE risk score area under the curve comparison have a significant difference (P<0.05), while the SYNTAX and GRACE risk score was no significant difference of the area under the ROC curve.

**Conclusion**: The prognosis value of NewScore system is better than SYNTAX and GRACE risk score system in patients with ACS undergoing PCI during 1 year follow-up. The prognosis value of SYNTAX and GRACE risk score system are considerably the same in these patients in 1-year follow-up. The Newscore system redistrict the low-risk(≤34points) and high-risk groups(>34points). The higher the score, the higher the proportion of adverse cardiovascular events.