

Comparison of traditional versus artificial intelligence based coronary artery disease risk prediction scores in young patients with acute coronary syndrome

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Background: Ever since the concept of preventive cardiology has come into vogue, several risk identification models have come up which combine several risk factors to create a risk prediction score for occurrence of cardiovascular (CV) event. While carrying a proven validation in Western population, none of the risk prediction model has been satisfactorily evaluated in Indians especially young <40 years old.

Objectives: To compare Artificial Intelligence based novel risk score with traditional risk scores in young (less than 40 years age) patients presenting with acute coronary syndrome (ACS) and to estimate the relative efficacy of different coronary artery disease (CAD) risk scores in young Indian Patients.

Design: Single center, Observational, Non-interventional study.

Participants: Cohort of Patients more than 20 but less than 40 years old with ACS in the department of Cardiology from 1st January 2019 to 31st October 2019.

Methods: 314 young patients [mean age 36.14±4.17 years] presenting with acute coronary syndrome (ACS) were enrolled. The three clinically most pertinent risk assessment models [Framingham Risk score (FRS), World Health Organization risk prediction charts (WHO/ISH), and QRISK3 scores] and Artificial Intelligence based novel risk score (AICVD) were applied on day 1 of presentation, and tried to see whether one risk score versus other risk score could have predicted the event earlier had we applied

it before the occurrence of ACS. Risk factors considered included those already in traditional scoring systems and new risk factors (diet, alcohol, tobacco, dyslipidemia, physical activity, family history of heart disease, history of heart disease, heart rate, respiratory rate, chronic heart symptoms and psychological stress).

Results: WHO/ISH provided the lowest high risk estimate with only 1 (0.9%) patient estimated to be having >20% 10-year risk. The FRS estimated high risk (>20% 10-year risk) in 3 (1%) patients. The QRISK3 estimated high risk (>10% 10-year risk) in 20 (6.5%) patient. In comparison, AICVD risk prediction model stood tall by identifying 73 (23.2%) patients as high risk and 62.74% patients as more than moderate risk for having CV events at 7 years ($p<0.001$).

Conclusion: Perhaps, this is the first study which has compared artificial intelligence based novel risk prediction model with the three most commonly applied models, in the young Indian patients. We found that a cohort of young Indian patients presenting with ACS, when studied retrospectively, was identified as "high risk" most likely by AICVD risk prediction model rather than the traditional counterparts. The WHO/ISH risk prediction charts and FRS were the poorest predictors. Performance of QRISK3 score also remained less than satisfactory. These findings suggested that AICVD risk prediction model is a promising tool to assess for CV risk in Indian population.

