AN OVERVIEW OF PRECISE-DAPT SCORE

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Abstract:
Dual antiplatelet therapy (DAPT) helps prevent ischemic events after coronary stenting but comes with an increased risk of bleeding. Several risk scores have been proposed for the management of patients receiving DAPT, but no standardized tool exists for the purpose. We sought to compare the performance of the new PRECISE-DAPT (Predicting Bleeding Complication in Patients Undergoing Stent Implantation and Subsequent Dual Antiplatelet Therapy), CRUSADE (Can Rapid Risk Stratification of Unstable Angina Patients Suppress Adverse Outcomes with Early Implementation of the American College of Cardiology/American Heart Association Guidelines), and ACUITY (Acute Catheterization and Urgent Intervention Triage Strategy) scores for the prediction of bleeding in Korean patients receiving DAPT.

Keywords: Precise-DAPT Score, risk score, dual antiplatelet therapy.

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Introduction:

Dual antiplatelet therapy (DAPT) with aspirin and a P2Y12 inhibitor after coronary intervention reduces ischemic events but increases bleeding risk, which has been associated with critical adverse events (1).

Platelet inhibition plays a central role for treatment and prevention of short- and long-term atherothrombotic events in patients with CAD. Oral antiplatelet agents for secondary prevention of patients with CAD include the cyclo-oxygenase-1 inhibitor aspirin, and the platelet adenosine diphosphate P2Y12 receptor inhibitors clopidogrel, prasugrel and ticagrelor. Aspirin and clopidogrel have been studied across the whole spectrum of CAD, whereas the more recent potent P2Y12 platelet receptor inhibitors prasugrel and ticagrelor have been evaluated in patients with ACS. (2).

Although there are several potential combinations of antiplatelet agents, DAPT refers to the therapy combining aspirin and a P2Y12 receptor inhibitor (clopidogrel, prasugrel or ticagrelor). DAPT has been shown to reduce recurrent major ischemic events in patients with ACS or undergoing PCI,1 at the expense of an unavoidable increased risk of major bleeding compared with single antiplatelet therapy. A personalized approach based on the patient clinical presentation (stable CAD or ACS), baseline ischemic and bleeding risk profiles, and management strategy (conservative treatment, PCI or coronary artery bypass graft (CABG)) is currently advocated (2).

International guidelines recommend the careful evaluation of bleeding risk when considering treatment duration; however, the optimal duration of treatment remains a topic of debate (3).

Nevertheless, bleeding risk stratification may improve patient management during DAPT. Bleeding predictors primarily consider the patient's clinical characteristics, the invasiveness of the procedure, and the potency of the antithrombotic regimen. Several bleeding risks scores have been proposed and compared to date (4).

Antiplatelet therapy represents the mainstay of the pharmacological treatment and secondary prevention of coronary artery disease (CAD). Compared with placebo, antiplatelet therapy has been shown to reduce recurrent major adverse cardiovascular events (MACE) among patients with stable CAD or acute coronary syndrome (ACS). Dual antiplatelet therapy (DAPT) provides more intense platelet inhibition than single antiplatelet therapy resulting in incremental reductions in the risk of thrombotic events after percutaneous coronary intervention (PCI) or ACS, but it has been associated with an increased risk of major bleeding (5).

The choice of optimal DAPT regimen and duration for patients with CAD requires a tailored approach based on the patient clinical presentation, baseline risk profile and management strategy. However, the selection of patients who might derive benefit from shorter or extended DAPT duration remains a matter of debate. (5).

The PRECISE-DAPT score has been recently developed to decide the optimal duration of dual anti-platelet treatment in patients after PCI. The PRECISE-DAPT score includes age, hemoglobin level, white blood cell count, creatinine clearance rate, and prior history of bleeding. Given that age, hemoglobin level, white blood cell count, and creatinine clearance rate are all important contributors to CIN development (6).

The PRECISE-DAPT is a novel risk score that mainly developed to guide the optimal duration of dual anti-platelet treatment in patients after PCI. According to the guidelines, in patients with PRECISE-DAPT score ≥ 25, the risk of bleeding is high, favoring shorter duration of dual anti-platelet treatment among these patients (7) .

In patients with acute coronary syndrome, dual anti-platelet treatment is recommended for 12 months. However, in case of high bleeding risk, discontinuation of dual anti-platelet treatment at 6 months should be considered. The parameters used in the calculation of the PRECISE-DAPT score include age, hemoglobin level, white blood cell count, creatinine clearance rate, and prior history of bleeding. The components of PRECISE-DAPT score have been shown as important contributors to CIN development (8) .

When patients admitted to hospital with the diagnosis of STEMI, primary PCI, where available, is the recommended treatment strategy according to the current guidelines. After the successful restoration of blood flow with angioplasty and/or stent, clinicians should calculate the PRECISE-DAPT score to estimate the optimal duration of dual anti-platelet treatment in these patients. The PRECISE-DAPT is a simple, user-friendly score, and can be calculated easily after the first medical contact.

Because the exact mechanisms responsible for the development of CIN have been unknown, and it mostly develops within the first 72 h, identifying the patients who are at high risk for CIN is a key step. Hence, clinicians should calculate the PRECISE-DAPT score after the first medical contact and be more alert in patients with higher PRECISE-DAPT score due to high risk for the development of CIN.

Particularly, the patients with higher PRECISE-DAPT score should be treated with adequate prophylactic strategies. The prophylactic regimens, which are capable of preventing CIN among these patients, may include stopping any nephrotoxic agents such as non-steroidal anti-inflammatory drugs, , and normal saline administration. Moreover, a close follow-up with the amount of urine volume in an hour or total urine volume in 24 h should be implemented in these patients. (9).

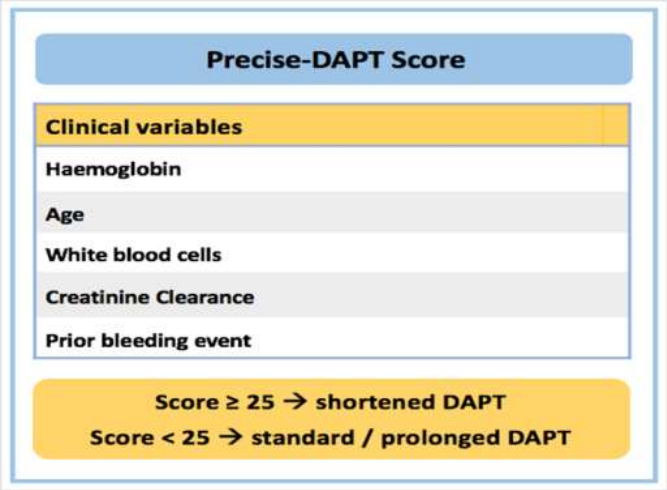

Figure 1: Precise-DAPT score.

The PRECISE-DAPT (Predicting Bleeding Complication in Patients Undergoing Stent Implantation and Subsequent Dual Antiplatelet Therapy) score was recently developed and validated in 8 multicentre randomized trials. Costa et al. (6), study included a total of 14963 patients with CAD who underwent elective, urgent, or emergent PCI and generated a five-item (age, CrCl, hemoglobin, white blood cell count, and prior spontaneous bleeding) prediction algorithm for outof- hospital bleeding in patients treated with DAPT.

The predictive performance of this novel score was assessed in the derivation cohort and validated in 8595 and 6172 patients treated with PCI from the platelet inhibition and patient Outcomes (PLATO) trial and the Bern PCI registry respectively(6). The PRECISE-DAPT score showed improved integrated discrimination and reclassification performance as compared to the PARIS bleeding score in both validation cohorts (6).

The usefulness of this score was also assessed within patients randomized to different DAPT durations (n = 10081) to identify the effect on bleeding and ischemia of a long (12–24months) or short (3–6months) treatment duration in relation to baseline bleeding risk. It was observed that among patients deemed at high bleeding risk based on PRECISE-DAPT (PRECISE-DAPT score >_25), prolonged DAPT was associated with no ischemic benefit but a remarkable bleeding burden leading to an NNT for harm of 38 (6).

On the other hand, longer treatment in patients without high bleeding risk (PRECISE-DAPT score <25) was associated with no increase in bleeding and a significant reduction in the composite ischemic endpoint of MI, definite stent thrombosis, stroke, and target vessel revascularization, with an NNT for benefit of 65 (6).

Selecting a shorter than 12- month treatment duration in patients deemed at high bleeding risk upfront may therefore prevent their exposure to an excessive bleeding hazard. In turn, patients at non-high bleeding risk might receive a standard (i.e., 12 months) or prolonged (i.e., >12months) course of treatment if tolerated. However, none of these risk prediction models have been prospectively tested in the setting of RCTs. Therefore, their value in improving patient outcomes remains unclear (7).

The PPECISE DAPT score is a simple 5-item risk score that predicts out-of-hospital bleeding during DAPT (6).

The European Society of Cardiology guideline recommended the PRECISE-DAPT score as guidance for the duration of short (3–6 months) or long (12–24 months) DAPT (7).

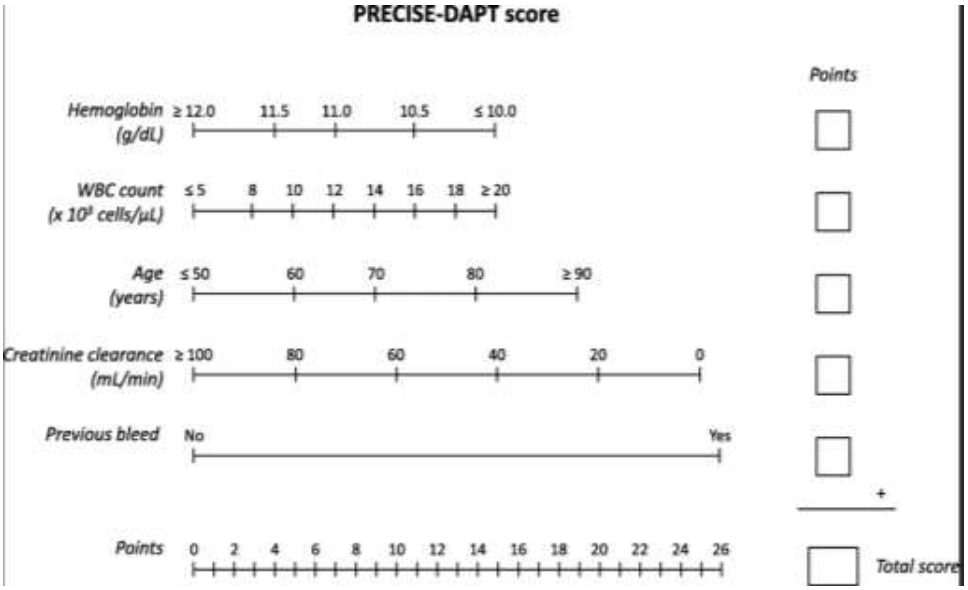

Figure 2: Precise-DAPT score (7)

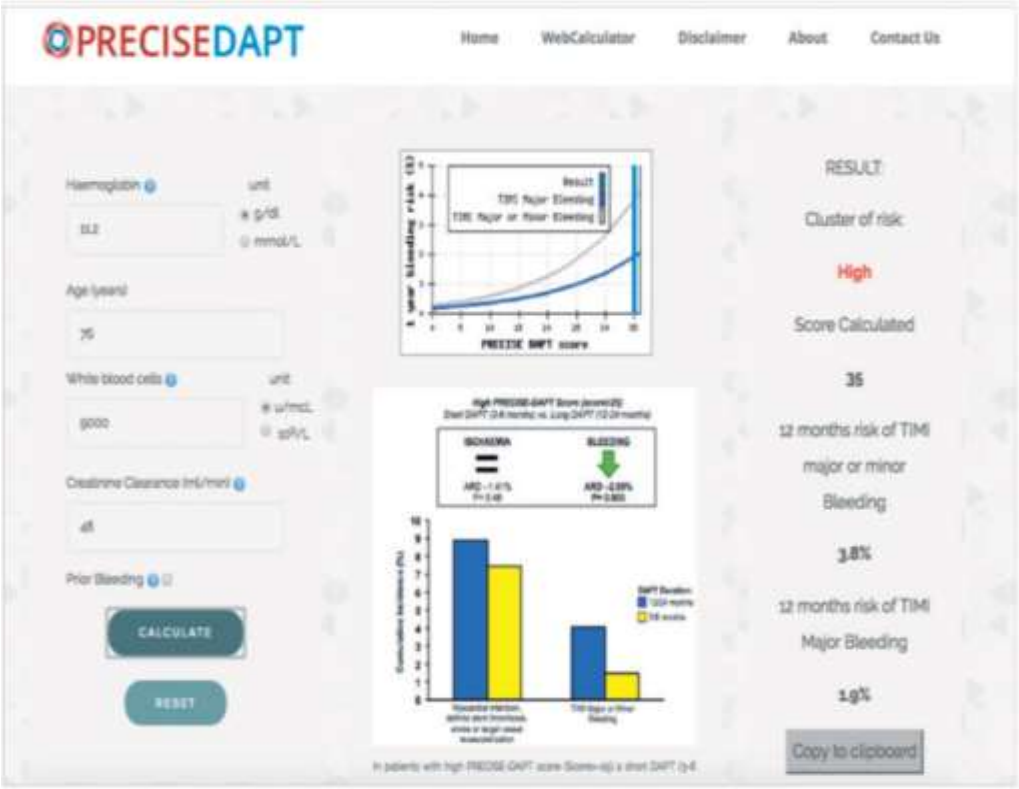

Figure 3: PRECISE-DAPT score calculation using the dedicated web-based tool (7)

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