External validation of PE-SARD bleeding score for early major bleeding in patients with acute pulmonary embolism: Insight from the COMMAND VTE Registry-2

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Funding Acknowledgements: Type of funding sources: Foundation. Main funding source(s): JSPS KAKENHI Grant Number JP 21K16022

Background/Introduction: The current guidelines and existing bleeding risk scores focus on assessing the risk of anticoagulant-related bleeding in patients with pulmonary embolism (PE) who are candidates for extended anticoagulation therapy. However, there is no consensus on the risk of bleeding in the acute phase. The Syncope, Anemia, Renal Dysfunction (PE-SARD) bleeding score has been developed to predict early major bleeding in acute PE patients. However, the score has not yet been externally validated.

Purpose: The present study aimed to externally validate the PE-SARD bleeding score, using a large-scale multicenter observational database of patients with venous thromboembolism (VTE).

Methods: The COMMAND VTE Registry-2 is a multicenter registry enrolling 5197 consecutive acute symptomatic VTE patients among 31 centers in Japan between January 2015 and August 2020. The present study population was consisted of 2722 patients with PE who received anticoagulation therapy during the acute phase and had a calculated PE-SARD bleeding score. The eligible patients were classified into three groups: high-risk group with a PE-SARD score >2.5 points, intermediate-risk group with a score of 1–2.5 points, and low-risk group with a score of 0 point. The discriminatory and calibration ability of the PE-SARD score for 30-day major bleeding were assessed by calculating the area under the receiver operating characteristic curve and creating a calibration plot, respectively.

Results: The high-risk group accounted for 537 patients (20%), intermediate-risk group for 1381 (51%), and low-risk group for 804 (30%). The proportion of thrombolysis use did not significantly differ across the groups. Among the patients who received direct oral anticoagulants (DOACs), the proportion of high-dose DOAC initiation was highest (54%) in the low-risk group and lowest in the high-risk group (29%). During the first 30 days of anticoagulation therapy, major bleeding occurred in 118 patients. The cumulative 30-day incidence of major bleeding substantially increased in the higher risk categories by the PE-SARD bleeding score (high-risk group: 8.2% [95% CI, 6.2%–10.9%], intermediate-risk group: 4.5% [95% CI, 3.5%–5.8%], and low-risk group: 1.8% [95% CI, 1.0%–3.0%], long-rank P<0.001). The discriminating power of the score was modest with a C-statistic of 0.65 (95%CI 0.61–0.70). Based on the calibration plot, the PE-SARD bleeding score was well calibrated. A sensitivity analysis excluding 275 outpatients showed similar results.

Conclusions: The risks of 30-day major bleeding in patients with PE substantially increased in the higher risk categories by using the PE-SARD bleeding score. The score is potentially helpful for management of anticoagulation therapy in the acute phase.
30-day Major bleeding

Log-rank P < 0.001

The Kaplan-Meier curves