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Characterization of actionable bleeding and thrombotic risk trade-offs in patients undergoing percutaneous coronary intervention

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Background: Patients undergoing percutaneous coronary intervention (PCI) are at risk of developing bleeding and/or thrombotic complications. Bleeding and thrombotic risk characteristics may overlap in some patients, which makes decision-making for dual antiplatelet therapy duration a clinical challenge. The actual proportion of PCI patients who have an increased bleeding risk and/or an increased thrombotic risk is unclear.

Purpose: Aim of this study is to identify sizeable and actionable proportions of patients at high bleeding risk (HBR) and/or at high thrombotic risk (HTR) in a contemporary cohort of PCI patients.

Methods: We retrospectively included all patients undergoing PCI at our Institution from November 2019 to April 2020 and identified those at HBR or HTR based on criteria from the Academic Research Consortium for High Bleeding Risk (ARC-HBR) or criteria from Giustino and colleagues, respectively. Since belonging to the HBR and HTR groups was non-mutually exclusive, patients were further stratified into 4 mutually exclusive subgroups: 1) HBR/HTR; 2) HBR, non-HTR; 3) non-HBR, HTR; and 4) non-HBR, non-HTR. In addition, the new ARC-HBR trade-off model (integrating patients' characteristics to define the individual risks of bleeding and thrombotic events) was applied to rank patients based on their computed risk scores for bleeding and thrombosis. Patients were categorized based on the ratio between the ARC-HBR thrombotic and the bleeding risk scores (i.e., high [1.5], intermediate [0.75–1.5], low [<0.75]).

Results: A total of 312 patients were included, of which 93 (30%) presented with HBR and 116 (37%) with HTR. Among patients with HBR, 41% presented with HTR. Among patients with HTR, 33% presented with HBR. Overall, 12.2% of patients had HBR/HTR, 17.6% had HBR, non-HTR, 25.0% had non-HBR, HTR, and 45.2% had non-HBR, non-HTR. Based on the ARC-HBR trade off score, 16.3% of patients had a higher risk of thrombosis than the risk of bleeding, 45.9% had similar risks, and 37.8% had a higher risk of bleeding than the risk of thrombosis. Among patients who had HBR/HTR, the trade-off model identified 8% as having a higher risk of thrombosis than the risk of bleeding and 18.4% as having a higher risk of bleeding than the risk of thrombosis.

Conclusions: Characterizing the risk of bleeding and thrombotic complications is an important prerequisite for tailoring strategies to individual patients, hence minimizing the risks and improving the outcome of PCI. More than half of patients undergoing PCI presented with HBR, HTR, or both. About 40% of patients presented with characteristics of high risk, which make them actionable (e.g., by using shorter durations of dual antiplatelet therapy in patients at HBR and non-HTR or using longer durations in patients at non-HBR and HTR). The ARC-HBR trade off model score is an additional useful tool that may be used to identify an additional quarter of actionable patients in the HBR/HTR category.