Anticoagulation in the Cath Lab: A Contemporary Approach

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The continuing evaluation of the safety and efficacy of antithrombotic therapies in cardiovascular disease reflects a changing approach to the development of novel pharmacologic agents that is modeled after our evolving understanding of the pathophysiology, therapeutic applications, and clinical outcomes of patients with acute coronary syndromes (ACS) and those undergoing coronary revascularization. In particular, several recent therapeutic advances have been made in the management of patients with ACS and those undergoing percutaneous coronary intervention (PCI) to improve early and late clinical outcomes. The focus of these research efforts leading to improvements in care has been on the potential to inhibit platelet aggregation and thrombin formation coupled with early invasive treatment options. In parallel with the development of effective antiplatelet and anticoagulant therapies, however, is

the need to maintain safety, with specific attention toward minimizing bleeding risk.

Despite remarkable achievements in the care of patients with ACS and among those treated with PCI, current standard therapies do have limitations, and the persistence of clinical event rates among patients receiving treatment has motivated the need for improved antiplatelet and anticoagulant therapy. In particular, contemporary clinical trials are seeking to refine treatment strategies for patients relative to individual risk for both ischemic and bleeding events.

In this supplemental issue of *Reviews in Cardiovascular Medicine*, we present an educational series focusing on the scientific and clinical basis for thrombosis in patients with ACS and those undergoing PCI. Collectively, these comprehensive reviews 1) provide a pathophysiological rationale for antithrombotic therapies in both ACS and PCI, 2) emphasize the impact of bleeding complications associated with conventional antithrombotic regimens, 3) examine the results of recent trials with newer generation antithrombin and antiplatelet therapies, and 4) present future directions for clinical investigation.

Specifically, Dr. David J. Schneider begins this series by presenting a new perspective regarding our understanding of the coagulation cascade, underscoring the essential role of the platelet as a mediator of thrombosis. This viewpoint of platelet-mediated thrombosis helps us better understand the mechanistic benefit of therapies intended to inhibit thrombin directly or block thrombin-induced platelet activation.

Simultaneous with attention toward improving efficacy with novel antithrombotic therapies, however, is an ongoing need to minimize bleeding risk. In an era of PCI in which ischemic complications are uncommon, bleeding complications remain an issue, given that most patients receive a combination of multiple antiplatelet and antithrombin therapies. Placing the risk of bleeding in perspective with the reduction in ischemic outcomes, Dr. Sunil V. Rao describes the interaction between bleeding events, blood transfusion, and mortality. This need to maintain safety outcomes, while preserving efficacy, is also the focus of Dr. Norman E. Lepor, who presents a practical, evidence-based rationale for the selection of anticoagulant therapy in the cardiac catheterization laboratory. In addition, Drs. Michael S. Lee and Rajendra R. Makkar summarize recent clinical trials data with the direct thrombin inhibitor bivalirudin in patients with ACS and in those undergoing PCI, followed by an economic appraisal of bivalirudin therapy by Drs. Ameet Bakhai and David J. Cohen.

The objectives of this supplement are to review the pathophysiology and clinical spectrum of thrombosis in ischemic events and coronary revascularization and to explore evidence-based treatment targets. Treatment strategies that vary relative to patient risk will be emphasized, and evolving pharmacologic therapies will also be presented. In particular, our final review introduces newer generation antiplatelet agents that include prasugrel and cangrelor and antithrombin agents such as fondaparinux. These issues are particularly relevant against the background of recent trials demonstrating superior safety and/or efficacy with novel antithrombotic therapies compared with conventional treatment regimens. An important example is the recent Acute Catheterization and Urgent Intervention Triage Strategy (ACUITY) trial, the design and principal results of which are summarized in this issue by Dr. Gregg W. Stone. In this study, bivalirudin therapy in ACS patients was associated with similar efficacy yet lower bleeding complications compared with conventional treatment that included heparin and a glycoprotein IIb/IIIa inhibitor. We hope that this information will prove useful in the care of patients with cardiovascular disease and enable a better understanding of antithrombotic treatment strategies that clinicians may apply to routine clinical practice. ■