Introduction

Antiplatelet Therapy and Platelet Function Testing

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Introduction

Platelets play a pivotal role in both normal hemostasis and pathological thrombosis, especially in the arterial bed.

Atherosclerosis is the multifactorial result of endothelial dysfunction, stimulation of inflammatory responses, migration and proliferation of smooth muscle cells and accumulation of monocyte-derived lipid-rich macrophages to the injury site, and resultant formation of atherosclerotic lesions.[1–3] Ruptured plaques expose the subendothelial matrix proteins and collagen to trigger a cascade of events resulting in arterial vascular occlusion. Platelet activation and aggregation are integral in the pathogenesis of atherothrombotic events characteristic of the acute coronary syndromes (ACS) or due to mechanical disruption of plaque by percutaneous coronary interventions (PCI).[4] Accordingly, antiplatelet therapy has become an important component of standard management in patients with ACS and/or those who undergo PCI.

The field of platelet inhibition has evolved substantially in the past decade with the initial establishment of dual antiplatelet strategies (aspirin [ASA] and a thienopyridine) in patients with ACS or who undergo PCI. Next, trial results have modified how ASA, thienopyridines, and glycoprotein (GP) IIb/IIIa antagonists are used in this setting. Unfortunately, despite the use of standard antiplatelet approaches, recurrent thrombotic events continue to occur, highlighting the need to identify and bridge clinical gaps that remain in this therapeutic area.

A panel of experts in interventional cardiology and platelet inhibition was convened on November 17, 2006. The goal of that meeting was to discuss the status of currently available antiplatelet therapies and determine unmet clinical needs that remain in the field. In this supplement, an evidence-based review of the most important topics and clinical needs identified by that panel is undertaken. The first article features a review of landmark trials that establish how antiplatelet therapies are currently used in patients with ACS. This is followed by a review of the important topic of platelet function testing and its current role. In the third article, the problem of persistent platelet activation in ACS and during the periprocedural and post-PCI periods is introduced. In the concluding two articles, important issues associated with the use of contemporary platelet inhibition are explored, including the problem of hyporesponse and variable response with certain antiplatelet strategies, optimal loading and maintenance dosing with clopidogrel, the timing of therapy prior to PCI, late stent thrombosis with the use of drug eluting-stents, and the persistent problem of platelet inhibitor underuse.

References

1. Fuster V, Badimon L, Badimon JJ, Chesebro JH: The pathogenesis of coronary artery disease and the acute coronary syndromes. Part I. *N Engl J Med* 1992;326:242–250
2. Fuster V, Badimon L, Badimon JJ, Chesebro JH: The pathogenesis of coronary artery disease and the acute coronary syndromes. Part II. *N Engl J Med* 1992;326:310–318
3. McNicol A, Israels SJ: Platelets and anti-platelet therapy. *J Pharmacol Sci* 2003;93:381–396
4. Ross R: Atherosclerosis: an inflammatory disease. *N Engl J Med* 1999;340:115–126

Received: November 20, 2007
Accepted: November 27, 2007

Published online in Wiley InterScience. (www.interscience.wiley.com)
DOI:10.1002/clc.20370