Guidelines for STEMI

Key messages from the ACC/AHA/SCAI 2009 focused update for the management of ST-elevation myocardial infarction.

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The in-hospital management of ST-elevation myocardial infarction (STEMI) has evolved significantly during the last decade, with particular emphasis on primary percutaneous coronary intervention (PCI) as the preferred treatment strategy when feasible.

Significantly, new information has emerged during the last 2 years regarding the practice of primary PCI that justifies a reassessment of procedural strategies and adjunctive therapies. Ongoing review by the American College of Cardiology/American Heart Association (ACC/AHA) Task Force on Practice Guidelines of these data in 2009 prompted a focused update, in conjunction with the Society for Cardiovascular Angiography and Interventions (SCAI), to the guidelines for management of patients with STEMI.[1] The purpose of this article is to identify and comment on certain key points of this focused update that should influence patient management in STEMI, both in and out of the catheterization laboratory.

PHARMACOLOGIC MANAGEMENT

The use of glycoprotein IIb/IIIa (GP IIb/IIIa) receptor inhibitors was reviewed by the Task Force based on a number of recent important clinical trials, which resulted in a remarkable shift in treatment recommendations.[1,2-4] The new guideline update advocates starting GP IIb/IIIa inhibitors only at the time of primary PCI, not before, and even then only in "selected" patients as a IIa recommendation. Additionally, the initiation of GP IIb/IIIa inhibition before primary PCI is now classified as a IIb recommendation, and in fact, is termed "uncertain … usefulness."

The reasoning for this de-emphasis of the role for GP IIb/IIIa inhibitors results from trials demonstrating the lack of efficacy of GP IIb/IIIa inhibitors in the era of dual-antiplatelet therapy (DAPT). The body of evidence supporting the use of GP IIb/IIIa inhibitors was developed in the era before the widespread use of DAPT. Because of this lack of effectiveness, the Task Force downgraded the recommendation for GP IIb/IIIa inhibitor use in STEMI, except in selected patients with unique features (eg, persistent thrombus burden) in whom these agents may have incremental value.

The role of thienopyridines continues to expand in STEMI care, a strategy certainly emphasized in the guideline update. Thienopyridines, as adjuncts to aspirin, are now considered an essential component of the management of patients with STEMI, and the options available to the clinician have expanded in the time since the management guidelines were last updated. Prasugrel, a new thienopyridine with actions documented in the TRITON-TIMI 38 trial, has been approved by the US Food and Drug Administration and is currently clinically available. In TRITON-TIMI 38, prasugrel afforded a 19% relative risk reduction in the primary composite endpoint of death, nonfatal MI, or nonfatal stroke when compared to clopidogrel, at the expense of a significant increase in the risk of major bleeding.[5] Three subgroups of patients appeared not to benefit or even have net harm, including patients with previous history of stroke or transient ischemic attack, those aged 75 years or older, and patients with body weights less than 60 kg, leading to a recommendation that prasugrel not be used in these patient populations. Prasugrel is administered as a 60-mg preprocedural load followed by a maintenance dose of 10 mg/d. Although the exact role of prasugrel remains to be defined by clinicians, this year's focused guideline update now includes prasugrel as a class I recommendation.

Recently, much attention has been given to the supposed interactions between thienopyridines and proton-pump inhibitors, which are postulated to interfere with the platelet inhibition of clopidogrel and, to a lesser extent, prasugrel. Despite ex vivo platelet inhibition studies and

retrospective reports suggesting a negative interaction between the two classes, there exist no published, peer-reviewed, randomized clinical trial data proving such a link. As such, the writing committee did not feel it prudent to add a guideline addressing this potential interaction despite the widespread concomitant use of these two classes. Since that time, the COGENT trial, which prospectively examined the interaction between clopidogrel and omeprazole, was presented at the 2009 Transcatheter Cardiovascular Therapeutics Scientific Sessions. Although the trial was discontinued early because of funding, it did not demonstrate any adverse effect of omeprazole on the effectiveness of clopidogrel.[6]

Parenteral anticoagulants remain a cornerstone of antithrombotic therapy for STEMI, and parenteral therapy is one area of greatest change in the 2009 focused guideline update. Based on the HORIZONS-AMI trial, which compared the direct-thrombin inhibitor, bivalirudin, to unfractionated heparin plus GP IIb/IIIa inhibitor, bivalirudin is now included as an additional class I recommendation for anticoagulant therapy in primary PCI, providing clinicians with a new therapy option with proven efficacy. Although patients assigned to bivalirudin demonstrated a similar 1-year rate of combined death, MI, ischemic target vessel revascularization (TVR), and stroke to those assigned to heparin and GP IIb/IIIa inhibitors, bleeding was less common among bivalirudin patients, as was all-cause mortality. Because of significant crossover in the trial (ie, many patients in the bivalirudin arm initially received unfractionated heparin, yet still a significant outcomes difference was realized), it is likewise considered acceptable to administer bivalirudin for primary PCI in patients who have already received heparin.[4]

Despite the improved clinical outcomes in HORIZONS-AMI for patients receiving bivalirudin, there was concern for a statistically significant increase in the number of patients experiencing acute stent thrombosis (< 24 hours) when compared to those in the unfractionated heparin arm.[4] This difference disappeared after 24 hours and did not affect overall clinical outcomes, but it did draw the attention of the writing committee, who recommend a 600-mg load with clopidogrel before primary PCI for patients receiving bivalirudin as a parenteral anticoagulant.

MECHANICAL THERAPIES

Among the new in-lab procedural recommendations made in the 2009 focused update, much attention was paid to the technique of thrombus aspiration, as well as stent selection.

Given the fundamental role of acute intracoronary thrombosis in the pathogenesis of STEMI, thrombus removal has the potential of augmenting coronary blood flow at both the epicardial and microvascular levels. Furthermore, improved myocardial perfusion may translate into clinical benefit such as lower cardiovascular mortality rates. The data of two randomized trials, TAPAS and EXPIRA, which evaluated manual thrombus aspiration as an initial reperfusion strategy, resulted in a new IIa recommendation in the 2009 update. These trials demonstrated improved perfusion of the microcirculation, reduction in infarct size in EXPIRA, and lower 1-year cardiac death or nonfatal reinfarction rates in TAPAS compared to patients who did not receive thrombus aspiration.[7,8] It is notable that in both trials, each patient who was assigned to the aspiration arm underwent thrombectomy, regardless of the extent of thrombus or duration of MI; the writing committee thus included the caveat that it is unclear whether manual aspiration is helpful in patients with small thrombus burdens or territories of infarct, or for those patients in whom ischemic time is long.

Stent selection continues to be an important decision for clinicians performing primary PCI in the setting of STEMI, particularly because frequently, little historical clinical information about the STEMI patient is available before the primary PCI procedure. Questions then arise regarding a patient's clinical appropriateness for 12 months of DAPT, his or her medical compliance, or access to DAPT, all of which directly affect the decision to select drug-eluting (DES) or bare-metal (BMS) stents. This issue was readily acknowledged by the writing committee, which advocates avoiding DES placement in any patient for whom there exists concerns regarding the ability to tolerate prolonged DAPT, as with elective PCI.[1]

The writing committee reviewed a number of trials, the largest of which was a prespecified substudy of the HORIZIONS-AMI trial in regard to the safety and efficacy of DES compared to BMS in STEMI.[9-11] Because safety appears equivalent and rates of TVR appear slightly lower with DES as compared to BMS, a new class IIa recommendation was created acknowledging DES as an acceptable alternative to BMS. It is also noteworthy that the slight benefit from TVR reduction may not offset the cost of DES and its concomitant longer DAPT requirement, particularly when patient variables are often unknown.

SUMMARY

The 2009 Focused Update for the Management of Patients with ST-Elevation Myocardial Infarction is an important, timely addition to the body of information used to provide competent and appropriate patient care.

The document incorporates information that is relevant, up-to-date, and of sufficient importance to alter practice patterns for many cardiologists. ■

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