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Evidence-Based Perioperative Management of Cardiac Medications in Patients Presenting for Noncardiac Surgery

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• Beta-blockers • Angiotensin-converting enzyme inhibitors
• Angiotensin receptor blockers • Alpha-2 receptor blockers • Anticoagulants
• Antiplatelet agents • HMG CoA reductase inhibitors/statins
• Cardiovascular disease

Key points

- Cardiovascular disease is a major cause of morbidity and mortality not only in the United States but throughout the world.
- Many classes of pharmacologic agents are utilized in the treatment of cardiovascular disease.
- New agents are constantly being introduced into practice. It is important for the anesthesiologist to be familiar with their mechanism of action and guidelines for use.

INTRODUCTION

Cardiovascular disease is the leading cause of death in the United States and is on pace to become the leading cause in the world. According to the Centers for Disease Control and Prevention, in 2014, 610,000 people died of heart disease in the United States [1]. Coronary artery disease (CAD) is the most prevalent subset of cardiovascular disease. CAD leads to major morbidity with more than 735,000 Americans affected by myocardial infarctions each year [2]. With the increase in prevalence of cardiovascular disease and expected continued growth of the diseased population, health care providers must be

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knowledgeable regarding drug therapies and ongoing advancements in therapies used to treat these patients [3].

Confusion often exists regarding appropriate management of cardiovascular-based medications for patients presenting for noncardiac surgery. Specific concerns revolve around need to continue or discontinue medications; the timing of discontinuation before, as well as following, surgery; and the benefits of initiating medications in patients previously naïve to those drugs. This article summarizes the pharmacology of commonly encountered cardiovascular medications, the indications for therapy, and most recent evidence-based guidelines from the American College of Cardiology/American Heart Association (ACC/AHA) regarding appropriate management in patients who are scheduled for noncardiac surgery.

Recommendations are given level of benefit and level of evidence designations based on the most recent 2014 ACC/AHA guidelines. Table 1 presents recommendation and evidence designations to aid familiarity with the perioperative recommendations provided.

Statin therapy

Pharmacology

HMG-CoA reductase inhibitors are generically known as statins owing to the common ending of each drug's generic name. These drugs include simvastatin (Zocor), atorvastatin (Lipitor), pravastatin (Pravachol), and rosuvastatin (Crestor), in addition to others that are not available in the United States. These drugs are currently considered first-line agents in the management of elevated cholesterol and hyperlipidemia in patients at risk for cardiovascular disease [4]. 3-Hydroxy-3-methylglutaryl coenzyme A reductase inhibitor (HMG-CoA) reductase is the rate-limiting enzyme involved in the synthesis of cholesterol though the mevalonic acid pathway (Fig. 1). Inhibiting this enzyme reduces blood cholesterol levels more than diet modification alone. Inhibition of HMG-CoA reductase results in upregulation of the low-density lipoprotein (LDL) receptor within the liver, which results in increased degradation of blood LDL. This subsequently lowers cholesterol while resulting in modest increases in high-density lipoprotein (HDL) [5].

Table 1
Class of recommendation and level of evidence for guidelines

Class of Recommendation	
I	Intervention is useful and effective
IIa	Intervention likely useful and effective based on weight of evidence
IIb	Intervention potentially useful and effective based on evidence or opinion
III	Intervention is not helpful and possibly harmful
Level of evidence	
A	Several RCTs; strong experimental findings
B	Limited evidence from observational trials or a single RCT
C	Expert opinion or standard of care; case reports or series

Abbreviation: RCT, randomized controlled trial.