

Management of Arrhythmias in the Perioperative Setting

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KEYWORDS

• Arrhythmia • Postoperative atrial fibrillation • Surgery • Elderly

KEY POINTS

- Data from several studies suggest that the incidence of postoperative arrhythmia after cardiothoracic surgery is approximately 30% to 40%, with postoperative atrial fibrillation (AF) being most common dysrhythmia.^{1–3} For noncardiothoracic procedures, the incidence ranges from 4% to 20%, depending on the type of surgery performed.^{4–6}
- Bradyarrhythmias are common after cardiac surgery and occur most frequently in the early postoperative period. These arrhythmias, in part, are related to the fluctuation of vagal tone caused direct surgical injury and local edema.
- The initial management of patients with perioperative atrial arrhythmia depends on the hemodynamic effect of the arrhythmia on the patient's clinical status. The first step in managing these patients is to eliminate any potential precipitating factors.
- Multiple studies have demonstrated that beta blocker reduces the risk of AF by up to 61% compared with placebo. Therefore, routine administration of beta blocker after cardiac surgery should be the standard of care to prevent AF.^{7,8}
- Sustained monomorphic or polymorphic ventricular arrhythmias are uncommon with approximately 1% to 3% of patients usually within the first week after surgery.

INTRODUCTION

Perioperative arrhythmias, which often reflect the presence of underlying cardiopulmonary disease or metabolic imbalances, are a common complication of surgery, particularly in the elderly.⁹ Thousands of patients undergo major surgery each year and a major complication of these procedures is the occurrence of perioperative arrhythmia. There is a considerable body of literature regarding the subject in cardiothoracic patients, with little work in noncardiothoracic surgical patients. The immediate postoperative period after surgery is a dynamic period, with elevated levels of

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circulating catecholamines, fluctuation of intravascular volume, alterations in sympathetic and parasympathetic activity, metabolic and electrolyte abnormalities, new surgical wound and cannulation sites on or near myocardial tissue, increased levels of inflammatory mediators, and the frequent presence of pericarditis, all of which have been implicated in the development of postoperative arrhythmias.¹⁰ Data from several studies suggest that the incidence of postoperative arrhythmia after cardiothoracic surgery is approximately 30% to 40%, with postoperative atrial fibrillation (AF) being the most common dysrhythmia.¹⁻³ For noncardiothoracic procedures, the incidence ranges from 4% to 20%, depending on the type of surgery performed.⁴⁻⁶ Among patients undergoing major vascular interventions, the reported incidence ranges from 10% to 20%.¹¹ The presence of postoperative AF is associated with increased morbidity, ICU stay, length of hospitalization, and hospital costs.² The burdens associated with perioperative arrhythmias are expected to rise in the future, given that the population undergoing cardiac surgery is getting older and sicker, thus making it imperative for clinicians managing these patients to be up-to-date on current management of these arrhythmias. In this article, we aim to accomplish the following objectives: (1) to review the prevalence, causes, and management of perioperative bradyarrhythmias, (2) to discuss the mechanisms and therapeutic options for perioperative atrial arrhythmias with a focus on AF, and (3) to review the prevalence and management of perioperative ventricular arrhythmias **Box 1**.

Bradyarrhythmias

Bradyarrhythmias are common after cardiac surgery and occur most frequently in the early postoperative period. These arrhythmias, in part, are related to the fluctuation of vagal tone caused by direct surgical injury and local edema.

The hemodynamic physiologic effects of perioperative bradyarrhythmia may be influenced by the type of arrhythmia, ventricular response, its duration, and the patient's volume status. Bradyarrhythmias, if associated with a loss of atrial synchronous contraction, can dramatically decrease cardiac output, particularly in elderly patients who often have relatively fixed stroke volumes due to underlying diastolic dysfunction. The result is hypotension, decrease coronary perfusion pressure, and myocardial ischemia. In the POISE multicenter randomized controlled trial,¹² which investigated the effects of perioperative beta-blockers in patients undergoing noncardiac surgery, significant hypotension occurred in 15% of treated patients. Preoperative left bundle branch block, concomitant left ventricular aneurysmectomy,

Box 1

Common risk factors for perioperative arrhythmia

Advanced age	Electrolyte abnormalities
Left atrial enlargement	Heightened adrenergic state
*Myocardial ischemia	Drug toxicity (*proarrhythmia)
Hypoxia	*Myocardial infarction
Hypovolemia	*Acute graft closure
Hemodynamic instability	*Reperfusion after cessation of bypass
Valvular heart disease	*Female sex
Hypertension	Hypoglycemia or hyperglycemia
Pulmonary disease	*Cardiomyopathy
Inflammation due to serositis	Beta-blocker withdrawal
* More specific for ventricular arrhythmias.	

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