Intraoperative Cardiac Emergencies

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KEYWORDS

• Perioperative hypertension • Myocardial infarction • Arrhythmias
• Autonomic dysreflexia • Tension pneumothorax • Tamponade

KEY POINTS

- Thorough preoperative evaluation and assessment of cardiac risk allows the anticipation of intraoperative cardiac alterations.
- Hypertension is a common coexisting disease of surgical patients and can exacerbate during the intraoperative period. Maintenance of the patient's baseline hemodynamics and pharmacologic treatment can optimize outcomes for these patients.
- There are various cardiac emergencies that can occur perioperatively, all requiring an astute practitioner for rapid assessment and treatment to decrease the associated morbidity and mortality.

INTRODUCTION

Cardiac complications constitute the most common cause of postoperative morbidity and mortality, strongly affecting the length and cost of hospitalization.[1] Cardiac alterations that present perioperatively include hypertension, myocardial infarction (MI) or ischemia, arrhythmias, autonomic dysreflexia, tension pneumothorax, and tamponade. Cardiac complications of death, MI, heart failure, or ventricular tachycardia occur in up to 5% of patients aged 45 years and older undergoing in-hospital noncardiac surgery.[2] Of these, perioperative MI is the most common. Thorough preoperative evaluations are necessary to clarify a patient's cardiac risk associated with the individual surgery presented. Certified Registered Nurse Anesthetists are directly involved in the assessment, management, and recovery of these patients during the perioperative period. Optimal outcomes from cardiac emergencies begin with prompt recognition and keen assessment to identify a change in a patient's status.

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HYPERTENSION

Hypertension is a commonly encountered coexisting disease in surgical patients. It affects roughly 30% of the United States population more than 18 years old and is one of the most common chronic medical conditions.[3] In individuals older than 65 years, two-thirds of the population have hypertension.[4] Hypertension is a strong risk factor for coronary artery disease (CAD) and also a cause of congestive heart failure and cardiomyopathy caused by the increased afterload from chronic vasoconstriction.[4] Hypertension is a risk factor for complications following anesthesia and surgery. Considering the prevalence of hypertension, the strict and thorough management of these patients undergoing surgery is critical to avoiding the associated morbidity and mortality.

Table 1 describes the different classifications of blood pressure. The Seventh Report of the Joint National Committee defined hypertensive crisis as systolic blood pressure greater than 180 mm Hg or a diastolic blood pressure greater than 110 mm Hg.[5] Hypertensive crisis in the perioperative setting usually presents in patients who are untreated or inadequately treated.[6] This term encompasses both hypertensive emergencies and urgencies, which are differentiated as follows:

- Hypertensive emergency: severe increase in blood pressure complicated by evidence of progressive organ dysfunction. This condition requires immediate blood pressure reduction to limit organ damage.
- Hypertensive urgency: severe increase in blood pressure without organ dysfunction.

Patients who are optimized before surgery have a more stable intraoperative course,[4] therefore it is essential to include certain details in the preoperative assessment:

- Clarify whether the patient has been on an adequate treatment regimen (determine the last dose of medications)
- Determine the level at which the patient's blood pressure is usually maintained
- Because hypertension is a major risk factor for CAD, evaluate the patient for any signs of ischemia

The decision to cancel elective surgery for preoperative hypertension is controversial and varies with practitioner experience and judgment. Wax and colleagues[7] performed a retrospective analysis to investigate the incidence of preoperative hypertension, case cancellations, and association with postoperative outcomes. The severity of preinduction hypertension was an independent risk factor for postoperative myocardial injury/infarction or in-hospital death. However, the small percentage of

Table 1
Classifications of blood pressure

BP Classification	SBP (mm Hg)	DBP (mm Hg)
Normal	<120	<80
Prehypertension	120–139	80–89
Stage 1 hypertension	140–159	90–99
Stage 2 hypertension	≥160	≥100

Abbreviations: BP, blood pressure; DBP, diastolic blood pressure; SBP, systolic blood pressure.

Data from Chobanian AV, Bakris GL, Black HR, et al. Seventh report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension 2003;42(6):1206–52.