

# Unravelling the Intricacies of Post-Surgical Cardiovascular Emergencies-A Comprehensive Analysis

Vismit Munesh Gami<sup>1</sup>, Jugal Shah<sup>2</sup>, Prutha Jadav<sup>3</sup>, Rutu Brahmhatt<sup>3</sup>, Viajkhora Muhammed Abdul Rashid<sup>3</sup>, Krutarth Chuahan<sup>3</sup>, Chirag Adhyaru<sup>3</sup>, Deep Mehta<sup>3</sup>, Dev Desai<sup>3\*</sup>

<sup>1</sup>NHLMMC, Ahmedabad, Gujarat, India.

<sup>2</sup>Department of Medicine AMC MET Medical College, Ahmedabad, Gujarat, India.

<sup>3</sup>Department of Surgery NHLMMC, Ahmedabad, Gujarat, India.

\*Corresponding author: Dev Desai.

## Abstract

Surgical procedures carry inherent risks, and one of the most critical complications that can arise is cardiovascular system emergencies. Patients with severe comorbidities should be referred to a relevant specialist to quantify the risk and to take appropriate measures to minimize operative morbidity. Surgery cannot be risk-free, but risk must be known so that patients can make an informed decision. By understanding the intricacies associated with these complications, healthcare professionals can enhance patient post-operative care and improve surgical outcomes. The aim of post-operative care is to provide the patient with as quick, painless, and safe recovery from the surgery as possible.

**Keywords:** post-surgical; anesthesia; surgery

## Editorial

Cardiac complications following surgery can pose significant risks to patients and are a leading cause of morbidity and mortality. These complications can arise due to various factors, including the patient's pre-existing cardiovascular conditions, the nature of the surgical procedure, and perioperative events [1,2]. There are various types of CVS complications like Hypotension, Myocardial infarction (MI), arrhythmias, pericardial effusion, Cardiogenic shock, heart failure etc [3]. Hypotension in the immediate post-operative period is more likely due to inadequate fluid replacement, subarachnoid or epidural anesthesia leading to vasodilation, surgical bleeding, cardiac failure, pleural effusion, anaphylaxis, Myocardial infarction, rewarming of patients etc [4]. Patients with hypotension have signs like cold clammy skin in extremities first with tachycardia and low urine output of <0.5ml/kg per hour. Hypovolemia should be corrected with intravenous crystalloids like normal saline (NS) or ringer lactate (RL) or colloid infusions like Dextran or human albumin. Myocardial Infarction (MI) [5]. Is more commonly seen in patients with previous cardiac problems undergoing major surgery. They present with complaints of retrosternal pain radiating to arms and neck along

with dyspnoea, syncope, nausea and vomiting. They are at risk of developing Acute coronary syndrome. MI, also known as heart attack, occurs when the blood supply to the heart muscle is compromised, leading to tissue damage called ischemia. Factors like Surgical stress, clot formation, and reduced blood flow during surgery can trigger an MI. There is ST elevation in two continuous leads in ECG in MI (STEMI) or some time it may not be there (NSTEMI). In both the MI, Serum troponin levels will be high and they are the earliest marker in the detection of MI in patients. For management of a patient with MI [5]. Treatment involve Oxygenation at a rate of 4L/min. along with medication like glyceryl trinitrate (GTN) sublingual, morphine, and aspirin with clopidogrel. Beta-blockers and calcium channel blockers may be added to reduce the further episode. In severe cases, cardiologists may perform Coronary reperfusion therapy in the form of Primary Percutaneous coronary intervention or thrombolysis in a state of emergency. Surgery can disrupt the electrical conduction system of the heart, resulting in abnormal heart rhythms called arrhythmia. Common arrhythmias include atrial fibrillation [6]. Ventricular tachycardia, and bradycardia. Arrhythmias can cause hypotension and ischemia in patient and thus they should be carefully monitored and apt treatment should be given that

include correction of the acid-base and electrolyte imbalance, hypoxia, and hypercapnia. Tachycardia caused in post-operative usually occurs due to anxiety, stress, sepsis, hypovolemia, and pain. Correcting the underlying cause can control tachycardia. Medication like amiodarone and beta blockers can be used. Cardioversion is reserved for conditions where medication fails or during an emergency. Bradycardia in the postoperative period is associated with hypoxia, medication like digoxin and post-operative beta blockers. To control bradycardia medication like atropine, and glycopyrrolate should be administered intravenously. Heart failure can be a significant postoperative complication that may arise following various major surgeries, which arises when the heart fails to pump enough blood to meet the body's needs [7]. It can occur due to severe myocardial damage or extensive fluid loss. The stress placed on the cardiovascular system during surgery, anesthesia, and the perioperative period can exacerbate pre-existing heart conditions like coronary artery disease, valvular heart disease, or other cardiac abnormalities are at an increased risk of developing postoperative heart failure. A multidisciplinary approach is crucial in managing this challenging complication. Medications such as diuretics to alleviate fluid overload, beta-blockers to reduce cardiac workload, angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs) to improve cardiac function, and inotropes in severe cases to enhance myocardial contractility. Frequent assessment of vital signs, fluid status, oxygen saturation, and cardiac function to guide treatment decisions and identify any worsening of heart failure. Supplemental oxygen may be provided to ensure adequate oxygenation and relieve respiratory distress. Cardiac tamponade is a rare but potentially life-threatening postoperative complication, characterized by the accumulation of fluid or blood in the pericardial sac, resulting in increased pressure on the heart and impaired cardiac function [8]. Accumulation of fluid, such as blood, lymphatic fluid, or serous fluid, in the pericardial space can occur as a result of surgical trauma, bleeding, or inflammatory response after surgery. Clinical presentation of cardiac tamponade describes as Beck's Triad, which includes, Hypotension, Muffled heart sounds and Distended Neck Veins [9]. Management includes prompt intervention to relieve cardiac tamponade and restore adequate cardiac function. Pericardiocentesis is a procedure where the immediate evacuation of fluid or blood from the

pericardial sac using a needle or catheter is done under ultrasound or fluoroscopic guidance [10]. Medication like inotropic agents or vasopressors may be required to support blood pressure until definitive treatment can be provided.

### **Prevention of such Cardiovascular complications is very important and this includes**

Preoperative evaluation of the patient's cardiac status before surgery helps identify those at high risk. Optimization of pre-existing conditions, such as coronary artery disease or heart failure, through medication and other interventions, can minimize the risk of complications [8]. Selecting appropriate anesthetic agents, monitoring hemodynamic parameters closely, and maintaining adequate blood pressure and oxygenation during surgery can reduce the incidence of cardiac complications. Strict adherence to surgical protocols, including minimizing blood loss, maintaining fluid balance, and preventing infections, is crucial. Early detection and prompt management of perioperative events, such as hypotension or electrolyte imbalances, are essential to prevent cardiac complications. Continuous cardiac monitoring in the immediate postoperative period helps identify any early signs of complications. Electrocardiography (ECG), echocardiography, and cardiac enzyme-like serum troponin tests may be performed as necessary. If a cardiac complication arises, prompt intervention is vital. Treatment strategies may include the administration of medications, such as antiplatelets or anticoagulants for MI, rhythm control for arrhythmias, and in severe cases, surgical intervention or mechanical circulatory support. In summary, post-surgical complications involving the cardiovascular system can have severe consequences and require prompt identification and intervention. By understanding the types, risk factors, clinical presentation, diagnostic interventions, prevention methods, and management modalities related to cardiovascular emergencies, healthcare professionals can optimize patient care and improve surgical outcomes. Through continued research and advancements in perioperative management, it is hoped that the incidence and impact of these complications can be further reduced, enhancing patient safety and well-being.

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