

COMPLICATIONS AFTER MYOCARDIAL INFARCTION

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**Abstract:** Myocardial infarction (MI) is one of the leading causes of mortality worldwide, and despite advancements in acute management, post-MI complications remain a significant burden on healthcare systems. This article provides a comprehensive overview of common complications following MI, including heart failure, arrhythmias, left ventricular aneurysm, thromboembolic events, pericarditis, and mechanical complications such as papillary muscle rupture and ventricular septal defects. Detailed attention is given to pathophysiology, diagnostic approaches, and treatment strategies for each complication. Emphasis is also placed on the role of cardiac rehabilitation and secondary prevention in improving outcomes and reducing recurrent events.

**Keywords:** Myocardial infarction, post-MI complications, heart failure, arrhythmias, ventricular aneurysm, secondary prevention

**Introduction.** Myocardial infarction (MI), commonly referred to as a heart attack, occurs due to the sudden obstruction of coronary blood flow, leading to ischemic necrosis of myocardial tissue. Despite advances in medical and interventional therapies, complications arising after MI continue to challenge clinicians. These complications can affect nearly all organ systems, predominantly impacting the cardiovascular system. Post-MI complications are categorized into:

1. Early complications (within the first 48–72 hours): arrhythmias, cardiogenic shock, and myocardial rupture.
2. Late complications (days to weeks): heart failure, ventricular aneurysms, and thromboembolism.

This article aims to review these complications comprehensively, analyze their pathophysiology, and discuss contemporary diagnostic and therapeutic strategies. **Materials and Methods.** This review is based on a systematic analysis of literature published between 2015 and 2024. Data sources included PubMed, Scopus, and Google Scholar, using keywords such as "myocardial infarction complications," "post-

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Researchbib Impact factor: 13.14/2024

SJIF 2024 = 5.444

Том 3, Выпуск 01, Январь

MI heart failure," "ventricular aneurysm," and "arrhythmias after MI." The analysis covered: Clinical trials and observational studies. Guidelines and recommendations from the European Society of Cardiology (ESC) and the American Heart Association (AHA). Meta-analyses focusing on post-MI complications. Studies were selected to highlight epidemiology, mechanisms, diagnostic tools, and treatment outcomes.

Results. 1. Heart Failure. Prevalence: Post-MI heart failure occurs in 20–40% of patients. Pathophysiology: The loss of myocardial tissue impairs systolic and diastolic function, leading to reduced cardiac output. Symptoms: Dyspnea, orthopnea, fatigue, and peripheral edema. Management: Pharmacological: Beta-blockers, ACE inhibitors, ARBs, MRAs, and SGLT2 inhibitors. Device-based therapies: Cardiac resynchronization therapy (CRT) and implantable cardioverter-defibrillators (ICDs) for advanced cases. Advanced therapies: Heart transplantation or left ventricular assist devices (LVADs) in refractory cases.

2. Arrhythmias. Prevalence: Up to 80% of patients experience arrhythmias post-MI. Types: Ventricular arrhythmias: Ventricular tachycardia (VT) and ventricular fibrillation (VF). Atrial arrhythmias: Atrial fibrillation (AF). Bradyarrhythmias: Sinus node dysfunction or heart block. Management: Acute: Antiarrhythmic drugs (e.g., amiodarone), electrical cardioversion for VT/VF. Chronic: ICD implantation for secondary prevention of sudden cardiac death.

3. Left Ventricular Aneurysm. Prevalence: Develops in 10–30% of patients. Pathophysiology: Infarcted myocardial tissue undergoes thinning and scar formation, resulting in aneurysmal dilation. Complications: Thrombus formation, arrhythmias, and heart failure.

Management: Medical: Anticoagulation to prevent embolism. Surgical: Resection of the aneurysm in symptomatic cases.

4. Thromboembolism. Prevalence: Occurs in 5–10% of patients. Mechanism: Blood stasis in the left ventricle or aneurysm promotes thrombus formation. Complications: Systemic embolism (e.g., stroke) and pulmonary embolism. Management: Long-term anticoagulation with warfarin or DOACs.

5. Pericarditis. Types: Early pericarditis: Occurs within 1–4 days due to direct myocardial inflammation. Dressler syndrome: An autoimmune reaction occurring weeks after MI. Symptoms: Chest pain, pericardial rub, and fever. Management: NSAIDs, colchicine, and corticosteroids in refractory cases.

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6. Mechanical Complications. Examples: Papillary muscle rupture: Leads to acute mitral regurgitation and pulmonary edema. Ventricular septal defect: Creates a left-to-right shunt, causing cardiogenic shock. Management: Emergent surgical repair is often required. Discussion Post-MI complications significantly impact patient outcomes and healthcare resources. Early identification and intervention are crucial. For example: Heart failure management has evolved with the introduction of SGLT2 inhibitors, significantly improving survival rates. Device-based therapies, such as ICDs and CRT, reduce arrhythmia-related mortality. Advances in imaging techniques (e.g., cardiac MRI) allow earlier detection of left ventricular dysfunction and aneurysms. Despite these advancements, challenges persist in resource-limited settings, where access to advanced therapies remains inadequate. Multidisciplinary care, integrating cardiologists, rehabilitation specialists, and primary care physicians, is essential for comprehensive management.

## Conclusion

Myocardial infarction continues to pose challenges due to its complications. Early detection, effective management, and cardiac rehabilitation are key to improving patient outcomes. Ongoing research into novel therapies, including stem cell therapy and gene editing, holds promise for reducing the long-term burden of post-MI complications.

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**SJIF 2024 = 5.444**

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