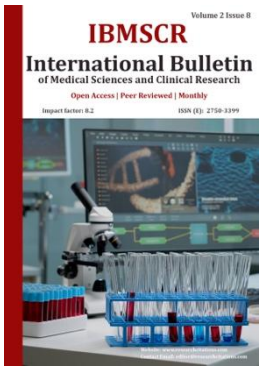


# ACQUIRED HEART DEFECTS, ISCHEMIC HEART DISEASE AND MODERN APPROACHES TO TREATMENT

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**Abstract**

Acquired heart defects and ischemic heart disease remain among the most pressing challenges in modern cardiology. These conditions significantly contribute to morbidity and mortality worldwide, affecting the quality of life of millions of patients. The development of acquired heart defects often results from chronic ischemia, infections, or degenerative changes within cardiac structures. Ischemic heart disease, primarily caused by atherosclerotic lesions of the coronary arteries, is one of the leading causes of disability and death globally. Recent advances in diagnostic methods, including echocardiography, cardiac MRI, and coronary angiography, allow for earlier and more accurate detection of pathological changes. Modern treatment strategies integrate pharmacological therapy, surgical interventions, and minimally invasive techniques such as percutaneous coronary intervention and valve repair. Furthermore, preventive measures, lifestyle modification, and patient education play a crucial role in reducing disease progression and complications. This article highlights current approaches to the diagnosis and treatment of acquired heart defects and ischemic heart disease, emphasizing the importance of comprehensive management for improved clinical outcomes.

**Keywords**

Acquired heart defects; Ischemic heart disease; Coronary artery disease; Modern treatment; Cardiology; Diagnosis; Prevention; Surgery; Pharmacological therapy.

## Introduction

Cardiovascular diseases remain one of the leading health concerns worldwide, with ischemic heart disease and acquired heart defects representing a major portion of this burden. These conditions not only increase the risk of morbidity and mortality but also place a considerable strain on healthcare systems. Acquired heart defects are commonly the result of long-term ischemia, infections, or degenerative changes in the cardiovascular structures. Meanwhile, ischemic heart disease, most often caused by narrowing of the coronary arteries due to atherosclerosis, continues to be the primary cause of premature death globally.

Advances in modern medicine have introduced more accurate diagnostic methods and innovative treatment strategies, ranging from pharmacological management to surgical and minimally invasive approaches. At the same time, prevention, lifestyle changes, and patient education are becoming equally important to improve long-term outcomes. Studying these diseases and modern therapeutic approaches is essential for both improving patient survival and enhancing quality of life.

## Main Part

### Development of Acquired Heart Defects

Acquired heart defects represent changes in the heart's structure that occur after birth, unlike congenital malformations. Their origins are diverse, but the most frequent causes include chronic ischemic processes, infections, inflammatory conditions, trauma, and age-related degeneration. One of the classical reasons is rheumatic fever, which remains a public health issue in some regions of the world. Repeated attacks of rheumatic carditis may lead to deformities of the cardiac valves, particularly producing mitral stenosis, mitral insufficiency, or combined lesions.

In elderly populations, degenerative valve disorders play a more important role. Progressive calcification and fibrosis of valve leaflets narrow the valve opening, leading to obstructed blood flow. Infective endocarditis is another cause, as microorganisms directly damage the endocardial surfaces, creating severe regurgitant lesions. Furthermore, ischemia of papillary muscles following myocardial infarction may weaken valve support and trigger functional regurgitation. These mechanisms gradually impair the hemodynamics of the heart, predisposing patients to heart failure.

**Ischemic Heart Disease as a Leading Cause of Death**

Ischemic heart disease (IHD), often referred to as coronary artery disease, arises mainly from atherosclerotic narrowing of the coronary arteries, which reduces blood supply to the myocardium. Multiple risk factors contribute, including hypertension, high cholesterol, diabetes, obesity, smoking, and lack of physical activity.

Clinical forms of IHD range from stable angina pectoris with exertional chest pain to acute coronary syndromes such as unstable angina and myocardial infarction. Myocardial infarction is particularly dangerous, as prolonged ischemia leads to irreversible necrosis of cardiac tissue. Over time, repeated ischemic episodes can cause remodeling of the myocardium, resulting in dilated or ischemic cardiomyopathy and chronic heart failure.

Recent global statistics indicate that ischemic heart disease accounts for nearly nine million deaths annually, making it the foremost cause of mortality worldwide. Despite improvements in medical technology, its prevalence remains high in low- and middle-income countries due to limited access to preventive care and interventional cardiology services.

**Diagnostic Methods**

The diagnosis of these cardiovascular disorders requires a combination of clinical evaluation and modern imaging techniques.

- **History and examination:** Patient interviews reveal risk factors and symptom patterns, while auscultation may identify murmurs pointing to valvular pathology.
- **Electrocardiography (ECG):** Provides rapid evidence of ischemia, prior infarction, and arrhythmias; exercise stress tests increase diagnostic accuracy.
- **Echocardiography:** Visualizes cardiac chambers, ventricular contractility, and valve abnormalities, making it indispensable in evaluating stenosis and regurgitation.
- **Coronary angiography:** Considered the reference standard for detecting arterial blockages and determining revascularization strategies.
- **Cardiac CT and MRI:** Enable precise assessment of myocardial perfusion, scarring, and coronary anatomy in non-invasive ways.

Timely detection is essential, as prognosis is closely linked with the stage at which treatment begins.

**Contemporary Treatment Approaches**

The management of acquired heart defects and ischemic heart disease integrates drug therapy, surgical interventions, and preventive strategies.

**Medical Therapy**

Medications remain the cornerstone of treatment in the early stages.

Antiplatelet drugs like aspirin and clopidogrel decrease thrombotic events.

Beta-blockers and calcium channel blockers reduce oxygen demand and relieve anginal discomfort.

Nitrates improve coronary perfusion and alleviate acute chest pain.

Statins slow atherosclerosis progression by lowering cholesterol.

In patients with heart failure, ACE inhibitors, angiotensin receptor blockers, and diuretics provide symptomatic relief and reduce mortality.

**Surgical and Interventional Management**

When pharmacological treatment is insufficient, invasive techniques are required.

- Valve surgery restores normal circulation in advanced valvular defects. Mechanical prostheses offer durability but require anticoagulation, while biological valves are more physiological but have limited lifespan.
- Coronary artery bypass grafting (CABG) remains highly effective in multivessel disease, improving survival and symptoms.
- Percutaneous coronary intervention (PCI) with balloon angioplasty and stent placement has revolutionized care, enabling revascularization without open surgery.
- For high-risk patients, transcatheter valve implantation (such as TAVI for aortic stenosis) is a minimally invasive option with promising outcomes.

**Preventive Measures and Lifestyle Changes**

No modern therapy is complete without preventive care. Lifestyle modifications—balanced diet, quitting smoking, physical activity, and weight control—are crucial in lowering cardiovascular risk. Public health programs that target risk factors at the community level are effective in reducing the incidence of both ischemic heart disease and acquired heart defects. Patient education also ensures adherence to treatment and improves long-term outcomes.

**Prospects for the Future**

The field of cardiology is rapidly evolving. Precision medicine aims to tailor therapies according to genetic profiles and biomarkers. Artificial intelligence is being integrated into diagnostic imaging and predictive models. Research into regenerative medicine, including stem cell and tissue engineering, provides hope for repairing damaged myocardium. Minimally invasive interventions are also becoming more refined, expanding access to advanced therapies for broader populations.

**Conclusion**

Acquired heart defects and ischemic heart disease remain major contributors to global morbidity and mortality, representing some of the most pressing challenges in cardiovascular medicine. Their multifactorial origins, ranging from infections and degenerative changes to atherosclerosis and lifestyle-related risks, make both prevention and treatment complex. Advances in diagnostic technologies such as echocardiography, cardiac MRI, and coronary angiography have significantly improved early detection, allowing physicians to initiate timely and targeted interventions. Modern therapeutic strategies demonstrate the importance of an integrated approach. Pharmacological treatment reduces symptoms and prevents

complications, while surgical and minimally invasive procedures restore cardiac function in advanced stages. At the same time, preventive measures and lifestyle modification continue to be fundamental in reducing disease progression and improving quality of life. Looking ahead, cardiology is entering a new era where precision medicine, regenerative therapies, and digital health innovations may transform patient outcomes. For effective control of these diseases, a comprehensive strategy that combines modern medical technologies with prevention and patient education is essential. Only through such a holistic approach can the burden of acquired heart defects and ischemic heart disease be reduced on both individual and public health levels.

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