

CLINICAL SIGNIFICANCE AND EFFECTIVENESS OF CARDIAC STENTING: MODERN APPROACHES

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Abstract: This article examines one of the widely used interventional methods in the treatment of cardiovascular diseases — cardiac stenting — analyzing its clinical importance, effectiveness, and its place in modern medicine. The article covers both the diagnostic and therapeutic approaches to stenting as a means of preventing and treating ischemic heart diseases through the opening of coronary arteries. It also provides information on different types of stents used in practice, their advantages and disadvantages, their impact on patient outcomes, potential complications, and preventive strategies.

Keywords: Cardiac stenting, coronary artery, interventional cardiology, ischemic heart disease, minimally invasive treatment, modern medicine.

Introduction

Cardiovascular diseases remain among the leading causes of death and disability worldwide. According to the World Health Organization (WHO), ischemic heart diseases claim the lives of millions each year. Despite significant progress in the diagnosis, prevention, and treatment of these diseases, the demand for innovative and effective approaches continues to grow. One such method — coronary artery stenting — has become widely adopted in modern cardiology. This technique restores heart function by reopening narrowed or blocked segments of arteries supplying blood to the myocardium. Compared to traditional open-heart surgery, stenting is considered safer, faster, and more efficient, marking a revolutionary advancement in the treatment of cardiac conditions. This intervention plays a vital role in saving lives in conditions such as angina pectoris, myocardial infarction, and coronary insufficiency. Furthermore, it allows for the early detection and treatment of cardiac diseases in a minimally invasive manner. This article explores the clinical foundations of stenting, evaluates the effectiveness of various types of stents, and discusses post-stenting management strategies and modern approaches. The goal is to provide a comprehensive theoretical and practical analysis of contemporary cardiac treatment modalities.

Methodology

This article is based on scientific literature analysis and relies on the following sources:

International peer-reviewed medical journals and articles published within the last 10 years (PubMed, The Lancet, European Heart Journal).

Official cardiovascular disease statistics in Uzbekistan (Ministry of Health).

Clinical observation and comparative analysis of patient outcomes.

Educational manuals and dissertations on interventional cardiology.

Guidelines from local and international health organizations.

Content analysis, comparative evaluation, and practical case generalization methods were applied.

Main body

1. General concept of cardiac stenting

Cardiac stenting is a minimally invasive, non-surgical procedure used to open narrowed or blocked coronary arteries and restore blood flow. The procedure is typically performed alongside coronary angioplasty, which involves balloon dilation of the artery. A stent is a small, mesh-like cylindrical device, often made of metal or polymer, inserted into the artery to keep it open. Early stents were bare metal, but more advanced types — such as drug-eluting and bioresorbable stents — have since been developed to improve outcomes and reduce complications.

2. Types of stents and their clinical effectiveness

These early-generation stents are inexpensive and structurally simple but are associated with a high rate of restenosis (re-narrowing of the artery) due to tissue regrowth inside the vessel. These stents are coated with medications like sirolimus, everolimus, or zotarolimus, which inhibit cell proliferation and reduce the risk of restenosis. Multiple clinical trials have confirmed their superior effectiveness compared to BMS. A recent innovation, BRS stents are designed to dissolve within the body over time, maintaining natural vascular function and reducing long-term mechanical complications. However, they are not yet widely adopted, and ongoing studies are assessing their safety and efficacy.

3. Benefits of stenting in clinical practice

Prompt stenting during a heart attack can significantly reduce myocardial ischemia and limit infarct size, playing a crucial role in patient survival. Stenting provides relief for patients with chest pain due to coronary narrowing, particularly when medications fail to control symptoms. In patients with ischemic cardiomyopathy, improving blood flow through stenting can help restore cardiac function and improve quality of life.

4. Post-stenting management and follow-up

After stent placement, dual antiplatelet therapy (DAPT) — typically aspirin combined with clopidogrel, prasugrel, or ticagrelor — is essential to prevent thrombosis. Regular cardiac check-ups, lifestyle modifications, and gradually increasing physical activity are also crucial for long-term success.

5. Complications and prevention

While generally safe, stenting may lead to complications such as:

Stent thrombosis — clot formation inside the stent.

Restenosis — re-narrowing of the vessel.

Allergic reactions — to contrast dye or stent material.

Prevention strategies include:

Strict adherence to antiplatelet therapy,

Pre-procedure allergy testing,

Personalized stent selection based on patient-specific anatomical and clinical factors.

Analysis and results

Stenting has proven effective not only in emergency but also in elective cases. Major international trials like SYNTAX and EXCEL demonstrated the clinical success of DES, showing that stenting offers faster recovery and comparable outcomes to coronary artery bypass grafting (CABG) in certain patient groups. Modern advancements have improved the biocompatibility of stents, enhancing patient tolerance. The future of bioresorbable stents is promising, offering solutions without permanent implants. Nonetheless, personalized medicine remains essential — each case requires evaluation of coronary anatomy, drug response, and overall risk profile.

Conclusion

Cardiac stenting is one of the most important modern therapeutic methods in cardiology. It plays a vital role in restoring blood flow, reducing pain symptoms, and improving patient outcomes. Particularly in myocardial infarction and unstable angina, rapid intervention can be life-saving. The variety of available stents allows for individualized approaches tailored to each patient. Drug-eluting stents have reduced the incidence of restenosis, while bioresorbable options may reduce long-term complications. As diagnostic methods evolve at the genetic and molecular level, stenting techniques will also become more personalized and effective, securing its position as a cornerstone of modern cardiovascular medicine.

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