

Advances in Percutaneous Coronary Intervention: Innovations in Stent Technology and Procedure Techniques

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Abstract

Percutaneous coronary intervention (PCI) has undergone significant advancements in recent years, particularly in stent technology and procedural techniques. This paper reviews the latest innovations in stent design, including drug-eluting stents (DES), bioresorbable scaffolds (BRS), and the emerging concept of next-generation stents. Additionally, procedural techniques such as improved imaging technologies, rotational atherectomy, and the integration of artificial intelligence (AI) in PCI procedures are explored. These advancements have led to enhanced patient outcomes, reduced complications, and improvements in the long-term success of PCI. By analyzing current trends and innovations, this paper highlights the ongoing evolution of PCI as a cornerstone of modern cardiovascular treatment.

Keywords: Percutaneous coronary intervention, stent technology, drug-eluting stents, bioresorbable scaffolds, PCI procedural techniques, artificial intelligence, rotational atherectomy.

1. Introduction

Percutaneous coronary intervention (PCI) has revolutionized the treatment of coronary artery disease (CAD) since its inception in the late 20th century. PCI, which involves the use of a catheter to treat narrowed or blocked coronary arteries, is an essential method for restoring blood flow to the heart. Advances in stent technology, particularly the development of drug-eluting stents (DES) and bioresorbable scaffolds (BRS), alongside innovations in procedural techniques, have significantly improved clinical outcomes for patients undergoing PCI. This paper aims to explore these technological innovations in stent design and PCI techniques, and their role in enhancing the safety and efficacy of PCI procedures.