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Revolutionizing Interventional Cardiology: A Comprehensive Exploration of Bioresorbable Vascular Scaffolds

Yi Wang*

Department of Internal Medicine, National Taiwan University, Taiwan

INTRODUCTION

In the dynamic field of interventional cardiology, technological innovations continually seek to enhance patient outcomes and improve the efficacy of treatments. One such groundbreaking development is the introduction of Bioresorbable Vascular Scaffolds (BVS), a revolutionary alternative to traditional metallic stents in coronary artery interventions. This article delves into the intricacies of Bioresorbable Vascular Scaffolds, exploring their development, mechanisms, clinical applications, benefits, challenges, and the future landscape of interventional cardiology. The advent of coronary stents has transformed the landscape of interventional cardiology, offering a minimally invasive solution to treat Coronary Artery Disease (CAD). Traditional metallic stents, typically made of stainless steel or cobalt-chromium alloys, have been widely used to provide structural support to diseased coronary arteries. However, their permanence poses challenges, such as the potential for late stent thrombosis, impaired vasomotion, and the limitation of vessel remodeling. Bioresorbable Vascular Scaffolds represent a paradigm shift in coronary stent technology. Composed of bioabsorbable polymers such as Poly-L-Lactic Acid (PLLA), these scaffolds provide temporary support to the vessel, gradually dissolving over time. The development of BVS aimed to address the limitations associated with permanent metallic stents and offer a more physiological and patient-friendly solution [1,2]. The introduction of BVS sparked extensive research and clinical trials to evaluate their safety and efficacy compared to traditional stents.

DESCRIPTION

BVS have demonstrated efficacy in treating complex lesions, including bifurcations and small vessels, where their temporary support allows for vessel healing without the long-term limitations associated with metallic stents. The temporary nature of BVS allows for vessel remodeling and restoration of physiological function, addressing one of the key limitations of metallic stents. As BVS gradually resorb, the risk of late stent thrombosis and chronic inflammation is reduced, potentially leading to improved long-term outcomes. The bioresorbable nature of these scaffolds enables better visualization of the vessel during imaging procedures, facilitating more accurate assessment of the treated segment. Achieving the right balance between scaffold strength and strut thickness remains a challenge. Struts that are too thick may impede vessel healing, while those that are too thin may compromise mechanical support. The rate at which BVS resorb can vary among individuals, potentially impacting the timing of vessel healing and exposing patients to a period of increased vulnerability. Ensuring the biocompatibility of the polymers used in BVS is crucial to minimize inflammation and promote optimal vessel healing. Ongoing research focuses on refining the design of BVS, incorporating advanced materials and technologies to address current limitations and enhance overall performance [3,4]. Combining BVS with other novel therapies, such as bioactive coatings and gene therapies, may offer synergistic benefits in improving patient outcomes.

CONCLUSION

Bioresorbable Vascular Scaffolds represent a groundbreaking innovation in interventional cardiology, providing a temporary solution to coronary artery disease with the potential to overcome the limitations associated with permanent metallic stents. Despite challenges and ongoing research, BVS have demonstrated promising results in various clinical scenarios, offering a glimpse into the future of patient-centric and physiologically tailored coronary interventions. As technology continues to advance, the evolution of BVS and their integration into routine clinical practice holds the promise of further improving patient outcomes and reshaping the landscape of

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Corresponding author Yi Wang, Department of Internal Medicine, National Taiwan University, Taiwan, E-mail: wangyi@seed.net.tw

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CONFLICT OF INTEREST

The author's declared that they have no conflict of interest.

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