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The Battle against Restenosis: Advances in Treatment and Prevention

Sarah Patel*

Department of Cardiology, Health Sciences University, United Kingdom

INTRODUCTION

These factors promote the migration and proliferation of smooth muscle cells into the vessel wall, contributing to fibrosis and the narrowing of the vessel. Over time, the buildup of scar tissue (fibrosis) can cause the artery to become stiffer and narrower, restricting blood flow and increasing the likelihood of restenosis. Vascular remodeling refers to the changes in the structure of the blood vessel wall that occur in response to injury. This process can be beneficial in some cases, as it can help the vessel heal and maintain blood flow. However, excessive remodeling can lead to further narrowing or restenosis. Restenosis can be categorized based on the type of intervention and the specific location of the artery involved. Stents are used to keep the artery open after balloon angioplasty, but in some cases, the artery can become narrowed again due to the mechanisms discussed above. ISR occurs in approximately 30% to 50% of patients following stent placement, particularly in those who have risk factors such as diabetes, smoking, or high cholesterol. The risk of ISR is higher in patients who receive older types of stents, such as Bare Metal Stents (BMS). Balloon angioplasty is a procedure in which a catheter with a balloon is inserted into a narrowed artery, and the balloon is inflated to widen the vessel.

DESCRIPTION

While balloon angioplasty can be effective in the short term, restenosis can occur as the artery heals and returns to its narrow state, particularly in the absence of a stent to maintain the artery's patency. The rate of restenosis after balloon angioplasty is higher compared to when stents are used, especially in arteries that are severely narrowed or calcified. Several factors increase the likelihood of restenosis following coronary artery interventions. Diabetic patients are at a higher risk of restenosis due to their tendency to develop more aggressive forms of atherosclerosis and impaired healing responses. High blood sugar levels can promote inflammation and fibrosis, which are critical factors in the development of restenosis. Smoking accelerates the process of atherosclerosis and impairs vascular healing, increasing the risk of restenosis after coronary interventions. Older individuals are more likely to experience restenosis due to age related changes in vascular function, including reduced elasticity and impaired endothelial function. Improper sizing of a stent or incomplete expansion of the stent during the procedure can lead to restenosis. Additionally, the use of a Bare Metal Stent (BMS) rather than a Drug Eluting Stent (DES) increases the risk of restenosis. The ability of the endothelial cells (cells lining the blood vessels) to heal after an angioplasty or stent procedure is critical in preventing restenosis.

CONCLUSION

Poor endothelial healing, which can be influenced by factors like smoking, high blood pressure, and diabetes, contributes to the development of restenosis. Restenosis is more likely in cases where the treated artery has long or complex lesions (narrowing), which may not be fully addressed with a single intervention. Diagnosing restenosis typically involves a combination of clinical assessment, imaging, and stress testing. Coronary angiography is the gold standard for diagnosing restenosis. This procedure involves injecting contrast dye into the coronary arteries and using X-ray imaging to visualize any narrowing or blockages that may have occurred at the site of the previous intervention.

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CONFLICT OF INTEREST

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

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Corresponding author Sarah Patel, Department of Cardiology, Health Sciences University, United Kingdom, E-mail: sarah.patel@cardiovascular.org

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