



Balloon Angioplasty: A Breakthrough in Cardiovascular Treatment

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DESCRIPTION

Cardiovascular Diseases (CVDs) remain a leading cause of death worldwide, accounting for approximately 17.9 million lives each year, according to the World Health Organization. Among the various conditions that fall under the umbrella of CVDs, Coronary Artery Disease (CAD) holds a prominent position due to its life-threatening complications. A major cause of CAD is the narrowing or blockage of arteries caused by atherosclerosis—a build-up of plaque (composed of fat, cholesterol, and other substances) in the arterial walls. Balloon angioplasty, also known as Percutaneous Transluminal Coronary Angioplasty (PTCA), is a minimally invasive procedure designed to treat blocked or narrowed arteries, particularly in the coronary arteries of the heart. Since its introduction in the late 1970s, balloon angioplasty has revolutionized cardiovascular treatment by offering a safer and less invasive alternative to open-heart surgery. This article delves into the mechanics of balloon angioplasty, its benefits, risks, and its role in modern cardiology. Balloon angioplasty is a procedure that opens narrowed or blocked arteries using a small balloon catheter. The goal of the procedure is to restore blood flow to the heart, which is compromised due to the narrowing of arteries caused by atherosclerotic plaque. By dilating the artery, the procedure alleviates chest pain (angina), improves exercise tolerance, and reduces the risk of a heart attack. The technique is commonly used to treat coronary artery disease but can also be applied to Peripheral Artery Disease (PAD), which affects the blood vessels in areas like the legs, arms, and kidneys. The doctor inserts a thin, flexible tube called a catheter into an artery, typically through the groin or wrist. The catheter is guided through the vascular system to the site of the blockage. Once the catheter

reaches the narrowed section of the artery, a smaller catheter with a balloon at its tip is threaded through the main catheter. The balloon is positioned precisely within the narrowed section. The balloon is then inflated, compressing the plaque against the arterial walls. This widens the artery, creating a smoother passage for blood flow. In many cases, a stent—a small, expandable mesh tube—is placed within the artery to keep it open. The stent is mounted on the balloon catheter and expands when the balloon is inflated. Once the balloon is deflated and removed, the stent remains in place, supporting the artery and preventing future narrowing (restenosis). After successful inflation of the balloon (and stent placement, if required), the catheter and balloon are withdrawn from the body, and the incision site is bandaged. This is the traditional form of angioplasty without stent placement. Though effective, POBA has a higher rate of restenosis compared to modern techniques. Today, most angioplasty procedures involve the placement of stents. These stents can be Bare Metal Stents (BMS) or Drug Eluting Stents (DES). Drug-eluting stents release medication to prevent scar tissue formation and reduce the risk of restenosis. In this method, the balloon has tiny blades that score the plaque before inflating, making it easier to dilate tough, calcified arteries. A newer technique where the balloon is coated with medication that is delivered to the artery during inflation.

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CONFLICT OF INTEREST

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

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