



## Classification of Complex Coronary Artery Lesions

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### Description

The modern treatment of coronary artery disease is heavily reliant on Percutaneous Coronary Intervention (PCI) in conjunction with medical management. PCI techniques have advanced significantly over time and can now stent even the most difficult lesions. However, some lesions present difficulties when accessed *via* the traditional PCI route. These lesions, known as complex coronary lesions, are classified as such due to anatomic, physiological, or functional difficulties. Bifurcation lesions, calcified lesions, chronic total occlusions, unprotected left main coronary artery lesions, ostial lesions, and saphenous vein graft stenosis are examples of complex coronary vessel lesions.

The presence of thrombus is frequently caused by plaque disruption prior to or during PCI. The occlusion of a saphenous vein graft is thought to be caused by intimal vessel smooth muscle proliferation. Each disorder has some disease processes in common. Diabetes mellitus and advanced age, for example, were identified as independent predictors of all complex coronary lesions. Each process has its own set of processes that contribute to its aetiology.

Bifurcation lesions, calcified lesions, chronic total occlusions, unprotected left main coronary artery lesions, ostial lesions, and saphenous vein graft stenosis are examples of complex coronary vessel lesions. Each of these lesions presents unique challenges, and

treatment is tailored to the individual. Specialized techniques, as well as more advanced cardiologists, have improved the successful treatment of such lesions.

### Most common complex lesions

**Bifurcation lesions:** This type of lesion occurs at or near the junction of two major coronary arteries. These lesions are divided into three anatomical parts. The proximal main branch, distal main branch, and side branch are the three parts. A bifurcation lesion is defined as a significant stenosis (more than 50%) in a coronary artery involving the origin of a side branch or in a coronary artery adjacent to the side branch's origin. In each of these locations, the Medina classification system assesses and defines the location of stenosis. This is a direct numerical system that includes the main branch, distal branch and side branch.

**Calcified lesions:** Vascular calcification of the coronary arteries is a common, active, regulated process that involves atherosclerotic, inflammatory, and hormonal disease processes. Intimal and medial calcifications were involved in Coronary Artery Calcification (CAC). CAC increases vessel stiffness and the risk of cardiovascular events.

**Chronic total occlusions:** This is when a coronary artery is completely blocked. These occlusions must have TIMI 0 or TIMI 1 flow and last 3 months.

**Left main coronary artery disease:** Because it is the source of the majority of the left ventricular coronary supply, left main coronary artery disease can be problematic. If there is significant stenosis in the left main coronary artery, the majority of the myocardium is at risk of death. A bypass graft supplying the left anterior descending artery or the left circumflex artery is a protected left main coronary artery.

**Ostial lesion:** An ostial lesion begins within 3 millimeters of the origin of a major coronary artery. Because of their proximity to the aorta, these may be difficult to stent.

**Saphenous Vein Graft (SVG) stenosis:** This type of stenosis is common, with some reports indicating that up to 20% of patients develop it within a year. SVG PCI carries a significant risk of myocardial infarction or decreased antegrade flow. Atherosclerotic disease within the graft also causes a high rate of restenosis.

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