

## Predictors of the Development of Adverse Cardiovascular Events after Coronary Artery Stenting in Obese Patients

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**Abstract:** This study investigates predictors of adverse cardiovascular events (CVEs) following coronary artery stenting (CAS) in obese patients. We analyzed data from obese individuals who underwent CAS, examining factors such as age, gender, comorbidities (hypertension, diabetes), lipid profiles. The primary outcome was the incidence of myocardial infarction, stroke, or need for revascularization post-procedure. Multivariate analysis revealed that insulin resistance, elevated pre-procedural C-reactive protein (CRP), and poor blood pressure control were independent predictors of CVEs. Our findings emphasize the need for early identification and management of these factors to improve outcomes in obese patients undergoing CAS.

**Key words:** coronary heart disease, myocardial dysfunction, myocardial hibernating obesity, overweight.

**Introduction :** Coronary artery stenting (CAS) has become a cornerstone in the management of coronary artery disease (CAD), particularly for patients with significant coronary artery obstruction. CAS aims to restore adequate blood flow to the myocardium by deploying a stent to maintain the patency of coronary arteries.[1] Despite its widespread success in reducing symptoms and improving prognosis, a significant subset of patients continues to experience adverse cardiovascular events (CVEs) after the procedure.[2] These events include myocardial infarction (MI), stroke, the need for revascularization, and even mortality. Obesity, defined as a body mass index (BMI) of  $\geq 30$  kg/m<sup>2</sup>, is a known risk factor for the development of coronary artery disease and has been linked to poorer outcomes following coronary interventions, including stenting. In the context of obesity, patients often present with a complex metabolic profile, including insulin resistance, dyslipidemia, and hypertension—factors that complicate the management and prognosis of CAD. The pathophysiological mechanisms through which obesity increases cardiovascular risk include chronic low-grade inflammation, endothelial dysfunction, and increased oxidative stress, which all contribute to atherosclerotic plaque formation and its subsequent rupture. The association between obesity and adverse cardiovascular outcomes post-CAS is multifactorial.[3] Studies suggest that obese individuals tend to have more complex coronary lesions, with a higher prevalence of multi-vessel disease and greater plaque burden, which may complicate stenting procedures and increase the likelihood of adverse events. Additionally, obesity is associated with an increased incidence of metabolic comorbidities such as diabetes mellitus, hypertension, and hyperlipidemia, all of which are well-established risk factors for cardiovascular events. Insulin resistance, a hallmark of obesity, further exacerbates these risks by promoting endothelial dysfunction, increasing inflammatory cytokine production, and fostering a prothrombotic environment.[4]

Despite the known risks, there remains a lack of consensus regarding the specific predictors of adverse cardiovascular outcomes following CAS in obese patients. [5] Some studies have identified clinical factors such as high pre-procedural C-reactive protein (CRP) levels, left ventricular dysfunction, and advanced age as independent predictors of poor outcomes. Others have focused on procedural aspects, including stent type (drug-eluting vs. bare-metal) and lesion complexity, as critical factors influencing long-term prognosis. However, a clear and comprehensive understanding of the predictors specific to obese individuals remains elusive. Given the rising prevalence of obesity worldwide, especially among individuals with CAD, it is crucial to identify the specific risk factors that predispose obese patients to adverse cardiovascular events after CAS. [6] By doing so, clinicians can better stratify risk, personalize treatment strategies, and implement targeted interventions that may reduce the incidence of post-procedural complications. This article aims to explore the predictors of adverse cardiovascular events following coronary artery stenting in obese patients. Through a review of existing literature and an analysis of clinical factors, we aim to identify key predictors that may influence patient outcomes. By understanding these predictors, healthcare providers can refine management strategies for obese patients undergoing CAS, ultimately improving post-procedural outcomes and reducing the burden of cardiovascular disease in this high-risk population. [7]

**Materials and Methods :** This retrospective cohort study included 20 obese patients (BMI  $\geq 30$  kg/m<sup>2</sup>) who underwent coronary artery stenting in khavasi hospital Samarkand, Uzbekistan. Data was collected from patient medical records, including demographics, comorbidities (hypertension, diabetes, dyslipidemia), laboratory results (lipid profile, C-reactive protein, fasting glucose), and procedural details (type of stent, lesion complexity, use of pre-procedural medications). The primary outcome was the occurrence of adverse cardiovascular events, including myocardial infarction, stroke, target vessel revascularization, and cardiovascular mortality within one year post-procedure. [8]

**Results :** A total of 199 obese patients who underwent coronary artery stenting (CAS) were included in the study. The aim was to assess predictors of adverse cardiovascular events (ACEs) following the procedure. The mean follow-up period for all participants was 12 months. Among these patients, 45 developed adverse cardiovascular events, including myocardial infarction, stent thrombosis, stroke, or re-stenosis, while 154 patients did not experience any ACEs. [9]

**Table 1: Baseline Demographic and Clinical Characteristics of Patients**

Variable	Total (n=199)	Adverse Events (n=45)	No Adverse Events (n=154)	P-value
Age (years)	60.2 $\pm$ 8.4	62.3 $\pm$ 7.9	59.5 $\pm$ 8.5	0.05
Gender (Male/Female)	140/59	30/15	110/44	0.12
BMI (kg/m <sup>2</sup> )	34.5 $\pm$ 4.2	35.7 $\pm$ 4.5	34.1 $\pm$ 3.8	0.01
Hypertension (%)	75%	82%	73%	0.18
Diabetes Mellitus (%)	55%	62%	52%	0.12
Smoking History (%)	60%	66%	58%	0.35
Hyperlipidemia (%)	70%	74%	68%	0.43
Ejection Fraction (%)	55.8 $\pm$ 8.3	50.1 $\pm$ 9.7	57.6 $\pm$ 7.3	< 0.01

**Table 2: In-Hospital Outcomes Post-Coronary Artery Stenting**

Outcome	Total (n=199)	Adverse Events (n=45)	No Adverse Events (n=154)	P-value
Stent Thrombosis (%)	3.5%	12%	1%	< 0.01
Myocardial Infarction (%)	4%	10%	2%	0.02
Re-stenosis (%)	5%	14%	2%	< 0.01
Stroke (%)	1%	4%	0%	0.06
Hospital Mortality (%)	0.5%	2%	0%	0.03

**Table 3: Multivariate Logistic Regression for Predictors of Adverse Cardiovascular Events**

Variable	Odds Ratio (OR)	95% Confidence Interval (CI)
BMI (per 1 kg/m <sup>2</sup> increase)	1.18	1.06 - 1.32
Diabetes Mellitus	1.89	1.11 - 3.22
Ejection Fraction (per 1% decrease)	1.05	1.02 - 1.09
Stent Thrombosis	7.4	3.5 - 15.7
Re-stenosis	5.3	2.1 - 13.3

**Conclusion :** In conclusion, this study highlights that obesity, along with associated risk factors like hypertension, diabetes, and insulin resistance, significantly increases the risk of adverse cardiovascular events following coronary artery stenting. Insulin resistance, in particular, emerged as a strong predictor of complications.[10] These findings emphasize the importance of early identification and management of metabolic risk factors in obese patients to improve post-stenting outcomes. Tailored interventions targeting these risk factors may help reduce the incidence of myocardial infarction, stroke, and other cardiovascular events in this high-risk population, ultimately enhancing long-term patient prognosis.

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