
CASE REPORT

Management of Left Main Artery Disease with Severe LV Dysfunction

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Abstract

Background: Left main artery disease (LMAD) poses a significant risk to patients, often leading to complications such as chest pain and hypotension with high mortality rates. Prompt and proper management is essential for improving outcomes in these cases.

Case Presentation: A 50-year-old lady with hypertension and diabetes presented with ST-segment elevation myocardial infarction (STEMI) refractory to thrombolysis, complicated by severe LV dysfunction. Coronary angiography revealed LMAD involving the LAD and LCx arteries.

Management & Results: High-risk percutaneous coronary intervention (PCI) under intra-aortic balloon pump (IABP) support was performed, resulting in successful stenting of the LMAD and improvement in symptoms and LV function.

Conclusion: This case highlights the importance of timely intervention and the role of IABP-assisted PCI in managing LMAD with severe LV dysfunction, emphasizing the need for a simplified approach and adherence to optimal medical therapy.

Keywords

Left main artery disease, LV dysfunction, PCI, intra-aortic balloon pump, optimal medical therapy.



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Introduction

According to the latest data from the World Health Organization (WHO), ischaemic heart disease (IHD) maintained its position as a leading cause of global mortality in 2019, accounting for 16% of total deaths worldwide. Notably, the prevalence of IHD-related fatalities increased significantly in low-, lower-middle, and upper-middle-income nations, contrasting with a decline observed in high-income countries, where IHD still ranks as the primary cause of death¹.

Since the advent of coronary artery angiography, it has been understood that not all atherosclerotic lesions pose the same level of risk. The obstruction of the left main coronary artery (LMCA) presents a particularly grave threat due to its anatomical significance. Depending on the dominance of coronary arteries, the LMCA supplies blood to a substantial portion (75–100%) of the myocardium. This vital role has historically earned the LMCA the ominous moniker of 'the artery of sudden death'².

Left main artery disease poses a significant threat to patients, often leading to severe complications such as ongoing chest pain and hypotension. Despite advancements in treatment, patients experiencing this condition still face high mortality rates³.

In this report, we present a case of a 50-year-old lady with left main artery disease and severely impaired left ventricular function, highlighting the challenges and successful management strategies employed.

Case Presentation:

A 50-year-old lady, with a noteworthy medical history including hypertension and diabetes, presented with a critical medical event: a ST-segment elevation myocardial infarction (STEMI). Unfortunately, initial thrombolysis failed to alleviate her condition, leading to persistent and severe chest pain. Subsequent evaluation revealed a grim picture: severely impaired left ventricular function, indicative of significant damage to her heart muscle.

Further investigation through coronary angiography unveiled a challenging landscape within her coronary arteries. The left main artery, a vital conduit for cardiac blood supply, was severely affected, with notable involvement of both the left anterior descending (LAD) and left circumflex (LCx) arteries.

Diagnostic Assessment:

At the time of presentation, the patient exhibited worrisome electrocardiographic findings, with ST elevations evident in anterior leads. Additionally, her echocardiogram painted a concerning picture, revealing an ejection fraction of only 38% alongside anterolateral akinesia, indicating impaired function of a significant portion of her heart muscle.

Despite the gravity of her cardiac situation, her renal function tests remained within normal limits, offering some relief amidst the clinical complexity.

Therapeutic Intervention:

In light of the challenging coronary anatomy and the patient's precarious clinical state, a decisive course of action was undertaken: high-risk percutaneous coronary intervention (PCI) under the supportive umbrella of an intra-aortic balloon pump (IABP).

The strategy aimed not only to mitigate the acute crisis but also to set the stage for long-term cardiac stability. With meticulous planning, the lesions in the left main artery were successfully addressed through stenting of both the LAD and LCx arteries.

Notably, a simplified approach was adopted, eschewing the complexities of bifurcation stenting in favor of a more streamlined intervention. Predilatation and stenting procedures were meticulously executed under the protective guise of IABP support, ensuring optimal blood flow restoration to all affected vessels.

Follow-up and Outcomes:

In the subsequent two months post-procedure, the patient's progress was monitored vigilantly. Encouragingly, she exhibited tangible signs of improvement, both clinically and echocardiographically.

Importantly, her adherence to optimal medical therapy (OMT) was commendable, underscoring the collaborative effort between medical professionals and the patient herself in the pursuit of cardiac wellness.

Discussion:

Acute total obstruction of the left main coronary artery (LMCA) leading to acute myocardial infarction (AMI) is a rare occurrence, found in only 0.025% of AMI cases undergoing coronary angiography according to various studies. The left main stem (LMS) is responsible for supplying two thirds of the myocardial blood, and when it's suddenly blocked, especially before collateral circulation is established, it often leads to cardiogenic shock⁴. Swift reperfusion has been shown to improve outcomes in such cases, but procedures like surgery or percutaneous coronary intervention (PCI) can also introduce risks such as reperfusion injury and malignant arrhythmias, impacting long-term prognosis.

This case underscores the importance of prompt and proper management of left main artery disease, particularly in the setting of severe LV dysfunction. IABP-assisted PCI has emerged as a crucial intervention in acute settings, leading to improved outcomes. The successful outcome in this case highlights the significance of a simplified approach to complex PCI, coupled with stringent follow-up and compliance with OMT.

Conclusion:

In the acute setting of left main artery disease with severe LV dysfunction, IABP-assisted PCI plays a paramount role in improving outcomes. A simplified approach to multi-vessel PCI may offer comparable or superior results to complex procedures. Strict adherence to optimal medical

therapy and regular follow-up are essential for optimizing patient outcomes.

Learning Points:

- **Early Recognition and Intervention:** Prompt recognition of left main artery disease (LMAD) is crucial, especially in patients presenting with post-MI angina or complications after thrombolysis. This case underscores the importance of rapid diagnosis and intervention in managing LMAD to prevent further deterioration and improve outcomes.
- **Multidisciplinary Approach:** Complex cases like severe LMAD with impaired LV function require a multidisciplinary approach involving cardiologists, interventionalists, cardiac surgeons, and critical care specialists. Collaborative decision-making in a heart team meeting helps in determining the most appropriate treatment strategy for each patient.
- **High-Risk PCI with Mechanical Circulatory Support (MCS):** In high-risk LMAD cases, percutaneous coronary intervention (PCI) supported by intra-aortic balloon pump (IABP) can be a feasible option, as demonstrated in this case. Utilizing MCS devices like IABP during PCI can stabilize hemodynamics and improve outcomes, particularly in patients with compromised LV function.
- **Simplified PCI Techniques:** The case highlights the importance of adopting simplified PCI techniques, such as avoiding bifurcation stenting when feasible, to achieve successful revascularization in complex coronary anatomy involving the left main artery and its branches.
- **Optimal Medical Therapy (OMT) and Follow-up:** After successful intervention, ensuring patient compliance with optimal medical therapy (OMT) and stringent follow-up is essential for long-term management of LMAD. Monitoring clinical symptoms and

cardiac function through regular follow-up visits aids in assessing treatment efficacy and detecting any potential complications early on.

- **Continuous Improvement in Treatment Strategies:** Advancements in medical technology, including the availability of new MCS devices and imaging modalities like intravascular ultrasound (IVUS), offer opportunities for further enhancing the care of patients with LMAD. Incorporating these advancements into clinical practice can lead to better patient outcomes and improved quality of care.

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Figure/Video



Figure 1: Ballooning in os-p-Lcx



Figure 2: Severe disease in os-p-LAD and os-p-Lcx

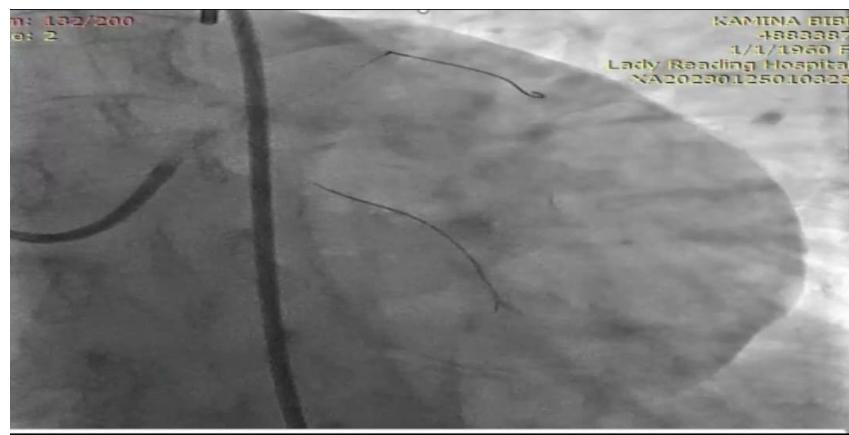


Figure 3: wired both LAD and LCx with samurai GW



Figure 4: Ballooning in os-p-LAD

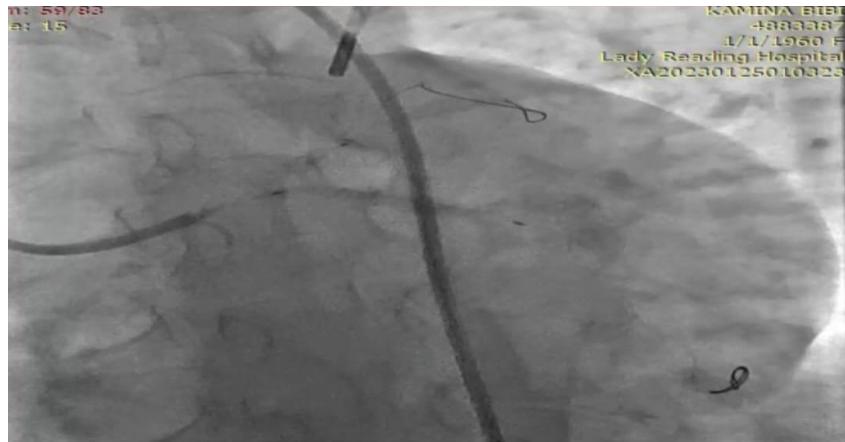


Figure 5: stenting os-p-Lcx



Figure 6: LMS-OS-LCX- Promus Premier 3.50x12 was deployed (14ATM)

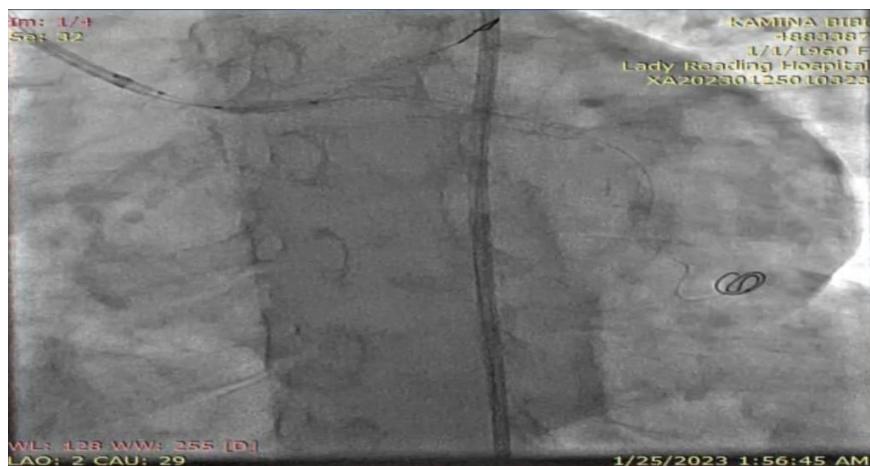


Figure 7: LMS – POT/Flaring was done with same stent balloon & NC balloon 4.50x8 (16,18,20)



Figure 8: Final Result