

CASE REPORT

Management of Severe Angina Following Myocardial Infarction in a Patient with Comorbid Hypertension and Diabetes: A Case Report

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Received 15/02/2024**Accepted** 20/03/2024**First Published** 01/06/2024**Abstract**

Background: Managing severe angina in patients with comorbid conditions following a myocardial infarction poses significant clinical challenges. Optimal medical therapy often proves insufficient, necessitating advanced interventional strategies to address persistent symptoms and improve patient outcomes.

Case Presentation: A 50-year-old female with a history of hypertension and type 2 diabetes mellitus presented with severe angina classified as Canadian Cardiovascular Society (CCS) class II-III despite receiving optimal medical therapy after an inferior wall myocardial infarction treated with thrombolysis. Initial evaluations, including electrocardiogram (ECG) and echocardiography, indicated residual myocardial ischemia.

Results: Coronary angiography revealed moderate disease in the mid-left circumflex artery and severe tubular lesions in the mid-right coronary artery (RCA). Percutaneous coronary intervention (PCI) was performed on the RCA, involving the deployment of multiple drug-eluting stents. The procedure was complicated by a distal edge dissection and the breakage of a guide wire, both of which were successfully managed. Final angiographic results demonstrated TIMI III flow with no residual stenosis.

Conclusion: This case highlights the challenges and complexities of managing severe angina in post-myocardial infarction patients with comorbid conditions. It emphasizes the necessity of timely and precise interventional strategies to achieve optimal patient outcomes.

Keywords

Myocardial Infarction, Angina, Percutaneous Coronary Intervention, Diabetes, Hypertension.



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Introduction

The management of severe angina following a myocardial infarction is a complex endeavor, particularly in patients with comorbid conditions such as hypertension and diabetes. These comorbidities not only complicate the clinical picture but also significantly influence the efficacy of standard medical therapies¹. Despite optimal medical management, many patients experience refractory angina, which can severely impair quality of life and increase the risk of subsequent cardiovascular events².

In such cases, traditional pharmacological approaches may fall short, necessitating the exploration of advanced interventional techniques³. This case report presents the therapeutic journey of a patient with severe, persistent angina post-myocardial infarction, underscoring the multifaceted challenges encountered in clinical decision-making. By examining this patient's treatment pathway, we aim to provide insights into the interplay between comorbidities and therapeutic options, contributing to a better understanding of how to manage similar cases in clinical practice.

Case Presentation

A 50-year-old female with a history of hypertension and type 2 diabetes mellitus, well-controlled on oral medications, presented with severe angina. In January 2024, she experienced an inferior wall myocardial infarction, for which she was treated with thrombolysis using streptokinase. Despite receiving optimal medical therapy, she continued to experience persistent angina, classified as Canadian Cardiovascular Society (CCS) functional class II-III.

Upon physical examination, no significant abnormalities were noted. Laboratory tests, including troponin I, renal profile, random blood sugar (140 mg/dL), and HbA1c (6.8%), all returned within normal limits. An electrocardiogram (ECG) revealed old ST-T changes in the inferior leads, indicative of prior ischemic events. Furthermore, echocardiography showed basal inferior hypokinesia with preserved left ventricular (LV)

systolic function, highlighting the need for further evaluation and potential intervention to address her refractory symptoms.

Diagnostic Assessment

Electrocardiogram (ECG): The ECG showed old ST-T changes in the inferior leads, consistent with a history of inferior wall myocardial infarction.

Echocardiography (Echo): The echocardiogram revealed basal inferior hypokinesia, indicating impaired contractility in the basal region, while left ventricular (LV) systolic function remained preserved.

Coronary Angiography:

- **Left Main Stem (LMS) and Left Anterior Descending (LAD) Arteries:** Both arteries appeared normal with no significant stenosis.
- **Left Circumflex Artery (LCX):** Moderate disease was identified in the mid-LCX, specifically involving the origin of the obtuse marginal artery (OM3).
- **Right Coronary Artery (RCA):** A severe tubular lesion was noted in the mid-RCA, suggesting significant obstruction that may contribute to the patient's ongoing angina.

Therapeutic Intervention

Elective coronary angiography was performed, revealing the following findings:

- **Left Main Stem (LMS) and Left Anterior Descending (LAD) Arteries:** Normal.
- **Left Circumflex Artery (LCX):** Moderate disease in the mid-LCX involving the origin of the obtuse marginal artery (OM3). (See Figure 1)
- **Right Coronary Artery (RCA):** Severe tubular lesion in the mid-RCA. (See Figure 2)

Procedure:

- The RCA was engaged using a 6F JR 3.5 guide catheter and wired with a workhorse wire.
- The lesion was ballooned with a 2.5 x 15 mm balloon. (See Figure 3)

- A 3.0 x 46 mm drug-eluting stent (DES) was deployed in the mid-RCA at a pressure of 9 atm. (See Figure 4)
- Noting distal edge haziness, an additional 3.0 x 15 mm DES was deployed distally with overlap at 9 atm. (See Figures 5 and 6)
- Post-stent ballooning was performed; however, a distal edge dissection occurred. (See Figure 7 and Figure 8)
- To address the edge dissection, a third DES (2.75 x 26 mm) was deployed, achieving TIMI III flow. (See Figure 9)
- During the procedure, a portion of the wire broke and remained in the distal RCA. (See Figure 10) Two workhorse wires were positioned in the distal RCA, and the twirling wire technique was successfully employed to retrieve the broken wire. (See Figure 11)
- Final angiography, using a diagonal TIG-II catheter, confirmed TIMI III flow in the RCA, with no wire remnants and optimal results achieved.

Follow-Up and Outcomes

Following the procedure, the patient exhibited significant improvement in angina symptoms, reporting a notable reduction in the frequency and severity of episodes. Subsequent follow-up visits confirmed the stability of the angiographic results, with no evidence of restenosis or new lesions. The patient remained asymptomatic, and there were no recurrent angina symptoms noted.

Additionally, the management of the patient's hypertension and diabetes continued to be effective, with both conditions well-controlled through her prescribed oral medications. Regular monitoring and follow-up appointments ensured her ongoing stability and overall well-being.

Discussion

This case highlights the interventional challenges faced in managing a patient with refractory angina following a myocardial infarction, particularly in the context of severe coronary artery disease. It emphasizes the critical role of percutaneous

coronary intervention (PCI) in addressing complex lesions that do not respond to optimal medical therapy.

The procedure showcased several intricacies, including the management of a distal edge dissection and the retrieval of a broken guide wire, which underscores the necessity for advanced interventional techniques and a high level of expertise. These challenges illustrate the importance of meticulous procedural planning and execution, as well as the need for skilled operators capable of adapting to unforeseen complications⁴.

Furthermore, this case reinforces the need for a multidisciplinary approach in the management of patients with comorbid conditions, such as hypertension and diabetes, which can significantly influence clinical outcomes⁵. Ongoing assessment and follow-up are essential to ensure long-term success and the prevention of future cardiovascular events.

Overall, the successful resolution of this patient's angina through PCI not only improved her quality of life but also serves as a reminder of the importance of advanced interventional cardiology in the treatment of complex coronary artery disease.

Conclusion

This case report underscores the significance of timely and precise interventional strategies in managing severe angina in patients with comorbid conditions following a myocardial infarction. The application of advanced percutaneous coronary intervention (PCI) techniques is essential in navigating the complexities associated with severe coronary artery disease, ultimately playing a crucial role in achieving optimal patient outcomes. This case highlights the need for a multidisciplinary approach to ensure comprehensive care and improve the overall prognosis for such patients.

Learning points

- Effective management of post-myocardial infarction angina requires a combination of

optimal medical therapy and interventional strategies tailored to the individual patient's needs.

- Percutaneous coronary intervention (PCI) is a valuable approach for managing severe coronary artery disease in complex cases, necessitating precise techniques and advanced procedural interventions to navigate potential complications.
- Continuous follow-up is critical for monitoring patient outcomes post-PCI, ensuring that any issues are promptly addressed and that the benefits of the intervention are sustained over time.

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Figure/Video



Figure 1: Moderate Disease in the Mid-LCX Involving the Origin of the Obtuse Marginal Artery (OM3)

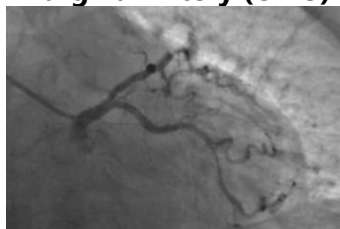


Figure 2: Severe Tubular Lesion in the Mid-RCA

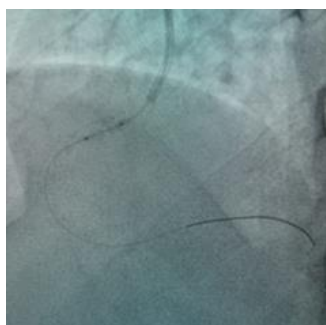


Figure 3: Lesion ballooned with a 2.5 x 15 mm balloon

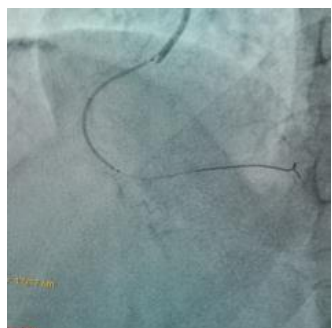


Figure 4: Deployment of a 3.0 x 46 mm drug-eluting stent (DES) in the mid-RCA at 9 atm

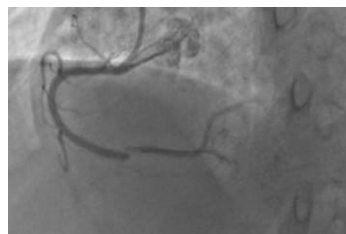


Figure 5: Additional 3.0 x 15 mm DES deployed distally with overlap at 9 atm

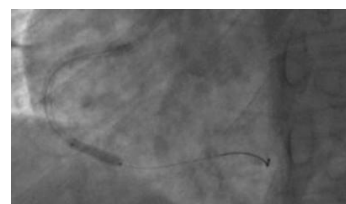


Figure 6: Additional 3.0 x 15 mm DES deployed distally with overlap at 9 atm

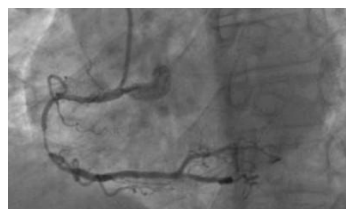


Figure 7: Post-stent ballooning with distal edge dissection

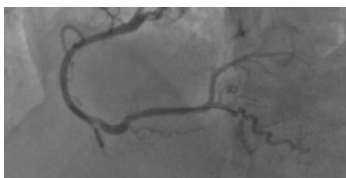


Figure 8: Post-stent ballooning with distal edge dissection

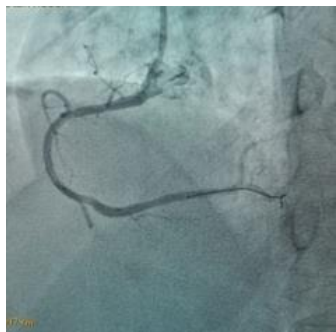


Figure 9: Deployment of third DES (2.75 x 26 mm) to address the edge dissection, achieving TIMI III flow

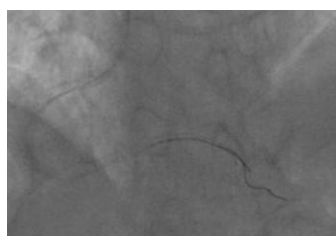


Figure 10: Broken portion of the wire in the distal RCA.



Figure 11: Retrieval of broken wire using the twirling wire technique with two workhorse wires in the distal RCA.

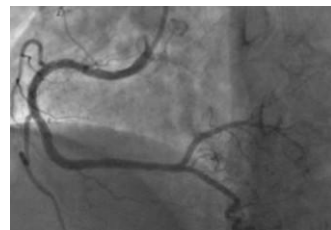


Figure 12: Final angiography confirming TIMI III flow in the RCA with no wire remnants and optimal results.