CATHALOGUE

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CASE REPORT

Chronic Total Occlusion of Left Main Stem with Multi-vessel Disease

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Abstract

Background: Chronic total occlusion (CTO) of the left main stem (LMS) presents a challenging scenario in the management of coronary artery disease. We present a case highlighting the successful intervention and long-term outcomes in a 70-year-old male with CTO of the LMS and multi-vessel disease, complicated by non-ST-segment elevation myocardial infarction (NSTEMI) and severely impaired left ventricular (LV) function.

Case Presentation: A 70-year-old hypertensive male presented with NSTEMI, severe LV dysfunction, moderate mitral regurgitation, and hypotension. Despite initial hesitation towards intervention, recurrent chest pain necessitated urgent coronary angiography. Diagnostic assessment revealed electrocardiographic changes suggestive of ischemia and echocardiographic evidence of LV dysfunction.

Management & Results: Therapeutic intervention involved meticulous pre-dilatation of the occluded LMS followed by angioplasty and stenting, with attention to avoid bifurcation stenting. Additional interventions included balloon angioplasty and stenting of proximal lesions in the left anterior descending (LAD) artery and ramus, and direct stenting of the distal right coronary artery (RCA) lesion. Long-term follow-up demonstrated significant improvements in clinical symptoms and LV function, emphasizing the efficacy of revascularization.

Conclusion: This case underscores the importance of timely intervention, tailored therapeutic approaches, and long-term medication adherence in optimizing outcomes in patients with complex coronary artery disease and impaired LV function. A simplified approach to multi-vessel percutaneous coronary intervention may offer favorable long-term outcomes, warranting further investigation.

Keywords

Chronic total occlusion, left main stem, multi-vessel disease, angioplasty, stenting, long-term outcomes.

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Introduction

Chronic total occlusion (CTO) of the left main stem (LMS) can pose significant challenges during coronary intervention due to difficulties in visualization. An early right-side injection can aid in delineating the left coronary anatomy, particularly in cases where the LMS is obscured. This case report highlights the successful management of a 70-year-old male with NSTEMI, severely impaired LV function, and three-vessel disease, including a CTO of the LMS. Despite initial reluctance for intervention, timely revascularization was performed, leading to remarkable long-term outcomes.

Case Presentation

In the clinical scenario of a 70-year-old male with a history of hypertension, the presentation of a non-ST-segment elevation myocardial infarction (NSTEMI) heralds a critical juncture in medical care. The patient's initial complaint of chest pain, coupled with the alarming finding of significant impairment in left ventricular (LV) function, underscores the gravity of the situation.

Accompanying these concerns, the presence of moderate mitral regurgitation (MR) and hypotension adds layers of complexity, necessitating swift and targeted intervention.

Diagnostic Assessment

The diagnostic assessment unveils a cascade of cardiovascular abnormalities mirroring the severity of the clinical picture. Electrocardiographic manifestations, including ST-T changes and anterior lead abnormalities, provide unequivocal evidence of myocardial ischemia, corroborating the initial clinical suspicion.

Echocardiography, a cornerstone in cardiovascular diagnostics, unveils the extent of LV dysfunction, with a particular emphasis on the anterolateral region showcasing akinesia. These findings not only confirm the diagnosis but also serve as a roadmap for therapeutic strategies.

Therapeutic Intervention

Navigating the intricate landscape of coronary anatomy, the therapeutic intervention demands a meticulous approach, balancing efficacy with safety. The decision to undertake pre-dilatation of the occluded left main stem (LMS) reflects a strategic maneuver aimed at optimizing procedural success. Angioplasty and stenting, the cornerstones of modern interventional cardiology, are executed with precision, with careful consideration to circumvent the challenges posed by bifurcation stenting.

Additional interventions targeting proximal lesions of the left anterior descending (LAD) artery and ramus, along with direct stenting of the distal right coronary artery (RCA) lesion, underscore the comprehensive nature of the therapeutic endeavor.

Follow-up and Outcomes

The saga of this patient's journey extends beyond the immediate post-intervention period, encompassing eleven years of meticulous follow-up. Against the backdrop of initial trepidation, the patient emerges as a testament to the transformative power of modern cardiovascular care. Remarkable improvements in clinical symptoms and echocardiographic parameters serve as tangible markers of success, offering solace to both patient and provider alike.

The documented restoration of flow in the LMS at three and five years post-intervention serves as a beacon of hope, reaffirming the efficacy of the chosen therapeutic strategy. However, amidst the triumphs, a cautionary tale emerges, highlighting the perilous consequences of medication non-compliance. The observed decline in exercise capacity and LV function serves as a poignant reminder of the indispensable role of guideline-directed medical therapy (GDMT) in sustaining long-term cardiovascular health.

Table 1: Patient Health Parameters Over Time

Follow up	Drugs compliance	Symptoms	BP	LV Size	EF %	LMS flow	LV clot
24.08.2012	Yes	CP/SOB III	90/70	5.7	37	Not checked	No
18.09.2012	Yes	None	110/76	5.4	53	Not checked	No
06.07.2015	Yes	None	116/76	5.0	55	Yes	No
17.08.2016	Yes	None	110/70	5.1	48	No	No
03.06.2021	Yes	None	140/80	4.5	50	Not checked	No
24.11.2021	Yes	None	133/76	5.4	42	Not checked	No
29.06.2022	No	SOB II	120/76	5.2	44	Not checked	Yes
15.08.2023	Yes	SOB I	130/80	5.6	39	No	No

Discussion

Acute coronary syndromes (ACS) are a leading cause of hospitalizations and mortality worldwide, despite advancements in pharmacotherapy and technology. A key treatment for patients with ACS is percutaneous coronary intervention (PCI) to restore blood flow in the affected artery. Patients with multivessel coronary artery disease (MVD), where multiple major heart arteries are significantly narrowed, have particularly poor prognoses compared to those with only one affected vessel.

This case underscores the critical importance of timely intervention in acute coronary syndromes to mitigate adverse outcomes, particularly in the setting of severe LV dysfunction and multi-vessel disease. The utilization of contralateral coronary injection can facilitate visualization and guide management in cases of challenging anatomy. Furthermore, a simplified approach to multi-vessel PCI, when feasible, may yield favorable long-term outcomes.

There's ongoing debate about whether to routinely treat non-culprit lesions (NCLs) during PCI or to manage them conservatively according to guidelines. It's uncertain whether intervening on NCLs during the initial ACS procedure could lower the risk of future events, as the clinical significance of these lesions in terms of inducible ischemia, angina, or plaque vulnerability isn't always clear.

Conclusion

Early recognition and intervention in acute coronary syndromes are paramount for optimizing patient outcomes. The judicious use of imaging modalities and procedural techniques, coupled with GDMT, are essential components of comprehensive care in complex coronary artery disease.

Learning points

- Early intervention in acute coronary syndromes (ACS) is critical to prevent adverse events and salvage myocardial tissue.
- Utilization of contralateral coronary injection aids in visualizing challenging coronary anatomy, facilitating informed decision-making during interventions.

- Simple approaches to PCI may yield comparable or superior outcomes to complex procedures, emphasizing lesion preparation, appropriate stent selection, and meticulous post-dilation.
- Long-term follow-up and medication compliance are integral to optimizing patient care post-intervention, serving as sentinels for disease recurrence and functional status.

References

1) Cannon CP, Weintraub WS, Demopoulos LA, Vicari R, Frey MJ, Lakkis N, Neumann FJ, Robertson DH, DeLucca PT, DiBattiste PM, Gibson CM, Braunwald E; TACTICS (Treat Angina with Aggrastat and Determine Cost of Therapy with an Invasive or Conservative Strategy)--Thrombolysis in Myocardial Infarction 18 Investigators. Comparison of early invasive and conservative strategies in patients with unstable coronary syndromes treated with the glycoprotein IIb/IIIa inhibitor tirofiban. N Engl J Med. 2001 Jun 21;344(25):1879-87. doi: 10.1056/NEJM200106213442501. PMID: 11419424.
2) Boden WE, McKay RG. Optimal treatment of acute coronary syndromes--an evolving strategy. N Engl J Med. 2001 Jun 21;344(25):1939-42. doi: 10.1056/NEJM200106213442510. PMID: 11419433.
3) Throckmorton DC. Future trials of antiplatelet agents in cardiac ischemia. N Engl J Med. 2001 Jun 21;344(25):1937-9. doi: 10.1056/NEJM200106213442509. PMID: 11419432.
4) Topaz O. Ischemic coronary syndromes and SVG Interventions--do 2b/3a inhibitors miss the target? Catheter Cardiovasc Interv. 2007 Apr 1;69(5):630-1. doi: 10.1002/ccd.20985. PMID: 17377986.

Figure/Video

Figure 1 A: Baseline LMS total

Figure 1 B: RCA distal severe

Figure 2: After Ballooning LMS Clogged Ramus with clot

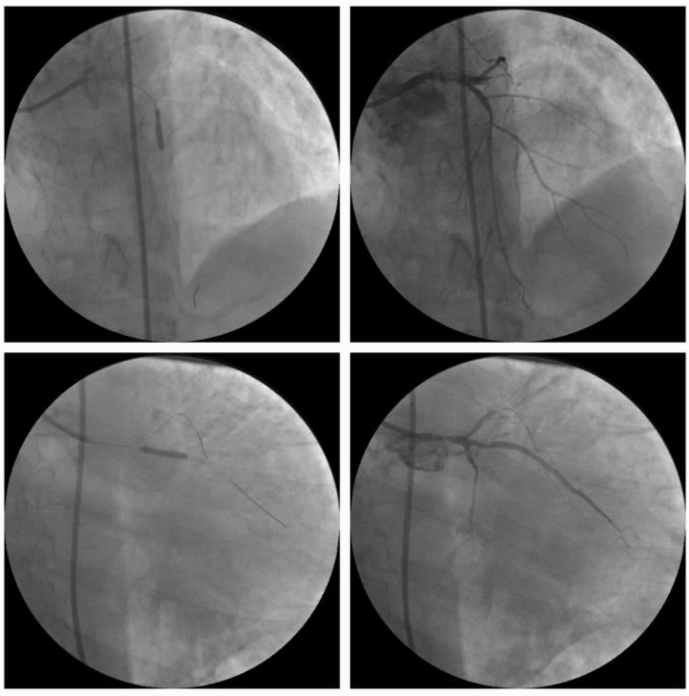

Figure 3: After Ballooning LMS and Ramus

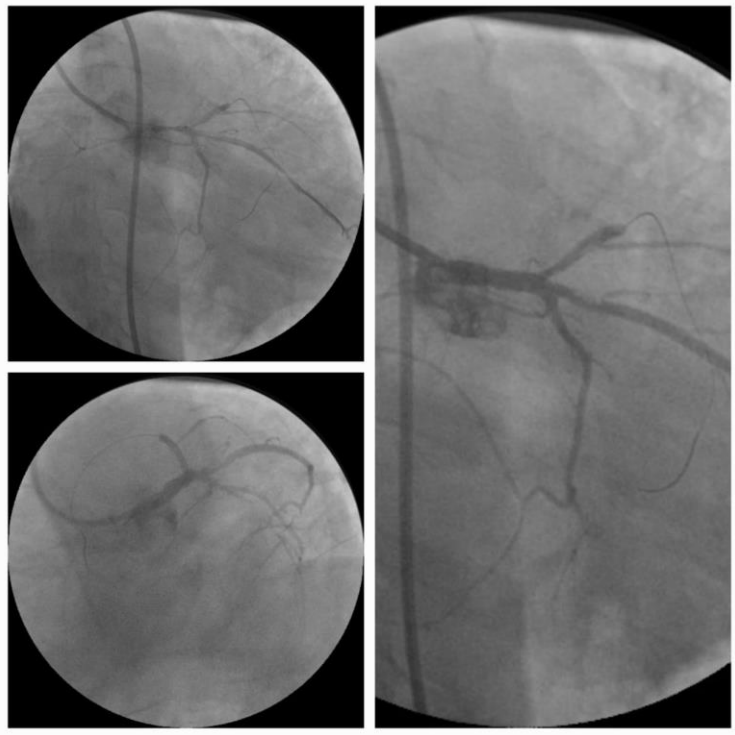

Figure 4: After LMS stenting clogged LAD

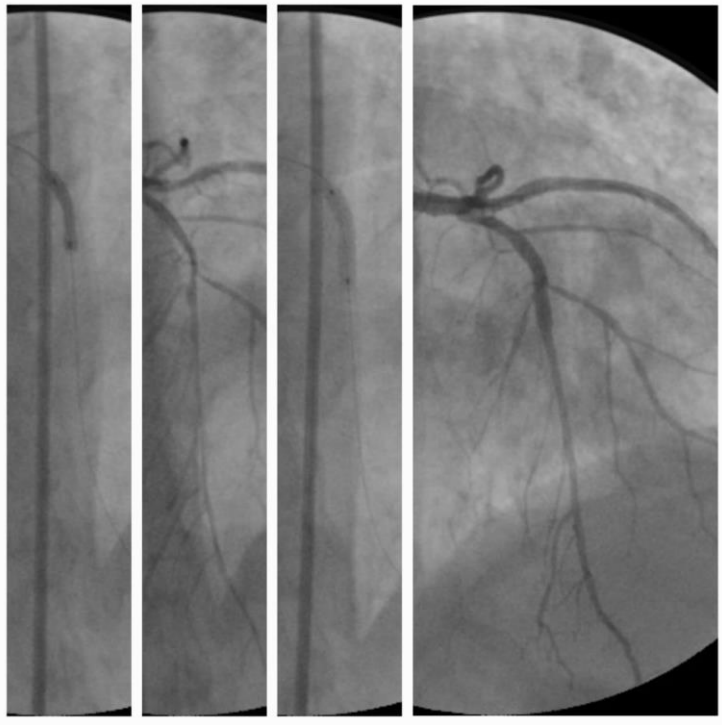

Figure 5: LAD ballooning and provisional stenting across diagonal

Figure 6: Ramus stenting

Figure 7: Direct stenting distal RCA

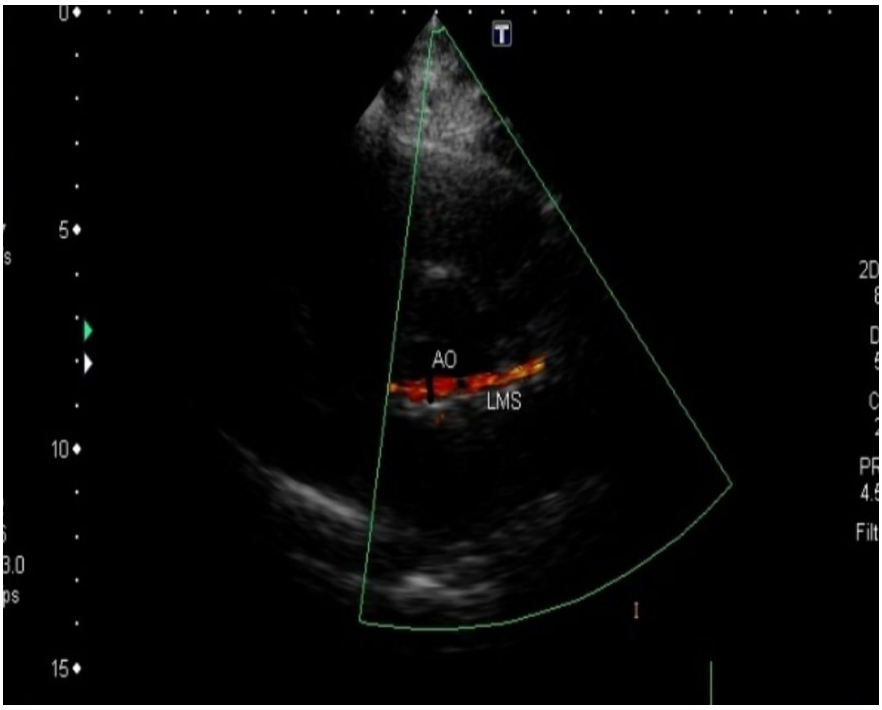

Figure 8: Echo color Doppler of the stented LMS at five years post angioplasty