CATHALOGUE

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CASE REPORT

Decision-making in the absence of surgical option

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Abstract

Background: The decision-making process in managing patients with multi-vessel CAD is multifaceted and must consider various factors, including anatomical complexity, patient preferences, and comorbidities. While CABG remains the gold standard for many patients, there is growing recognition of the role of PCI as a viable alternative, particularly in select patient populations.

Case Presentation: a 72-year-old non-diabetic, non-hypertensive ex-smoker, presented with angina categorized as CCS Class 2. A diagnostic angiogram in 2020 uncovered triple-vessel coronary artery disease (TVCAD), prompting deliberation regarding surgical or percutaneous intervention. However, patient declined surgical options, leading to the pursuit of multi-vessel PCI.Patient exhibited mild mitral and aortic regurgitation, a reversed E/A ratio indicative of diastolic dysfunction, and no regional wall motion abnormalities on echocardiography. His laboratory results were unremarkable.

Management and Results: Multi-vessel PCI was conducted as patient's therapeutic choice. The procedure targeted TVCAD and aimed to ameliorate symptoms. Following PCI, echocardiographic evaluations showcased stability and preservation of cardiac function.

Conclusion: This case emphasizes the viability of multi-vessel PCI as an alternative in instances of surgical refusal, offering relief from symptoms and safeguarding cardiac function. This case highlights the importance of tailored interventions and shared decision-making in managing complex coronary artery disease scenarios.

Keywords

TVCAD, CCS Class 2, Non-diabetic, Non-hypertensive, Ex-smoker, Multi-vessel PCI, Echo, CABG refusal, Surgical opinion, Echocardiography

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Introduction

For patients with multi-vessel CAD, treatment strategies typically involve revascularization to alleviate symptoms, improve quality of life, and reduce the risk of adverse cardiovascular events. Coronary artery bypass grafting (CABG) has long been regarded as the gold standard revascularization approach, offering durable and comprehensive revascularization in patients with complex coronary anatomy. However, the advent of percutaneous coronary intervention (PCI), particularly with the introduction of drug-eluting stents (DES), has expanded the armamentarium of therapeutic options for patients with CAD.

Despite the efficacy of CABG and PCI in managing CAD, treatment decisions are often influenced by patient-specific factors, anatomical considerations, and the presence of comorbidities. In some cases, patients may decline surgical intervention due to concerns about procedural risks, recovery time, or personal preferences. This scenario presents a clinical challenge, as healthcare providers must navigate alternative treatment pathways while ensuring optimal outcomes and patient satisfaction[1].

This case study aims to explore Patient's clinical presentation, therapeutic interventions, and outcomes following multi-vessel PCI, shedding light on the challenges and opportunities in managing refractory TVCAD in elderly patients. By examining this case in the context of existing literature, we seek to elucidate key principles of patient-centered care, shared decision-making, and the role of PCI as a viable alternative to CABG in select patients with CAD.

Case Presentation

a 72-year-old male, presented with symptoms of angina consistent with Canadian Cardiovascular Society (CCS) Class 2. His medical history was notable for smoking cessation, with no reported history of diabetes or hypertension. Despite being a non-diabetic and non-hypertensive individual, patient's cardiovascular health was compromised by the presence of triple-vessel coronary artery disease (TVCAD), as revealed by a diagnostic angiogram conducted in 2020. Upon presentation, his angina symptoms were characterized by exertional chest discomfort, which prompted further evaluation to assess the severity and extent of his coronary artery disease. An echocardiogram was performed to evaluate cardiac structure and function, providing valuable insights into patient's cardiovascular status.

Echocardiographic Findings:

- Left ventricular end-diastolic dimension (LVEDD): 5.1 cm
- Left ventricular end-systolic dimension (LVESD): 3.5 cm
- Left atrial dimension (LA): 4.0 cm
- Fractional shortening (FS): 30%
- Ejection fraction (EF): 60%
- Mild mitral regurgitation (MR) and aortic regurgitation (AR)
- Reversed E/A ratio
- No regional wall motion abnormalities

The echocardiographic assessment provided a comprehensive overview of his cardiac function, revealing preserved systolic function with a mildly reduced EF, mild valvular abnormalities, and diastolic dysfunction manifested by a reversed E/A ratio. Despite the presence of TVCAD, Patient's echocardiographic parameters indicated relatively stable cardiac function with no evidence of significant myocardial compromise.

In addition to the echocardiogram, laboratory investigations were conducted to assess patient's overall health status and screen for potential comorbidities. These investigations yielded results within normal limits, indicating no acute abnormalities or systemic disturbances.

Given his clinical presentation, including angina symptoms and the anatomical severity of TVCAD, the recommendation for revascularization was made. While coronary artery bypass grafting (CABG) was initially advised as the preferred intervention, he expressed reluctance towards undergoing surgical treatment, citing concerns about procedural risks and recovery. In light of patient's refusal of CABG, the decision was made to pursue multi-vessel percutaneous coronary

intervention (PCI) as an alternative revascularization strategy. The PCI procedure aimed to alleviate patient's angina symptoms, improve myocardial perfusion, and enhance overall quality of life by addressing the obstructive coronary lesions identified on angiography.

Diagnostic Assessment

The diagnostic assessment of patient encompassed a comprehensive evaluation, including coronary angiography, echocardiography, and laboratory investigations, to elucidate the extent and severity of his cardiovascular condition.

Initially he underwent coronary angiography in 2020, which revealed the presence of triple-vessel coronary artery disease (TVCAD). This diagnostic procedure provided crucial information about the severity and anatomical distribution of patient's coronary artery disease, guiding subsequent treatment decisions.

An echocardiogram was performed to assess his cardiac structure and function. Key findings included preserved systolic function with mildly reduced ejection fraction (EF), mild mitral regurgitation (MR) and aortic regurgitation (AR), reversed E/A ratio suggestive of diastolic dysfunction, and no regional wall motion abnormalities. Echocardiography provided valuable insights into patient's cardiac function, helping to guide treatment decisions and prognostication.

Comprehensive laboratory investigations were conducted to assess his overall health status, screen for potential comorbidities, and evaluate baseline parameters relevant to cardiovascular risk assessment. These investigations yielded results within normal limits, indicating no acute abnormalities or systemic disturbances.

Therapeutic Intervention

Coronary Artery Bypass Grafting (CABG) was initially recommended as the primary revascularization strategy for patient's triple-vessel coronary artery disease (TVCAD). However, he expressed apprehension towards undergoing surgical intervention, citing concerns about procedural risks and the subsequent recovery period. Consequently, CABG was not pursued in his case. Instead, given his refusal of CABG and the significant symptomatic burden posed by TVCAD, the healthcare team opted for percutaneous coronary intervention (PCI) as an alternative revascularization approach.

The PCI procedure aimed to alleviate patient's angina symptoms, enhance myocardial perfusion, and improve his overall quality of life by addressing the obstructive coronary lesions identified on angiography. Multi-vessel PCI involved the percutaneous insertion of drug-eluting stents (DES) to treat the obstructive lesions in his coronary arteries. Under the guidance of fluoroscopy and intravascular imaging, interventional cardiologists navigated through his coronary arteries, deploying DES at sites of significant stenosis to restore blood flow and myocardial perfusion.

The selection of DES was meticulously tailored to patient's individualized needs, considering factors such as lesion morphology, vessel size, and procedural feasibility. DES were preferred over bare-metal stents due to their superior efficacy in reducing restenosis rates, particularly in the setting of complex coronary lesions.

In addition to stent placement, patient received adjunctive pharmacotherapy during and after the PCI procedure to minimize procedural complications, prevent thrombotic events, and promote stent patency. This included antiplatelet agents (such as aspirin and P2Y12 inhibitors), anticoagulants (such as heparin), and adjunctive medications (such as statins and beta-blockers) for secondary prevention of cardiovascular events.

Following PCI, he underwent close monitoring in a cardiac care unit to assess for procedural complications, monitor hemodynamic stability, and initiate post-procedural care protocols. Subsequent follow-up visits were scheduled to evaluate his clinical status, assess symptom relief,

monitor cardiac function, and optimize secondary prevention measures.

By choosing multi-vessel PCI, his healthcare providers pursued a minimally invasive revascularization approach tailored to his clinical preferences and anatomical considerations. This therapeutic intervention aimed to improve patient's quality of life, alleviate angina symptoms, and reduce the risk of adverse cardiovascular events, ultimately optimizing his long-term cardiovascular outcomes.

Follow-Up and Outcomes

Meticulous follow-up assessments post-PCI were conducted to evaluate symptom relief, cardiac function, and overall outcomes in this case. Regular monitoring was essential for optimizing long-term management, assessing treatment efficacy, and promoting cardiovascular health and well-being.

The overall outcomes of PCI were assessed through a comprehensive evaluation of various clinical endpoints, including cardiovascular events, hospital readmissions, and mortality. Long-term follow-up data were collected to track patient's clinical course, identify any recurrent ischemic events or procedural complications, and evaluate the durability of the revascularization achieved through PCI. Additionally, the impact of PCI on patient's healthcare utilization and quality-adjusted life years (QALYs) was assessed to determine the cost-effectiveness and societal impact of the intervention. Regular monitoring of patient's cardiovascular health was essential for optimizing long-term management and assessing the efficacy of treatment interventions. Follow-up visits were scheduled at predefined intervals to ensure continuity of care and address any emerging clinical concerns promptly. During these visits, patient's medication adherence, lifestyle modifications, and adherence to secondary prevention measures were reinforced to mitigate the risk of future cardiovascular events.

Discussion

This case exemplifies the importance of patient-centered care and shared decision-making in clinical practice. Despite the recommendation for coronary artery bypass grafting (CABG) as the preferred revascularization strategy for his triple-vessel coronary artery disease (TVCAD), patient's reluctance towards surgical intervention prompted consideration of alternative options. This highlights the need for healthcare providers to engage patients in meaningful discussions about treatment preferences, risks, and benefits, empowering them to make informed decisions aligned with their values and priorities.

The decision to pursue multi-vessel percutaneous coronary intervention (PCI) in this case reflects a nuanced approach to managing complex CAD. While CABG remains the gold standard for revascularization in patients with TVCAD, PCI emerged as a viable alternative given his preference and clinical presentation. This decision underscores the importance of individualized treatment strategies tailored to the patient's clinical characteristics, anatomical considerations, and personal preferences.

The efficacy and safety of multi-vessel PCI in patient's case hinge on several factors, including procedural success, symptom relief, and long-term outcomes. By addressing the obstructive coronary lesions and restoring myocardial perfusion, PCI aimed to alleviate angina symptoms, improve cardiac function, and enhance patient's quality of life. Close monitoring and adherence to secondary prevention measures are essential to mitigate the risk of procedural complications, prevent recurrent ischemic events, and optimize long-term cardiovascular outcomes.

The success of PCI in patient's case hinges on meticulous long-term management and follow-up. Regular monitoring of cardiac function, symptom assessment, medication adherence, and lifestyle modifications are essential to optimize outcomes and prevent disease progression. Additionally, ongoing communication and collaboration between the patient, healthcare team, and interdisciplinary providers are critical to address emerging clinical concerns, tailor treatment

strategies, and promote patient engagement in self-care[2].

Patient's case has broader implications for clinical practice in managing patients with complex CAD. It underscores the importance of individualized care, shared decision-making, and a multidisciplinary approach to treatment[3]. By considering patient preferences, clinical characteristics, and evolving evidence-based practices, healthcare providers can optimize outcomes and improve the overall quality of care for patients with CAD[4].

Conclusion

In conclusion, multi-vessel PCI represents a suitable alternative to CABG in patients with TVCAD who decline surgical intervention. Individualized care and shared decision-making are essential components of managing complex coronary artery disease, facilitating informed treatment decisions that align with patients' preferences and values. Regular follow-up is paramount for assessing the long-term efficacy and safety of interventions, optimizing patient outcomes, and promoting cardiovascular health and well-being.

Learning points

Multi-vessel PCI as an Alternative to CABG: This case underscores the significance of multi-vessel PCI as a viable alternative to CABG in select patients with TVCAD who decline surgical intervention. While CABG remains the gold standard for revascularization in complex coronary artery disease, some patients may have valid reasons for refusing surgery, such as concerns about procedural risks or recovery time. In such cases, multi-vessel PCI can offer a minimally invasive alternative, providing symptomatic relief and preserving cardiac function without the need for sternotomy or cardiopulmonary bypass.

Individualized Care and Shared Decision-Making: This case highlights the importance of individualized care and shared decision-making in managing patients with complex coronary artery disease. Each patient's clinical presentation, anatomical considerations, comorbidities, and personal preferences must be carefully considered when determining the most appropriate treatment strategy. Shared decision-making empowers patients to actively participate in their care, ensuring that treatment decisions align with their values, preferences, and goals.

Regular Follow-Up for Long-Term Assessment:
The case emphasizes the critical role of regular follow-up in assessing the long-term efficacy and safety of interventions in patients with complex coronary artery disease. Follow-up assessments allow healthcare providers to monitor symptom relief, evaluate cardiac function, detect procedural complications, and optimize secondary prevention measures. Regular monitoring ensures continuity of care, facilitates early intervention for emerging clinical concerns, and contributes to improved outcomes and quality of life for patients like this.

References

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Figure/Video

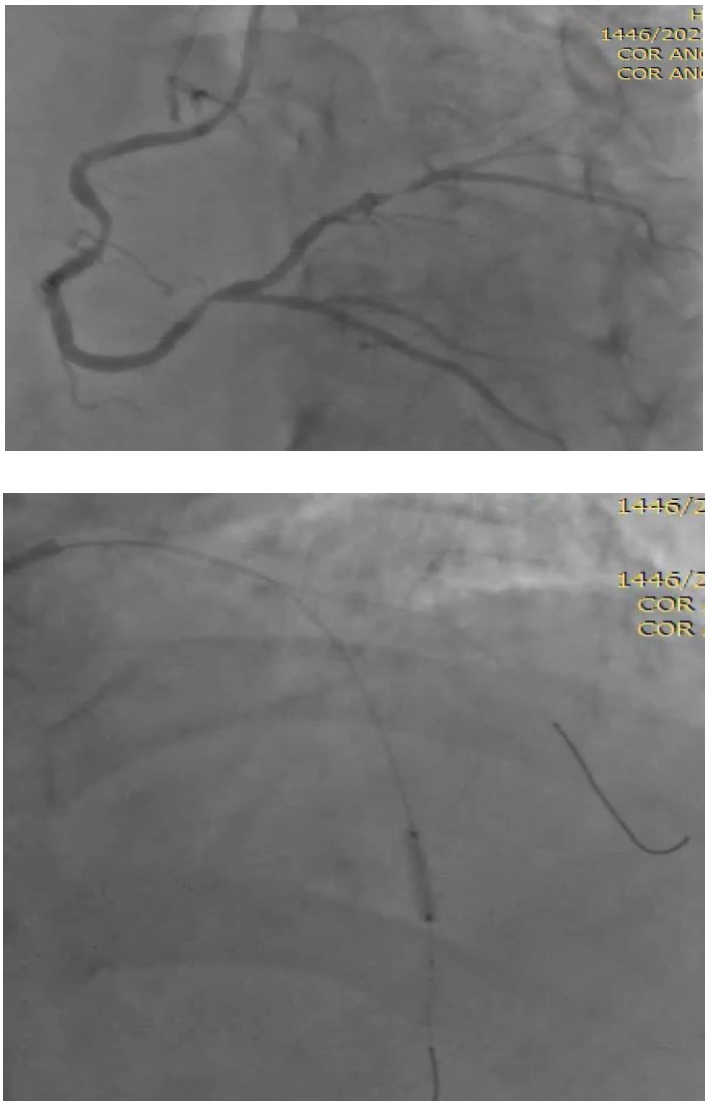

Figure 1: Using EBU GC workhorse guide wire crossed into diagonal and lad and predilatation done as shown.

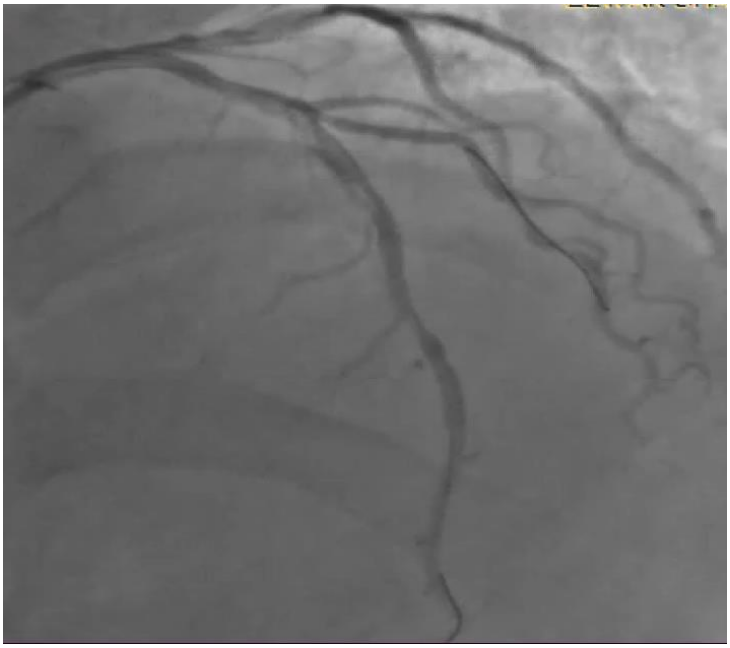

Figure 2: Post stent deployment under expansion can be seen.

Figure 3: Post NC Ellis type iii perforation.

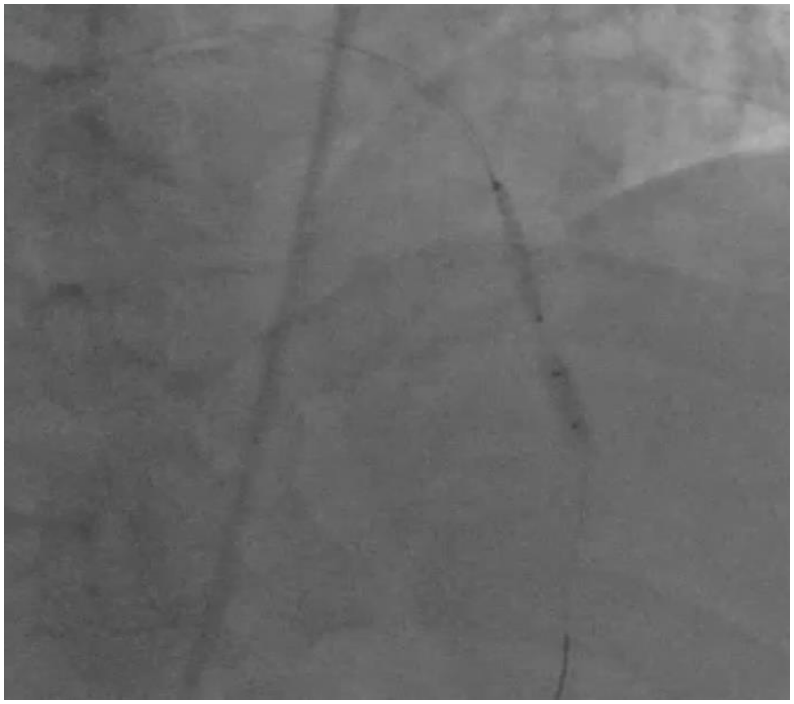

Figure 4: Balloon temponade and ping pong technique shown with cover stent proximal to the temponade balloon.