



Figure 1. Ex vivo appearance of the retrieved stent-balloon system. Separation of the proximal segment of the stent from the balloon, balloon perforation, and stent deformation at the tip of the guiding catheter are clearly observed.

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Successful Percutaneous Revascularization with Culotte Technique and Management of Acute Complications in Left Main Coronary Bifurcation Lesion

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Introduction and Aim: Percutaneous coronary intervention (PCI) of left main coronary artery (LMCA) bifurcation lesions requires high technical expertise and immediate management of potential hemodynamic and rhythm complications. In this case, we present the successful application of the Culotte stenting strategy for an LMCA-LAD-LCx bifurcation lesion in an 86-year-old female patient presenting with acute coronary syndrome and cardiogenic shock, along with the prompt management of intraprocedural ventricular fibrillation (VF) and coronary dissection complications. LMCA bifurcation lesions represent some of the most complex coronary interventions due to the large territory of myocardium at risk. The Culotte technique, a two-stent strategy, ensures complete ostial coverage of both branches; however, potential side-branch occlusion or severe arrhythmias during the procedure require rapid intervention.

Case Report: An 86-year-old female patient was admitted to our catheterization laboratory with a preliminary diagnosis of acute coronary syndrome. Upon arrival at the catheterization suite, the patient was in cardiogenic shock. The electrocardiogram revealed prominent ST-segment elevation in lead aVR with widespread ST-segment depressions in other leads (Fig. 1). Coronary angiography demonstrated a severe bifurcation lesion involving the distal LMCA, proximal LAD, and proximal LCx segments (Fig. 2). Given the clinical presentation of cardiogenic shock, immediate stenting was pursued. The procedure was initiated by engaging the LMCA ostium with an EBU 3.5 guiding catheter. The LAD and LCx arteries were crossed using soft workhorse wires. Predilatation was performed on the LCx and LAD lesions using a 2.0x20

mm balloon. A 3.5x24 mm drug-eluting stent (DES) was deployed along the LMCA-LCx axis. Proximal optimization technique (POT) was performed at the LMCA level using a 4.5x8 mm non-compliant (NC) balloon. Subsequently, a 3.5x21 mm DES was implanted along the LAD-LMCA axis. After rewiring the LAD and LCx, stent struts were dilated with a 2.0x15 mm balloon. Kissing PTCA was executed using 3.0x12 mm and 3.5x12 mm NC balloons in the LCx and LAD branches, respectively (Fig. 3). During the procedure, the patient developed VF, which was rapidly converted back to sinus rhythm with immediate electrical defibrillation. Following defibrillation, a decrease in LAD forward flow was noted; thus, an overlapping 2.5x34 mm DES was implanted into the LAD. Final POT was performed at the LMCA using a 4.5x12 mm NC balloon. Upon identifying a dissection at the LCx ostium, a 2.5x21 mm DES was deployed into the LCx. Following the two-vessel Culotte stenting, complete resolution of stenosis and TIMI-3 flow were successfully restored in all branches (Fig. 4). Post-procedure, a half-dose tirofiban (Aggrastat) infusion was initiated.

Conclusion: The Culotte technique provides high procedural success in LMCA bifurcation interventions when the vessel anatomy is favorable. Prompt response with immediate defibrillation to malignant arrhythmias such as VF, alongside bail-out stenting for flow-limiting dissections, are key determinants of clinical success in this high-risk patient population.

Keywords: Left main coronary artery, bifurcation, culotte technique, cardiogenic shock, coronary dissection.

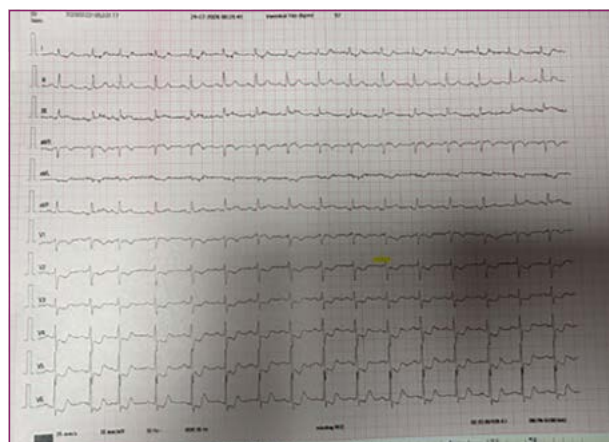


Figure 1. Initial 12-lead electrocardiogram (ECG) upon admission. Prominent ST-segment elevation in lead aVR accompanied by diffuse ST-segment depressions in anterior/inferolateral leads (indicative of extensive left main / multivessel ischemia).



Figure 2. Baseline coronary angiography image. Medina (1,1,1) bifurcation lesion with severe stenosis involving the distal Left Main Coronary Artery (LMCA), proximal Left Anterior Descending (LAD), and proximal Circumflex (LCx) arteries.

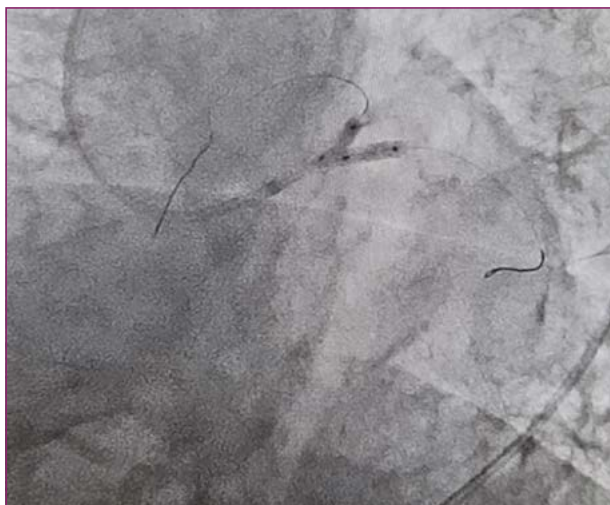


Figure 3. Simultaneous Kissing Balloon inflation in the LAD and LCx branches during the Culotte stenting procedure to optimize stent strut opening.



Figure 4. Final angiographic view demonstrating complete resolution of stenosis in the LMCA, LAD, and LCx branches with restored TIMI-3 flow.

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From Cardiac Arrest to Successful LMCA Bifurcation PCI: A Challenging Case

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Introduction and Aim: Iatrogenic coronary dissection with cardiac arrest is a rare but life-threatening complication of percutaneous coronary intervention, particularly in patients with complex coronary anatomy. We present a challenging case of ostial LCx dissection complicated by cardiac arrest in a patient with NSTEMI, diabetes mellitus, and chronic kidney disease. Following successful resuscitation and stabilization, the patient underwent complex LMCA-LAD-LCx bifurcation PCI with sequential stenting, proximal optimization, and kissing balloon techniques, resulting in complete sealing of the dissection and restoration of TIMI grade 3 flow. This case highlights the importance of meticulous guidewire control and a systematic, stepwise approach to complex bifurcation PCI in the management of iatrogenic coronary dissection. In patients with diabetes mellitus and chronic kidney disease presenting with NSTEMI, coronary anatomy is often complex, heavily calcified, and technically challenging. Iatrogenic subintimal dissections occurring during percutaneous coronary interventions (PCI), particularly when complicated by hemodynamic arrest, represent highly challenging clinical scenarios associated with substantial morbidity and mortality. We aimed to present a case of cardiac arrest following subintimal wire passage during intervention for an ostial circumflex (LCx) lesion at an outside center, followed by successful complex left main coronary artery–left anterior descending artery–left circumflex (LMCA-LAD-LCx) bifurcation stenting after referral to our center following intensive care unit management.

Case Report: A 66-year-old man with known diabetes mellitus (DM) and chronic kidney disease (CKD) presented to an outside center with chest pain and was diagnosed with NSTEMI. Coronary angiography (CAG) revealed 99% stenosis at the ostium of the LCx. During an attempt to cross

the lesion with a guidewire, the wire entered the subintimal space, resulting in coronary dissection and cardiac arrest on the angiography table. Following approximately 15 minutes of cardiopulmonary resuscitation (CPR), sinus rhythm was restored. The patient was subsequently monitored in the intensive care unit for 5 days and then referred to our center for further evaluation and treatment. After hemodynamic stabilization at our center, the patient was transferred to the catheterization laboratory. Following successful cannulation of the left main coronary artery (LMCA), 0.014-inch guidewires were successfully advanced separately into the LAD and LCx. Predilatation of the 99% ostial LCx lesion was performed using a 3.0×15 mm PTCA balloon at 18 atm. Subsequently, a 4.0×24 mm drug-eluting stent (DES) was deployed from the LCx into the LMCA at 14 atm, followed by proximal optimization technique (POT) using a 5.0×8 mm non-compliant (NC) balloon in the LMCA. After rewiring the LAD, kissing balloon inflation was performed using a 3.0×15 mm balloon in the LAD and a 3.5×15 mm balloon in the LCx. Subsequently, a 4.0×33 mm DES was deployed from the LAD into the LMCA at 18 atm, followed by repeat POT in the LMCA using a 5.0×8 mm NC balloon. The distal LCx was rewired, and final kissing balloon inflation was successfully performed using a 3.0×15 mm NC balloon in the LCx and a 3.5×15 mm NC balloon in the LAD. The procedure was completed with a final POT of the LMCA using a 5.0×8 mm NC balloon. Post-procedural control coronary angiography demonstrated excellent bifurcation anatomy and optimal stent expansion, with TIMI grade 3 flow in both the LAD and LCx. The dissection plane was completely sealed. The patient had an uneventful clinical and hemodynamic course and was discharged in good clinical condition.

Conclusion: In high-risk and anatomically challenging cases complicated by iatrogenic coronary dissection and cardiac arrest, experienced and systematic complex PCI strategies following acute-phase stabilization can be lifesaving. This case demonstrates that even in subintimal dissection involving the left main coronary artery and major branches, excellent angiographic and clinical outcomes can be achieved through meticulous guidewire control, optimal balloon and stent sizing, and repeated POT–kissing balloon inflation techniques.

Keywords: Left main coronary artery, iatrogenic coronary dissection, coronary bifurcation, coronary angiography.