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Coronary Artery Stent Dislodgement and Loss in the Bloodstream: A Case Report and Management Options

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Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
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Patient: Female, 46-year-old
Final Diagnosis: Coronary artery dissection and stent dislodgement
Symptoms: Chest pain
Medication: —
Clinical Procedure: PCI
Specialty: Cardiology

Objective: Rare disease

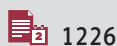
Background: Coronary stent dislodgement is rare but carries serious complications like thrombosis, myocardial infarction, disruption of the systemic circulation, and coronary dissection, which can lead to sudden death. Thus, rapid evaluation and intervention are needed to restore blood flow to vital organs.

Case Report: A 46-year-old woman with no relevant past medical history except for smoking, presented to the Emergency Department (ED) with left-sided chest pain. The physical exam was unremarkable. EKG showed ST segment elevation, and troponin was 4.03. She underwent cardiac catheterization, which showed 100% occlusion of the left anterior descending coronary artery (LAD). A drug-eluting stent (DES) was placed. Later, she had chest pain similar to the initial episode. EKG showed 1-mm elevation at ST segment in leads V1 and V2 and T wave inversion in leads V2, V3, V4, and V5. She underwent a repeat heart catheterization, which revealed a dissection in the middle LAD distal to the initial stent placement. She was treated with another stent overlapping the proximal stent. While attempting to cross the proximal stent, the stent came off the balloon, slipped from the wire, and went down into the descending aorta.

Conclusions: Coronary artery stent dislodgement is a rare event that can lead to significant complications during PCI. Patient restlessness and small-sized, severely angulated, and previously stented coronary arteries are associated risk factors. The main treatment option is stent retrieval, either surgically or using other available techniques. If retrieval of the stent is impossible, crushing it against the blood vessel wall could be considered.

Keywords: Coronary Artery Disease • Percutaneous Coronary Intervention

Full-text PDF: <https://www.amjcaserep.com/abstract/index/idArt/937598>



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Background

Coronary artery stent dislodgement is a rare but recognized serious complication during cardiac interventions. It may lead to induced coronary thrombosis, myocardial infarction, and peripheral and cerebral blood circulation disruption. In such cases, interventions may be necessary to restore blood flow to prevent myocardial infarction and cardiac arrest.

Case Report

A 46-year-old woman with no pertinent past medical history except for tobacco smoking presented to the ED with left-sided chest pain, which she described as aching, 7/10 in intensity, radiating to the left shoulder, aggravated by changes in position, associated with nausea, vomiting, and lightheadedness, and not relieved by antacids. She denied any headache, diaphoresis, or weakness. She was not in acute distress and was hemodynamically stable on physical examination. Vital signs were blood pressure 137/82 mmHg, pulse 82 beats per minute, temperature 37.3°C, respiratory rate 17 breaths per minute, height 1.473 m, weight 80 kg, and SpO₂ 95% on room air. The physical exam was unremarkable, with no chest tenderness was detected on palpation. There were no added heart sounds. Heart rate and rhythm were normal sinus, the lungs were clear to auscultation, there was no leg edema, and peripheral pulses were palpable.

EKG showed ST segment elevation at V1 and V2. The initial troponin value was 4.03. She received a sublingual nitroglycerin tablet and a loading dose of aspirin and Brilinta. Code heart was called, and she underwent cardiac catheterization, which showed 100% occlusion of the LAD, and the ejection fraction was 55%. A stent was placed, her chest pain resolved, and she

was transferred to the Intensive Care Unit (ICU) for observation. She was started on a statin, metoprolol, and lisinopril. Five hours later, she reported having chest pain similar to the initial episode when she presented to the ED. Morphine was administered intravenously, and EKG showed 1-mm ST segment elevation in leads V1 and V2. In addition, there was T wave inversion in leads V2, V3, V4, and V5. She underwent urgent cardiac catheterization, which revealed type A dissection in the middle LAD distal to the initial stent placement (**Figure 1**), considered iatrogenic because of guidewire and stent deployment. She was treated with another stent, “Resolute Onyx DES,” which is an overlapping proximal stent. While attempting to cross the proximal stent, it came off the balloon and was not deployed in the coronary artery. There was difficulty in threading the stent over the balloon. However, the stent was hooked to the tip of the balloon and was brought back into the guiding catheter. While pulling the stent and the guiding catheter together, the stent slipped from the balloon tip and the guide wire prolapsed into the descending thoracic aorta. Subsequently, the distorted stent (**Figure 2**) was lost into the blood stream. She was transferred back to the ICU for close monitoring. She did not have any chest pain, shortness of breath, palpitations, or other symptoms during the following 2 days. Peripheral pulses were intact, capillary refill was less than 2 s, and there were no signs of ischemia.

The medical team spoke with the patient regarding the event of stent dislodgement. We shared the scientific data and approach to retrieve the stent. A CT chest, abdomen, and pelvis was done to localize the stent embolization site. However, it did not show up in the CT scan. The patient was reassured and informed about the CT results. She was discharged home on aspirin, Brilinta, metoprolol, statin, and lisinopril.

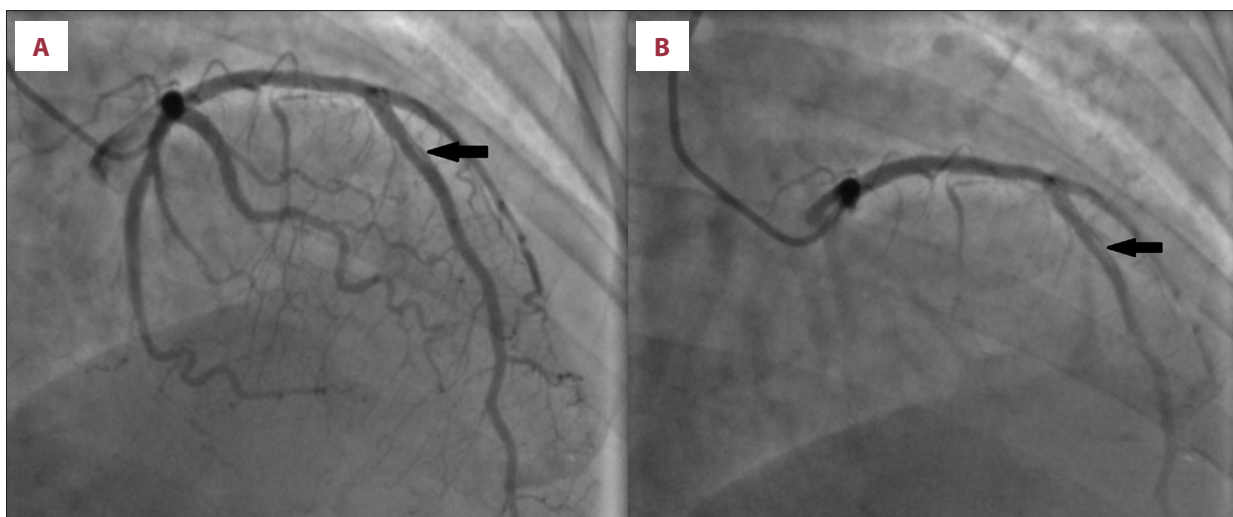


Figure 1. (A, B) Coronary angiography showing type A coronary dissection “arrow head” in the middle left anterior descending artery.

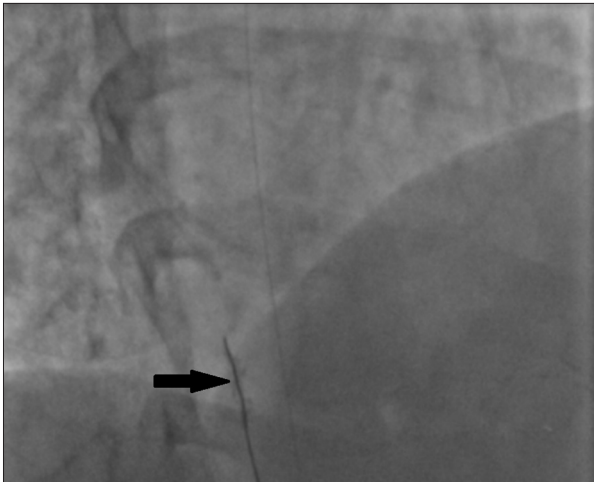


Figure 2. Cardiac catheterization showing the distorted stent “arrow head” attached to the guide wire before it was lost downstream in the descending aorta.

Discussion

Percutaneous coronary intervention has been used widely since 1996 and is associated with better outcomes when compared to medical therapy alone. However, complications after coronary stents still may occur, such as an allergic reaction to contrast, contrast nephropathy, stent thrombosis, and arrhythmia due to reperfusion injury. One of the rarest complications after stent placement is stent dislodgement.

The incidence of stent dislodgement has decreased significantly with the new techniques and devices, as shown in this study [1]. It has reduced from 5% in studies done before 2000 to 0.3% in studies done after 2005 [1]. The percentage of complications after stent dislodgement is approximately 19%, and only 3% of the dislodged stents were left untreated [1]. In our case, stent dislodgement did not result in any complications. The stent was lost in the descending aorta and tracked by CT of the chest, abdomen, and pelvis, but we could not determine its location. At 1-week outpatient follow-up, the patient was asymptomatic.

Complications resulting from stent dislodgement depend on the location of the dislodgement. It can lead to coronary artery occlusion, arrhythmia, and death if it occurs inside the coronary arteries. It may also dislodge in the ascending aorta and go directly to the cerebral circulation, which would lead to stroke. Peripheral circulations also could be involved. In our case, the stent dislodged in the descending aorta, and fortunately, it was uneventful.

Risk factors associated with stent dislodgement are inadequate sedation, restless patient, tortuous coronary arteries, severe angulation of the vessel, previously stented vessels, small stents, and stents with poor support, like JR4 [2,3]. The only risk factor that existed was a previously stented vessel,

as the stent was dislodged while trying to pass the proximal stent in the LAD artery.

Appropriate management of the dislodged stent is important to prevent those complications. Several management options are available to deal with this critical situation. Retrieval of the stent is the principal goal of the intervention. A retrieval could be done using a small-balloon catheter, loop snare, double wire, and forceps. The small-balloon catheter should pass distal to the dislodged stent, then inflated, and the double wire should be twirled around the dislodged stent with the help of the loop snare, and the stent could be retrieved by withdrawing the new stent back through the arterial system. If retrieval fails using this maneuver and the risk of complications is high, open-heart surgery could be considered. As a last resort, the dislodged stent could be crushed against the blood vessel wall by another stent to prevent distal embolization [2,4,5].

Based on the available medical literature, some techniques will help mitigate the risk of such complications, such as adequate sedation, thus preventing excessive unpredicted movement and the use of appropriately-sized stents. The stents should have good support, especially in tortuous, severely angulated, or previously stented vessels. Also, cardiologists should be aware of different options to retrieve the stents in case of dislodgement.

Conclusions

In the medical literature, coronary artery dissection with stent dislodgement is a rare but described complication of percutaneous coronary artery intervention. This complication is associated with high morbidity and mortality rates (eg, MI, arrhythmia, stroke, and death). There are multiple contributory factors. Some are procedure-related (eg, an awake and restless patient), and others are related to the anatomy of the coronary artery (eg, a prior stent in the same artery, small coronary artery, sharply angulated coronary artery), and a small stent might be a contributory factor. Treatment options can include stent retrieval and stent crushing against the blood vessel wall or open-heart surgery, with the last 2 methods as a last resort if the stent retrieval technique fails.

Acknowledgments

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Declaration of Figures' Authenticity

All figures submitted have been created by the authors who confirm that the images are original with no duplication and have not been previously published in whole or in part.

References:

1. Alomar ME, Michael TT, Patel VG, et al. Stent loss and retrieval during percutaneous coronary interventions: A systematic review and meta-analysis. *J Invasive Cardiol.* 2013;25(12):637-41
2. Yang DH, Woo SI, Kim DH, et al. Two dislodged and crushed coronary stents: Treatment of two simultaneously dislodged stents using crushing techniques. *Korean J Intern Med.* 2013;28(6):718-23
3. Al Kindi DI, Al Kindi FA. Right coronary artery stent dislodgment during primary percutaneous coronary intervention. To leave or to retrieve? *Heart Views.* 2019;20(3):109-13
4. Taylor JD, Lehmann ED, Belli AM, et al. Strategies for the management of SVC stent migration into the right atrium. *Cardiovasc Intervent Radiol.* 2007;30(5):1003-9
5. Kagiya K, Shimada T, Nakano M, et al. Coronary artery stent dislodgement and aortic dissection in a patient with a severely calcified lesion in the proximal right coronary artery. *J Cardiol Cases.* 2017;16(4):105-8