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CORONARY, PERIPHERAL, AND STRUCTURAL INTERVENTIONS

CLINICAL CASE

Expanded Stent Migration and Renal Artery Embolization During Aorto-Ostial Left Main Percutaneous Coronary Intervention

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ABSTRACT

BACKGROUND Stent dislodgement with systemic embolization is a rare but serious complication of percutaneous coronary intervention.

CASE SUMMARY During intravascular ultrasound-guided percutaneous coronary intervention for aorto-ostial left main artery stenosis, a fully expanded 4.0-mm drug-eluting stent dislodged upon balloon withdrawal. Angiography showed the stent partially floating in the aortic root, with its distal struts still anchored at the ostium, before its complete embolization. After securing the left main artery with a second stent, the dislodged stent was identified following systemic embolization to the left renal artery. Given the high risk of retrieval, it was managed in situ with balloon expansion to achieve full apposition against the vessel wall.

DISCUSSION This report describes the rare event of systemic embolization of a fully expanded stent. Our experience indicates that in situ expansion may represent a practical alternative when retrieval poses significant hazards, offering a potential pathway to stabilize the complication.

TAKE-HOME MESSAGES Fully expanded coronary stents can in rare cases dislodge and embolize systemically. When retrieval is high risk, intentional in situ deployment at the embolization site provides a safe and definitive management option. (JACC Case Rep. 2026;31:106327) © 2026 Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Aorto-ostial percutaneous coronary intervention (PCI) is associated with significant technical challenges because of sharp vessel angulation, aortic root motion, and instability of the guide catheter.[1] While stent loss most commonly occurs prior to deployment,[2] migration and embolization of a fully expanded stent is exceedingly rare and poses unique procedural and management difficulties.

This report describes a rare case of postdeployment stent embolization during left main artery (LM) PCI, resulting in systemic migration into the renal

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ABBREVIATIONS AND ACRONYMS

IVUS = intravascular ultrasound

LM = left main artery

PCI = percutaneous coronary intervention

artery. We detail the clinical course, propose underlying mechanisms, and outline a stepwise management strategy, including bailout techniques and procedural insights.

TAKE-HOME MESSAGES

- Even fully expanded coronary stents can in rare cases dislodge and embolize systemically; this first reported case of renal artery embolization highlights the need for vigilance and meticulous technique, especially during aorto-ostial interventions.
- When retrieval of an embolized stent is high risk, in situ deployment with postdilation offers a safe, effective, and definitive strategy to preserve vessel patency and avoid hazardous retrieval attempts.

HISTORY OF PRESENTATION

A 45-year-old woman presented with several hours of exertional chest pain. On examination, her blood pressure was 160/90 mm Hg, heart rate 86 beats/min, and oxygen saturation 98% on room air. Physical examination was unremarkable.

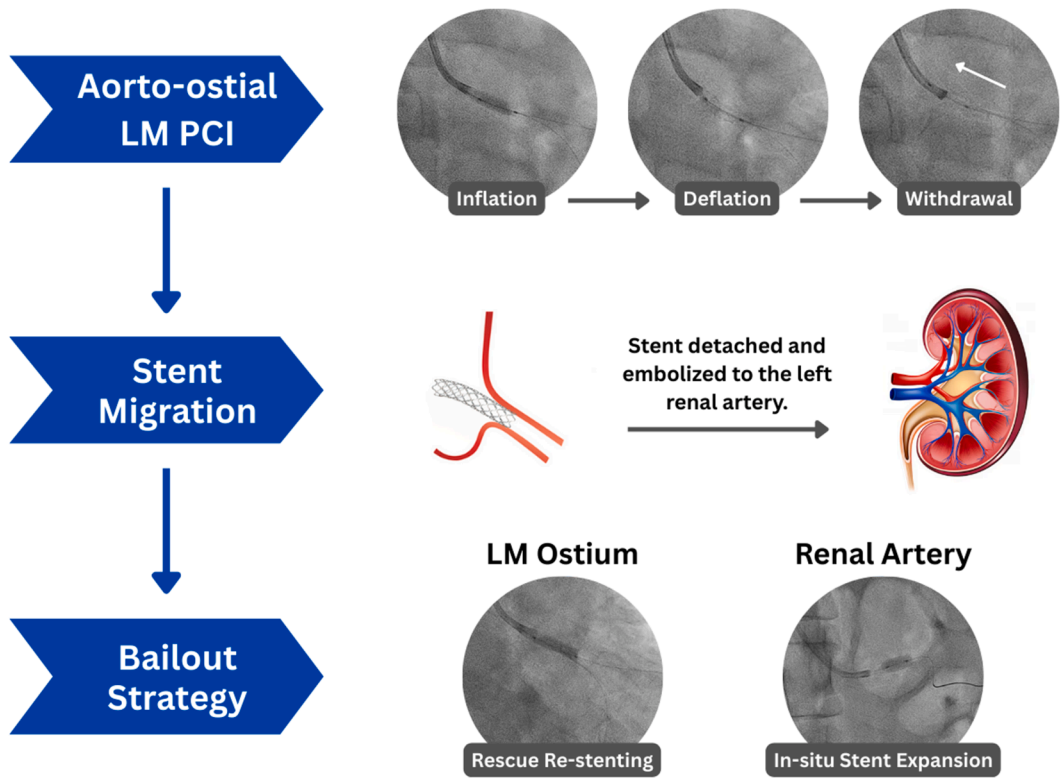
PAST MEDICAL HISTORY

The patient had a history of poorly controlled hypertension. She had no prior coronary interventions and no known renal dysfunction.

INVESTIGATIONS

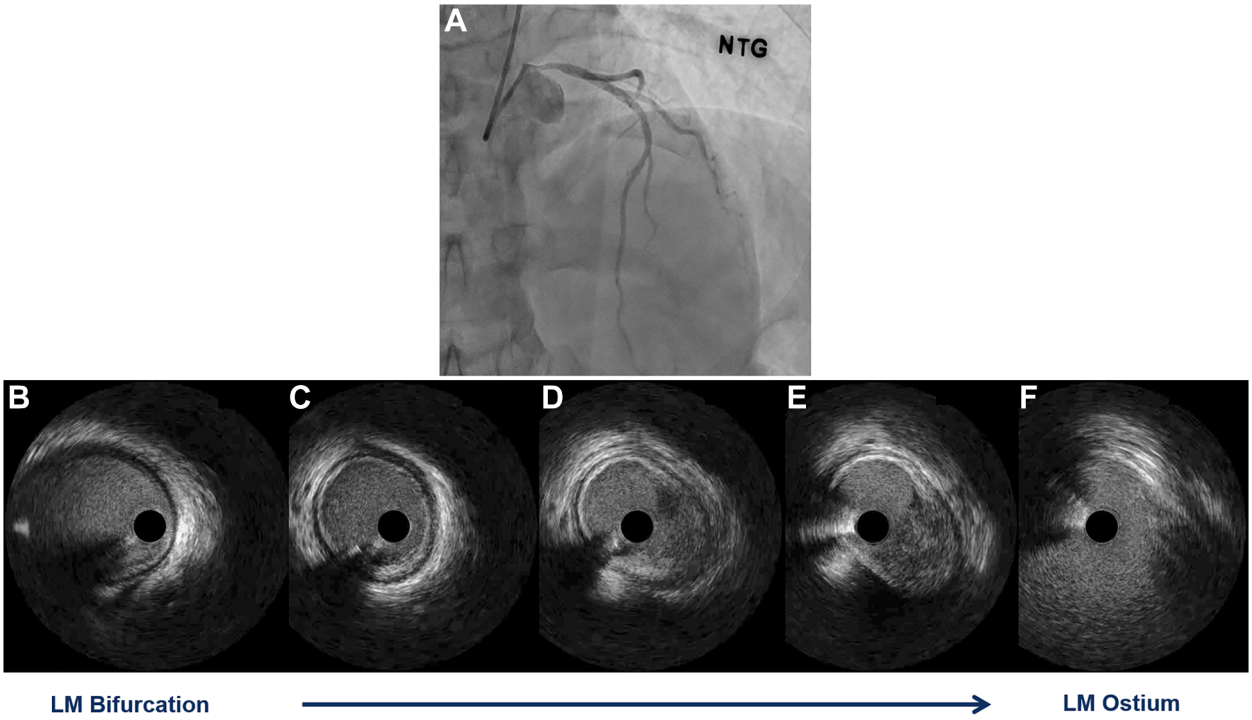
Initial electrocardiogram showed lateral and inferior ST-segment depression. Serial high-sensitivity cardiac troponin I levels rose from 73.89 to 502.03 pg/mL. Emergent coronary angiography was initiated via the left distal radial artery but converted to right radial access given severe vascular tortuosity and spasm. Diagnostic angiography using JL 4.0 and JR 4.0 catheters revealed a normal right coronary artery. During LM cannulation, pressure damping was observed. The catheter was

VISUAL SUMMARY Overview of the Case



During LM PCI, premature balloon withdrawal after stent deployment led to stent migration, detachment, and embolization into the left renal artery. Bailout management consisted of prioritizing a second LM stent for ostial coverage, followed by in situ expansion of the embolized renal stent. LM = left main artery; PCI = percutaneous coronary intervention.

FIGURE 1 Aorto-Ostial LM Lesion and IVUS Findings



(A) Nonselective angiography demonstrates a significant aorto-ostial LM stenosis, with corresponding serial IVUS images illustrating key anatomical segments: (B) the LM bifurcation, (C) distal reference vessel, (D) midlesion, (E) the site of minimal lumen area, and (F) the left main ostium adjacent to the aorta.
IVUS = intravascular ultrasound; LM = left main artery.

withdrawn, and a nonselective aortic root injection using an Amplatz Left 1 catheter revealed a severe aorto-ostial LM lesion (**Figure 1A**). Serial intravascular ultrasound (IVUS) images are shown in **Figures 1B to 1F**. Measurements demonstrated a fibrous plaque with a distal reference vessel exhibiting an external elastic lamina diameter of 4.00 × 4.30 mm, a lesion length of 12.07 mm, and a minimal lumen area of 3.96 mm^2. There were no features suggestive of vasospasm or aortic wall pathology, such as dissection or inflammation.

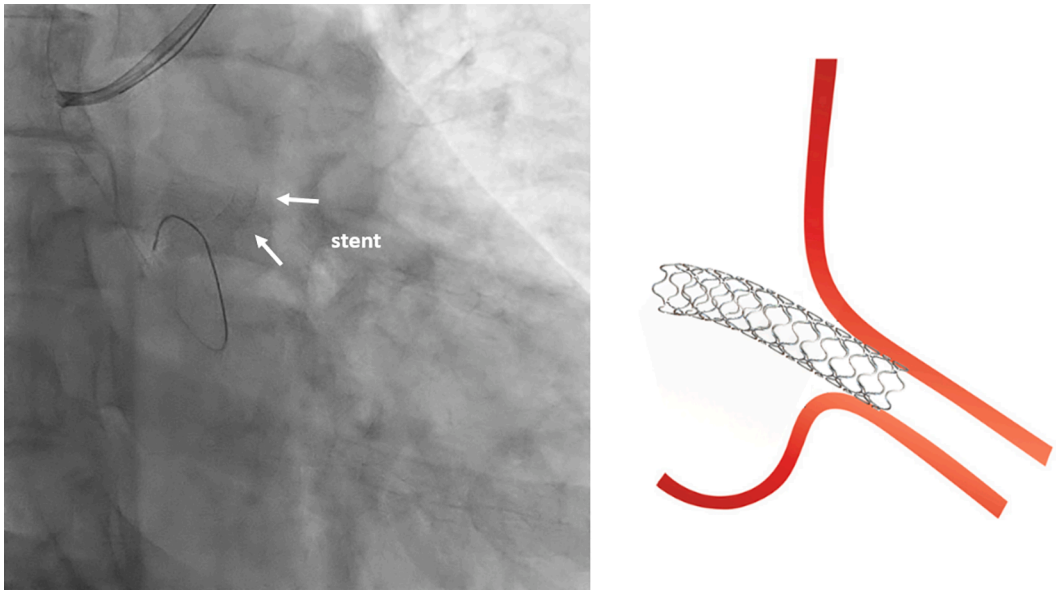
MANAGEMENT

IVUS-guided PCI of the aorto-ostial LM was performed via right radial access using a 6-F JL 3.5 guide catheter. Sion Blue guidewires (Asahi Intecc) were advanced into the left anterior descending artery and left circumflex artery. After lesion preparation with a Kamui 3.0 × 15 mm balloon (Asahi Intecc), a 4.0 × 15 mm Xience Skypoint drug-eluting stent (Abbott Vascular) was positioned. Stent tracking was smooth, and deployment was performed without adjunctive anchoring techniques (eg, floating wire).

Unexpectedly, during balloon deflation and withdrawal (Video 1), the fully expanded stent migrated proximally into the aorta, causing guide catheter instability and subsequent complete wire loss. Angiography revealed the stent partially floating in the aortic root, with distal struts still anchored at the LM ostium (**Figure 2**). Options considered included retrieval, repositioning, or allowing the stent to embolize, with subsequent management depending on final location.

Given persistent ischemic symptoms, unstable anatomy, and risk of LM occlusion, securing coronary flow was prioritized. During attempts to re-establish access, the stent became completely dislodged and embolized distally. Repeat IVUS confirmed no dissection or residual obstruction. Based on persistent distal external elastic lamina dimensions, a second identical 4.0 × 15 mm Xience Skypoint drug-eluting stent was successfully deployed at the LM ostium, this time allowing prolonged balloon

FIGURE 2 Stent Partially Floating in the Ascending Aorta



Fluoroscopic and illustrative images showing the stent partially floating within the ascending aorta, with its distal end still engaged at the left main ostium.

deflation and careful, slow withdrawal of the stent balloon. Postdilation was performed with a 4.5 × 10 mm Raiden3 noncompliant balloon (Cordis) (Figure 3). Final IVUS confirmed excellent expansion and apposition, with no edge dissection or significant aortic protrusion.

Fluoroscopy subsequently identified the embolized stent lodged in the left renal artery (Figure 4A). Selective engagement using a 6-F JL 3.5 catheter allowed advancement of a Sion Blue guidewire. Initial attempts to cross the stent failed, as the wire passed between struts because of size mismatch (4.0-mm stent vs 5-6 mm renal artery) (Figure 4B). The stent demonstrated craniocaudal motion with respiration, but during expiratory pauses, improved coaxial alignment permitted successful wire passage into the distal true lumen (Figures 4C and 4D).

Given the high risk of retrieval—including potential renal artery injury or trauma during stent extraction through the vascular access—the stent was secured in situ. A 5.0-mm Pantera LEO balloon (Biotronik) was used to achieve full expansion and apposition against the renal artery wall. Final angiography showed excellent renal perfusion, without flow limitation (Figure 5).

OUTCOME AND FOLLOW-UP

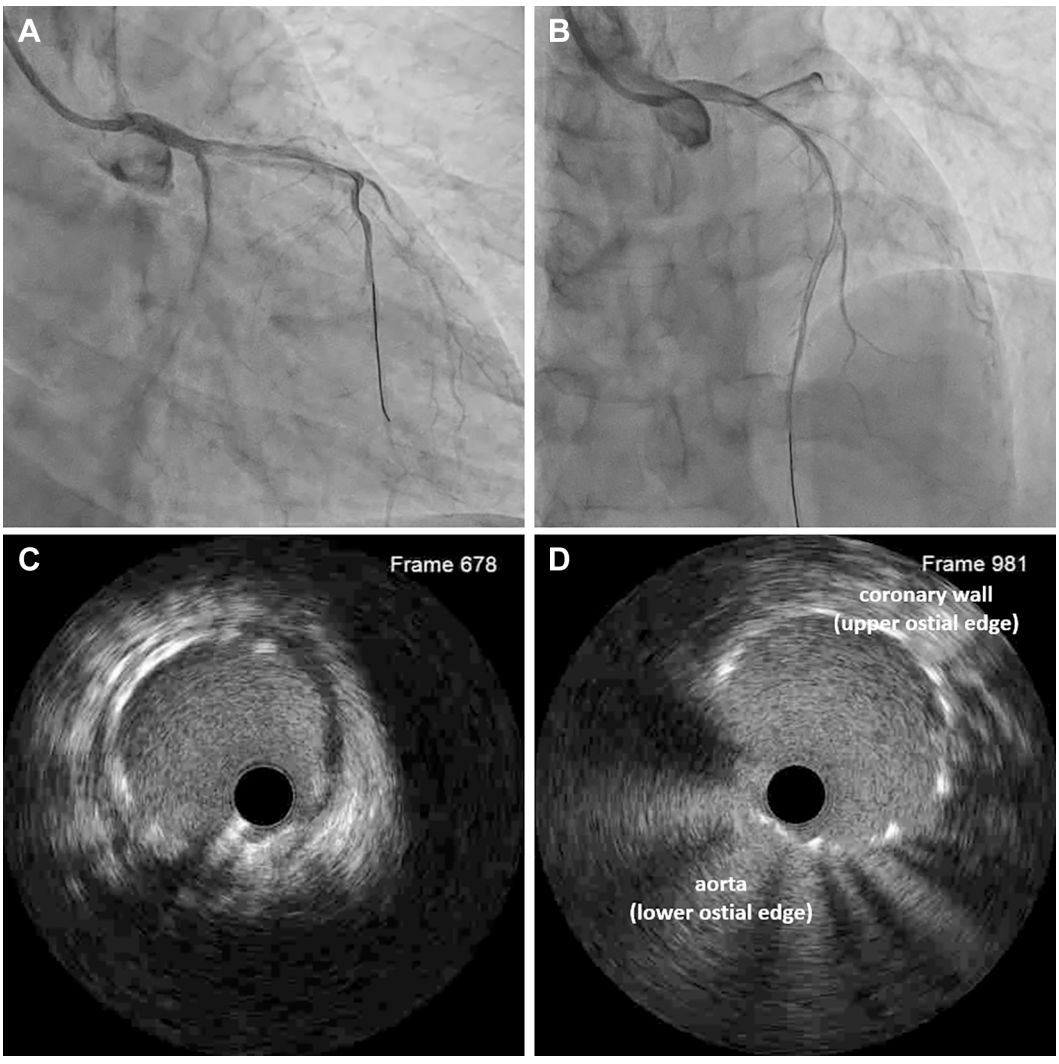
The patient remained hemodynamically stable with preserved renal function during hospitalization. Serum creatinine stayed within baseline limits, and transthoracic echocardiography demonstrated preserved left ventricular systolic function (ejection fraction: 62%). She was discharged on dual antiplatelet therapy and remained asymptomatic at the 6-month follow-up, with normal electrocardiogram, troponin levels, and renal function.

DISCUSSION

This case illustrates a rare and complex scenario of a fully expanded coronary stent migrating postdeployment, with subsequent systemic embolization. To our knowledge, this represents the first reported instance of a fully expanded coronary stent embolizing to the renal artery.

The only comparable case, reported by Farooqui et al[3] in 2025, involved dislodged overlapping stents during LM PCI, with one proximally deployed stent migrating into the guide catheter and ultimately being deployed in the brachial artery after failed

FIGURE 3 **Final Angiography and IVUS Findings**



Final angiographic views demonstrating good lumen gain in (A) caudal and (B) cranial projections. Stent edge transitions are shown (C) at the distal edge with smooth integration into the reference segment and no dissection, and (D) at the proximal edge with full ostial coverage and no significant aortic protrusion. IVUS = intravascular ultrasound.

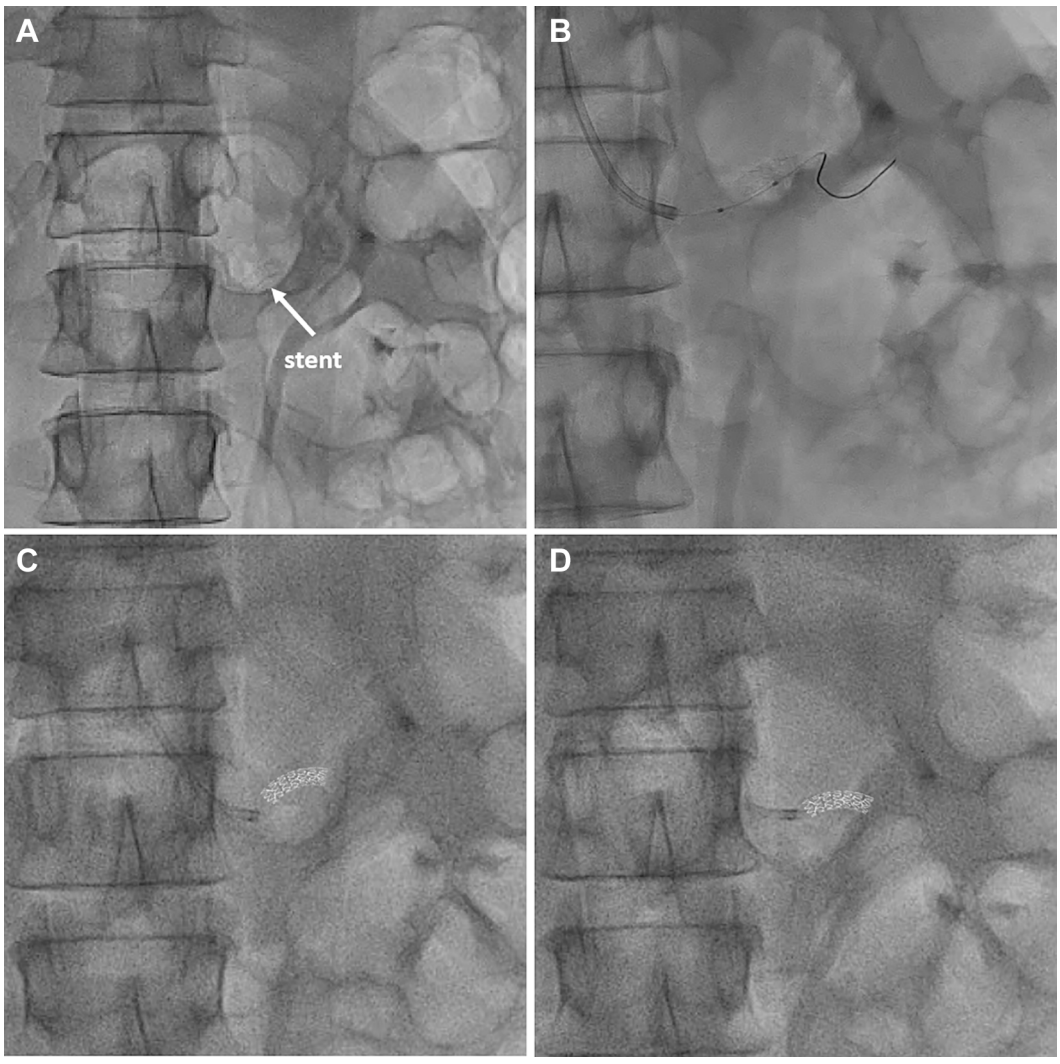
retrieval attempts. A critical distinction in our case is the complete loss of wire access, which allowed the stent to migrate freely into the systemic circulation before finally lodging in the renal artery.

Retrieval was considered but was deemed high risk given several factors: the stent was fully expanded, situated distally in a dynamic vascular bed, and unstable in position. Previous literature emphasizes the substantial hazards associated with stent retrieval, including major bleeding, vascular trauma, and potential need for emergent surgery.[4] In this context, in situ bailout stenting emerged as the safest and most practical solution.

Only 3 prior cases of coronary stent migration to the renal artery have been reported, all involving nonexpanded stents that embolized to the left renal artery. Juszkat et al (2007)[5] described a case where a stent was initially retrieved from the renal artery with a snare but ultimately dislodged again and lodged in the femoral bifurcation, requiring removal via a two-wire crossover technique. Li et al (2010)[6] reported successful retrieval of a migrated rapamycin-eluting

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FIGURE 4 Embolized Stent in Left Renal Artery and Wire Navigation Challenges

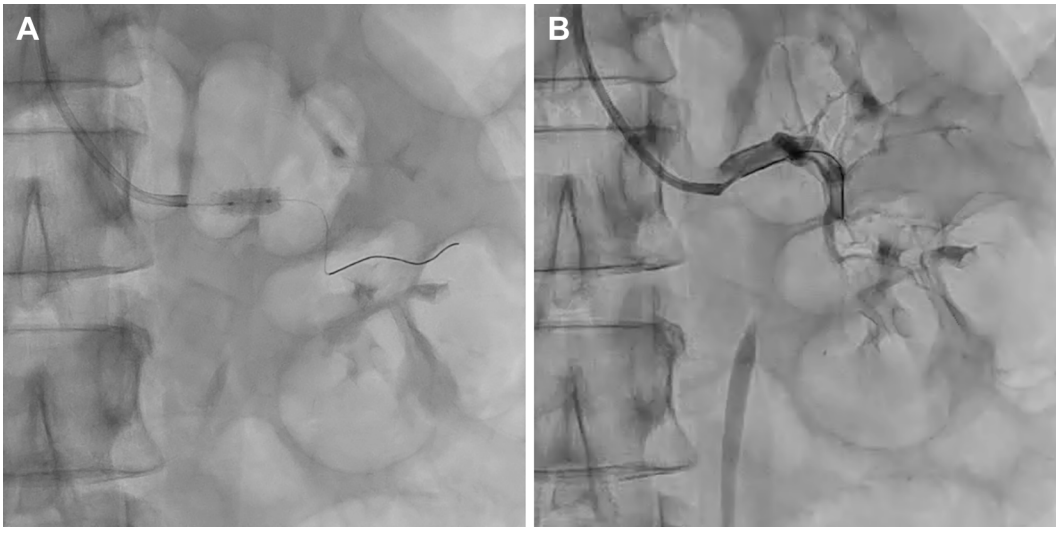


(A) Fluoroscopy revealing the embolized stent lodged in the left renal artery. (B) Selective engagement of the left renal artery using a JL 3.5 catheter and attempted guidewire advancement, with balloon passage unsuccessful given wire entrapment between stent struts. (C and D) Illustrative frames showing respiratory-related craniocaudal stent movement causing (C) catheter-stent malalignment during inspiration and (D) improved alignment during expiration.

stent from the renal artery using a 5.0-mm Amplatz gooseneck snare, while Atanasković et al (2025)[7] most recently described stent removal from a segmental renal artery branch using a SpiderFX embolic protection device after multiple failed retrieval attempts.

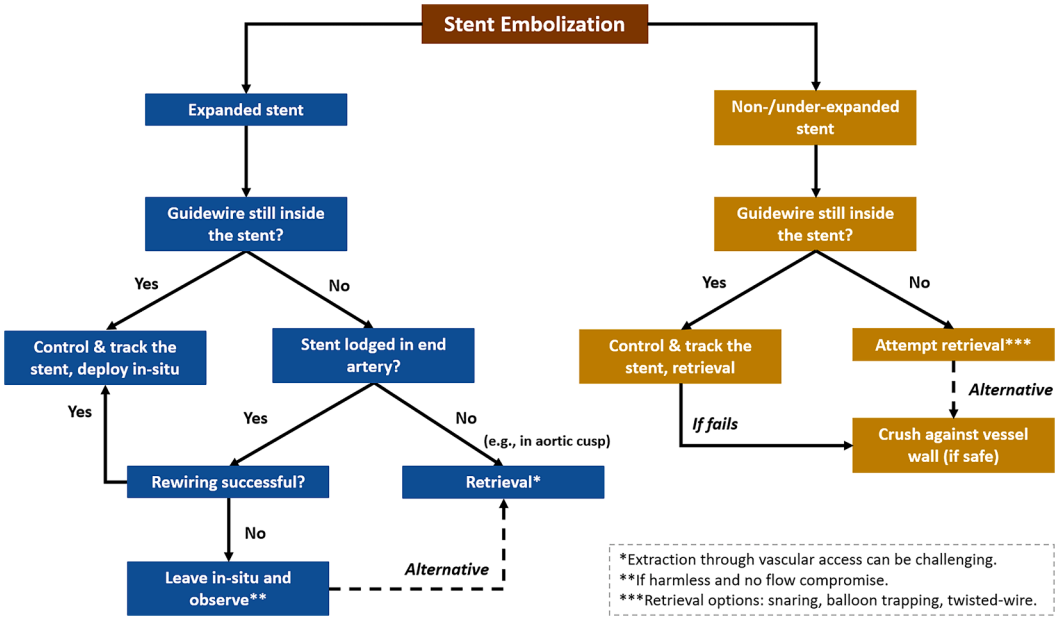
Beyond retrieval considerations, this case highlights the technical challenges inherent in aorto-ostial interventions. These procedures are associated with geographic miss rates as high as 54% and a threefold increase in target lesion revascularization.[1] The primary objective—complete ostial coverage without excessive aortic protrusion—is frequently challenged by pressure damping, difficulty in angiographically defining the true ostium, a narrow landing zone, and dynamic cardiac/respiratory motion. In the present case, we hypothesize that proximal stent displacement was initiated by premature balloon withdrawal before complete deflation. This action was likely compounded by the bulky balloon engaging the stent struts and the resistance from a high, localized, discrete plaque at the aorto-ostial junction. The displacement resulted in a loss of guide catheter

FIGURE 5 Balloon Expansion of Embolized Stent With Preserved Renal Flow



(A) A 5.0-mm balloon was used to further expand the embolized stent, improving apposition against the renal artery wall. (B) Final angiography demonstrated preserved and unobstructed renal arterial flow.

FIGURE 6 Proposed Algorithm for Management of Stent Embolization



This flowchart outlines a practical decision-making process for managing embolized coronary stents, beginning with the assessment of stent expansion status (expanded vs unexpanded) to guide appropriate treatment strategies.

support and subsequent wire disengagement. The subsequent systemic embolization was likely driven by hemodynamic forces and cardiac motion, exacerbated by the small ostial anchorage that left the stent highly unstable.

The management of embolized stents depends critically on their expansion status, location, and retrieval feasibility. When embolization occurs, stents typically follow the descending aorta rather than the sharply angled cephalad branches; to our knowledge, no embolization to the upper body, neck, or brain has been documented. While standard retrieval techniques (snaring, balloon trapping, or twisted-wire methods) may be attempted in selected cases, fully expanded stents in high-risk locations often warrant definitive approaches such as in situ deployment or crushing. In our patient, although the embolized stent was nominally expanded and did not immediately disturb blood flow, leaving it unapposed within the renal artery still posed significant long-term risks, including stent thrombosis and restenosis. Therefore, we determined that securing the stent via balloon expansion to ensure full wall apposition was necessary to mitigate these potential complications. Had rewiring failed or posed an excessive risk of vascular injury, the alternative would have been to leave the stent in situ with intensified antiplatelet therapy, albeit requiring vigilant long-term follow-up.

Based on our experience and the existing literature, we propose a practical decision-making framework that begins with evaluating the stent's configuration (expanded vs unexpanded) to guide appropriate management (**Figure 6**). This structured approach may assist interventional cardiologists in rapidly identifying safe and effective solutions in similarly complex scenarios.

CONCLUSIONS

Aorto-ostial stenting poses unique challenges, with stent overprotrusion into the aorta being a primary risk. This case demonstrates that although systemic embolization of a fully expanded stent is exceedingly rare, it remains a critical complication. A key technical lesson is the necessity of a controlled, slow balloon withdrawal after full deflation to mitigate this risk. When retrieval is high risk, in situ deployment of the embolized stent offers a safe, effective, and definitive bailout strategy.

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KEY WORDS coronary stent complication, guidewire loss, in situ stent management, interventional bailout technique, IVUS guidance

APPENDIX For a supplemental video, please see the online version of this paper.