Clinical Case Report

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# Migration of a stent from left main and its retrieval from femoral artery

## A case report

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**Abstract**

**Rationale:** Embolization of a deployed stent is a rare complication and its mechanism remains unclear in most cases.

**Patient concerns:** A 52-year-old man underwent coronary angiography for effort angina, revealing an 80% stenosis of the proximal left anterior descending (LAD) involving the distal left main (LM). After luminal sizing with intravascular ultrasound two drug-eluting stents were deployed (5.0 × 12 mm and 3.5 × 15 mm) to cover the LM-LAD lesion. After postdilatation, the proximal stent had disappeared from the LM.

**Diagnoses:** The missing stent was found in the right deep femoral artery.

**Interventions:** A new 5.0 × 15 mm stent was deployed onto the LM-LAD ostium, in overlapping with the previously implanted. Then, the stent migrated to the deep femoral artery was successfully retieved through the contralateral femoral artery.

**Outcomes:** The patient was discharged 2 days later, after an uneventful hospital stay.

**Lessons:** Stent deformation after postdilation is a possible causes of stent migration.

**Abbreviations:** atm = atmospheres, IVUS = intravascular ultrasound, LAD = left anterior descending, LM = left main, PCI = percutaneous coronary intervention.

**Keywords:** drug-eluting stent, left main, percutaneous coronary intervention, stent migration

### 1. Introduction

Stent migration and loss during percutaneous coronary intervention (PCI) is an infrequent complication. Migration of deployed stent into peripheral arteries is rare and frequently asymptomatic, although a subsequent peripheral ischemia is still possible. We present a case of a cobalt and platinum iridium alloy stent deployed into the left main that migrated to femoral artery and was successfully retrieved.

### 2. Case presentation

A 52-year-old man with hypertension, dyslipidemia, and smoking was admitted to our Cardiology Division for effort angina. Coronary angiography showed an 80% stenosis of the proximal left anterior descending (LAD) involving the distal left main (LM) (Fig. 1A and Moving image 1, http://links.lww.com/MD/C18). After patient's informed consent, a PCI was performed for LAD-LM lesion. The left radial artery was used to engage with a 6-Fr guide catheter (EBU 3.5 Launcher; Medtronic, Minneapolis, MN), and the stenosis was crossed with 0.014-inch wire (Hi-Torque Balance Middleweight Elite Guide Wire; Abbott Vascular, Abbott Park, IL). On intravascular ultrasound (IVUS), minimal and maximum lumen diameters of LM proximal reference were 4.6 and 5.3 mm, respectively, whereas distal reference lumen diameters at LAD were 3.5 and 4.0 mm, respectively. In addition, LAD lesion showed large thick fibrotic plaque with 1.7 mm of minimum luminal diameter (Fig. 1B). Due to the coronary diameter mismatch between LAD and LM, after pre-dilation with 2.5 × 15 mm balloon at 16 atmospheres (atm), we deployed a short 5.0 × 12 mm cobalt alloy and platinum iridium alloy-zotarolimus eluting stent (Resolute Onyx; Medtronic, Minneapolis, MN) into the LM to LAD at 14 atm, and then a 3.5 × 12 mm cobalt chromium-everolimus eluting stent (Xience Alpine; Abbott-Vascular, Abbott Park, IL) in the proximal LAD at 14 atm (Fig. 2A and Moving image 2, http://links.lww.com/MD/C19). An additional 3.0 × 15 mm cobalt chromium-everolimus eluting stent was necessary for treating a residual distal LAD stenosis. Finally, high pressure postdilatation was performed with a 5.0 × 12 mm noncompliant balloon (NC Quantum Apex; Boston Scientific, Marlborough, MA) in order to optimize the LM stent (18 atm). After postdilation of the 2 LAD stents and LM stent, the guidewire was removed. The final control angiography showed the shift of LM stent to more proximal side with edge deformation leaving a gap between the LM and the LAD stents, not present in previous angiogram (Fig. 2B and Moving image 3, http://links.lww.com/MD/C20). A

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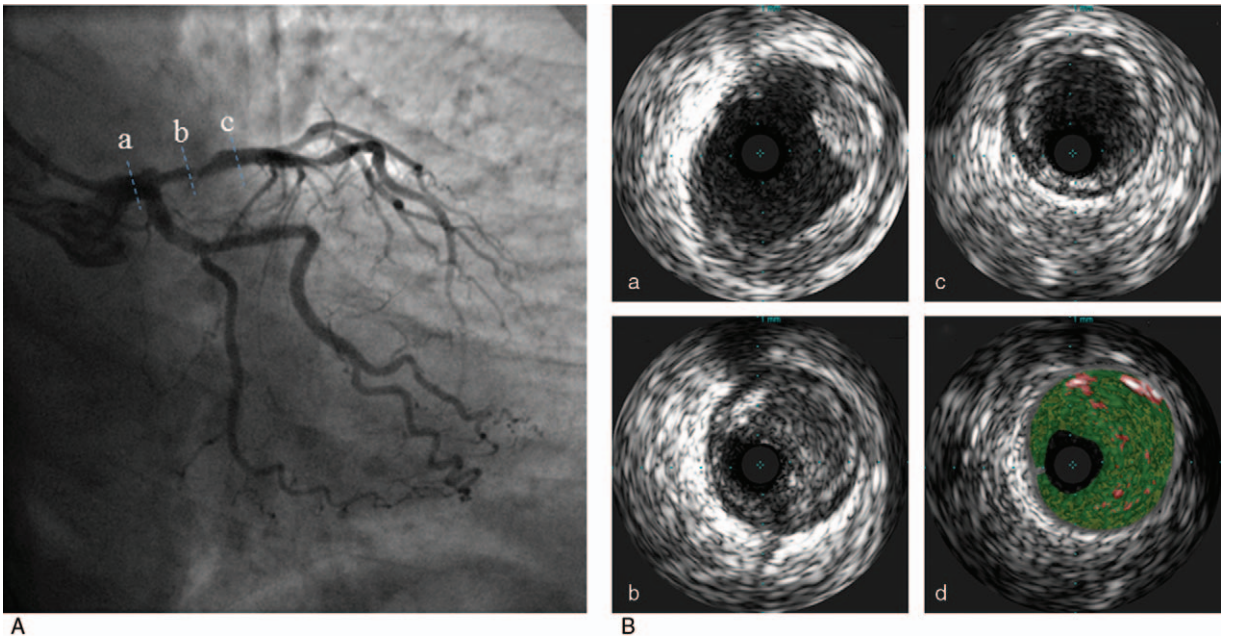


**Figure 1.** (A) The coronary angiography showed 80% stenosis of the proximal left anterior descending (LAD) involving the distal left main (LM); (B) a–c, Intravascular ultrasound (IVUS) showed lumen diameter mismatch between LAD and LM; (B) d, Virtual Histology-intravascular ultrasound (VH-IVUS) demonstrated thick fibrotic plaque.

further angiography demonstrated that the $5.0 \times 12$ mm stent was not any more present into the LM trunk (Fig. 2C and Moving image 4, http://links.lww.com/MD/C21). After a careful fluoroscopy scan, the deformed stent was found in right deep femoral artery (Fig. 3A and Moving image 5, http://links.lww.com/MD/C22). Therefore, an additional $5.0 \times 15$ mm cobalt alloy and platinum iridium alloy-zotarolimus eluting stent (Resolute Onyx; Medtronic, Minneapolis, MN) was implanted overlapping the

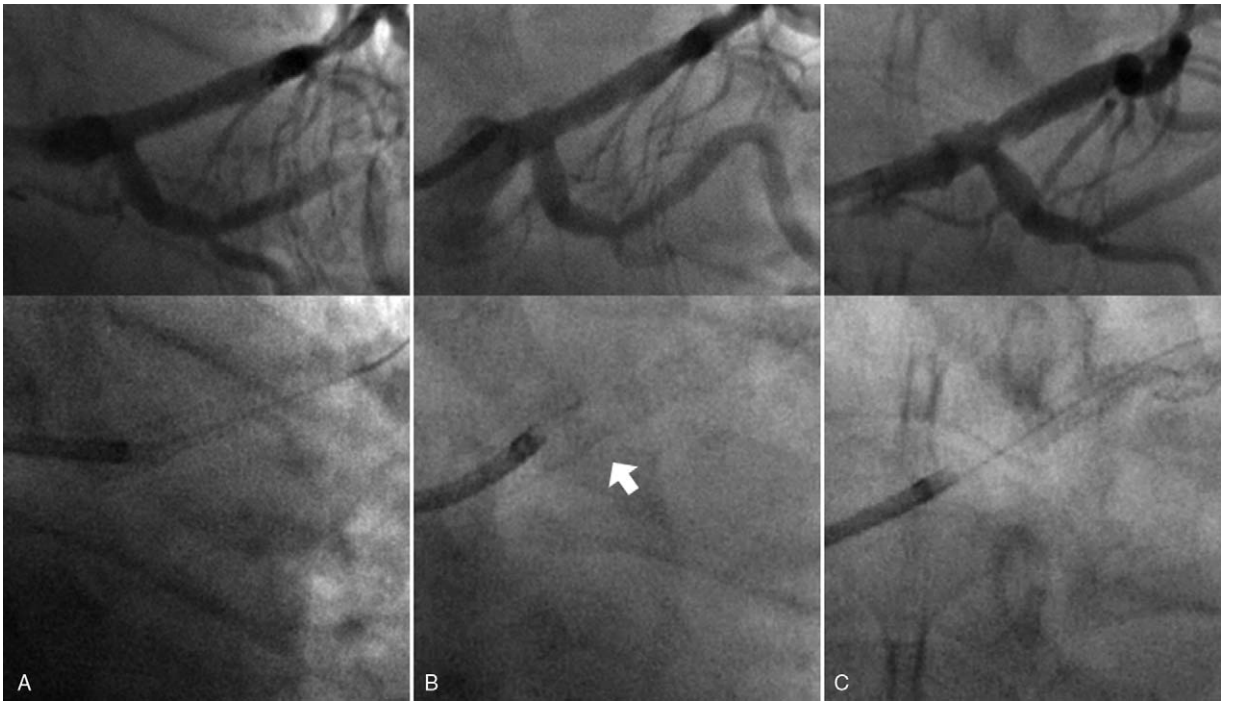


**Figure 2.** (A) A $5.0 \times 12$ mm cobalt alloy and platinum iridium alloy-zotarolimus eluting stent (Resolute Onyx; Medtronic) and a $3.5 \times 12$ mm cobalt chromium-everolimus eluting stent (Xience Alpine; Abbott-Vascular) were deployed in left main (LM) to left anterior descending (LAD); (B) After the postdilatation, the proximal stent migrated to proximal side. The distal edge of Resolute Onyx seems to be deformed (arrow); (C) Subsequent angiography demonstrated the proximal stent disappeared from coronary artery.

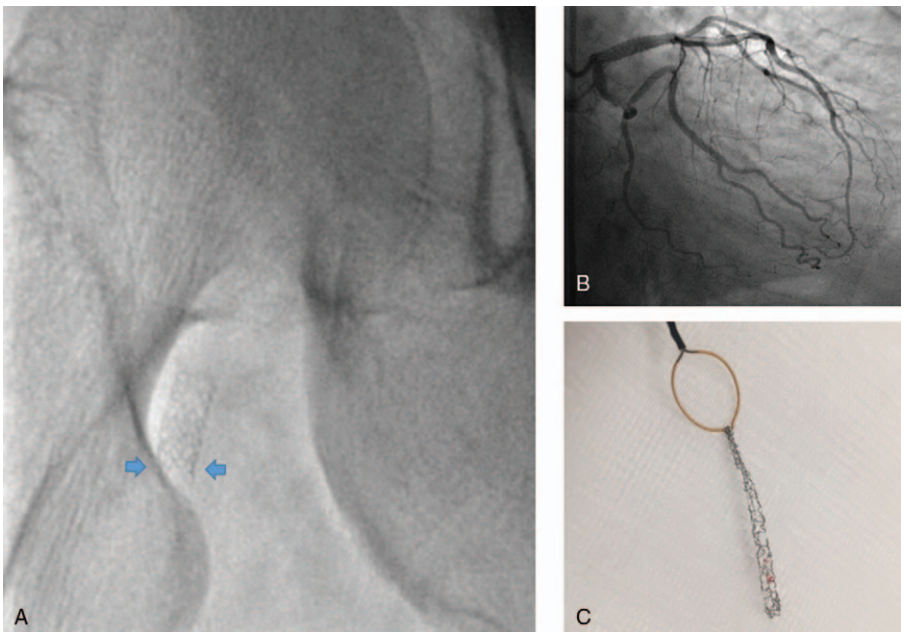


**Figure 3.** (A) On fluoroscopy scan, the stent was found in right deep femoral artery. The edge was deformed (arrows); (B) Final angiography after deployed another Resolute Onyx 5.0 × 15 mm; (C) Embolized stent was removed using Goose Neck catheter.

distal LAD stent at 16 atm in the LM with a good angiographic result (Fig. 3B). We did not perform postdilatation of the second LM stent to avoid stent deformation and potential new migration.

At the end of the coronary procedure, a 10 mm loop Goose Neck Snare (Goose Neck Snare; Medtronic, Minneapolis, MN) inserted from the contralateral left femoral artery through a 7Fr sheath was used to successfully remove the stent from the right femoral artery (Fig. 3C). The patient was discharged 2 days after the procedure without additional complications. The clinical follow-up at 3 months was uneventful and an angiographic and IVUS control was planned at 1 year.

## 3. Discussion

Stent loss during PCI is uncommon (from 0.3% to 1.3%) and its incidence has decreased in the recent years.[1,2] Stent loss mostly occurs from balloon dislodgment during implantation. Migration and loss of a deployed stent is an even more rare complication. To our knowledge, little has been reported on the incidence and mechanisms of deployed stent migration after their successful implantation.

In this case, stent migration and deformation were confirmed after the postdilatation with noncompliant balloon, and these findings suggest that stent migration was triggered by the postdilatation. One hypothesis that may explain the stent migration in the case presented could be the acute stent recoil and stent deformation after postdilatation of the new cobalt and platinum iridium alloy stent. To this regard, it should also be pointed out that bench tests showed that postdilatation with a noncompliant balloon in the proximal segment of the stent may cause deformation of the distal stent segment.[3] Considering that the IVUS image showed high volume plaque and the embolized stent presented a deformed shape, stent distal deformation was probably related to acute stent recoil due to the presence of a hard plaque. However, mechanical stress of guiding catheter and additional stenting might have been also involved in the stent migration.[4]

Finally, stent embolization into the peripheral arteries remains often asymptomatic.[5] However, in rare cases, stent embolization can lead to thrombosis, which could in turn cause peripheral ischemia.[6] That was why we decided to retrieve the stent from the femoral artery, and an attempt should be done whatever possible.

## 4. Conclusion

We report the migration of a cobalt and platinum iridium alloy stent to the femoral artery after successful stent deployment in LM-LAD and its successful percutaneous retrieval.

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