

# Rare Complication in The Coronary Angiography Laboratory: Stent Stripping

## Koroner Anjiografi Laboratuvarında Nadir Karşılaşılan bir Komplikasyon: Stent Sıyırılması

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### Öz

Yabancı cisim embolizasyonu, perkütan koroner girişimin nadir bir komplikasyonu olmasına rağmen, işlem sayısının artması, bu sorunun girişimsel kardiyologlar tarafından daha sık karşılaşılmaya neden olmaktadır. Son yapılan vaka çalışmaları, stent sıyırma oranının % 1'in altında olduğunu bildirmiştir. Girişimsel kardiyologlar, günlük pratikte önemli sayıda vakayla ilgilenir ve çok çeşitli komplikasyonlarla karşı karşıya kalır. Stentin sıyırılması, acil koroner baypas cerrahisi, koroner tromboz, miyokardiyal enfarktüs, serebrovasküler olay ve ölüm gibi ciddi komplikasyonlara neden olabilir. Bu nedenle, stent sıyırılmasının doğru yönetimi, mortalite ve morbidite riskini azaltmak için önemlidir. Bu vaka da sol ana koroner arterde stentin sıyırılma olgusunu sunuyoruz; sıyırılan stentin kaldırma prosedürünü ve ortaya çıkan komplikasyonları tartışıyoruz.

**Anahtar Kelimeler:** Stent sıyırılması, koroner anjiografi, girişimsel kardiyolog, embolizasyon

### Abstract

Although foreign body embolization is a rare complication of percutaneous coronary intervention, the increase in the number of procedures results in this problem being more frequently encountered by interventional cardiologists. Contemporary case studies have reported the rate of stent stripping to be below 1%. Interventional cardiologists attend to a considerable number of cases in everyday practice and witness a diverse spectrum of complications. Stent stripping can result in severe complications such as emergency coronary bypass surgery, coronary thrombosis, myocardial infarction, cerebrovascular event and death. Thus, the proper management of stent stripping is important for reducing the risk of mortality and morbidity. In this article, we present a case of left main coronary artery stent stripping; we discuss the removal procedure and the complications that arose.

**Key words:** Stent stripping, coronary angiography, interventional cardiologists, embolization

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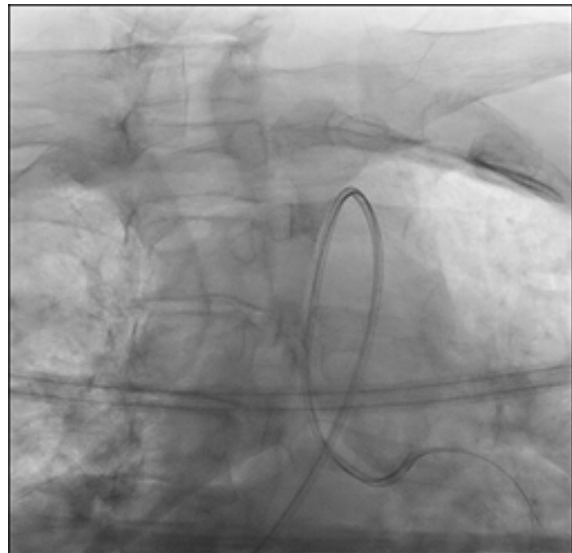
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## INTRODUCTION

Although foreign body embolization is a rare complication of percutaneous coronary intervention, the increase in the number of procedures results in this problem being more frequently encountered by interventional cardiologists. Contemporary case studies have reported the rate of stent stripping to be below 1% (1). In previous times, coronary stents were manually mounted onto balloons. It has been proven that manually mounted stents have greater rates of stripping compared to prepared stents (2). With the development of modern technologies, the complications associated with stent stripping continue to decrease. Stent stripping can result in severe complications such as emergency coronary bypass surgery, coronary thrombosis, myocardial infarction, cerebrovascular event and death. Thus, the proper management of stent stripping is important for reducing the risk of mortality and morbidity. In this article, we present a case of left main coronary artery stent stripping; we discuss the removal procedure and the complications that arose.

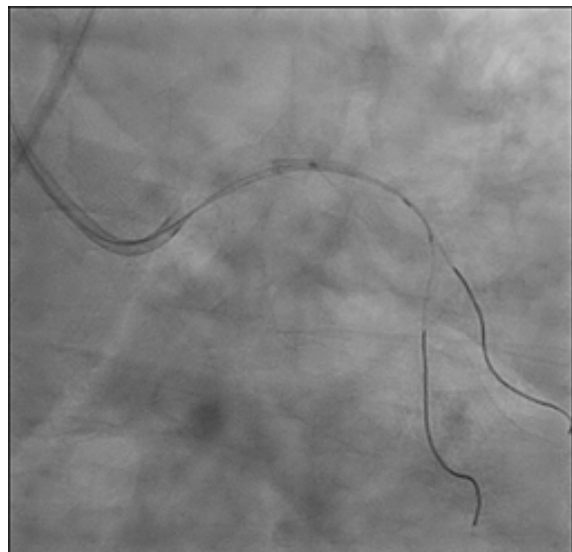
## CASE

A 67 year old female patient presented to the cardiology polyclinic with recently intensifying chest pain that increases with effort; the patient had a medical history of hypertension. Although the patient's physical examination did not demonstrate any pathological findings, she was transferred to the coronary angiography laboratory due to unstable angina. Coronary angiography was performed via the right femoral artery. The coronary angiography revealed 80% proximal stenosis of the LCx (left circumflex artery), 99% stenosis just before the OM (obtuse marginal) separation and 90% stenosis in the middle of the LCx. There were non-critical stenoses of the other coronary arteries. The LCx was considered responsible for the patient's complaints. Two floppy guidewires were directed towards the LCx lesion and OM artery. The lesion was then predilated using a 1.5x15mm balloon. Subsequently, we attempted to move a 2.5x15mm stent towards the distal end of the lesion. However, the stent could not pass the proximal LCx to reach the lesion. The stent and balloon were then retrieved, but the stent had stripped off the balloon. Non-contrast imaging revealed the stripped stent inside the LMCA (left main coronary artery). The stent was crossed with the existing floppy guidewires (Figure 1). The retrieval of the stent was attempted, however, only the floppy guidewires



**Figure 1.** The stent was crossed with the existing floppy guidewires.

had returned. Afterwards, a 1.2x15mm balloon was pushed past the distal end of the stent and inflated with a low atm; the stent was held (Figure 2). The stent was grasped with a catheter tip, but the stent and balloon had separated while on the catheter. The stent was then held with another 1.25x15mm catheter, it could not be held inside the catheter but was controlled from the wires; within the ostium, the



**Figure 2.** Afterwards, a 1.2x15 mm balloon was pushed past the distal end of the stent and inflated with a low atm; the stent was held.

stent and balloon separated and a distal embolization occurred. The location of the stent was investigated; cranial imaging came back clean, distal imaging showed that the stent was located on a medial branch of the deep femoral artery (Figure 3). Due to risk of thrombosis, the preferred method of approach was retrieval using a snare catheter. An 8F sheath was placed in the left femoral artery and the opposite side was accessed with an IMA (Internal mammary artery) catheter. It was exchanged a right guiding catheter. The segment distal to the stent was accessed with a hydrophilic wire. A snare catheter was then guided to the same location. The stent was held with the snare catheter, but was later displaced after the stent folded in the catheter opening. The retrieval of the stent was attempted again, but was unsuccessful. A floppy guidewire was then pushed past the stent and a 1.25x10mm balloon was used for retrieval. However, the stent could not be retrieved and the procedure was terminated. Control imaging showed minimal extravasation at the stent site. The procedure was finished. The department of cardiovascular surgery was consulted. The patient's complete blood count and clinical status were being monitored. The hemoglobin and hematocrit had seen a 2.8 g/dL and 6% drop, respectively, and a contrast CT (computer tomography) of the iliac and femoral arteries were taken, showing no signs of extravasation. The healthy



**Figure 3.** The location of the stent was investigated; cranial imaging came back clean, distal imaging showed that the stent was located on a medial branch of the deep femoral artery.

patient was discharged. She returned 2 weeks later for a control physical examination and no pathology was observed.

## DISCUSSION

Interventional cardiologists attend to a considerable number of cases in everyday practice and witness a diverse spectrum of complications. Vascular access complications include bleeding (hematoma, retroperitoneal hemorrhage, pseudoaneurysm), the creation of arterio-venous fistulae, arterial dissections, vessel rupture, infection, embolism, and thrombosis (3,4). In percutaneous coronary intervention, a rare but potentially severe complication of stent application is the stripping of the stent. This may lead to systemic or coronary embolization, which can result in serious morbidity or mortality (5). If the stent gets stripped in the coronary artery, the initial approach should be to evaluate the stent's location and, depending on the situation, plan its retraction or implantation. The stent should be pulled back if possible or implanted onto a proper location within the artery. If the stent is to be implanted, it should be completely adhered to the arterial wall and no malapposition should be permitted (6). During the process of stent retrieval, there are several useful methods such as removal of the stent with a snare, dilating a thin balloon on the distal end of the stent and subsequently latching the stent onto the catheter, and sliding another wire past the stent and performing the twisted guide wires maneuver with the stent wire. Although it is difficult to foresee the stripping of a stent, there are certain risk factors. Being mindful of these risk factors and accordingly taking preventive measure through the use of an assistive catheter, coaxial catheter placement and predilation will reduce the risk of stent stripping (7). In this case, we initially attempted a twisted guide wires maneuver using the wires inside the stent and were unsuccessful. Subsequently, we pushed a balloon through the stent, inflated it with a low atm and carried the stent into the femoral artery; peripheral embolization occurred after. We then attempted to retrieve the stent from the peripheral artery using a snare catheter but failed. Nevertheless, this case illustrates that primary PCI can be complicated by an embolized stent. This condition might cause neurological events, peripheral arterial ischemia and delayed revascularization, resulting in less favorable outcomes (8). For this, clinicians should consider preventing stent stripping before it can potentially occur; steps of precaution include ensuring that the

guide catheter is aligned linearly with the coronary ostium and predilation of severe target lesions. Every case of stent stripping is unique with respect to the method of stent retrieval; for this reason, the use of various techniques alone or in combination should be considered. All potential complications should be noted and the necessary equipment must be readily available in the catheter laboratory.

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