Alternative urgent management for iatrogenic dissection of a large left-main coronary artery: Renal stent implantation

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Introduction

For patients with unprotected left main coronary artery (uLMCA) disease, the main accepted treatment is coronary artery bypass graft surgery (CABG) (1). Previously, percutaneous coronary intervention (PCI) for uLMCA disease was associated with relatively high procedural and post-procedural long-term unwanted events (2). Recently, this has been performed in clinical practice with increasing numbers, over several landmark studies, and similar outcomes when compared with CABG (3). The strategy for revascularization LMCA should be determined on a per-patient basis because of long-term risks. Furthermore, drug-eluting stents (DESs) with advanced procedural techniques and new antithrombotic drugs have increased the popularity and success of LMCA stenting (4).

Of the elective procedures, there are reports of uLMCA stenting performed in high-surgical-risk patients or as the bailout process for procedure-related acute LMCA dissection (5). Percutaneous management of large vessels (>5 mm) has become a challenging process for interventional cardiologists because of limited commercial sizes of coronary stents. In this study, we present a case with catheter-induced uLMCA dissection successfully managed with a renal stent due to the large anatomical size of the LMCA.

Case Report

We report a case where a 46-year-old male patient who previously successfully underwent right coronary artery PCI also underwent elective stenting for his left anterior descending artery (LAD). During the process of stent implantation in LAD, no problem occurred. Afterward, a post-dilatation was performed, in which an opacity on LMCA was observed. After LAD stent balloon post-dilatation, a peri-procedural dissection on LMCA was detected (Fig. 1, Video S1), in which an urgent PCI of uLMCA was planned.

Intra-coronary vascular ultrasound was performed in calculating the LMCA size. Dissection was detected in the LMCA area,

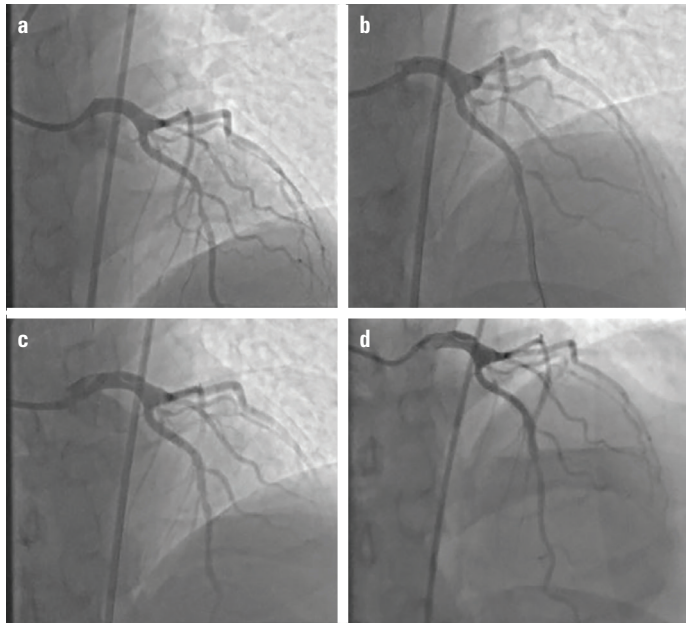

Figure 1. While the left main coronary artery (LMCA) was patent during left descending artery (LAD) stenting (a, b), dissection was observed on LMCA at the point with the catheter in touch (c, d) after LAD stenting performed

measuring 32.3 mm^2 with a mean diameter of 6.1 mm (Video S2). Because no commercial coronary stent (>5 mm) was available, a 6×15 mm Balloon-expandable Hippocampus Renal RX Stent System 0.014" (Medtronic, Minneapolis, MN, USA) was implanted and dilated with its balloon up to 14 atm (Fig. 2). The sufficient apposi-

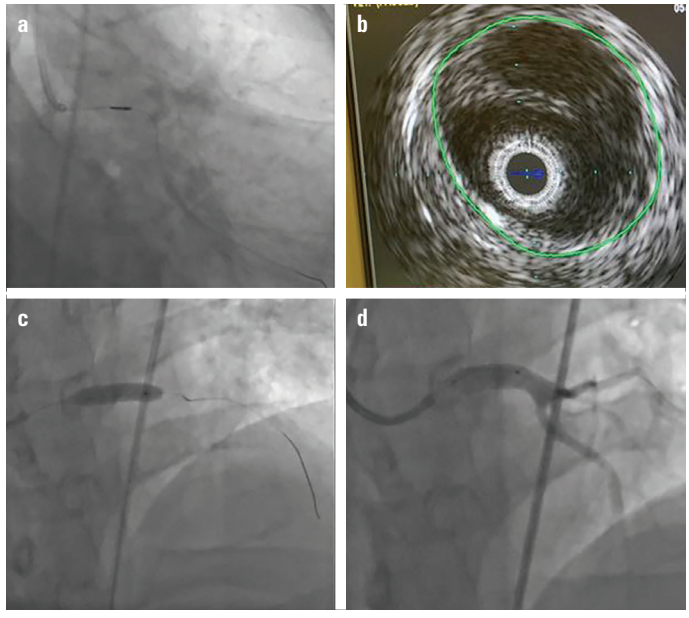

Figure 2. Dissection in the left main coronary artery (LMCA) was detected (a), and LMCA's diameter was measured with intracoronary vascular ultrasound as 6.1 mm (b). A Hippocampus Renal Balloon Expandable Stent was positioned (c) and successfully implanted (d) to the scope of the LMCA

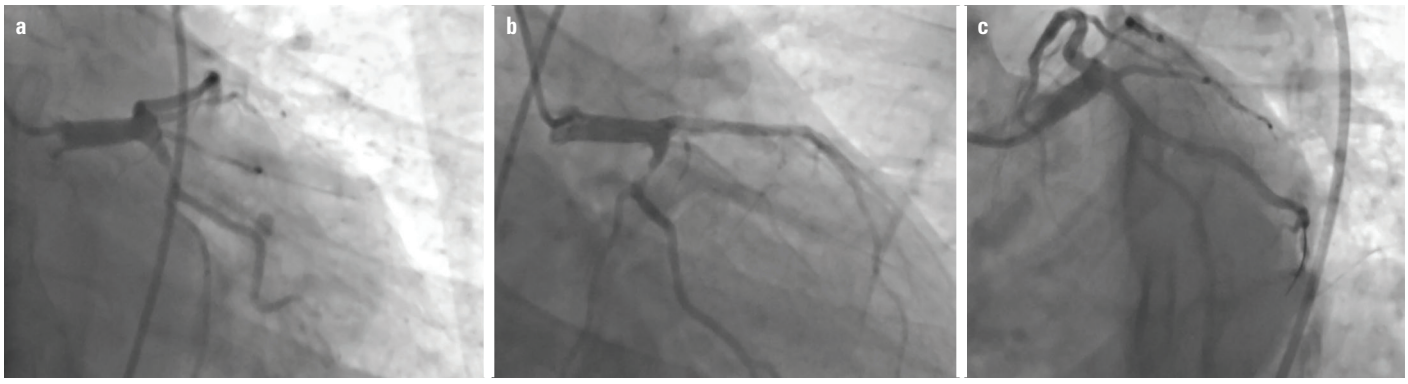

Figure 3. The left main coronary artery stent was patent perfectly on sixth-month control coronary angiography (a), but there was a critical proximal circumflex artery (Cx) lesion (b). The lesion was treated with drug-eluting stent implantation (c)

tion of the stent was detected after the procedure on IVUS (Video S3). A 3×16 mm DES was implanted in the proximal segment of the previous LAD stent. The final angiogram showed a slow flow in LAD, as the myocardial infarction (TIMI) 2/3 flow. The patient was admitted to the coronary intensive care unit and treated with intravenous tirofiban to prevent acute stent thrombosis.

There were no complications during the in-hospital follow-up period, and eventually, the patient was discharged home. The patient had no complaints in the second month of follow up. After 6 months of LMCA stenting, a routine angiographic control was performed. LMCA stent was patent perfectly; however, a 99% de-novo stenosis detected proximal circumflex artery (Cx), which was unrelated to the LMCA stent and without any clinical complaint. A DES was implanted to Cx successfully (Fig. 3, Video S4). Double antiaggregant therapy with prasugrel and acetylsalicylic acid was used for the patient. Besides, the patient had no complications during the 7-month follow up.

Discussion

In the last four decades, coronary angiography (CAG) has significantly increased in clinical practice, making it the main technique for diagnosis and treatment of coronary artery disease (6). One of the complications of CAG is coronary artery dissection, which can be life-threatening. Another complication is catheter-related dissection, which is uncommon; however, it has a high mortality rate because of its critical location and risk for rapid progression (7).

Atherosclerosis, deep intubation of the catheter, forceful contrast injection, the use of stiff coronary guidewires, and lack of experience of the operator are the multiple risk factors triggering the development of an LMCA dissection (7). The incidence of LMCA dissection is low, nearly 0.07%, but this life-threatening complication needs urgent treatment as the dissection flap may lead to impaired antegrade blood flow and hemodynamic instability (8). Because of the poor prognostic feature of acute LMCA dissection, it needs recognization and management immediately. Selecting the optimal mode of treatment is difficult because these cases are rare and present as an emergent clinical scenario. Thus, the strategy should be determined according to the patient's clinical status and dissection anatomy. The initial treatment can be percutaneous intervention, and if there is a complicated dissection, a surgical approach may be required in case of PCI failure (6).

In our study, the patient was clinically and hemodynamically stable. We decided to treat the LMCA dissection via PCI. Lacking proper coronary stent size for large vessels is the other problem. Previously, Ozeke et al. (9) and Pourdjabbar et al. (10) reported similar cases, in which elective LMCA PCI was performed via renal stents. They also stated that renal stent implantation could be feasible for the intervention of large coronary vessels.

To the best of our knowledge, unlike literary cases, this is the first PCI case that uses renal stent for an urgent case of acute LMCA disease. We also presented that using a renal stent for LMCA can help to struggle with LMCA dissection, resulting in early discharge of the patient.

With this strategy, we could manage a life-threatening interventional complication with a strategy not explained in the guidelines.

Conclusion

In the catheterization laboratory, even simple coronary cases can be complicated, and thus, undedicated materials may be successfully used in emergent situations, such as LMCA dissection.

Informed consent: All procedure was performed under patients approval.

Video S1. Left main coronary artery dissection (LMCA), which is not in the first poses, was observed. After intravascular ultrasound measurement, the renal stent was implanted to LMCA, and dissection was treated successfully.

Video S2. Left main coronary artery dissection area measuring 32.3 mm^2 with a mean diameter of 6.1 mm via intra-coronary vascular ultrasound.

Video S3. After the procedure, sufficient apposition of the left main coronary artery stent was detected via intra-coronary vascular ultrasound.

Video S4. On the sixth-month control coronary angiography, the left main coronary artery stent was patent, and a new proximal circumflex artery lesion was treated with stenting.

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DOI:10.14744/AnatolJCardiol.2020.50625