



## CASE REPORT

Medicine Science 2020;9(3):796-8

# Successful recanalization of previously subintimal stenting of the right coronary artery

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Received 14 May 2020; Accepted 24 Jun 2020

Available online 17.08.2020 with doi: 10.5455/medscience.2020.05.082

### Abstract

Stent placement in the subintimal or false lumen is a rare complication of coronary interventions. Subintimal stenting can cause chronic total occlusion. Angiography images of previously treated CTO cases should be carefully monitored. To avoid placing a stent in the false lumen, it must be absolutely sure that it is inside the lumen. In this case, we presented a successful case of chronic total occlusion in the right coronary artery with a subintimal stent.

**Keywords:** Chronic total occlusion, right coronary artery, subintimal stenting

### Introduction

Iatrogenic coronary artery dissection is a rare but serious complication of percutaneous coronary interventions (PCI) [1]. Especially in cases of PCI due to acute myocardial infarction, it is more common to advance the wire to the dissected or false lumen [1]. Implantation of the stent in the false lumen may lead to undesired coronary events in the acute and chronic stages [2]. In this case report, we present a patient who underwent successful PCI for chronic total occlusion (CTO) of a stent implanted subintimally to the right coronary artery (RCA).

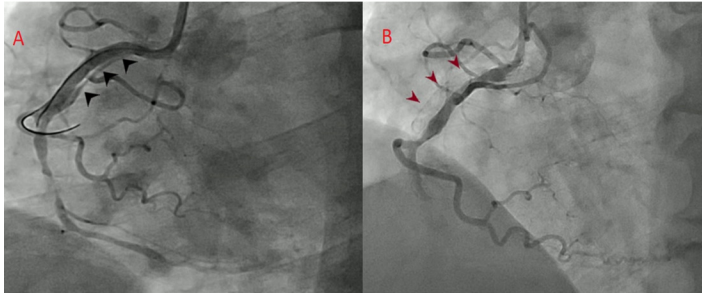
### Case Report

A 47-year-old male patient was admitted to our clinic with recurrent compressive chest pain. On physical examination, his fever was 36.5 °C, pulse was 84 bpm and blood pressure was 140/80 mmHg. Laboratory investigations included WBC: 7.8 /L, HGB: 13.9 g / dl, Glucose 125 mg / dl, BUN 18.60 mg / dl, Creatine 0.90 mg / dl, LDL 167 mg / dl. Troponin, CK and CK MB values were within a normal range. Electrocardiography

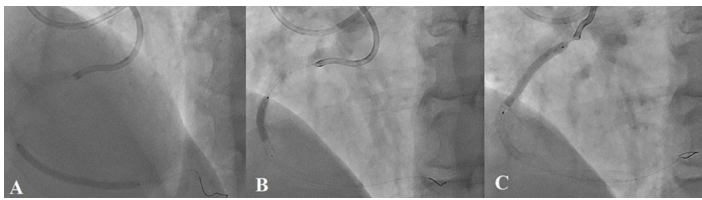
showed a normal sinus rhythm. Transthoracic echocardiography showed an ejection fraction of 60%, mild mitral regurgitation, and left ventricular hypertrophy. His medical history included hypertension and coronary artery disease. Anamnesis revealed that RCA PCI was performed five years ago due to acute coronary syndrome, but TIMI 3 flow could not be provided after the procedure. Although the coronary proximal stent of the RCA was open, a 100% lesion after the right ventricular branch of the RCA could not be passed through the guidewire. When the images were examined carefully, there was a suspicious dissection image in the proximal part of the RCA (Figure 1). Coronary angiography (CAG) was re-planned for the patient in our clinic. CAG showed LAD was plaque and there was an 80% lesion after CX OMI. It was observed that the stent previously placed in the RCA was completely occluded and a CTO segment formed from the mid part of the RCA (Figure 2). The first stent placed in the proximal segment of the RCA was suspected to be in the false lumen. It was thought that the subintimal stent was thrombosed and occluded so the coronary intervention which was performed in the external center was unsuccessful. RCA CTO PCI procedure was planned for the patient. A 7Fr Hyperion Guide Catheter AL5.75 SH (Asahi Intecc, Nagoya, Japan) guiding catheter was inserted into the RCA ostium, and a FL4 diagnostic catheter (Boston Scientific, Marlborough, MA, USA) was inserted into the left coronary system. The J-CTO score of the lesion was found to be 2 in dual injection. The lesion was passed with a guidewire of gladius (Asahi

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Intecc, Nagoya, Japan) accompanied by microcatheter (caravel) (Asahi Intecc, Nagoya, Japan). Before the passage of the lesion, the proximal segment was forced to pass from the subintimal transition region of the stent to the true lumen. The passage into the distal lumen was confirmed after type injection. Then guidewire Sion Blue (Asahi Intecc, Nagoya, Japan) was replaced with a guidewire and the microcatheter was removed by the nanto method. Percutaneous Transluminal Coronary Angiography post with 3,00X18 airtimes balloon (Brosmed, Dongguan, China), 3,00X38MM, 3.0X18MM, and 3,00X 24MM drug extended stent Xience Pro were placed. (Abbott Vascular, CA, USA). TIMI 3 flow was achieved without any complication. The patient was discharged the next day with medical treatment.



**Figure 1A** Coronary angiogram of right coronary artery shows shrinkage of the dissected pseudolumen. **Figure 1B** Coronary angiograms of RCA shows the previous stent outside of the lumen



**Figure 2.** Right coronary artery intervention and stenting are performed by passing through the true lumen



**Figure 3.** Side-by-side view of two stents in the false and true lumen after successful intervention in the right coronary artery.

## Discussion

Stent placement of the subintimal or false lumen is a rare complication of PCI procedures [3]. It is necessary to ensure that the guidewire is within the true lumen before stent placement to

total occlusive coronary lesions [3]. Otherwise, stent placement may damage the distal coronary flow. In our case, it was evident that the stent, which was placed subintimal in the procedure performed at the external center about 4 years ago, was performed without making sure that it was in the distal true lumen. The regeneration of the flow in the native vessel after total occlusion of the stent may be explained by the directing of the blood flow from the mid-proximal part of the stent to the true lumen, due to resistance to flow in the distal part of the stent. However, randomized controlled trials are needed to confirm this hypothesis.

CTO is the complete occlusion of the coronary artery lumen over three months and TIMI 0 flow after occlusion. Successful CTO PCI improves angina complaints, improves exercise capacity, increases left ventricular ejection fraction, and reduces the need for coronary artery bypass surgery [4]. Intervention is recommended for patients with persistent angina despite optimal medical treatment [5]. Angiography images can be taken from different angles to see if the guidewire is in the true lumen. Microcatheter type injection or intravascular ultrasound (IVUS) can be performed [6]. In addition, it is useful and important for use in complex lesions such as left main coronary artery procedures, chronic total occlusions and bifurcations. IVUS can be used to determine the site of entry into the CTO lesion, to detect the site of transition from the false lumen to the true lumen, and in particular to determine the optimal stent size in CTO procedures [7]. CTO PCI with IVUS was significantly less stent thrombosis in the follow-up compared with non-IVUS [7]. However, we could not use it in our case because IVUS was not present in our center. Balloon dilatation or stenting should not be performed until the wire is in the true lumen. Otherwise, it has been reported that arterial wall damage as a result of subintimal stenting may disrupt vascular geometry, causing late coronary aneurysms, late stent thrombosis, and stent fractures [5]. Catheter placement to coronary artery ostium should not be aggressive. It is recommended that the catheter should be placed just outside the ostium to avoid catheter-related dissection [8].

## Conclusion

As a result, images obtained from coronary angiography should be carefully monitored in each patient and the guidewire must be in the true lumen before stent placement. The use of ancillary examinations such as coronary computed tomography and / or IVUS in appropriate cases may increase the chance of success of the operator.

## Conflict of interests

*The authors have no conflicts of interest to declare.*

## Financial Disclosure

*All authors declare no financial support.*

## Patient informed consent

*Consent of patient was obtained.*

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