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Case Report

Rare Reason Analysis for Stent Loss during PCI Procedure

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Abstract

The incidence of stent loss during PCI is low and has been decreasing. Although the lost stents were successfully retrieved in most cases, stent loss was associated with high rates of complications, such as coronary artery bypass graft surgery, myocardial infarction and death. Here we reported a stent lost case, which was caused by a fractured guiding wire filament wrapping. The case may be the first report for the loss reason of stent around world.

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General Information and PCI Process

A lady, 67 years old, 60 Kg, about 7 hours she was admitted to local hospital due to acute chest pain. She was diagnosed with acute anterior wall myocardial infarction and received thrombolysis treatment with Reteplase and loading dose of aspirin and clopidogrel following a standard dual antiplatelet therapy strategy. Her symptoms were quickly relieved and reperfused according ECG criteria. And then she was transferred to Zhengzhou University People's Hospital about 17 hours after her chest pain. Her first ECG in our hospital still showed anterior wall acute myocardial infarction changes (Figure 1). She didn't have histories of hypertension and diabetes. At the tenth day, echocardiography showed: LVEDd = 52 mm, EF53 %; SPECT showed ischemic necrotic change (isotope filling defect) at anterior wall and apex. She had coronary angiography at AMI 12th day and the result showed : RCA diffuse atherosclerosis without significant stenosis; LM normal; LCX normal; Middle LAD was severe diffuse stenosis around 80-90% accompanied by severe calcification which involved with first diagonal branch orifice (B2 type lesion) (Figure 2). Through communication with patient and their families, finally we decided coronary artery intervention for LAD lesion. Because of the LAD and D1 special anatomical structure, we planned to use CULOTTES technology. With right radial artery approach, 6000u common heparin (100u/ kg body weight) was given through 6F sheath side arm, verapamil 5 mg was given to prevent radial artery spasm. We selected 6 F EBU 3.5 guiding catheter (ID = 0.72), 2 BMW wires into the distal LAD and D1, 2.5 X15 B Braun balloon to pre-dilate LAD and D1, 10atmx10 seconds respectively. China-made Firebird II (Shanghai Microport, China) 3.0 X23 stent was implanted from LAD to D1, 16 atm x 10 seconds deployed the stent (Figure 3), TIMI blood flow was good. Diagnal BMW wire was inserted into the LAD from stent strut mesh. A 2.5 X15 B Braun balloon was reused to pre-dilate stent strut mesh about 10-12 atm. When we pull back first LAD BMW wire, we met very high resistance. When the BMW wire was out, we can see distal wire (opaque X-ray segment about 30 mm) left in LAD between LAD intima and the stent (distal wire fractured) (Figure 4). We concerned that the left wire could not be removed easily and had a little effect on blood flow and prognosis, so we planned to implant

Figure 1: ECG on 7-Jan-2015, 12AM, about 7hs after chest pain and about 1hs after thrombolysis, V1-V3 was QS form.

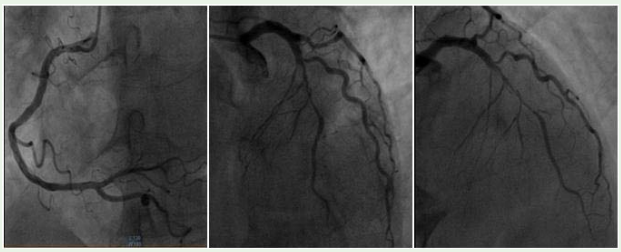

Figure 2: Angiogram showed that RCA was normal; Left main was normal; Left circumflex was normal; Mid LAD was very tight long lesion about 80-90% stenosis which involved with very severe orifice stenosis of diagonal branch.

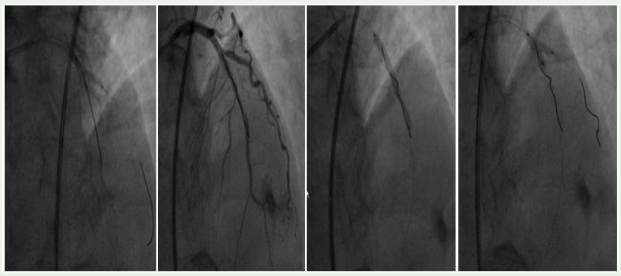

Figure 3: PCI to LAD and D1 with Culottes technology.

a second stent (Firebird II 3.0 X23 stents, Shanghai Microport, China) with CULOTTES technology. But the second stent was very difficult to push forward with very high forward resistance. When we tried to retrieve the second stent, the second stent lost from stent balloon. We can see lost stent floating in in LAD - LM - AO way with GOOSE snare device to snare the stent, finally we successfully snared the stent (Figure 4 and 5).

We rewired LAD and D1 and fully pre-dilated LAD with balloons. We put third Firebird II 3.0X33 stent (Shanghai Microport,China) into LAD, and completed final kissing with NC Sprinter 3.0 X12 balloon and NC Trek 3.0 X12 balloon, 12-16 atm . Fractured wire can still be seen between intima and stent. From femoral artery, we inserted the second 6F EBU3.5 guiding catheter, using GOOSE snare device to snare the stent. Finally we successfully snared the stent. We can see some stent filament on the stent. So we rewired LAD and D1 and fully pre-dilated LAD with balloons. We put third Firebird II 3.0X33 stent (Shanghai Microport, China) into LAD, and completed final kissing with NC Sprinter 3.0 X12 balloon and NC Trek 3.0 X12 balloon, 12-16 atm. Final result was satisfied. Blood flow TIMI grade was grade III (Figure 6 and 7). Operation time: 3 hours. Digestive tract hemorrhage and thrombocytopenia were happened when the patient went back ward. Fortunately digestive tract hemorrhage and thrombocytopenia were corrected after blood transfusion. The patient everything got very good recovery and discharged 1 week later after PCI. The patient has not had any symptoms with standard medications after one year follow-up (Figure 8).

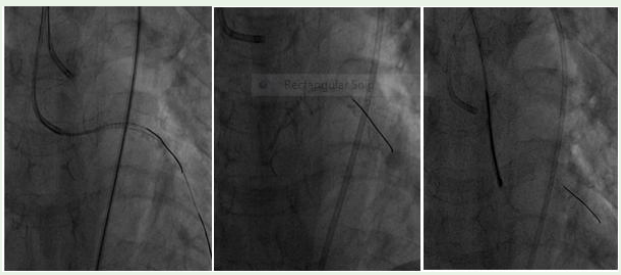

Figure 4: BMW wire was fractured, opaque X-ray segment about 30 mm: middle segment left in LAD between LAD intima and the stent (distal wire fractured).

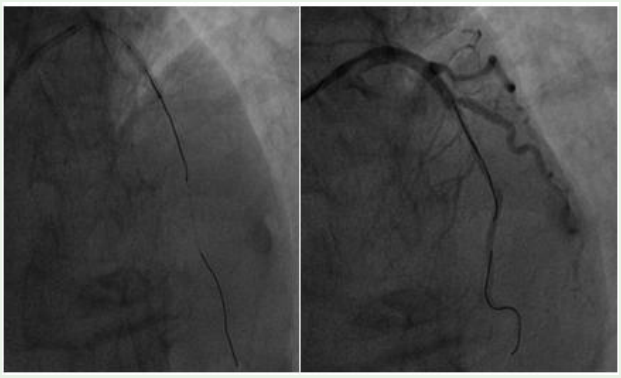

Figure 5: Stent lost in LAD-LM-AO.

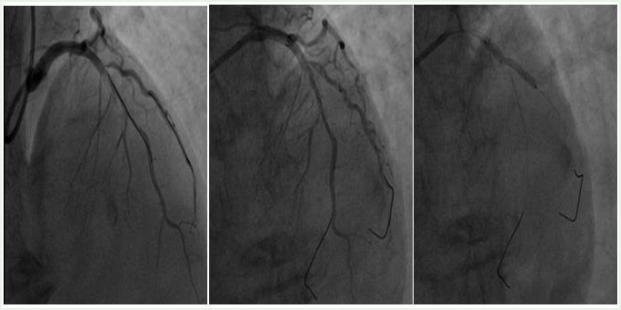

Figure 6: Successfully completed dual-stenting procedure and final kissing.

Reason Analysis for Stent Lost during PCI Procedure

After the first stent deployed in LAD - D1, we did not pull out LAD guiding wire. It led BMW wire fractured and left opaque X-ray segment about 30 mm in LAD between LAD intima and the stent (distal wire fractured) due to strong pull back power and high pull back resistance. Because we thought that only opaque X-ray segment about 30 mm left in LAD. That was wrong concern and judgment.

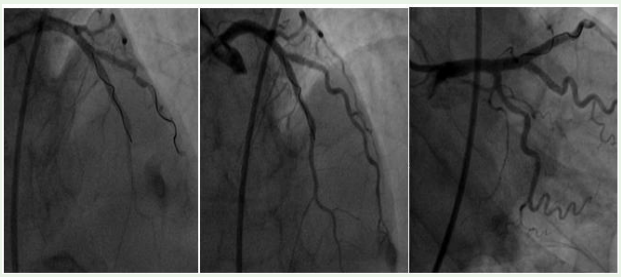

Figure 7: Final result was satisfied. Blood flow TIMI grade was grade III. Operation time: 3 hours.

Figure 8: ECG on 12-Sept-2016, about 6 days after PCI, no much change compared to before.

As we know, distal BMW guiding wire is spring-wrapped structure, when BMW guiding wire is prolonged, spring-wrapped filament is prolonged too. These spring filament may be floating in LAD luman. But we cannot see these spring filament and only can see opaque X-ray segment about 30 mm. That is very dangerous situation. Floating filament is great resistance for stent and this floating filament can wrap stent. This situation made stent not easily forward or pull back, finally led stent loss. The case may be the first report for the situation around world.

Measures to prevent stents to lose

The incidence of stent loss during PCI is low and has been decreasing [1-3]. Although the lost stents were successfully retrieved in most cases [1-4], stent loss was associated with high rates of complications, such as coronary artery bypass graft surgery, myocardial infarction, and death. Reasons for stent loss vary. But the reason of stent loss for the patient is very clear. The remnant metal filament winded stent which floated in proximal LAD luman caused the stent to take off from balloon. If, after the first LAD - D1 stents deployed, we put third wire through stent mesh into LAD, and then take out BMW wire before pre-dilate LAD, guiding wire would be more easy to withdraw, and probably can avoid wire broken and left in LAD-LM-Ao. Second, when we pull back the wire pressed by stent and meet high pulling back resistance, we should gradually and kindly pull back, or pull back the wire with help of small diameter balloon. Third if stent forward resistance is high, we need to analyze reasons, don't push too hard. Fourth, if facing some complicated complications or problems, we should consult with experienced colleagues; it may avoid second complications or malignant complications.

We selected 6 F EBU 3.5 guiding catheter (ID = 0.72) with right radial artery approach, 6000u common heparin (100u/ kg body weight) was given through 6F sheath side arm, verapamil 5 mg was given to prevent radial artery spasm. 2 BMW wires into the distal LAD and D1, 2.5 ×15 B Braun balloon to pre-dilate LAD and D1, 10atm×10 seconds respectively. China-made Firebird II (Shanghai Microport,China) 3.0 X23 stent was implanted from LAD to D1, 16 atm×10 seconds deployed the stent , TIMI blood flow was good.

Diagnal BMW wire was inserted into the LAD from stent strut mesh. A B Braun 2.5×15 balloon was used to pre-dilate stent strut mesh about 10-12 atm. When we pull back first LAD BMW wire, we met very high resistance. When the BMW wire was out, we can see distal wire (opaque X-ray segment about 30 mm: middle opaque X-ray segment) left in LAD between LAD intima and the stent (distal wire fractured).

We concerned that the left wire could not be removed easily and had a little effect on blood flow and prognosis, so we planned to implant a second stent (Firebird II 3.0X33 stents, Shanghai Microport, China) with CULOTTES technology. But the second stent was very difficult to push forward with very high forward resistance. When we tried to retrieve the second stent, the second stent lost from stent balloon. We can see lost stent floating in LAD - LM - AO way. With GOOSE snare device to snare the stent, finally we successfully snared the stent.

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