Reforming inflated balloon instead of microcatheter for the distal coronary artery angiography-A case report

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Abstract

During the procedure of percutaneous coronary intervention for some occlusion vessels, microcatheter would often be used to get the angiograph of distal segment. The reported case was a 68-year-old Chinese man with chronic total occlusion of right coronary artery (RCA), after the guidewire and balloon were successfully crossed the occlusion to the vessel distal side and the predilation was finished, antegrade angiography showed the distal segment invisible. Under the circumstances, a microcatheter was indispensable for RCA distal angiography to reveal the lumen condition and make sure that the guidewire was in the true lumen. Thinking the Ryujin TM Plus 1.25×15 mm predilation balloon would not be used in further step, we reformed the balloon by piercing its wall with needle and then sent it to the distal part again instead of microcatheter and injected contrast agent through the reformed balloon (with side hole) to perform the distal antegrade angiography and the angiography showed distal blood flow of total occlusion clearly. Further, RCA lesion was dilated in sequence from distal segment to proximal segment and stents were implanted successfully.

The reformed balloon could simplify the operating procedure, reduce the dose of contrast agent, along with enhanced safety and success rate of the intervention and saved the medical cost simultaneously.

Introduction

With the advance of new devices and techniques, interventional cardiologists are attempting more complex lesions. Currently, total occlusion has to be among the most challenging. Applying microcatheter for angiography of distal coronary artery lesion is the common method on PCI of total occlusion. In our case, during the procedure of percutaneous coronary intervention of a chronic total occluded left anterior descending coronary artery, we improved the Ryujin TM Plus RX balloon (size: 1.25×15 mm) to replace microcatheter and performed the coronary angiography of distal coronary artery effectively. Using reformed balloon to replace microcatheter could simplify the operating procedure, reduce the dose of contrast agent, and save the medical cost simultaneously.

Case presentation

A 68-year-old Chinese man admitted into the inpatient cardiovascular ward on the 23th October 2013 and complained paroxysmal precordial discomfort for about 1 week and worse for two days. He had a 30-year cigarette smoking history of one pack a day, and no other risk factor for coronary artery disease. The physical examination revealed no significant positive sign. The initial ECG showed a sinus rhythm, occasional ventricular premature contraction. Laboratory tests were as follows: TroT <50 ng/L, TroCobas h 232, Roche, BNP 622.0 pg/mL (Triage METER PRO, BIOSITE).

The diagnosis of the patient was coronary artery disease, unstable angina pectoris, occasional ventricular premature contraction.

The patient received standard management after admission, including anti-platelet aggregation, anticoagulation, statins, nitrates and diuretic. On the 30th October 2013, coronary angiography (CAG) was performed and showed that there was diffuse lesion to total occlusion at proximal segment of right coronary artery (RCA) (Figure 1). Consequently, percutaneous coronary intervention (PCI) was performed for RCA total occlusion lesion. 6F JR4 (TERUMO) was placed at the RCA ostium, a run-through guidewire had crossed occlusion to distal side, a Ryujin TM Plus RX 1.25×15 mm balloon was pushed to the distal of RCA lesion and dilated in sequence from distal to proximal segment. Withdrawing the balloon, antegrade angiography showed the distal segment invisible. Under the circumstances, we need RCA distal angiography by microcatheter to clear the lumen condition and make sure that the guidewire was in the true lumen. Thinking the Ryujin TM Plus RX 1.25×15 mm balloon would not be performed in further step, for saving the cost of operation, we imaged to reform used Ryujin TM Plus 1.25×15 mm balloon to replace microcatheter and perform the distal segment antegrade angiography: the used Ryujin TM Plus 1.25×15 mm balloon was inflated at 2 atm, then the wall of balloon was pinned with angiographic needle. Then the reformed balloon (with side hole) was placed at RCA distal segment and injected contrast agent through the balloon lumen into the RCA distal microcatheter for angiography (Figure 2). The antegrade angiography...
showed distal blood flow of total occlusion clearly. Further, RCA lesion was dilated in sequence from distal segment to proximal segment with SPL2.0*15 mm balloon. The Partner 2.75*36 mm stent, Partner 3.0*36 mm stent, Partner 3.0*29 mm stent were implanted from RCA distal, middle to proximal segment lesion in sequence, stent joints were dilated again with stents balloon. The operation was ended successfully (Figure 3). Standard management including anti-platelet aggregation, anticoagulation, statins, nitrates were applied continually after intervention. After three-month follow-up, there was no Major Adverse Cardiovascular Events (MACE) happened.

Discussion

With the advance of new technique on PCI, increasing extensive application of microcatheter is more important for complex coronary lesions. Angiography by microcatheter can show vascular path more clearly, and decrease the dose of contrast agent [1-4]. Identifying of distal vascular structures, medicine injection after No-reflow phenomenon in emergency PCI [5-7], and management of intervention complications such as coronary artery perforation [8], were supported by microcatheter.

In our case, we chose Ryujin TM Plus 1.25×15 mm balloon to cross total occlusion successfully in the procedure of PCI. Ryujin TM Plus 1.25×15 mm balloon's tip entry profile is 0.42 mm, distal shaft is 2.4 Fr (0.8 mm), its tip entry profile is closed to the Finecross microcatheter's. It was performed to replace microcatheter for performing the distal coronary artery angiography and could indicate distal vessel lumen structure and blood flow clearly. Furthermore, the performed balloon had monorail, and need not the wire withdraw during the contrast agent or medicine injection, and was more convenient than microcatheter. Same as the microcatheter, it could inject micro-dose contrast agent through the pinned balloon wall to indicate the character of local vessel, in order to guide exact location of wire.

Conclusion

The reformed balloon (with side hole) simplified the operating step and reduced dose of contrast agent, along with enhanced the safety and success rate of the intervention and saved the medical cost simultaneously. The reformation of balloon was simple and convenient, the key point of the procedure should be DO NOT damage the shaft of balloon to avoid fracture when pierced balloon wall.
References


7. Park CB, Cho JM, Kim DH, Kim CJ (2016) Intracoronary nitroglycerin injection through a microcatheter for coronary no-reflow following percutaneous coronary intervention. *Int J Cardiol* 214: 400-402. [Crossref]


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