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Case Report
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Successful Retrieval of an Entrapped Rotablator Burr by Using a Guideliner Guiding Catheter and a Snare

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Although burr entrapment is a rare complication of rotablation, it is extremely difficult to retrieve a stuck entrapped burr without surgical intervention. There are several techniques typically employed to retrieve an entrapped burr, using bailout endovascular approaches. Herein we have presented a new retrieval method involving a Guideliner child-in-mother catheter combined with a snare, which was used to successfully rescue a stuck rotablator burr.

Key Words: Coronary artery disease • Percutaneous coronary intervention

INTRODUCTION

The rotablator is a suitable and irreplaceable device used to remove heavily calcified lesions in current percutaneous coronary intervention (PCI). Since incomplete stent expansion is a well-known predisposing factor for further in-stent restenosis and thrombosis, using rotational atherectomy (RA) for the under-deployed stent is mandatory. However, a rare but serious complication during RA is burr entrapment, and invasive surgery is frequently necessary to retrieve the trapped burr.[1] General prior experience in the medical community with non-invasive removal of stuck burr has been extremely limited. There are several bailout endovascular approaches that have been proposed, including sample manual traction, passing of another guide wire followed by balloon inflation to release the trap, using a snare proximal to the burr for forceful local traction, or a child-in-mother catheter to facilitate the successful retrieval. We describe a new successful attempt to retrieve an entrapped stuck rotablator burr using a Guideliner catheter combined with a snare. We believe this technique is more effective for interventional cardiologists who use rotablators in their daily practices.

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CASE REPORT

A 74-year-old woman was admitted to our institution with acute coronary syndrome. Her coronary angiography revealed chronic total occlusion both in the middle left anterior descending artery (LAD) and in the middle left circumflex artery (LCX), as well as diffusely calcified stenosis in the distal right coronary artery (RCA). Considering her symptoms, we decided to perform percutaneous revascularization of RCA. After dilatation with a Sapphire II 2.5 × 15 mm (OrbusNeich, Hong Kong) balloon, two drug-eluting stents, Xience Prieme 3.0 × 23 mm, and 3.0 × 28 mm (Abbott Vascular, Abbott Park, IL, USA) were deployed. However, the stents showed inadequate dilatation, and therefore an upsized non-compliant balloon (Quantum 3.5 × 15 mm; Boston Scientific, Marlborough, MA, USA) was used for stent post-dilatation. One month later, we decided on debulking surgery for the freshly implanted stents.

An 8 Fr JR guiding catheter (Medtronic, Minneapolis, MN, USA) was inserted through the right femoral artery to the RCA ostium. After advancing the guidewire

(Rotawire floppy; Boston Scientific) to distal RCA, a 2.0-mm rotablator burr was performed to ablate the stents at 180,000 rpm. Multiple sessions of ablation were unsuccessful in crossing the lesion, even though the device speed was increased to 220,000 rpm. The burr suddenly stalled and became trapped in the middle portion of the proximal stent. At that time, the patient developed chest pain and stable vital signs were observed. Although a simple manual pull back of the rotablator system was then undertaken, this resulted in unsuccessful removal. We also tried to pass a stiff tapered wire (Conquest Pro 12g, Asahi-Intec, Japan), but the effort was in vain. Then, we cut off the drive sheath and the sheath of the rotablator, inserted a 5.5 Fr Guideliner V2 (Vascular Solutions, Inc.) straight catheter through the remaining rotablator system and fixed the catheter tip near the entrapped rotablator burr by pushing and pulling the rotablator at the same time. Finally the burr was removed and the angiogram showed similar imaging as prior to the intervention (Figure 1). We decided to downsize the burr with a 1.5-mm burr, which could smoothly pass through the lesion. The intravascular ultrasound (IVUS) (Opticross, Boston Scientific) examination showed a tapered stenosis, with a heavily calcified end, where only 2 mm in diameter presented a "napkin ring" sign in the stent. According to the finding of IVUS, a 2.15 mm rotablator burr was used for further debulking. The rotational speed was initiated at 160,000 rpm, and increased to 220,000 rpm after several sessions of ablation. However, the burr was trapped again during the eighth session. Next, we cut off the drive shaft, removed the drive shaft sheath and again inserted the Guideliner. However, several attempts to manually pull back the burr were unsuccessful. Finally, a 4 mm gooseneck snare (St. Jude Medical, Sylmar, CA, USA) was inserted through the Guideliner catheter into the lesion around the burr. Simultaneously, we pulled the snare and burr together and pushed the Guideliner, which succeeded in retrieving the entrapped burr (Figure 2). Thus, we implanted a bare metal stent (Liberate 4.0 × 16 mm; Boston Scientific) in proximal RCA to rescue the dissection caused by the engaged 8 Fr guiding catheter. The final angiogram showed an optimal result. A little chest discomfort was noted in the three months after the patient was discharged.

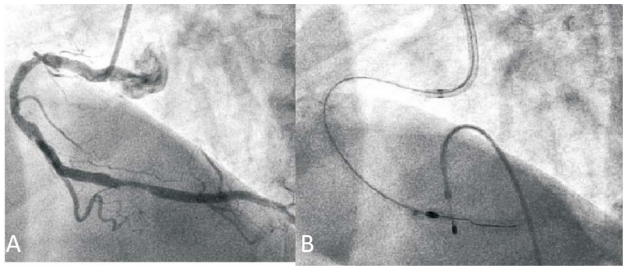

Figure 1. *(A) A diagnostic image of right coronary artery (RCA) showing the previous stent with moderate stenosis in the distal part. (B) Insertion of a 5.5 Fr Guideliner catheter through the remaining rotablator system and retrieval of the entrapped 2.0 mm burr with success.*

DISCUSSION

Burr entrapment is a rare but serious complication of RA. This complication is life-threatening due to the difficulty in retrieving the burr without surgical treatment. Although surgical removal with coronary bypass graft is the most reliable method, the primary therapeutic option remains interventional retrieval by means of

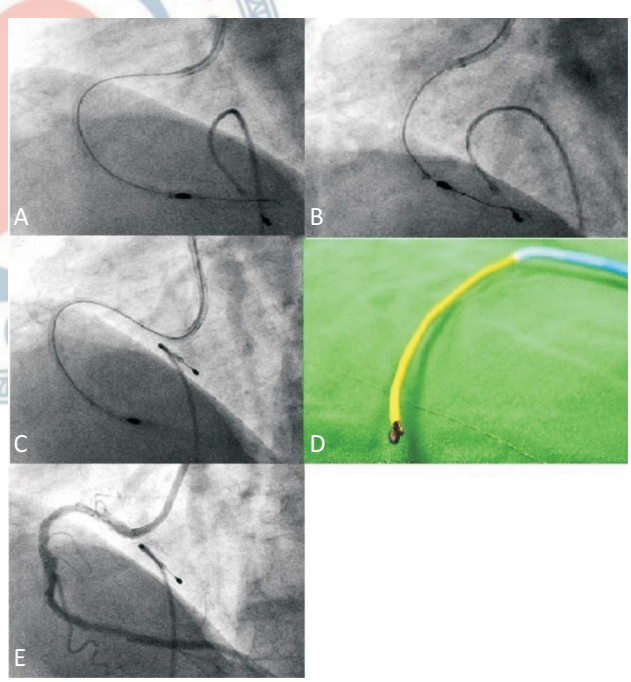

Figure 2. *(A) Another 2.15 mm burr was also entrapped in the critical stenotic site and the Guideliner was used again. (B) Pushed the Guideliner catheter as well as simultaneously pulled the rotablator system, resulted in shortening the vessel but the burr still entrapped. (C) Successful retrieval of the entrapped burr using a 4 mm gooseneck snare combined with a Guideliner catheter. (D) A photograph of a 2.15 mm RotaLink Plus in the Guideliner catheter also with a snare. (E) Final angiogram.*

the step-by-step approach. Namely, the step-by-step algorithm from Dmitrity et al. has shown this method to be: (1) recross with a second wire; (2) removal with a snare; (3) removal with a child-in-mother catheter; and (4) surgical removal.[2,5]

Previous literature focusing on the use of child-in-mother catheter to remove an entrapped rotablator burr has been reported. In these reports, a 120-cm straight guiding catheter is recommended, and Heartrail ST01 (Terumo, Tokyo, Japan) is most frequently used.[3] In the present case, we for the first time employed a 5.5 Fr guiding catheter Guideliner to retrieve the entrapped rotablator burr. The Guideliner catheter is a coaxial guiding extension just like ST01, and its monorail structure provides easy delivery of other devices. For the first entrapped 2.0 mm burr, we succeeded in retrieving the burr by pushing the Guideliner catheter as well as simultaneously pulling the rotablator system. However, we failed to retrieve the larger burr in the second entrapment. Thereafter, we tried to advance the 4 mm gooseneck snare to the stuck burr through the coaxial alignment of Guideliner.[4] By this avenue, extraction through both the Guideliner and snare could exert a larger and more direct pulling force against the entrapped burr. In addition, the snare might confer a protective effect on the consideration of Rotawire fracture during the process of pulling the burr.

In this case, burr entrapment occurred twice in the procedure, which will increase the risk of complication. From the IVUS findings, the lesion tapers to the most heavily calcified point, making the burr unable to achieve the narrowest point. Besides, the stent is malleable as well. For these two reasons, a small burr (1.5 mm) can pass the lesion, but a larger burr cannot. Following the standard procedure of rotablation by stepping up the burr size, this may be a more effective and safe procedure than one burr strategy. For an un-deployed stent, if entrapment occurs during the large burr manipulation, further intervention should not be performed until after the stuck burr is retrieved.

CONCLUSIONS

The present case suggests that the entrapped rotablator burr could be retrieved by pulling with a snare through a Guideliner catheter. The combined use of the Guideliner catheter with a snare is more effective and safer than only using child-in-mother catheter or snare. Overall, this technique could be very useful for interventional cardiologists who use RA in daily practice.

REFERENCES

1. Cunnington M, Egred M. Guideliner, a child-in-mother catheter for successful retrieved of an entrapped rotablator burr. *Catheter Cardiovasc Interv* 2012;79:271-3.
2. Kanazawa T, Kadota K, Mitsudo K. Successful rescue of stuck rotablator burr entrapment using a Kiwami straight catheter. *Catheter Cardiovasc Interv* 2015;86:942-5.
3. Kimura M, Shiraishi J, Kohno Y. Successful retrieval of an entrapped rotablator burr using 5 Fr Guiding Catheter. Catheter *Cardiovasc Interv* 2011;78:558-64.
4. Grise MA, Yeager MJ, Teirtein PS. A case of an entrapped rotational atherectomy burr. *Catheter Cardiovasc Interv* 2002;57: 31-3.
5. Hyogo M, Inoue N, Nakamura R, et al. Usefulness of conquest guidewire for retrieval of an entrapped rotablator burr. *Catheter Cardiovasc Interv* 2000;49:85.