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Twisting wire technique: An effective method to retrieve fractured guide wire fragments from coronary arteries☆,☆☆

Soumen Devidutta *, Soo Teik Lim

Department of Cardiology, National Heart Centre, Singapore

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ABSTRACT

With the increasing number of complex coronary interventions, there has been an increase in the incidence of device fractures and dislodgements. We report 2 cases of successful retrieval of fractured guide wire fragments from coronary arteries using the twisting wire technique and discuss its advantages and issues.

The last decade has seen an exponential increase in percutaneous coronary interventions (PCI) across the globe. Aging population, rising incidence of diabetes and higher number of repeat procedures have meant an increasing number of complex coronary interventions. Contemporary interventions often involve calcified lesions, tortuous vessels, total occlusions, bifurcation lesions, diffusely diseased vessels, instent restenosis, post bypass PCI etc. Such interventions frequently require rotational atherectomy, use of multiple guide wires, side branch wiring and wire entrapment, microcatheters, extensive maneuvering of balloon catheters etc. They are associated with a small but finite risk of device fracture and dislodgement which pose an unfamiliar problem to the newer generation of interventionists. Although with modern hardware this risk is low [1], interventional cardiologists should be familiar with certain techniques and devices which may be useful to tackle such unpleasant situations. Twisting wire technique is a simple and effective technique to retrieve fractured guide wire fragments. We employed this technique successfully to retrieve retained guide wire fragments in two cases.

A 63 year old gentleman with known coronary artery disease (CAD) presented with recurrent angina (CCS II) despite optimal medical treatment. The patient underwent coronary artery bypass grafting (CABG) in 2003 with a left internal mammary artery (LIMA) graft to the left anterior descending (LAD) artery, and saphenous vein grafts (SVG) to the obtuse marginal (OM), ramus intermedius (RI), right posterior descending artery (RPDA) and posterolateral (PL) branches. Comorbidities included type II diabetes mellitus, dyslipidemia, hypertension and chronic kidney disease. He had myocardial infarctions in 2009 and 2011. He had recovered from a remote cerebrovascular accident and also had peripheral vascular disease. Myocardial perfusion imaging showed a moderate area of inducible ischemia in the basal and inferolateral walls of left ventricle with mild resting systolic dysfunction (ejection fraction – 45%). On presentation, he was hemodynamically stable with no evidence of heart failure. He was in sinus rhythm with no ischemic changes in the electrocardiogram. Coronary angiogram revealed patent LIMA graft with good flow into mid and distal LAD, but all the venous grafts were occluded. His native coronaries showed severe diffuse triple vessel disease. The vessels were moderate to severely calcified. In view of the inferolateral ischemia in the perfusion scan, it was decided to intervene on the native circumflex (LCx).

The left coronary was engaged with 6 Fr Judkins (Cordis, Johnson and Johnson) left 3.5 guide catheter. Runthrough® NS (Terumo, Japan) 0.014″ guide wire was used to access LCx-OM. We decided to use rotational atherectomy to modify the heavily calcified lesion in LCx. Runthrough wire was then exchanged for Rota floppy (Boston Scientific, Maple Grove, MN) 0.009″ guide wire. The anatomy was however very unfavorable with LCx arising at a very acute angle from the left main (Fig. 1). A 1.25 mm burr (Boston Scientific, Maple Grove, MN) at 160,000 rpm was used to rotablate. As anticipated the burr could not enter the LCx due to the sharp bend. With further attempts the burr deviated from course with an abrupt give fracturing the distal part of the rota wire which remained unmoved confined in the OM (Fig. 2). Patient fortunately remained hemodynamically stable and no extravasation of contrast was seen. The burr and the proximal wire fragment were withdrawn. Twisting wire technique was employed to retrieve the fractured fragment. Sequentially 3 workhorse guide wires were cautiously inched across the retained fragment (Fig. 3a). The wires were parked such that

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* Corresponding author at: Department of Cardiology, National Heart Centre Singapore, 5 Hospital Drive, Singapore 169609.
E-mail address: soumen18@gmail.com (S. Devidutta).

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Fig. 1. Diffusely diseased calcific circumflex, arising almost perpendicularly from LMCA.

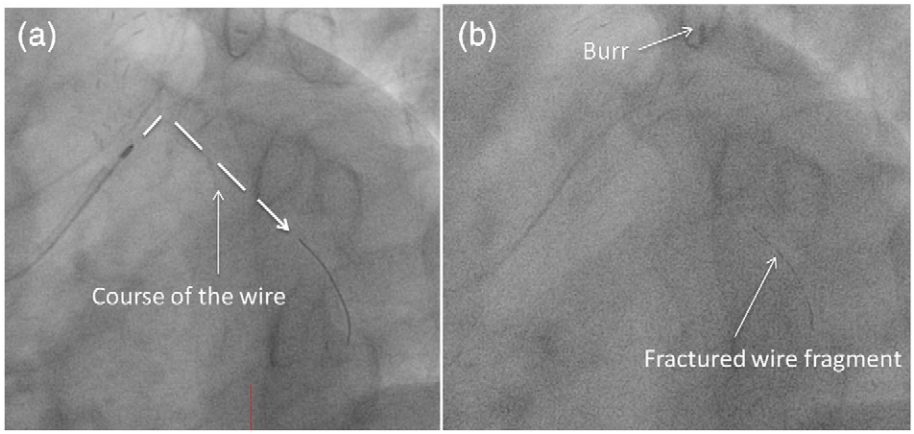

Fig. 2. (a) Course of the rota wire before burring. (b) Burr deviating off course fracturing the rota wire.

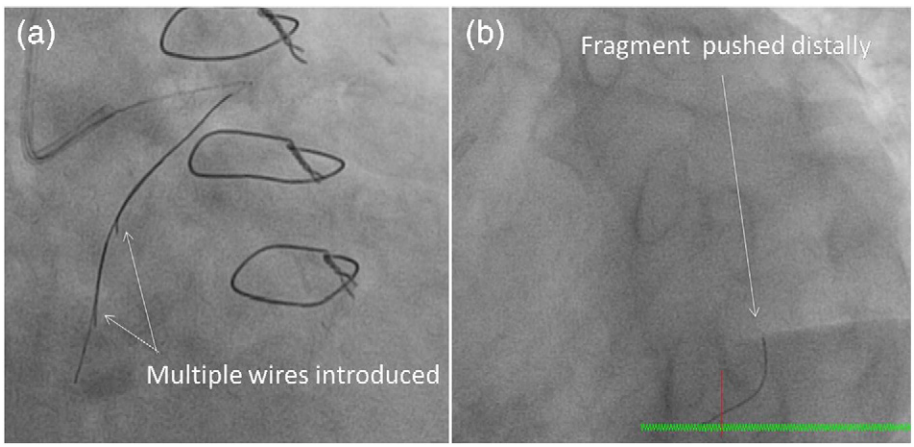

Fig. 3. (a) Twisting wire technique employed to retrieve the fragment. (b) Initially wire was pushed distally.

their tips were at the level of the tip of the fractured piece to maximize the chances of entrapment. The fractured fragment was initially pushed distally while attempting to engage it (Fig. 3b). All 3 wires were simultaneously rotated under fluoroscopy till the fragment appeared entangled with the wires. It took multiple attempts and wires before the fragment was caught (Fig. 4).The wires were then carefully withdrawn under fluoroscopy, monitoring the movement of the fragment. The fragment was however lost in the left main artery (Fig. 5a). It was grasped again and pulled out (Fig. 5b) but was lost yet again in the external iliac artery, just as it was about to enter the sheath (Fig. 6). It was finally retrieved to our relief but not before taking several attempts and using a total of 7 guide wires.

A 76 year old gentleman with known CAD presented with unstable angina. He was on treatment for type II DM, hypertension and dyslipidemia. He had undergone CABG in 1992 with LIMA graft to LAD and SVG to first diagonal, first OM and RPDA. Several interventions were subsequently performed to the SVG to RPDA and diagonal. Angiogram on presentation showed atretic and subtotally occluded LIMA to LAD