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Case Reports

Broken guidewire – A tale of three cases



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ABSTRACT

Guidewire fracture is a rare complication of percutaneous coronary intervention. Retained guide wire fragments in the coronary tree can cause thrombosis, embolic phenomena, dissection, perforation, and vessel occlusion. The management of this complication is still debated and it involves conservative management of leaving wire alone, percutaneous retrieval of fractured fragment, use of second stent to crush the wire, or open heart surgery. Here, I am reporting three cases of broken guidewire and they have been managed in three different ways.

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1. Introduction

Coronary guidewire fracture is a rare complication of percutaneous coronary intervention (PCI). Guidewire fracture could be due to (a) entrapment into or behind stent struts, (b) wire cutting by rotational atherectomy devices, (c) stuck wire into distal tortuous vessel, and (d) structural failure of the wire. Management options are (1) retrieval by snare or wire intertwining, (2) deployment of stent across broken fragment, and (3) leave the wire alone if it is in insignificant distal vessel or branch. Here, I am reporting three cases of broken guidewire and they have been managed in three different ways.

2. Case one

A 55-year-old male presented with acute coronary syndrome. He had ST/T changes in II, III, AVF leads in electrocardiogram. There was significant troponin elevation (1.1 ng/ml) and inferior wall hypokinesia in echocardiography. TIMI risk score of coronary angiogram revealed significant lesion in right coronary artery (RCA). RCA had very tortuous anatomy with

multiple bends. It was difficult to negotiate through these bends. Cruiser (Biotronik) wire was taken to cross the lesion. But the wire got stuck in one of the tortuous bends and distal floppy part got separated from the shaft (Fig. 3). Over-rotation of this stuck wire may be responsible for the wire fracture. Another two wires (stabilizer supersoft and BMW) were taken to intertwine it and finally the broken wire was brought back into the guidecatheter (Fig. 4). There was dissection in proximal RCA during wire retrieval and TIMI (thrombolysis in myocardial infarction) I flow. The patient started having chest pain but he was hemodynamically stable. Lesion was crossed immediately with Terumo run through floppy wire and dilated by Sprinter legend balloon (2 × 10) to open the artery. Two drug eluting stents were deployed across the lesion and dissected segment. Ultimately, TIMI III flow was restored and the patient had an uneventful recovery.

3. Case two

A 68-year-old male had refractory hypertension. In spite of five antihypertensive drugs in optimum doses, blood pressure remained uncontrolled. Echocardiography, ultrasonogram of

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abdomen, and biochemical parameters were within normal limits. He had significant lesion in ostio proximal right renal artery. Renal guide catheter (RDC 7F) was taken to cannulate the ostium. Lesion was crossed by BMW guidewire. Lesion preparation was done by sequential dilatation by 3×10 and 4×10 semicompliant balloon. Finally, it was stented by (8×16) mm bare metal stent. But during wire withdrawal, it got entangled in one of the stent struts and floppy part was separated from wire shaft (Fig. 5). There was TIMI III flow. Coronary microsnare was taken and after several attempts, broken floppy part was trapped into snare loop (Fig. 6). Finally, the wire was retrieved successfully. The patient remained asymptomatic in follow-up.

4. Case three

A 62-year-old male presented with unstable angina. Electrocardiogram showed ST/T changes in anterior leads. There was anterior wall hypokinesia in echocardiography with ejection fraction of 55%. There were elevated troponin levels and TIMI risk score was 4. Coronary angiogram revealed significant lesion in mid part of the left anterior descending artery (LAD). It was a bifurcation lesion (Medina 1,0,1). Judkin left (3.5 6F) was taken to engage left coronary ostium. Lesion was crossed by BMW guidewire. Stabilizer supersoft wire was taken to negotiate the diagonal branch. Unfortunately, the wire got fractured. It could be because of (a) structural failure, (b) over-rotation, and (c) entanglement of two wires and excessive manipulation to cross side branch (Fig. 1). Multiple attempts went in vain for wire retrieval by intertwining it with different wires. The patient became hemodynamically unstable and there was TIMI 0 flow. He was having excruciating chest pain. We stopped trying to retrieve it and dilate the lesion with 2×6 semicompliant balloon to open the artery. Subsequently, two drug eluting stents were deployed to crush the wire into vessel wall and to cover the stenotic part of the artery (Fig. 2). Both the stents were post-dilated. TIMI III flow was restored and the patient became stable.

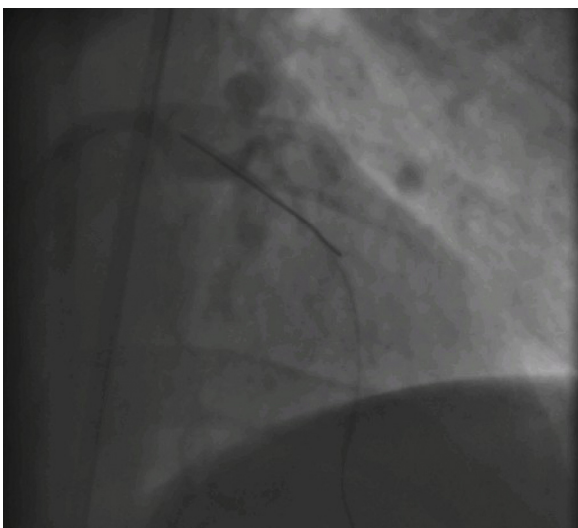


Fig. 1 – Broken guidewire in left anterior descending artery.

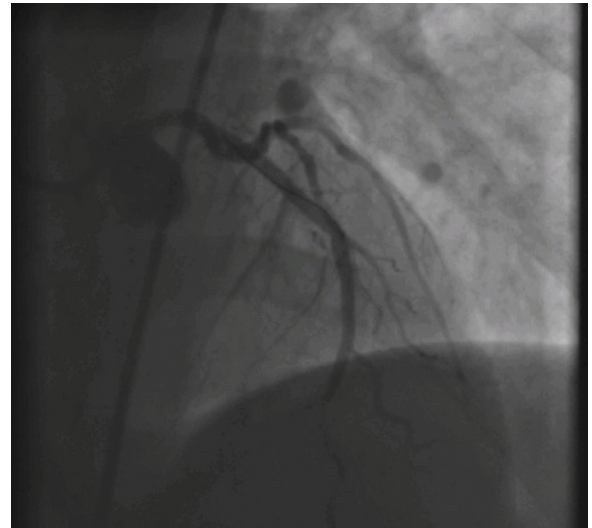


Fig. 2 – Stent implantation to restore TIMI III flow.

5. Discussion

The basic structure of a guidewire consists of shaft or central core, spring coil, and coating. Central core is usually composed of stainless steel, nitinol, or in combination. Spring coil is made of either platinum or tungsten. Spring coil is coated with polytetrafluoroethylene, silicon, hydrophobic microglide coating, or hydrophilic epoxy hydrocoat. Guidewires are usually broken at the junction between flexible 3-cm tip and the remainder of the guidewire (weakest part of guidewire). Fracture of coronary guide wires during PCI is a very rare complication. The incidence of such complication varies from 0.2 to 0.8%.¹ Entrapment, excessive rotation, and forceful traction of the guide wires are responsible factors.³ Repeated use of same wire is another reason. We have not used old wires in any of our three cases.

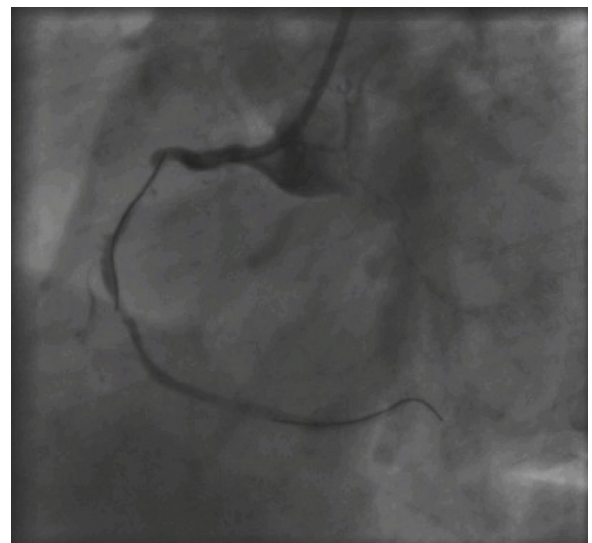


Fig. 3 – Broken wire in right coronary artery.

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