



Medical Management of Broken Guidewire: Case Report

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ARTICLE INFO	ABSTRACT
Published Online: 31 March 2023	Bifurcation lesions were once indicating surgery but not anymore, now they will follow the same principles for revascularization of non-bifurcation lesions. However, PCI of bifurcation lesions can be world widely challenging due to anatomic characteristics of each lesion.
Corresponding Author: EL KARROUMI Nassima	Guidewire fracture is known to be a rare complication of percutaneous coronary intervention. The consequences however might be deadly, and its management is still debated until further guidelines. The aim of this article is to raise the difficulties of the interventional care of the LAD/Diagonal lesions.
KEYWORDS: guidewire fracture, coronary spasm, medical therapy.	

INTRODUCTION

Coronary guidewire fracture is known to be an infrequent complication of percutaneous coronary intervention. It can however be responsible of vessel occlusion, perforation or dissection.

Management options can go from leaving the wire alone, stenting across the broken fragment, to open surgery depending on the clinical situation of the patient and the location of the broken wire.

CASE REPORT

A 54-year-old female whose risk factors are hypertension, menopause, type 2 diabetes, dyslipidemia and a past history of hypothyroidism on medication, was admitted in our department in March 2021 for a recent angina explored by an ischemic TTE's test that revealed the presence of myocardial ischemia in the LAD territory.

In the admission, physical exam was normal, the basic ECG showed a slight ST segment elevation in high lateral territory less than 1mm with poor R wave progression in anterior territory.

The coronary angiography revealed a heavy plaque in the bifurcation area of first diagonal into its 2 large branches.

The LAD-D area was slightly diseased.

The operators B and L decided to treat this diagonal branch bifurcation by provisional approach and implanted a 2.5x 18 DES from the mild segment of the D1 to its upper branch.

However, the procedure got complicated by a severe constriction of the proximal segment of the diagonal branch. After not responding to intracoronary nitrates injection, it was considered coronary spasm.

We have to note that no more investigations had been done to explore and evaluate this area (no invasive imaging such as IVUS, OCT or FFR))

3 weeks later, the patient suffered from recurrence angina with accentuation of the symptoms even with optimal medical therapy.

She was re-admitted 2 months later for unstable angina.

The coronary angiography showed an obstructive atherosclerosis disease in the LAD-D1 bifurcation unclassified 1,1,1 or 1,0,1 with a long stenosis in the proximal segment of the LAD. (figure1)

The operators 3 and 5 decided to treat this lesion based on DES implantation from the proximal LAD (MV) towards the diagonal branch (SB); 2 wires were placed: one in the LAD and the other in the unstented branch of diagonal artery. Then a 30.0 x 18 Stent was placed from the proximal LAD to the diagonal branch.

A pinching of the LAD was observed in the 10/40 principal view with TIMI 3 flow.

The procedure got complicated with the fracture of the floppy tip of the LAD wire. (figure 2) Which migrated and was poached out to the mild LAD with a slow flow along the rest of distal and apical segment.

The procedure was stopped at this step and the AntiGP2 was introduced.

By getting to the ICU room the patient had a cardiac arrest.

The EKG showed a huge ST elevation in the LAD territory and the decision was to treat medically.

During 7 days of the hospitalization, several complications were managed (femoral hemorrhaging, ventricular tachycardia, apical thrombosis and Left heart failure)

The patient left the department 15 days later, with the diagnostic of myocardial infarction in the anterior segment with apical dyskinesia and a reduced LVEF less than 35%



Figure 1: LAD-D1 bifurcation unclassified 1,1,1 or 1,0,1 with a long stenosis in the proximal segment of the LAD



Figure 2: Coronary image showing the fracture of the LAD wire

DISCUSSION

A coronary bifurcation lesion is historically defined as a coronary artery narrowing adjacent to and/ or involving the origin of a significant side branch.

Coronary bifurcations are more susceptible to develop atherosclerotic plaque than any region of the coronary vasculature due to local hemodynamic forces such as low-shear stress and oscillatory flow. Those features seem to be correlated to endothelial dysfunction.

However, PCI of bifurcation lesions can be world widely challenging due to anatomic characteristics of each lesion. It includes: bifurcation site, plaque location, plaque morphology, bifurcation angle between the MB and SB and vessel diameter. (1)

Actually, bifurcation anatomy can be dynamic and can change during PCI due to vessel spasm for example. (1)

Coronary spasm can be caused by deep guide catheter engagement or aggressive manipulations. It can however, be avoided by administering nitroglycerin (2) which unfortunately wasn't the case for our patient. The spasm remained even after administering nitroglycerin.

The incidence of guidewire fracture varies from 0.2 to 0.8 % (3). It can be caused by aggressive pulling, or by over rotating. (4) To prevent that, atherectomy should not be performed over a kinked guidewire. And for that, the guidewire should be replaced with a new one before proceeding with atherectomy.

The main consideration in managing a fractured wire is whether it is twisted or not.

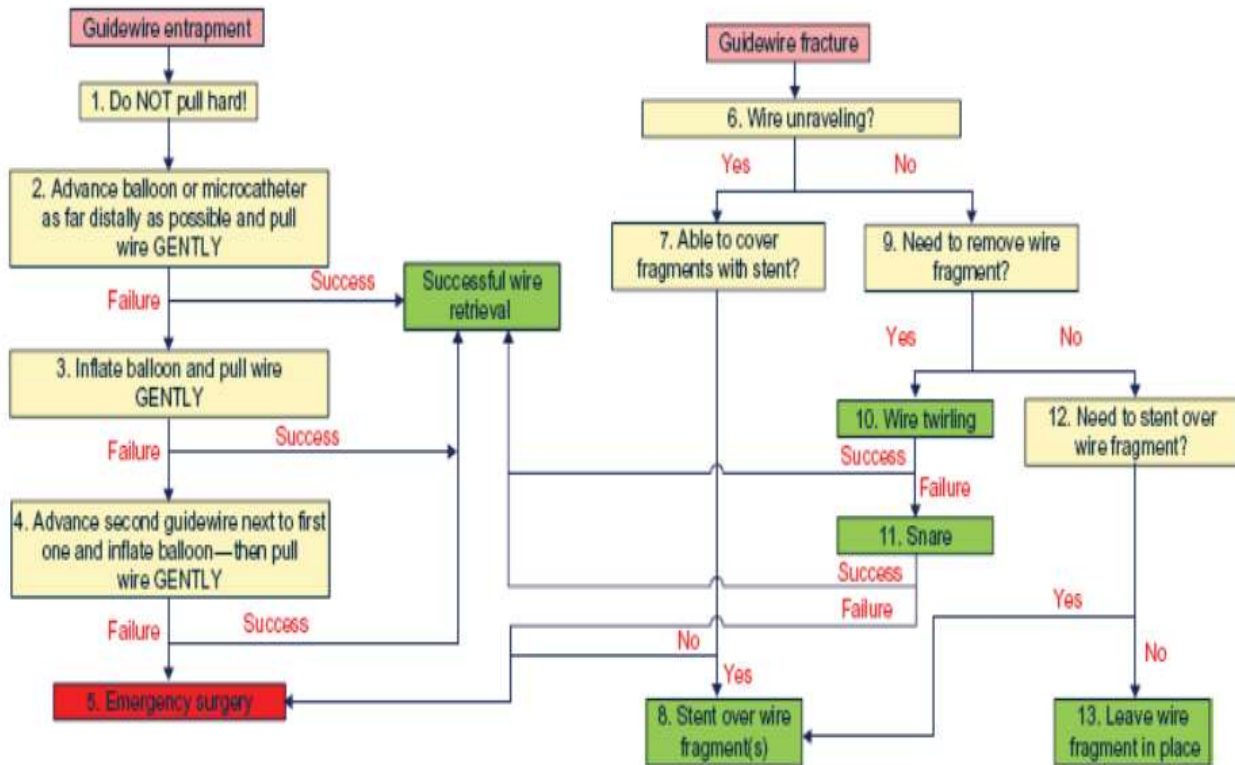


Figure 3: Guidewire fracture management

A twisted wire is actually more challenging than a simple fracture because of the risk of predisposition to thrombosis. Hence the importance to perform intravascular imaging. Plus, its location can also indicate emergency surgery such as extension into the aorta or if it is located in a critical coronary location such as the left main or in a major bifurcation. On the other hand, successful PCI fragment removal has been described where a snare can be used to break the twisted guidewire as close as possible to the coronary ostium so that a stenting over the wire fragment can be done. However, if there is no evidence of a twisting wire. Leaving the guidewire can be proposed especially if the fragments are located in small distal branches or in collateral vessels. (2) Until now, there are no guidelines in regard to the optimal management or choice of anticoagulation/ antiplatelet. (5)

CONCLUSION

This case has highlighted that interventional medical care for bifurcation coronary lesions can be tricky and responsible of many complications such as guidewire fracture. Various options have been proposed to solve this problem. For that matter, all interventional cardiologists should acknowledge this management techniques for any eventuality.

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