Journal of Cardiology Cases 7 (2013) e137–e141

Contents lists available at www.sciencedirect.com

Journal of Cardiology Cases

journal homepage: www.elsevier.com/locate/jccase

Case Report

A case of fractured guide wire perforating the coronary artery and ascending aorta during percutaneous coronary intervention

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ARTICLE INFO

Article history:
Received 18 July 2012
Received in revised form
19 November 2012
Accepted 3 January 2013

Keywords:
Complication
Percutaneous coronary intervention
Guide wire fracture
Coronary perforation
Cardiac tamponade

ABSTRACT

We experienced a rare and serious case of fractured hydrophilic guide wire necessitating surgical intervention during percutaneous coronary intervention (PCI) for a tortuous and calcified stenosis in the proximal right coronary artery. An 85-year-old female presented to our hospital and was diagnosed as having unstable angina. A 0.014 in. hydrophilic guide wire (HI-TORQUE WHISPER MS Guide Wire™, Abbott Vascular, Abbott Park, IL, USA) was fractured during PCI trying to pass a microcatheter Corsair™ (ASAHI INTEC, Seto, Japan). During the procedure to retrieve the retained guide wire, the distal segment of the fractured guide wire penetrated the atherosclerotic coronary wall and ascending aorta unexpectedly. The surgical procedure could be performed successfully by extracting the fractured guide wire segments and stopping the bleeding. The edge of a hydrophilic guide wire that is fractured by friction between the microcatheter and guide wire is extremely sharp and can perforate both the atherosclerotic coronary vessel wall and aortic wall. Caution should be exercised when using such a device in combination with a polymer-jacketed wire at an acute angulated and calcified lesion.

<**Learning objective:** Guide wires are the most common devices for interventional cardiologists. Guide wire fracture is a rare complication, but cardiologists should be well informed about it. This case report presents a detailed situation of hydrophilic guide wire fracture and penetration of coronary artery and even the aorta and discusses the mechanism.>

Introduction

Guide wire fracture is a rare complication during percutaneous coronary intervention (PCI) [1–6]. We experienced a patient with a rare and serious complication caused by a fractured hydrophilic guide wire necessitating surgical intervention. We also discuss possible mechanisms and previous cases in the literature.

Case report

An 85-year-old female with type 2 diabetes mellitus and chronic renal failure presented to our hospital complaining of chest discomfort and nausea. A 12-lead electrocardiogram showed ST segment level depression in leads I, II, III, aVL, aVF, and V2-6. Blood examination revealed elevated levels of troponin I (2.165 ng/ml), creatine phosphokinase (331 IU/l), and B-type natriuretic peptide (1727.8 pg/ml). Emergency cardiac catheterization was performed. She had congestive heart failure (Forrester 2 type) and triple vessel disease. We selected PCI for this acute coronary syndrome associated with congestive heart failure. Although revascularization seemed to be necessary for all lesions, we started PCI for the proximal and mid right coronary artery (RCA) lesion which was tortuous and calcified and had a thrombotic appearance suggesting it was the culprit lesion (Fig. 1A and B).

PCI procedure

An 8 French system was used via a femoral approach. An Amplatz left 0.75 type guiding catheter (Mac1, Boston Scientific, Natick, MA, USA) was inserted into the RCA and coaxial engagement (alignment) was inappropriate due to the slightly anterior take off of the RCA. A 0.014 in. hydrophilic guide wire (HI-TORQUE WHISPER MS Guide Wire™, Abbott Vascular, Abbott Park, IL, USA) could be passed through after unsuccessful use of a 0.014 in. coil wire. An intravascular ultrasound (IVUS, Boston Scientific) catheter could not be passed through, even after pre-dilation with a small 1.2 mm balloon. Next, we thought backup force with a support wire would be better and attempted to exchange the WHISPER MS Guide with a support wire through a microcatheter Corsair™ (ASAHI INTEC, Seto, Japan). During the negotiation to

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http://dx.doi.org/10.1016/j.jccase.2013.01.001

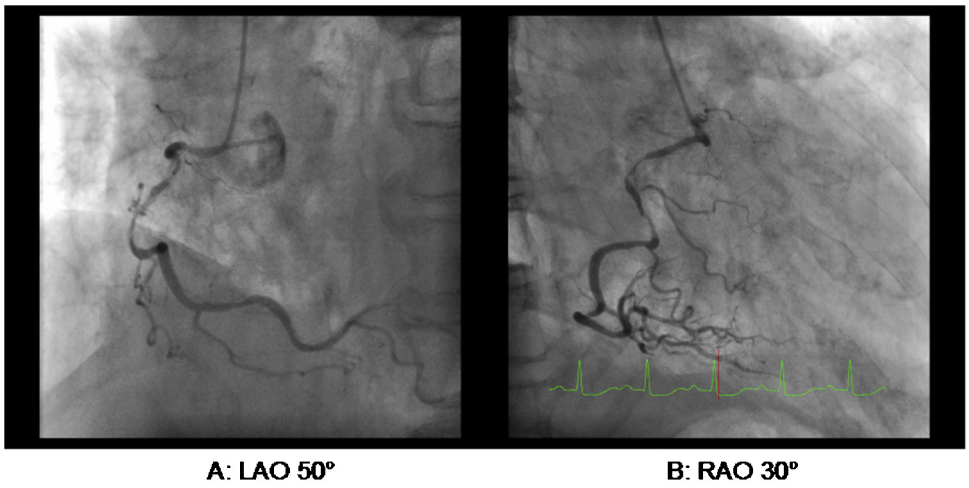

Fig. 1. Coronary angiograms of the right coronary artery at baseline. (A) Left anterior oblique view and (B) right anterior oblique view.

cross the Corsair at the proximal end of the stenosis (Fig. 2A), which had a 90° entry site angle, we rotated the Corsair gently several times clockwise followed by counter clockwise rotations while holding the guide wire at the proximal section according to the manufacturer's recommendation. We performed a couple of series of this manipulation. When pulling the Corsair, the guiding catheter accidentally got away from the ostium of the RCA. The operator noticed that the wire was fractured at the Corsair orifice and that the distal segment of the guide wire was retained in the RCA (Fig. 2B). At this time, its proximal edge was facing the outer curve of the proximal RCA and the distal end was located in the acute marginal branch. We attempted to retrieve the retained segment of the guide wire using an Amplatz Gooseneck microsnare (Microvena, St. Paul, MN, USA) after insertion of a second Whisper MS guide wire without difficulty, but failed in retrieval. The next strategy we selected was to dilate the stenosis and grab it using

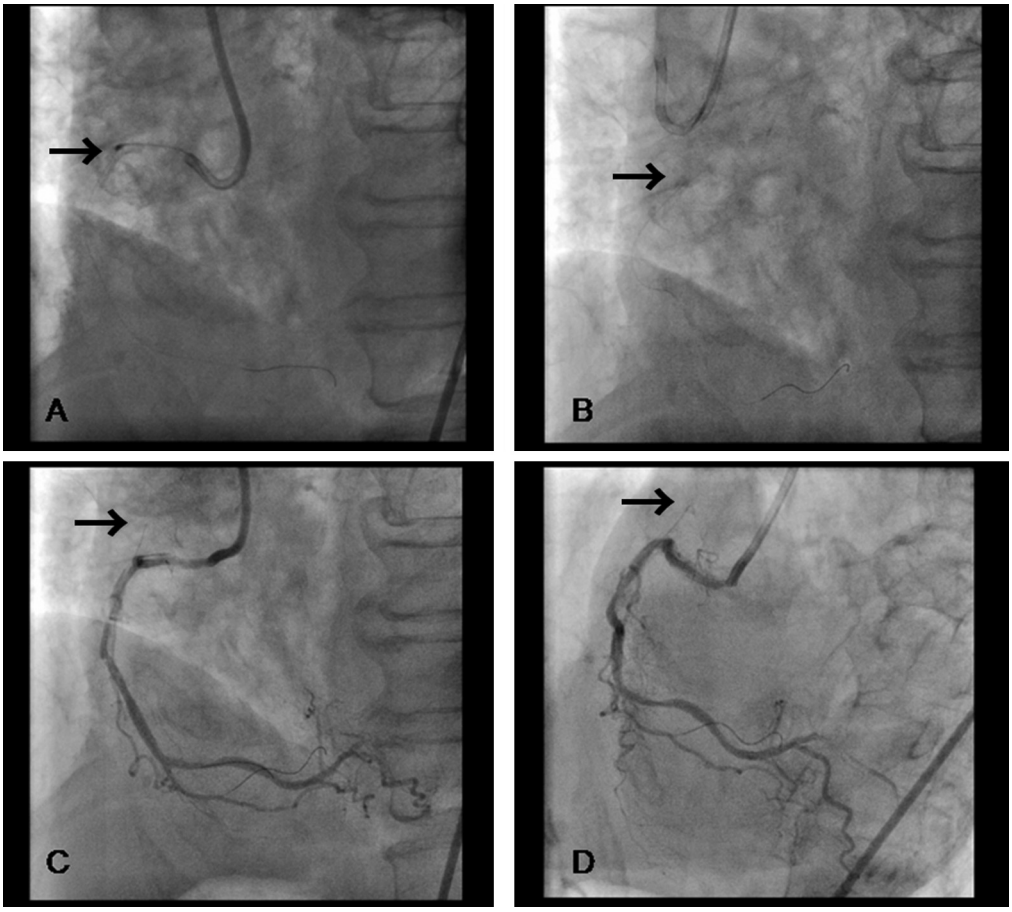

Fig. 2. Coronary angiograms during procedure. (A) Guide wire in the Corsair. Black arrow indicates the distal tip of the Corsair. (B) Fractured guide wire retained in the stenosed mid and distal coronary artery. Black arrow indicates the proximal end of the fractured guide wire. (C) Fractured guide wire tip perforating the coronary artery. Black arrow indicates the proximal end of the fractured guide wire. (D) Fractured guide wire tip perforating the ascending aorta. Black arrow indicates the wire tip.