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Case Report

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Extensive Retrograde Coronary Dissection into the Ascending Thoracic Aorta, Clinical Case Report

Vladimir Ganyukov*, Nikita Kochergin and Olga Barbarash

Abstract

Retrograde dissection extending into the ascending thoracic aorta is a life threatening complication during percutaneous coronary intervention (PCI). This form of severe coronary dissection is very rarely observed. Aortic dissection extending >40 mm up the aorta in hemodynamically unstable patients is usually treated by a surgical intervention. We present a case of coronary artery dissection during a PCI where retrograde dissection extending progressively into the ascending thoracic aorta was observed. The complication was accompanied by hemodynamic instability but was successfully treated with stenting without an operation.

Keywords

Aortic dissection; Coronary angioplasty; Coronary stenting; Sinus of Valsalva dissection; PCI

Introduction

Currently, percutaneous coronary intervention (PCI) provides revascularization for up to two thirds of patients with ischemic heart disease. Procedure-related complications such as coronary dissection may lead to emergency surgery, nonfatal myocardial infarction, or even a fatal outcome. Dissection of the Valsalva sinus and the ascending aorta during a PCI procedure is a rare complication, but it is very often fatal [1-3]. The danger of this event depends on the potential occlusion of the related coronary artery and the possibility of the dissection extending into the ascending aorta and further. Retrograde coronary dissection requires emergency coronary stenting or surgery in the most cases. If the initial dissection is extensive, beginning from the sinus of Valsalva and reaching the ascending aorta or the aortic arch, then surgical treatment is selected [3,4]. Surgery is the treatment of choice especially if an extensive dissection is complicated by a sudden hemodynamic deterioration [5]. On the other hand, surgical intervention is associated with high risk and preoperative assessment requires a long time especially in unstable patients [1,3]. Using a coronary stent to seal the entry of dissection made it possible for us to facilitate the management of this condition within the shortest possible time period without the need for subsequent open-heart surgery.

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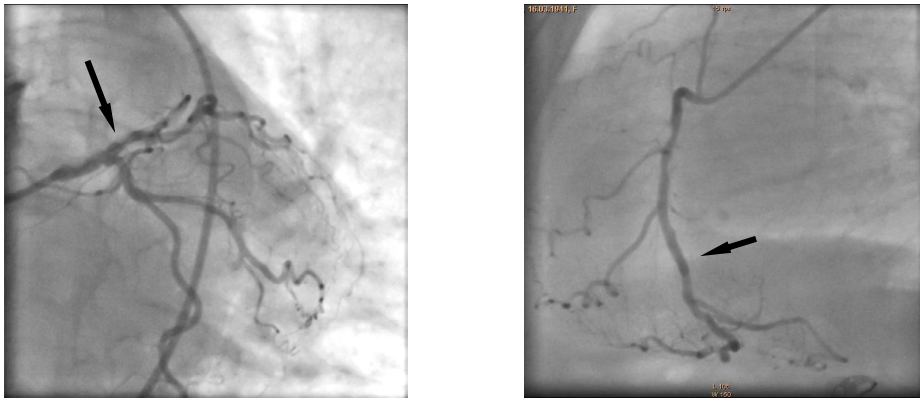
Case Report

A 70-year-old woman with a known history of ischemic heart disease and predominant left anterior descending artery (LAD) disease underwent PCI in March, 2011 on an elective basis. Two months ago she underwent right coronary artery (RCA) stenting. Angiography had demonstrated a right dominant circulation, no RCA in-stent restnosis, the irregular left main coronary artery (LM), a 70% proximal LAD lesion and no disease in the non-dominant circumflex circulation (Figure 1A and 1B). She had already been on treatment with aspirin, clopidogrel and anti-ischemic medications. The LM was easily cannulated with a soft-tipped 6-French XB 4 SH guiding catheter (USA) having a 0.064-inch inner diameter. The first contrast injection showed aortic dissection beginning from the left main coronary artery and extending into the ascending aorta (Figures 2A-2C). The patient started complaining of severe chest pain with ischemic ECG changes in the anterolateral leads. She experienced an abrupt onset of bradycardia with hemodynamic shock. Cardiopulmonary resuscitation with ventilatory support and IABP support was required. A soft wire was threaded to the LAD and after inflation of a balloon a bare-metal stent was inserted through the left main trunk behind the target LAD stenosis to cover the entry of the dissection. The stent (3.5-23 mm) was expanded through the ostium of the circumflex artery followed by non-compliant balloon inflation (4.0-10 mm, 24 ATM). A control angiogram showed complete sealing of the coronary dissection, TIMI 3 blood flow in the target vessel and contrast staining limited to the left sinus of Valsalva and ascending aorta (Figures 3A-3C). This improved the patient's ECG and hemodynamics. In the next days dynamic plain computed tomography scans revealed a decrease in the contrast medium leakage into a false lumen of the ascending aorta. The surgeons have chosen a conservative treatment strategy. The patient was discharged in 7 days.

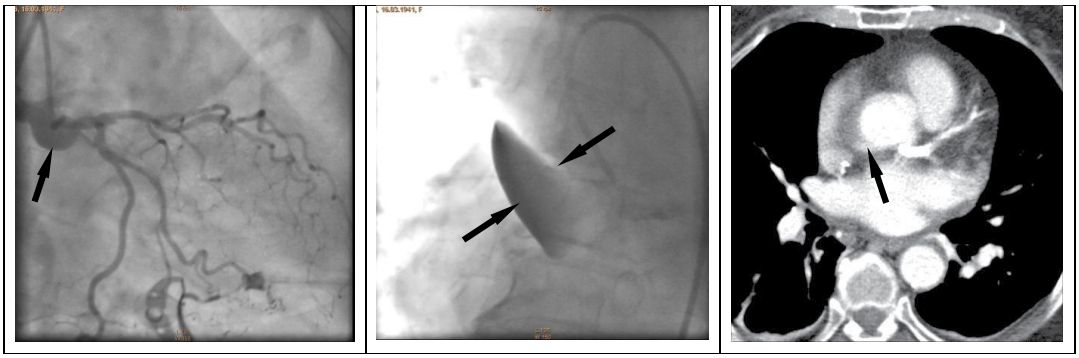
Comment

Retrograde aortocoronary dissection is an unusual complication of coronary angioplasty. The incidence rate of this potentially life threatening complication is rare: up to 0.008% for diagnostic catheterization and up to 0.06% for PCI procedures [1,2]. The options for treatment are determined by a patient's stability, the nature of the dissection of the coronary vessel, the ability to restore the coronary circulation by PCI and, finally, by the extent of the aortic dissection. While some authors insist that the best option is outright surgical repair [6,7], some report a conservative strategy, with medical management only [2], others think that stenting of the entry port is suitable, if a patient is stable and the dissection is not extending into the ascending aorta [1,8-10]. The reason for surgical treatment is the extension of the initial dissection, beginning from the sinus of Valsalva and reaching the ascending aorta or the aortic arch [4,5], especially in unstable patients. Mukherjee et al. [5] suggested an algorithm for the management of iatrogenic aortocoronary dissection. This approach is based on the assessment of the extent of ascending aorta dissection and the severity of hemodynamic disturbances. If the length of the dissection is over 40 mm and a patient is clinically unstable a surgical intervention is absolutely necessary. However, if the stenting could cover the entry site of the coronary dissection, then medical follow-up might sometimes be successfully selected even for ascending aorta



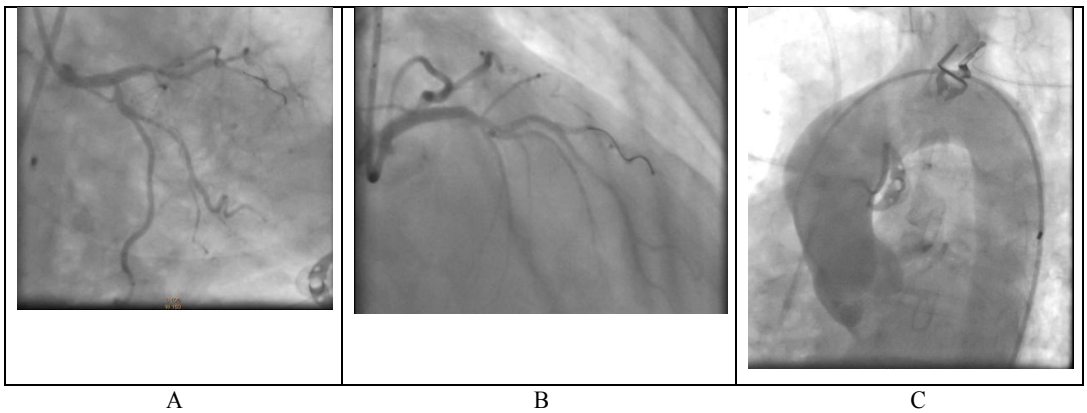
A B

Figure 1: Coronary angiography. A - Irregular LM, a 70% proximal LAD lesion (arrow); B - a right dominant circulation, no RCA in-stent restenosis (arrow)



A B C

Figure 2: Visualization of the dissection. A - dissection beginning from the LM coronary artery and extending to the left sinus of Valsalva; B - screening of the ascending aorta reveals a localized dissection with the contrast medium retention within the false lumen (space between two arrows); C - plain computed tomography scan show an aortic dissection in the ascending aorta (arrow)



A B C

Figure 3: Control angiogram at the end of PCI. A, B - complete sealing of the coronary dissection, TIMI 3 blood flow in the target vessel; C - no contrast medium leakage into a false lumen of the ascending aorta

or arch dissection [9,10]. On the other hand, the operation is often not possible because a patient's condition is critical and preoperative preparation can take too much time especially if we deal with abrupt closure of the LM.

The same is for our case. We had the LM dissection with an abrupt closure. The complication was accompanied by hemodynamic instability. The condition of our patient was so severe that there was no time to prepare for surgery. The patient was successfully treated

with stenting and the sealing of the dissection entry made it possible for us to facilitate the management of this condition within the shortest possible time period. The decrease in the contrast medium leakage into a false lumen of the ascending aorta on dynamic plain computed tomography scans allowed us to abstain from a subsequent open-heart surgery.

In summary, due to the risk of the dissection progression into the descending aorta, the entry site closure by stenting of the coronary artery is a potentially useful treatment strategy especially if the extensive dissection is complicated by a severe hemodynamic deterioration and abrupt closure of the LM. Subsequently, a high level of attention on dynamic plain computed tomography scans allows to abstain from an open surgery to repair aorta.

Conflict of Interest

This manuscript has been read and approved by all the authors. This paper is unique and is not under consideration by any other journal and has not been published elsewhere. The authors of this paper report no conflicts of interest. The authors confirm that they have permission to reproduce any copyrighted material.

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