

The Usefulness of a Multimodality Approach in a Case of Subtle Iatrogenic Aortic Dissection: Sometimes is Better to Look and Wait

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Abstract

We report a rare case of iatrogenic right coronary artery (RCA) dissection complicated by a retrograde subtle aortic dissection, which occurred during a primary percutaneous transluminal coronary angioplasty (PTCA). A 65-year-old female, with acute anterior ST-elevation myocardial infarction (STEMI), promptly underwent primary PTCA in the left anterior descending artery. After 5 h, the patient's condition becomes worse with recurrence of chest pain and new electrocardiogram modifications suggestive of inferior STEMI. A second coronary angiography revealed a spiral dissection extending from the ostium to the medium tract of the RCA. At the same time, a contrast media extravasation due to coronary ostium fissure occurred. Coronary stents were implanted from the medium tract of the right coronary to the ostium, to promptly arrest the active bleeding and to treat the dissection. After cardiosurgical advice, the patient was referred to the radiology department, where she underwent computed tomography angiography (CTA), which showed a small hematoma in the anterior wall of the ascending aorta. The stable clinical conditions of the patient suggested a conservative therapeutic approach. During the following 6 weeks CTA and transesophageal echocardiography were performed to rule out any other complication, and the patient was fortunately discharged with almost complete resolution of the hematoma.

Keywords: Aortic intramural hematoma, computed tomography angiography, coronary artery dissection, transesophageal echocardiography

INTRODUCTION

Iatrogenic aortic dissection (AD) during percutaneous coronary intervention (PCI) is a complication that occurs in 3.4%–2.0% of diagnostic angiography and 14.3% of *ad hoc* PCI.^[1] We present a case of iatrogenic right coronary artery (RCA) dissection complicated by a retrograde subtle AD, promptly treated with coronary stents implant from the medium tract of right coronary to the ostium, to arrest the progression of dissection and rupture of the coronary wall.

CASE REPORT

A 65-year-old female presented at the emergency department of our hospital with acute anterior ST-elevation myocardial infarction (STEMI) associated with moderate dyspnea. In her history, there was a family history of cardiovascular disease, hypertension, dyslipidemia, smoke, and polycythemia vera.

The patient was directly referred to the Cath lab for primary percutaneous transluminal coronary angioplasty (PTCA). Coronary angiography revealed a severe proximal subocclusive stenosis (99%) of the left anterior descending, successfully treated with stent implantation. After 5 h, there was a worsening of patient's condition, with recurrence of chest pain and electrocardiogram (ECG) ST-elevation in the inferior leads (inferior STEMI); therefore, the patient was submitted to a new coronary angiography. A diagnosis of spiral dissection, extending from the ostium to the medium tract of the RCA with a contrast media extravasation, due to coronary ostium fissure, was made, and coronary stents were implanted from

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the medium tract to the ostium to promptly arrest the active bleeding and to treat the dissection.

Although the patient was hemodynamically stable, once that consent informed was obtained, a computed tomography (CT) scan was promptly performed with a 64-detectors scanner (SOMATOM Definition Siemens), to rule out an AD. Unenhanced scan showed extravasation of contrast media, administered during the second PTCA, in the upper pericardial recesses [Figure 1]. After intravenous administration of contrast media, the examination showed the absence of pericardial active bleeding and the presence of stents in the RCA ostium [Figure 2]; however, CT showed also a small hematoma of the right coronary sinus, as a result of the dissection, treated with stents of the right coronary [Figures 2 and 3]. The stable clinical conditions of the patient suggested a conservative therapeutic approach.

The follow-up of this finding was made with serial transesophageal echocardiography (TEE) [Figures 4a and b], which revealed a progressive and complete hematoma resolution [Figures 5a and b].

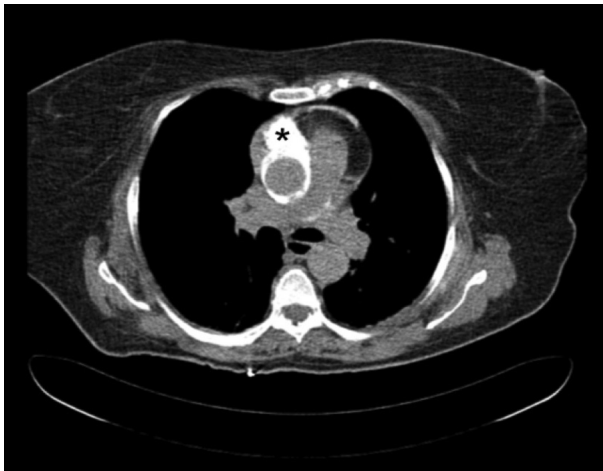


Figure 1: Unenhanced computed tomography scan shows extravasation of contrast medium (asterisk) in the anterior recess due to right coronary artery dissection

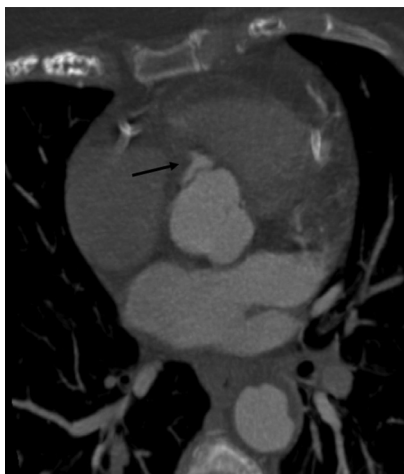


Figure 3: An axial view shows the presence of a subtle hematoma of the right coronary sinus (black arrow)

DISCUSSION

Coronary artery dissection could be spontaneous or traumatic. The real incidence of spontaneous coronary artery dissection (SCAD) is not well known widely, since, in many cases, it is rarely diagnosed. This pathology was considered very rare, nevertheless contemporary angiographic series report SCAD diagnosis rates of 0.07%–0.2% of all angiograms, and 2%–4% of angiograms performed for acute coronary syndromes.^[2]



Figure 2: Sagittal reconstruction shows the absence, after contrast medium intravenous injection, of pericardial active bleeding, the presence of a stent in right coronary, and the subtle hematoma of right coronary sinus (white arrow)



Figure 4: (a) (Top) transesophageal echocardiography at 44° and (b) (bottom) at 110° multipane angle display a complete resolution of the aortic hematoma



Figure 5: (a) (Top) transesophageal echocardiography at 44° and (b) (bottom) at 110° multiplane angle display a complete resolution of the aortic hematoma

Nowadays, the pathophysiology of SCAD is still unknown. The combination of predisposing factors such as female sex and pregnancy, fibromuscular dysplasia, inflammatory conditions, atherosclerotic risk factors, mechanical stressors, emotional stressors, inherited connective tissue disorders, and genetics could increase the susceptibility of minor trigger events.^[2]

Nevertheless, a great amount of coronary artery dissections is iatrogenic, since these latter ones have been caused by the tip of guiding catheter applied during PCI. Iatrogenic coronary artery dissection extending from the coronary sinuses during PCI is present in 3.4%:2.0% of diagnostic angiography and 14.3% of *ad hoc* PCI.^[1] In the majority of cases, a proximal RCA dissection with retrograde extension toward the aorta is the first complication,^[3] as in our case. The origin of most dissections of the ascending aorta is located at the ostium or in the proximal segment of the coronary artery. This complication occurs following a trauma caused by the tip of the catheter or balloon dilation in case of PTCA; furthermore, a vigorous manual injection of contrast material may play a role in extending the dissection to the aortic root.^[3] Clinical risk factors for the extension of the coronary dissection into the aortic sinuses include older age, hypertension, both present in our patient, and calcification of the aortic root.^[4,5] The prompt treatment of the coronary dissection in the area of the tear with the implant of covered stents blocks the bleeding and extension of the dissection, with a subsequent disappearance of the supply of the false lumen, as in our case. In some cases, despite a stent implantation covering the coronary dissection's

tear, the retrograde extension of dissection has made necessary a coronary artery bypass grafting and ascending aorta replacement.^[6] To detect an acute AD,^[7] a transthoracic echocardiogram is inadequate, while TEE, due to the relative proximity of the esophagus to the thoracic aorta and high resolution of the images, plays an important role. ECG-gated CT and magnetic resonance imaging are the leading techniques for diagnosis and classification of ADs. The first imaging modality plays a pivotal role in the diagnosis, risk stratification, and management of aortic diseases. Its advantages over other imaging modalities include the short time required for image acquisition and processing, the ability to obtain a complete 3D dataset of the entire aorta, and its widespread availability.^[7]

A combined diagnostic approach, with multimodality imaging, plays a fundamental role in patients with aortic complications during PTCA. In the present case, this combined approach has been helpful for clinical decision-making and ultimately to reach an agreement for avoiding cardiac surgery.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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