

Aortocoronary Dissection during Diagnostic Coronary Angiography: Treatment with Multiple Stenting of the Coronary Artery

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Catheter-induced combined coronary artery- ascending aorta dissection following diagnostic coronary angiography is rare. Localized aortic dissection has been treated by stenting the coronary artery and sealing the entry point. We describe a very long spiral right coronary artery dissection extending to the ascending aorta during coronary angiography. The dissection was limited to the proximal 35mm of the ascending aorta evaluated by Transesophageal echocardiography and was successfully treated by multiple stenting of the right coronary artery including the entry point of the aortic dissection which was monitored by means of echocardiography.

Key words: Dissection, Coronary Artery Angiography, Multiple Stenting

Introduction

Aortic dissection is a rare complication of coronary angiography and angioplasty,¹⁻⁵ with a frequency of about 0.02%.⁶ Aortic dissection can lead to serious complications, such as myocardial infarction or sudden cardiac death. Most described cases occurred during angiography and angioplasty of the right coronary artery (RCA).^{1,7,8} The morphological and structural differences between right and left coronary arteries may explain the fact that left aortic sinus is less prone to iatrogenic dissection.⁹ Some right coronary artery dissections with retrograde extension to the right coronary sinus were treated by coronary artery bypass grafting with repaired of the aortic dissection,¹⁰ some just stented the right coronary artery and monitored the aortic dissection by means of transesophageal echocardiography (TEE),¹¹ while others implanted coronary stents to maintain coronary blood flow before surgery and repairing aortic dissection surgically. In addition, to ensure the distal right coronary blood flow an aortocoronary bypass graft was implanted during surgery.¹² In our patient the aortic dissection was limited to the ascending aorta and treated the right coronary artery dissection by stenting and monitoring the aortic dissection by TEE.

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Case Report

Our patient was a 46-year-old female visited because of exertional chest pain. She had no history of diabetes mellitus, hypertension or smoking. She only had hypercholesterolemia and was on 20 mg daily atorvastatin. Her sister had sudden death at 51 years without any definite diagnosis. The patient had no abnormality on physical examination. Electrocardiography (ECG) was normal and echocardiography showed no regional wall motion abnormality. During exercise tolerance test, patient had angina and ST segment depression in inferolateral leads, requiring diagnostic coronary angiography. Coronary angiography was performed using left and right Judkins coronary catheters (Cordis, Johnson and Johnson, USA). Her left coronary circulation was normal. Right coronary catheter was easily engaged in right coronary sinus and initial testing showed no abnormality. However, during first injection for obtaining image, a spiral dissection was seen from ostium of the right coronary artery extending to its distal part with staining in right coronary sinus (Fig. 1), and followed shortly by patients experiencing a severe sustained chest pain. ECG showed ST segment elevation in inferior leads and then her rhythm indicated complete heart block with systolic blood pressure falling to 40 mmHg.

Immediately, a temporary pacemaker was used for the patient and the diagnostic catheter was changed to a guiding right Judkins. We stented the RCA distally with 3 long overlapping stents. An additional stent covering the ostium of RCA and

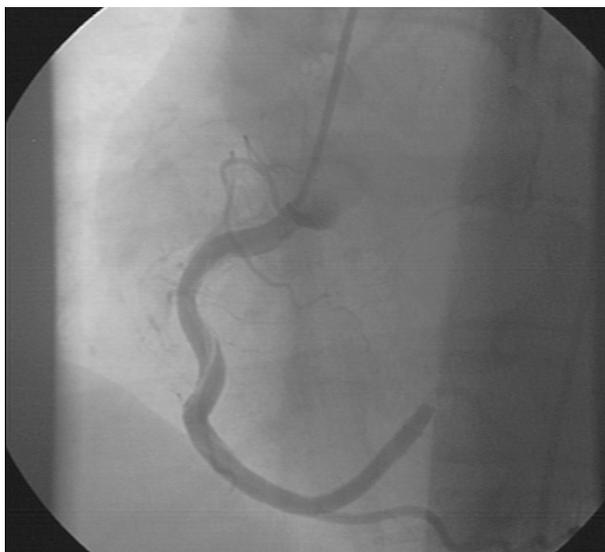


Figure 1. Spiral dissection of the Right Coronary Artery from Ostium to distal portion

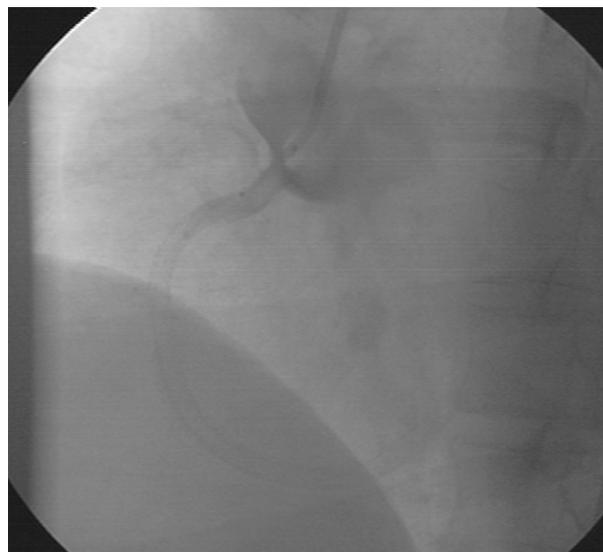


Figure 2. Beginning of retrograde extension of coronary dissection into the Aorta

extending about 2 mm into the right coronary sinus was placed to seal the entrance point of aortic dissection. During the procedure we noticed that the line of aortic dissection was propagated retrogradely involving the ascending aorta (Fig. 2, 3). At this point we performed TEE in the cath lab to monitor the size and extension of aortic dissection (Fig. 4). The dissection of aorta was limited to about 35mm of the proximal part of ascending aorta, and the false lumen had no flow evaluated by color flow Doppler. We therefore decided to manage the patient medically. The patient was transferred to intensive care unit. Her rhythm was converted to sinus rhythm after about 4 hours. Her hemodynamic condition became stable and repeat transthoracic echocardiography showed mild left ventricular dysfunction (ejection fraction about 45%) without any evidence of pericardial effusion or extension of the dissection. TEE was performed after 24 hours and found no further abnormality. The patient's general condition improved significantly, but CPK-MB isoenzyme increased to 6 times the normal level. The patient was discharged from hospital after about 6 days and following about 3 months she is doing well.

Discussion

Catheter-induced coronary dissection is rare but potentially life threatening complication. Although the reported incidence of coronary dissection involving the aortic root was 0.02% for diagnostic angiography (6), it was 0.07 for coronary angioplasty cases.¹³ The mechanism by which dissection of the right coronary artery occurs more frequently than the left is not clear.^{1,3,4,14} In histological and structural

study morphological and structural differences between right and left sides were explained denoting left aortic sinus to be more resistant to traction and so less prone to iatrogenic dissection.⁹ These major differences were due to the greater diameter of the left coronary artery than the right, the acute angle between left coronary artery and the ascending aorta, compared to nearly right angle for right coronary artery, and finally because of larger number of smooth muscle cells and collagen type-1 fibers covering the periostal wall and sinotubular junction of the left coronary artery.⁹ Aortic dissection occurs when a hematoma develops within the aortic media and may have some predisposing conditions such as hypertension, Marfan syndrome, congenital unicuspid and bicuspid aortic valves.¹⁵ In our case, the patient did not have any of these conditions. The incidence of iatrogenic aortic dissection in the setting of acute myocardial infarction (AMI) has been reported to be higher compared to elective procedures.⁵ Our patient underwent elective coronary angiography and not after AMI. A classification for combined coronary artery- ascending aorta dissection has been described which could be a guideline for management of the patients.⁵ Class 1 is a focal dissection restricted to the coronary cusp, and class 2 extends retrogradely to the ascending aorta but <40mm. Class 3 extends >40mm to the ascending aorta. Most class 1, 2 patients were successfully managed with stenting of the coronary dissection entry point whereas class 3 patients required surgical repair, but with high mortality.⁵ The dissection of the ascending aorta of our patient evaluated by

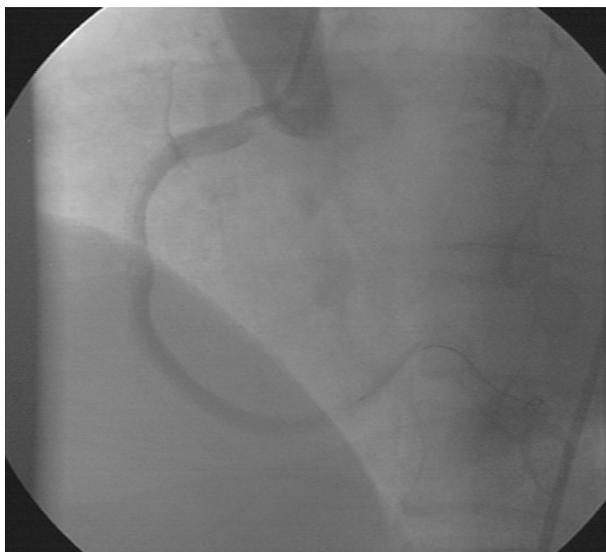


Figure 3. Extension of the Aortic dissection

TEE was up to 35 mm and after stenting of the entry point of the dissection which was illustrated by TEE, did not progress. We therefore believe that in regard to such fateful events the availability of TEE in the cath lab can be very helpful for making a decision.

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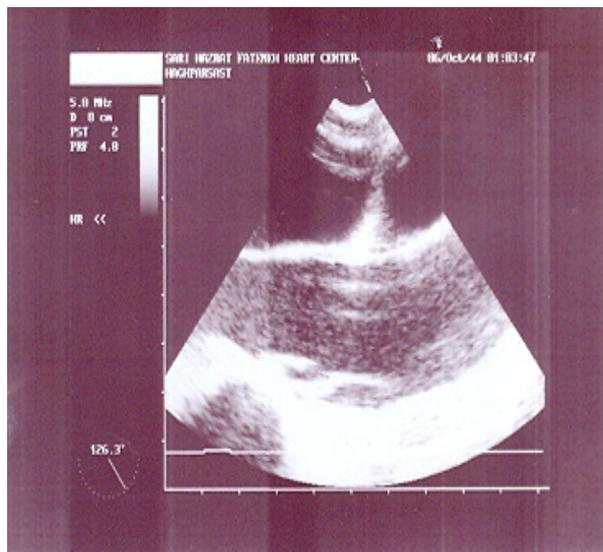


Figure 4. Trans Esophageal Echo (TEE) showing the extension of the dissection into the ascending Aorta

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