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Case Report

Aortic Root Dissection after Coronary Artery Bypass Graft Operation

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Introduction

Dissection of aorta after Coronary Artery Bypass Graft Operation (CABG) is a rare and a potentially lethal complication, usually diagnosed postmortem. Aortic root dissection usually occurs as a result of intimal tear of heavily calcified aorta during the clamping procedure. Once diagnosed, emergent operation should be undertaken, although even the operation itself has high mortality risk. We present the case of a 44-year old man in whom aortic root dissection occurred one month after the bypass operation.

Case Presentation

A 44-year-old man on dialysis presented to our emergency department with the complaint of chest pain associated with fever and dyspnea. One month ago he had undergone triple vessel CABG operation in our hospital. His blood pressure was 166/64 mm Hg, the heart rate 93 beats per minute and the respiratory rate 14 breaths per minute, the temperature 37.8°C. Chest auscultation revealed bibasilar rales in the lungs. Laboratory studies were done. White blood cell count was 15,000 per microliter. The level of high sensitive troponin was 27,860 pg per milliliter, C-Reactive Protein (CRP) 140 mg per deciliter, creatinine 14.8 mg per deciliter, N-terminal B-type natriuretic peptide > 35,000 pg per milliliter. An electrocardiogram was unremarkable. Echocardiogram despite having poor echogenicity revealed mild left ventricular systolic dysfunction with an ejection fraction of 45% and moderate aortic regurgitation and an equivocal mobile mass in the aortic root prolapsing into the left ventricle. With the pre-diagnosis of acute coronary syndrome, heart failure and infective endocarditis, the patient was treated with heparin, anti-ischemic treatment and empiric antibiotic as well as undergone hemodialysis with effective fluid removal. Transesophageal Echocardiography (TEE) was scheduled. On the third day of his hospitalization, he developed asystolic cardiac arrest which responded to resuscitation. After a successful resuscitation, he was treated with dobutamine and dopamine. He had constant fever with persistent high CRP levels. He was undergone TEE with the suspicion of aortic abscess. TEE demonstrated severe aortic regurgitation and a dissection flap on the aortic root prolapsing into the left ventricle Figure 1 and Figure 2. Computed tomographic angiographic studies of chest revealed dilated ascending aorta with a diameter of 4.25 cm and a dissection flap starting on the aortic root and extending to the beginning of arcus aorta. Upon diagnosis of type A Aortic dissection, an immediate operation was performed with ascending aorta replacement which lasted 11 hours. The patient left the operation room unstable on dopamine and dobutamine as well as intraaortic balloon pump. Hemodynamic deterioration continued and he died within 8 hours after the operation.

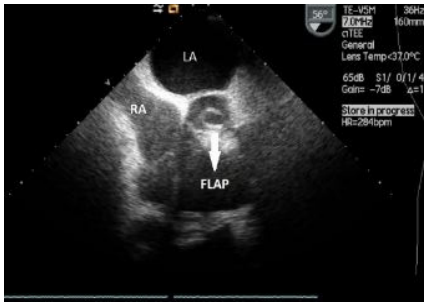

Figure 1: TEE image, ascending aorta, short axis view, demonstrating aortic root dissection.

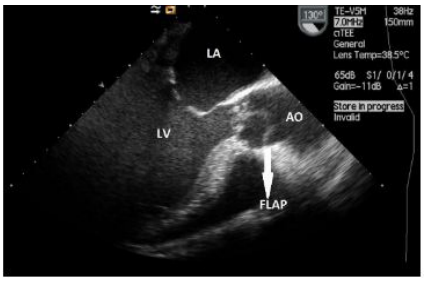

Figure 2: TEE image, ascending aorta, long axis view, demonstrating aortic root dissection.

Discussion

Aortic dissection classically occurs when a tear in the intima results in separation of intima from the media. Increased age, uncontrolled hypertension, genetic diseases, especially Marfan syndrome and bicuspid aorta, pregnancy were the leading risk factors for aortic dissection. Aortic trauma, particularly with chest direct injuries, but also with direct endoluminal trauma during arterial catheterization or with cardiothoracic surgery was another less frequent risk factor. It was estimated that acute aortic dissection occurs in 0.12% to 0.16% of patients with a history of cardiac surgery and cardiopulmonary bypass [1]. There were a few cases of aortic dissection after CABG. Furthermore, 1 in every 7 to 8 patients with acute type A aortic dissection had previously undergone cardiac surgery. Based on these data, it's possible to postulate that cardiac surgery is a potential risk factor for aortic dissections. Aortic dissection can complicate routine cardiac surgery unexpectedly at any time, either intraoperatively and early or late afterward [2]. Iatrogenic aortic dissection was defined as intraoperative when the dissection occurred and was recognized during the primary cardiac surgery. Early iatrogenic aortic dissection was defined as dissections occurring within 30 days after primary surgery whereas late dissection was defined as those occurring >30 days after primary surgery. Several potential sites of iatrogenic trauma during primary cardiac surgery have been suggested to be the origin for later aortic dissection, including sites of cross-clamping injury, suture line, and cannulation sites, especially in the presence of concomitant vessel wall pathologies. The typical presenting symptom is a sudden onset of chest pain that is severe in intensity and ripping and tearing in quality. It may also present with a wide range of clinical manifestations such as heart failure, neurologic deficit and tamponade.

Our patient had been on dialysis associated with end stage chronic kidney disease which is a potential risk factor for pathologic calcification of various tissues, including aorta. Possible intraoperative trauma during cross clamping might have caused this late aortic dissection post bypass. However, the presenting case requires differential diagnosis of several possible causes of our patient 'symptoms and signs early after bypass operation. Chest pain associated with troponin increase made us consider early graft occlusion and myocardial infarction and the patient was treated accordingly, including heparin which is contraindicated when aortic dissection is suspected. Infective endocardit was also among the possible diagnosis upon the presence of constant fever. Unfortunately, transthoracic echocardiography couldn't provide unequivocal diagnosis of dissecting flap and these two misdiagnosis caused a delay for the ultimate correct diagnosis and prompt treatment of aortic dissection. Operative mortality of Type A aortic dissection repair with previous cardiac surgery is high, especially with previous coronary artery bypass grafting. The mortality of untreated acute aortic dissection is high and estimated to increase by 1% per hour within the first 48 hours if surgery is not performed [3].

The presented case is an example of a rare but extremely dangerous late complication of a bypass operation, especially if there is a delay in the treatment. Careful peri and postoperative care is necessary after CABG, particularly in the case of calcified aorta. Both the cardiovascular surgeon and cardiologist should be aware of such delayed complications of cardiopulmonary bypass operations.

References

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