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Spontaneous Coronary Artery Dissection after Minimally Invasive Mitral Valve Repair

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ABSTRACT

Spontaneous coronary artery dissection is a rare condition usually encountered in young women without risk factors for atherosclerotic disease but with tortuous coronary artery or contemporary presence of fibromuscular dysplasia. Sometimes spontaneous coronary dissection occurs in patients with atherosclerotic disease, although without significant epicardial coronary artery stenosis. We report a case of a patient who underwent minimally invasive mitral valve repair, whose initially uneventful postoperative course was complicated by spontaneous coronary artery dissection of the left main causing a life threatening condition. A subsequent emergency sternotomy was required to perform a coronary artery bypass.

CASE REPORT

We report a case of a 69-year-old woman who complained of dyspnea associated with mild exercise. The transesophageal echocardiogram (TOE) showed a severe mitral valve regurgitation caused by a flail of P2 because of chordal rupture with normal ejection fraction (EF).

The coronary angiography revealed moderate coronary artery disease without significant lesions. An atherosclerotic plaque determining less than 20% stenosis was present at the level of the main stem (Figure 1).

The patient underwent minimally invasive mitral valve repair. A 5-cm incision was made in the fourth intercostal space and the right femoral vein and artery were exposed at the same time. A 30-degree-high resolution camera was inserted through a 5-mm trocar located in the fourth intercostal space at the level of the anterior axillary line. A vent and CO_2 line was inserted through a second 9 mm trocar located at the seventh intercostal space.

After administration of heparin, cardiopulmonary bypass was instituted via femoral arterial and venous cannulation.

Direct aortic clamping was performed with a Chitwood clamp. Then, the crystalloid cardioplegia (Custodiol) was directly administered into the aortic root with the overpressure alarm set to 150 mmHg. The left atrium was opened and the mitral valve was exposed using an atrial retractor. The mitral valve analysis confirmed a myxomatous degeneration with a P2 flail because of chordal rupture. A sliding plasty at the level of P2 was performed followed by chordal transposition. A Carpentier-Edwards Physio 30-mm ring was inserted.

At the end of the surgery, the TOE showed a competent mitral valve confirming a good result of mitral valve repair with normal left EF. The patient was then transferred to the ICU.

After two hours of stable hemodynamics, the ECG showed an ST elevation associated with low pressure. A pericardial tamponade or an aortic dissection was rapidly ruled out by TOE that showed a new anterior wall dyskinesia with the left ventricular function reduced to less than 20%. Therefore, high doses of inotropic agents were administered and an intraaortic balloon pump counterpulsation (IABP) was inserted. Immediately, an emergency coronary angiography was performed showing a spontaneous coronary artery dissection (SCAD) of the left main (Figure 2).

The patient was transferred to the operating room and an emergency sternotomy was performed. A CPB was established by cannulating the ascending aorta, with venous drainage through the right atrium. The left internal mammary artery was harvested and a latero-lateral anastomosis to the diagonal and subsequent termino-lateral anastomosis to the left anterior descending artery was performed on a beating heart.

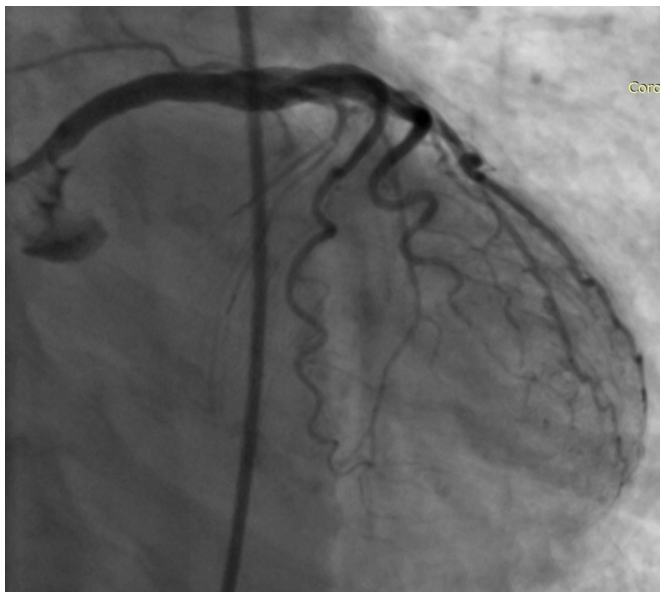

Figure 1. Coronary angiography before minimally invasive mitral valve repair.

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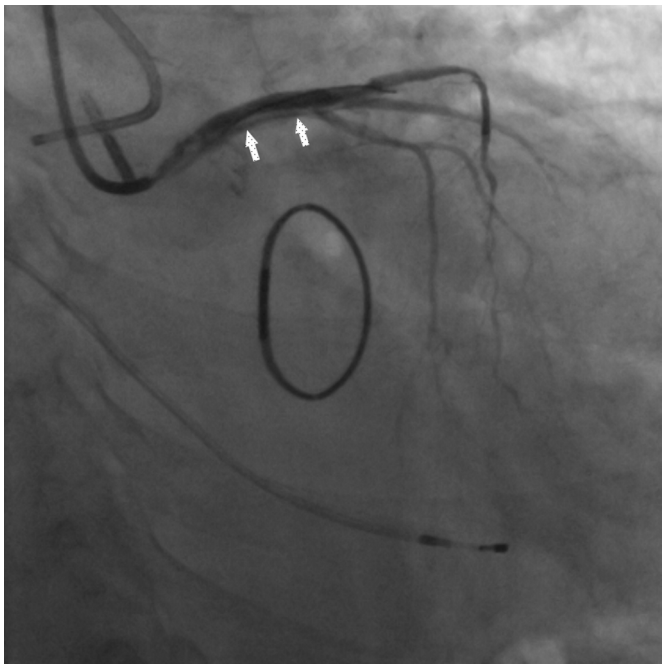

Figure 2. Coronary angiography after minimally invasive mitral valve repair. White arrows show the main stem dissection.

After three days, the patient was weaned off the inotropic support and IABP. The TOE documented an EF of 30% and a competent mitral valve.

After 30 days, the EF improved up to 38%. At the conclusion of cardiac rehabilitation, the EF was 40%.

DISCUSSION

SCAD is a well-known insidious disease that frequently presents in women with systemic inflammations, connective tissue disorders, hormonal therapy, or history of multiple pregnancies. Moreover, it is prevalent in young women without cardiovascular risk factors, but a recent series underlines the association of this disease with coronary artery disease [Alfonso 2012]. Furthermore, as described by Alfonso [Alfonso 2015] there is a strong correlation between SCAD and fibromuscular dysplasia (FMD). Finally, another interesting characteristic identified when performing coronary angiography in patients with SCAD is the presence of coronary tortuosity.

Coronary angiography is considered the gold standard to diagnose the presence of arteriosclerotic coronary artery disease. It is not always true in the presence of SCAD. In fact, the IVUS (with lower spatial resolution of 150-200 um but deeper penetration) and/or the OCT (with much higher resolution of 10-20 um but poorer penetration) allow better visualization of intimal tears and flaps of the coronary wall encountered in the presence of SCAD [Yip 2015].

In this case we report, the patient was not young, not premenopausal, not pregnant, without any connective disorders, with relatively few risk factors for coronary disease, and not affected by FMD. The angiography showed tortuous coronary arteries with a small and apparently innocent plaque in the main stem determining less than 20% stenosis.

In the presence of SCAD the watchful waiting approach is often sufficient because of late vessel healing occurring in most patients. It is still unclear if the use of antiplatelet therapy is adequate as well as the use of anticoagulant therapy. Moreover, thrombolytic therapy should be avoided and PCI or CABG limited to patients with clinical deterioration associated with persistent pain and ST elevation. In the case presented, the length of the dissection involving the left main, the descending artery, and its branches made percutaneous intervention unsuitable. Therefore, the patient underwent an emergency coronary artery bypass graft. Considering the patient's age and the short time required for the diagnosis, obtained by following a standardized diagnostic algorithm, we preferred to harvest the internal mammary artery instead of a vein. The cardiopulmonary bypass was mandatory because of ongoing ischemia causing acute heart failure. Instead, anastomosis was easily performed on the beating heart as a consequence of the vast experience acquired in routinely performing off-pump CABG with aortic no-touch technique at our institute.

To the best of our knowledge, this is the first case reported of spontaneous coronary dissection complicating the postoperative course of a minimally invasive mitral valve repair, demanding an emergency sternotomy in a life-threatening situation. How to predict and avoid this kind of complication remains the bigger unresolved issue.

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