Case report

Successful emergency surgery on triple-vessel spontaneous coronary artery dissection

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Abstract
Although there is increasing number of reported spontaneous coronary artery dissection (SCAD) recently, this is the first successful operative case of myocardial revascularization on triple-vessel SCAD. Emergency coronary artery bypass grafting was performed on a 42-year-old female presented with acute myocardial infarction, who had failed thrombolysis with on-going angina and acute heart failure.

Keywords: Spontaneous coronary artery dissection (SCAD); Triple-vessel; Coronary artery bypass grafting

1. Introduction

Spontaneous coronary artery dissection (SCAD) is rare but it has received increasing attention recently with 51 publications since year 2000, and there are over 122 reported cases in the last 40 years. It usually occurs in young women, especially in the peripartum or early postpartum period and is usually fatal with most of the known cases diagnosed at autopsy. We report a successful emergency myocardial revascularization in a 42-year-old woman with no previous history of atherosclerotic heart disease presented with acute myocardial infarction, who had failed thrombolysis with on-going angina and acute heart failure. She was found to have triple-vessel spontaneous coronary artery dissection of the proximal left anterior descending artery, circumflex artery and mid right coronary artery at cardiac catheterization. To date, this is the first successful operative case of triple-vessel spontaneous coronary artery dissection.

2. Case report

A 42-year-old female presented with sudden onset of severe chest pain at rest, with progressively worsening shortness of breath. She was a smoker and her only past medical history was hypertension. On examination, she had signs of heart failure. Electrocardiography (ECG) showed widespread T-wave inversion and blood test revealed raised level of Troponin and Creatine Kinase. She was immediately thrombolysed with intravenous Retepase but her chest pain did not settle. She suffered on-going angina despite being treated with continues intravenous heparin and glycerin trinitrate (GTN).

In view of her unsettling cardiac symptoms and worsening heart failure, cardiac catheterisation was performed which showed triple vessel spontaneous coronary artery dissection (Figs. 1 and 2). Echocardiogram revealed poor left ventricular systolic function with ejection fraction of only 20% and inferior apical hypokinesia.

Following insertion of an intra-aortic balloon pump, she was referred for surgical treatment and emergency coronary artery bypass grafting was performed. At operation, the heart was found to have globally poor ventricular function. There was clear evidence of dissection with bruising around the distal third of right coronary artery (RCA), and also proximally around the left anterior descending artery (LAD) and circumflex artery (Cx). These coronary vessels were opened distal to site of bruising. The false lumen with haematoma in between the tunica media and adventitia, and also the dissection flap were observed in each of these vessels. The true lumen was then carefully identified for conduit anastomosis. The anastomosis was performed in routine fashion using continuous suture technique with 7.0
prolene excluding the false lumen. Four coronary vessels were revascularised with on-pump cardio-pulmonary bypass. Left internal mammary artery (LIMA) was used as the conduit for LAD while long sapheneous vein graft (SVG) was used for the right acute marginal artery, posterior descending artery (PDA) and the first obtuse marginal artery (OM1) anastomoses. Post-operatively, she had multiple-organ failure involving the heart, kidney and liver in addition to coagulopathy. A further coronary angiography was not performed but trans-thoracic echocardiogram showed that the ventricular function remained poor. She had a slow but progressive recovery before being discharged from the hospital 6 weeks post-operatively.

3. Discussion

Spontaneous coronary artery dissection is rare and the first case report was described by Pretty et al. in 1931. The incidence is more prevalent in young to middle-age women, especially in the peripartum or early postpartum period [2,4,6,7] and is usually fatal with most of the known cases diagnosed at autopsy [1,5,6]. Sudden death and acute coronary syndrome are the usual mode of presentation. Others include ischaemic heart disease, left ventricular failure, left ventricular aneurysm and cardiac tamponade [2,8].

The definition of primary SCAD is dissecting aneurysm of coronary artery or intramural haematoma of the vessel wall and thus a false lumen between the adventitia and tunica media. It flattens the true lumen of the coronary artery, and also tearing the intimal causing blood flow obstruction. In many patients, the cause of SCAD is unknown. Several predisposing factors are postulated but no single one completely explained the pathogenesis of the disease. They include hypertension, collagen synthesis disorder, low-intensity blunt chest trauma, intense physical exercise, puerperium and oral contraceptive pill. It is not known whether SCAD affects preferentially the normal or atheromatous coronary arteries. However, in patients with SCAD, they also found to have coronary atherosclerosis with atherosclerotic plaque [4].

Although SCAD is a serious condition with high mortality, there is no standardised management plan. Conservative medical treatment is mostly considered in haemodynamically stable patient but the outcome is controversial. Symptom free patients without recurrent dissections and subsequent myocardial infarctions, intractable angina pectoris and even sudden deaths were reported in follow-up of medically treated patients [4]. Thrombolytic agents have been used to re-establish coronary blood flow but some studies reported aggravated bleeding and extension of dissection due to bleeding in the vessel wall [6]. Angioplasty with insertion of coronary stent is the treatment of choice by the cardiologist if the lesion is proximal but it is also associated with a risk of progression of dissection or the formation of intramural haematoma [9].

As for surgical management, coronary artery bypass grafting has been reported to achieve good results over the last decade and is recommended as the first-line treatment especially when multiple coronary vessels are involved. Coronary bypass surgery with or without cardiopulmonary bypass should be considered if patients do not have any
contraindication for anesthesia or surgery [1–5,7]. Pregnant patients with SCAD can also be operated by off-pump coronary artery bypass surgery [4]. To our knowledge, successful coronary artery bypass grafting on triple-vessel SCAD has never been previously described. We report a 42-year-old woman presented with acute myocardial infarction and developed heart failure due to triple-vessel SCAD, received an emergency coronary artery bypass grafting on four coronary vessels. Although she had a predicted slow postoperative recovery due to severity of her disease and preoperative condition, she managed to be discharged from the hospital. In conclusion, a prompt diagnosis of SCAD is essential and surgical intervention such as urgent coronary artery bypass grafting may be life saving.

References