

» **Case Report** «

# Two Dehiscences of the Aortic Valve Commissure and Cusp with Progressive Acute Aortic Regurgitation

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A 54-year-old female with acute heart failure due to aortic regurgitation (AR) was admitted to our hospital. Following admission, her condition worsened progressively; thus, surgery was performed prematurely. During surgery, two dehiscences were visualized in the aortic valve commissure between the right and left cusps and the upper part of the left coronary artery ostium. However we scheduled aortic valve replacement (AVR) at first, we made the shift to perform the aortic root replacement for reinforcement of the aortic wall around the left coronary artery ostium. We describe a rare case of two dehiscences at the aortic root, which is the first report.

**Keywords:** dehiscence, avulsion, acute aortic regurgitation

## Introduction

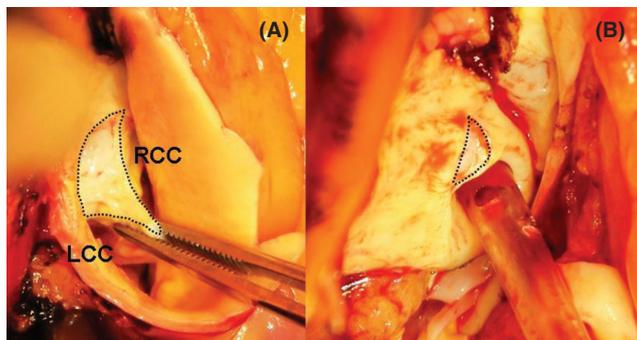
We previously reported a case of aortic valve commissural dehiscence resulting in acute aortic valve regurgitation (AR), with a history of aortic valve replacement (AVR). A commissural dehiscence is a rare clinical condition that the detachment of aortic valve commissure from the aortic wall with acute AR and this common treatment is AVR.<sup>1)</sup> Simple commissural dehiscence has been reported in some articles. Here we describe a more recent and rare case of a patient with two dehiscences of the aortic valve commissure and the upper part of the left coronary artery ostium complicated by acute AR, which is the first report. The difference as last manuscript is that she necessitated aortic root replacement for reinforcement of the aortic wall around the left coronary artery ostium.

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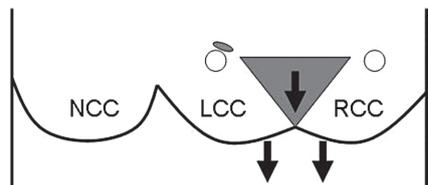
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## Case Report

A 54-year-old female with orthopnea and nocturnal dyspnea was admitted to a local hospital 2 months before. She had severe hypertension (approximately 200/120 mmHg), which had been untreated for 15 years. Subsequently, she was admitted to our institution with a diagnosis of acute cardiac failure due to AR. Initial physical examination of the patient revealed a body temperature of 36.4°C, a blood pressure of 113/53 mmHg following administration of anti-hypertensive medication, a normal pulse rate (67 beats/min), and a diastolic heart murmur at Erb. Chest radiography revealed bilateral pulmonary congestion and a cardiothoracic ratio of 60%. Computed tomography revealed no dissection or enlargement of the aortic root, whereas transthoracic echocardiography indicated severe AR for unknown reasons. There was no evidence of infective endocarditis (IE). The patient's symptoms of cardiac failure worsened rapidly. Her transthoracic echocardiographic findings progressively deteriorated, as indicated by an ejection fraction decreasing from 80% to 57% and an elevated tricuspid regurgitation peak gradient of 15–68 mmHg. Simultaneously, a blood test revealed elevated brain natriuretic peptide levels of 283–424 mg/dL. We diagnosed as progressive acute AR and scheduled surgery for AVR prematurely. Upon opening the chest cavity via median sternotomy, the ascending aorta, the superior vena cava, and the inferior vena cava were cannulated, and cardiopulmonary bypass was initiated. Following clamping and opening of the ascending aorta, we examined the aortic valves and the aortic wall. A commissural dehiscence between the right and left cusps and a small dehiscence of the upper part of the left coronary artery ostium that lacked continuity were detected (Fig.1, Fig. 2). Macroscopically the aortic valves was degenerated a few and the intima of aorta was normal outside of dehiscences. Because of a detachment of the commissure from the aortic wall, the right and left cusps were prolapsed into the left ventricle and AR occurred. As only AVR can't be effectively addressed for the dehiscence of the upper



**Fig. 1** Intraoperative photograph. (A) revealed the commissural dehiscence (dotted frame) between the right cusp (RCC) and the left cusp (LCC). (B) revealed the dehiscence of the upper part of the left coronary artery ostium (5 mm in diameter, dotted frame).

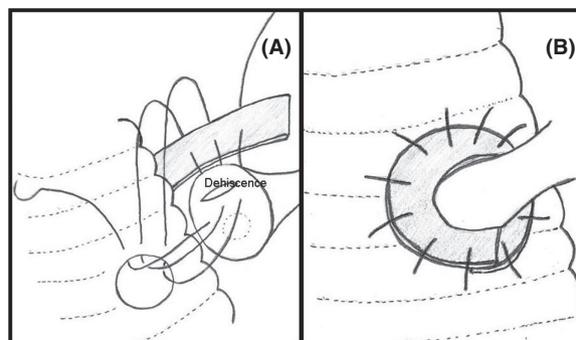


**Fig. 2** Schema of the two dehiscences of the aortic root (gray points). The prolapse of the valves is indicated by arrows. RCC: right cusp; LCC: left cusp; NCC: noncoronary cusp

part of the left coronary artery ostium, the surgical intervention was performed for aortic root replacement using a composite graft sutured a 21-mm mechanical valve and a 24-mm synthetic graft. The dehiscence of the aortic valve commissure was repaired using a horizontal mattress suture sandwiching between the composite graft and a Teflon® pledget. The left and right coronary buttons were implanted end-to-side into the composite graft, and the dehiscence of the upper part of the left coronary artery ostium was reinforced by sandwiching between the composite graft and the back of the Teflon® felt (Fig. 3). The operation time was 455 min, aortic cross-clamp time was 204 min, extracorporeal circulation time was 259 min, and amount of bleeding was 270 ml. The surgery was successful with an uneventful postoperative recovery.

## Discussion

Clinically, most causes of acute AR have been reported to follow IE or type A aortic dissection. As already reported at the last manuscript, the detachment of the aortic valve commissure from the aortic wall can cause acute AR, which is usually an isolated event and a very rare condition.



**Fig. 3** Schema of aortic replacement. (A) showed anastomosis of the left coronary button. At the medial site of the dehiscence an acus send out with the back of the Teflon® felt. (B) showed completed anastomosis of the left coronary button.

Although rarely reported, this condition has been described in some reports as dehiscence, avulsion,<sup>2)</sup> or commissural tear.<sup>3)</sup> This clinical condition is associated with progressive acute heart failure, hence immediate surgery is required. Nevertheless, this condition was difficult to diagnose prior to surgery. The causes of aortic valve commissural dehiscence include thoracic trauma,<sup>4)</sup> cystic medial necrosis, degenerative diseases,<sup>5)</sup> and atheromatous plaque,<sup>6)</sup> but with no pathological changes. In this case pathologically the valves and the aorta were not specific, picking of a part of dehiscence was impossible because of a requiring for repair. Hypertension is considered to be a risk factor for this condition.<sup>7)</sup> In such cases, extreme diastolic blood pressure is expected to become overloaded by an aortic valve commissure. In past articles the commissural dehiscence is simple and this dehiscence of the upper part of the left coronary artery ostium is reported first. We expect that it may be caused by the commissural traction force into the left ventricle. Compared two dehiscences, the dehiscence of the upper part of the left coronary artery ostium was more fresh in looks. A common treatment for this condition is AVR, but there are only few reports on root replacement in cases associated with root enlargement.<sup>7)</sup> We preferred to use aortic root replacement instead of AVR because of reinforcement of the aortic wall around the left coronary artery ostium.

## Conclusion

An incidence of two dehiscences of the aortic valve commissure and cusp is rare and requires the consideration of aortic root replacement.

## Disclosure Statement

The authors have no conflicts of interest to declare.

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