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Acute Aortic Regurgitation due to Spontaneous Laceration of the Aorta

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Abstract

We report a relatively rare case of acute aortic regurgitation due to spontaneous laceration of aorta without dissecting aneurysm. A 73-year-old male who had complained of sudden onset of chest discomfort was admitted to our hospital, and severe aortic regurgitation with aortic valve prolapse was detected by echocardiography. There were not any echographic and radiographic evidences of dissecting aneurysm. At operation, a transverse laceration was noted in the sinus portion below the commissure of left and non-coronary cusps of the aortic valve with detachment of the commissure from the aortic wall resulting in prolapse of the left and non-coronary cusps. We performed aortic root replacement and the post-operative course was uneventful. Acute aortic regurgitation due to spontaneous laceration of aorta without dissecting aneurysm is relatively rare but should be considered as a course of acute aortic regurgitation with aortic valvular prolapse even if there is no evidence of classical dissecting aneurysm.

Keywords

acute aortic regurgitation; spontaneous laceration of aorta; without dissecting aneurysm; detachment of the aortic valve commissure

Abbreviations

AR: Aortic Regurgitation

Introduction

Detachment of the aortic commissure from the aortic wall resulting in aortic valvular prolapse and aortic regurgitation (AR) is usually caused by either blunt chest trauma or dissecting aneurysm [1]. Detachment of the aortic commissure due to spontaneous laceration of the aorta without dissecting aneurysm is rare, and it is difficult to diagnose preoperatively [2-4]. Here, we report such a case and present the surgical findings.

Case Presentation

A 73-year-old male who had complained of sudden onset of chest discomfort was admitted to our hospital. He had a past history of hypertension. However, he had no past history of trauma or family history of cardiovascular disease. Transthoracic and transesophageal echocardiography showed severe eccentricAR with aortic valve prolapse (Figure 1). Transesophageal echocardiography and contrast-enhanced computed tomography did not demonstrate any evidence of dissecting aneurysm (Figure 1).

Eight days after admission, he underwent surgery because of progression of heart failure.

At operation, there were not hemopericardium or hematoma of the cardiac base. The diameter of the ascending aorta was 50mm and sinuses of Valsalva were moderately dilated. Aortotomy revealed a transverse laceration of 12mm in size in the sinus portion below the commissure of left and non-coronary cusps of the aortic valve. The commissure of them was detached from the aortic wall resulting in prolapse of the left and non-coronary cusps. There was no intramural hemorrhage in the sinuses of Valsalva and the ascending aorta (Figure 2). We performed aortic root replacement using bioprosthetic aortic valve.Histological examination of the sinus portion neighboring the laceration showed focal medial degeneration; however, cystic medial necrosis could not be confirmed in any specimens including ascending aorta. The patient was discharged from the hospital uneventfully 28 days after the operation.

Discussion

Infective endocarditis, blunt chest trauma, and acute dissecting aneurysm are well-known causes of acute AR [1-6]. Spontaneous detachment of the aortic commissure from the aortic wall resulting in aortic valvular prolapse is a rare but important cause of acute AR [1-6]. In the literature, it has been reported as dehiscence of the aortic valve commissure [2-5], an unusual variant of acute dissection [3], and avulsion of the aortic valve commissure [1]. Carter et al. classified the types of aortic valvular prolapse as follows: (A) intact cusps, (B) a ruptured cusp, (C) the loss of commissural support to the aortic wall, and (D) displacement of the aortic root in association with a ventricular septal defect [6]. Additionally, they subdivided the loss of commissural support as follows: (1) laceration of the aorta with or without dissecting aneurysm, and (2) avulsion of a commissure [6]. Spontaneous laceration involves the intima, and the thickness of the related underlying media varies among cases. The consequence of such a laceration is one of the following: (1) simultaneous through-and-through laceration of the media and overlying adventitia, (2) limited intra-medial dissection of blood (i.e., an incomplete dissecting aneurysm), or (3) classical dissecting aneurysm [7]. Therefore, according to Carter et al.'s classification [6], the present case corresponded to laceration of the aorta without dissecting aneurysm.

Hypertension and primary weakness of the aorta such as cystic medial necrosis are factors that increase the risk of spontaneous laceration of the aorta [6, 7]. However, sometimes the precise pathological change cannot be identified [3, 4]. Cystic medial necrosis [7], age-related pathophysiologic changes such as dilatation of the aorta and aortic annulus and increased aortic valve stiffness and thickness [1], and atheroma [5] are also reported as risk factors of avulsion of a commissure, which is a similar pathological condition to spontaneous laceration. In the present case, hypertension and dilatation of the Valsalva sinuses and ascending aorta and medial degeneration may have caused the spontaneous laceration.

Acute AR due to spontaneous laceration of the aorta without dissecting aneurysm is difficult to diagnose preoperatively [2-4]. In fact, we did not suspect this pathophysiology as a cause of acute AR. The definitive diagnosis of this pathophysiology is based on the intraoperative findings. However, based on this experience and previously reported cases, we must consider this pathophysiology as a cause of acute AR with aortic valvular prolapse when we cannot determine other causes such as infective endocarditis, chest trauma, and classical dissecting aneurysm, and timely surgery should be performed because this pathophysiology is associated with progressive congestive heart failure and poor prognosis with

deteriorating hemodynamics [2-4].

Valvuloplasty (i.e., fixation to the original commissural insertion in the aortic wall) [3, 6], replacement of the aortic valve with reinforcement of the aortic wall [2], and aortic root replacement [4] are reported surgical treatments for this pathophysiology. However, it may be difficult to control AR sufficiently with valvuloplasty [2, 3]. Although aortic valve replacement is a common procedure reported in the literature [2, 4], we elected to perform aortic root replacement in our case because of dilatation of the Valsalva sinuses and ascending aorta.

Figures

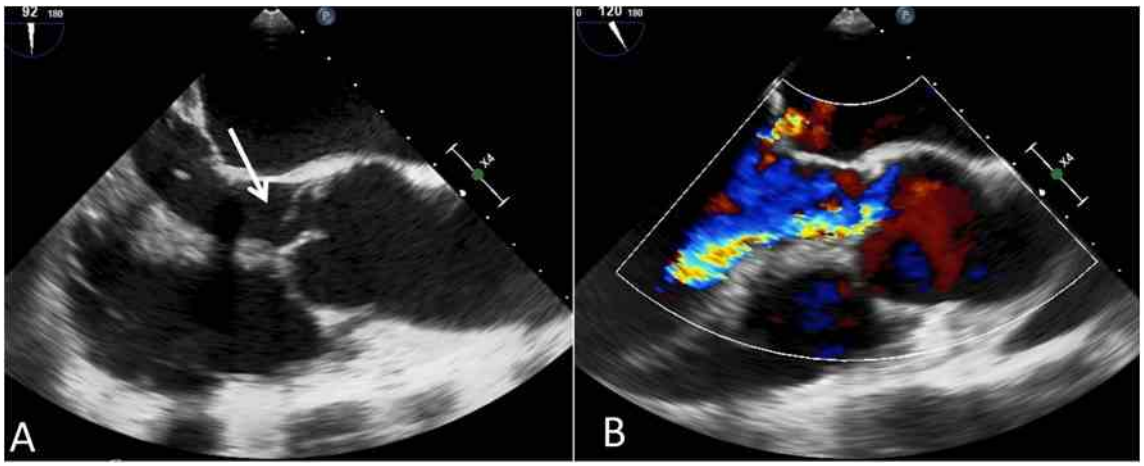

Figure 1: (A) Transesophageal echocardiography showing aortic valve prolapse (white arrow). There was no any evidence of aortic dissection in the sinuses of the Valsalva and the ascending aorta. (B)Transesophageal color echocardiography showing severe eccentric aortic regurgitation.

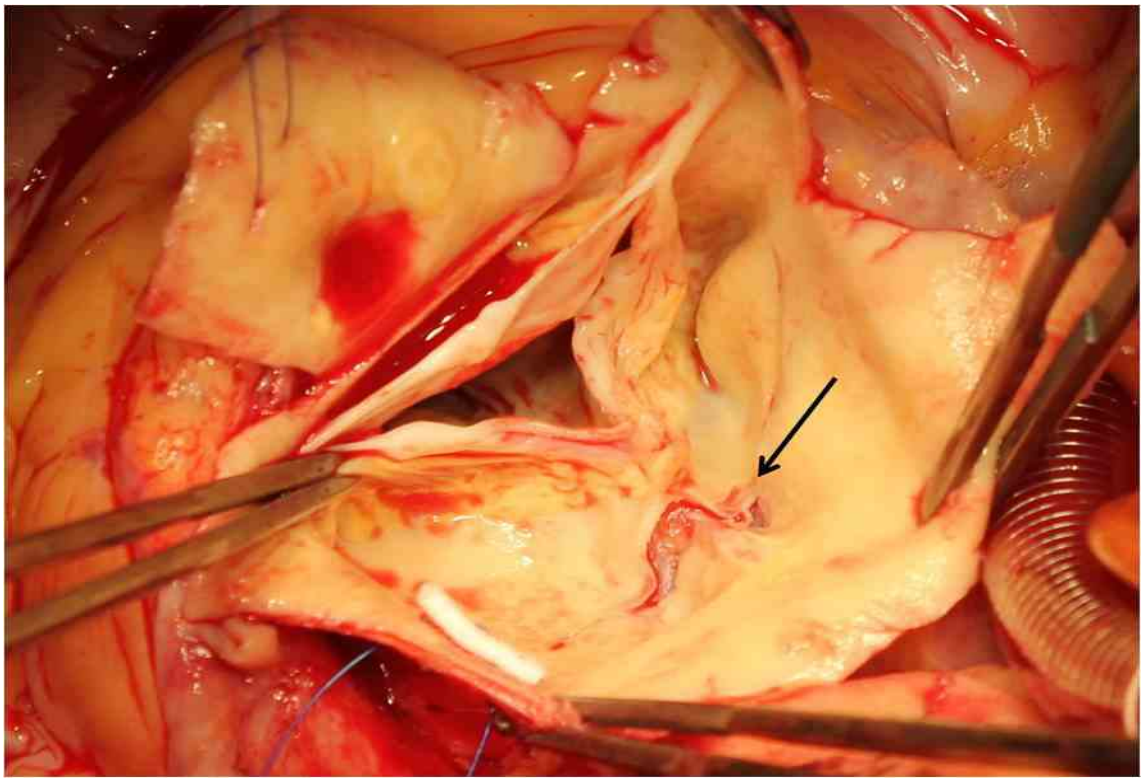

Figure 2: Intraoperative finding showing a transverse laceration (arrow)measuring 12mm in the sinus portion below the commissure of the left and non-coronary cusps of the aortic valve. This commissure was detached from the aortic wall, resulting in prolapse of the left and non-coronary cusps. There was no intramural hemorrhage in the sinuses of the Valsalva and the ascending aorta.

Conclusion

Acute AR due to spontaneous laceration of aorta is relatively rare but should be considered as a course of acute AR with aortic valvular prolapse even if there is no evidence of classical dissecting aneurysm.

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