**Case
Report**

Transient Constrictive Pericarditis Following Cardiac Surgery

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Transient constrictive pericarditis (CP) is quite rare, with only a few reports presented. Herein, we report 2 cases of transient CP following cardiac surgery. Case 1 was an 80-year-old man who underwent repair of a left ventricular free wall rupture, while Case 2 was a 69-year-old woman who underwent a conventional aortic valve implantation procedure. In both cases, constrictive features developed about 2 weeks after surgery, which were treated successfully by administrations of non-steroidal anti-inflammatory drugs (NSAIDs). Prior to performing a pericardiectomy, NSAID administration should be considered for affected patients who are hemodynamically stable.

Keywords: constrictive pericarditis, non-steroidal anti-inflammatory drug, cardiac surgery

Introduction

Constrictive pericarditis (CP) is considered to be a process of inflammation of the pericardium, which often leads to thickened, scarred, and calcified tissues that limits diastolic ventricular filling. Generally, a pericardiectomy is the only effective treatment for CP. However, a few reports have noted that CP was treated successfully by conservative therapy including administrations of non-steroidal anti-inflammatory drugs (NSAIDs) and steroids.^{1–5)} Such a pathophysiology has been termed transient CP. Herein, we describe 2 cases of transient CP following cardiac surgery that recovered after receiving NSAID administrations.

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Case Report

Case 1

An 80-year-old man was referred to our department for a left ventricular free wall rupture (LVFWR) after acute myocardial infarction (AMI). Life-saving surgical repair of the LVFWR was performed on an emergency basis. The postoperative course was uneventful and the patient was discharged on postoperative day 9. On postoperative day 15, he complained of dyspnea on effort and was readmitted. Chest X ray findings showed bilateral pleural effusion and a laboratory examination demonstrated mild inflammation (white blood cell count and C-reactive protein 8200/mm³ and 2.61 mg/dl, respectively). Echocardiography revealed anomalous movement of the interventricular septum, known as “septal bounce,” an adhesion between the pericardium and liver, and cyclic variation in the transmitral flow E wave velocity during respiration, typical signs of CP (**Fig. 1A**). With cardiac catheterization, a “dip and plateau” pattern was shown (**Fig. 1B**). Based on these findings, the patient was diagnosed with CP and administered an NSAID (aspirin, 2250 mg/day) along with diuretic drugs, as the

Fig. 1 (A) Cyclic variation in mitral inflow during respiration. A marked increase in the E wave of 32.6% with expiration was seen as compared with inspiration. (B) Cardiac catheterization revealed equalization of left (arrowhead) and right (arrow) ventricular diastolic pressures, which presented a dip and plateau pattern.

Fig. 2 Pre-discharge echocardiography showing that the cyclic variation of transmitral flow was significantly improved (from 32.6% to 14.5%).

symptoms were not severe. Dyspnea disappeared completely on postoperative day 37, while echocardiography showed significant improvements in septal bounce, adhesion of the pericardium, and cyclic variation of transmitral flow (**Fig. 2**). He was discharged on postoperative day 51 and has since undergone regular outpatient examinations without recurrence.

Case 2

A 69-year-old woman suffering from chest pain on effort was diagnosed with severe aortic stenosis and referred to our department for surgical treatment, during which a conventional aortic valve replacement procedure was performed. On postoperative day 14, the patient developed pretibial edema and right pleural effusion.

Fig. 3 (A) Cyclic variation in tricuspid inflow during respiration. A marked increase of 35.3% was seen with inspiration as compared with expiration. E/A = 1.77. (B) Cardiac catheterization revealed a dip and plateau pattern. RV: right ventricle; PCW: pulmonary capillary wedge.

Echocardiography showed septal bounce, adhesion of the pericardium, and cyclic variation in tricuspid inflow during respiration (**Fig. 3A**). Furthermore, severe

Fig. 4 Cyclic variation in tricuspid inflow was significantly improved from 35.3% to 18.8% in an outpatient echocardiography examination. E/A = 1.19.

tricuspid regurgitation, which had not been recognized in preoperative echocardiography findings, was revealed. Cardiac catheterization demonstrated a dip and plateau pattern (**Fig. 3B**), and we made a diagnosis of CP. Considering the possibility of transient CP, the patient was administered an NSAID (1500 mg/day), as she was hemodynamically stable. Following disappearance of pretibial edema and pleural effusion, she was discharged on postoperative day 83. An outpatient echocardiography examination on postoperative day 106 showed significant improvement in septal bounce, adhesion of the pericardium, and cyclic variation of transmitral flow (**Fig. 4**).

Discussion

CP following cardiac surgery is rare, with the incidence estimated to range from 0.2%–0.3%,⁶⁾ and only two cases (out of 1492 open heart surgeries from 2010 January to 2012 December: 0.13%) were found in our institute. In affected patients, echocardiography can demonstrate septal bounce, adhesion of the pericardium, and cyclic variations in mitral and tricuspid inflow during respiration. In the inspiratory phase, an increase in venous return in the right atrium leads to a marked increase in right atrial pressure because of right ventric-

ular diastolic dysfunction, which results in an elevated E wave in the trans-tricuspid valve as compared to in the expiratory phase. In the expiratory phase, left atrial pressure is higher than normal because of left ventricular diastolic dysfunction, which results in a marked increase in the trans-mitral valve pressure gradient and E wave as compared to in the inspiratory phase. In addition, cardiac catheterization demonstrates a dip and plateau pattern.

A pericardiectomy is the only known effective treatment for CP, with a number of reports presented.^{7–11)} Although an early pericardiectomy procedure has been advocated to improve results, operative and late mortality rates are not low.⁷⁾ In our Case 1, the operative mortality related to a pericardiectomy procedure might have been higher than usual because of post-myocardial infarction. Furthermore, Gongora, et al., reported moderate or severe tricuspid regurgitation such as seen in the present Case 2 is associated with increased mortality.¹⁰⁾

On the other hand, few cases of transient CP have been reported.^{1–5)} Sagrista-Saulea and colleagues reported that 16 of 177 patients with acute idiopathic constrictive pericarditis had a transient course.¹⁾ Also, Haley and colleagues investigated the cause and natural history of transient CP, and reported that 36 of 212 patients (including 9 of 48 following cardiovascular surgery) who had echocardiographic findings of CP showed resolution of constrictive hemodynamics without a pericardiectomy in follow-up echocardiogram findings.²⁾ In that study, patients with transient CP were treated conservatively with NSAIDs, steroids, or others, with an average of 17.4 weeks needed to resolve transient CP in those that had undergone cardiovascular surgery. In the present cases, resolution was seen in 8 and 15 weeks, respectively. However, their report was a review of an echocardiogram database, thus there might have been more cases of transient CP for which a pericardiectomy was performed. Furthermore, there are no reports regarding how NSAIDs or steroids function in repair of CP, though it has been suggested that patients who have constrictive features early in the course of illness and are hemodynamically stable should be considered for conservative therapy with NSAID administration before a pericardiectomy is pursued.

Conclusions

In summary, we report 2 cases of transient CP following cardiac surgery, which were successfully treated with administrations of NSAIDs. Patients who have

constrictive features early in the course of illness and are hemodynamically stable should be considered for NSAID administration before a pericardiectomy is pursued. Nevertheless, there are few reports of transient CP, thus further investigation is mandatory.

Disclosure Statement

The authors declare that they have no competing interests.

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