Tricuspid Regurgitation Resulting From Acute Type A Aortic Dissection
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Proximal extension of acute type A aortic dissection can affect the aortic valve but seldom affects the tricuspid valve. We report the case of an octogenarian who underwent successful surgical repair of an aortic dissection that was accompanied by tricuspid regurgitation. We believe that the tricuspid regurgitation was attributable to displacement of the valve resulting from aortic dissection.


Proximal extension of acute type A aortic dissection often infiltrates the aortic root, resulting in aortic valve insufficiency [1, 2], but seldom affects the tricuspid valve [3]. We report the case of an octogenarian patient who underwent surgical repair of an aortic dissection that was accompanied by tricuspid regurgitation. We believe the etiology of the tricuspid regurgitation to have been displacement of the valve by the bulging of the false lumen in the interatrial septum.

An 81-year-old woman experienced sudden severe anterior chest and back pain and was brought to the emergency room at our facility, where she was diagnosed with acute type A aortic dissection. She had been followed for ascending aortic aneurysm, aortic valve disease, and chronic atrial fibrillation; echocardiography 2 years before had shown mild aortic stenosis and regurgitation and trivial tricuspid regurgitation. Electrocardiography showed atrial fibrillation with a heart rate of 87 beats per minute and no ST-segment or T-wave changes. Chest X-ray demonstrated mild enlargement of the mediastinal shadow. Laboratory study revealed troponin T to be negative. Computed tomography showed a communicating aortic dissection in the ascending aorta and aortic arch with a maximum diameter of 64 mm. An entry tear was found near the aortic root, and mild pericardial effusion was also identified. Echocardiography confirmed fairly preserved left ventricular contraction and no exacerbation of aortic valve disease. The patient was immediately taken to the operating room.

Operative monitoring was started. The patient’s arterial pressure was approximately 75 mm Hg and central venous pressure was 21 mm Hg. Conventional median sternotomy followed by pericardiotomy was performed. After drainage of serosanguineous fluid in the pericardial space, central venous pressure decreased to 14 mm Hg but gradually increased again to 20 mm Hg thereafter. The right atrium was markedly expanded, and transesophageal echocardiography revealed massive regurgitation through the tricuspid valve. Cardiopulmonary bypass was established with perfusion through the right femoral artery and bicaval drainage. Myocardial protection was achieved with cold crystalloid cardioplegia administered by direct coronary perfusion. Transection of the ascending aorta was performed, revealing the entry tear identified preoperatively above the sinotubular junction. The dissection extended mainly into the non-coronary sinus and partially into the right and left coronary sinuses. Resuspension of a detached commissure between the right and noncoronary cusps was performed using a pledgeted polypropylene suture. BioGlue (CryoLife, Kennesaw, GA) was used to obliterate the false lumen in the proximal aorta and the ascending aorta was replaced, accompanied by antegrade selective cerebral perfusion with a minimum rectal temperature of 24.4°C. After rewarming, the tricuspid regurgitation remained mild before weaning the patient from cardiopulmonary bypass. However, immediately after cessation of cardiopulmonary bypass, the regurgitation became massive (Fig 1). The patient’s arterial pressure could not be maintained over 80 mm Hg despite volume loading and a central venous pressure of over 12 mm Hg. Cardiopulmonary bypass was restarted, the heart reaersted, and the right atrium opened. The leaflet and subvalvular apparatus of the tricuspid valve was intact, but bulging of the false lumen adjacent to the anterosetal commissure was identified. The bulging was seen to displace the septal leaflet of the tricuspid valve. The decision was made to perform tricuspid ring annuloplasty to restore the displaced valve to its normal

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position. A 28-mm Edwards MC³ annuloplasty ring (Edwards LifeSciences, Irvine, CA) was positioned by means of 10 mattress sutures of 2-0 polyester. There was a dramatic decrease in tricuspid regurgitation and improvement in the patient’s hemodynamic status, with a central venous pressure of approximately 7 mm Hg, after weaning from cardiopulmonary bypass. The patient had an uneventful postoperative course and was discharged in excellent condition with trivial tricuspid regurgitation on echocardiography.

Comment

Extension of acute aortic dissection often involves the aortic root and leads to aortic valve insufficiency, with an incidence of moderate to severe regurgitation of 44% to 48% [1, 2]. However, involvement of the other valves is extremely rare. Tricuspid regurgitation due to aortic dissection has been reported only once [3]. Vyas and colleagues [3] concluded, on the basis of intraoperative inspection and postmortem examination, that displacement of the septal leaflet of the tricuspid valve caused by aortic dissection extending into the interatrial septum had resulted in regurgitation. We believe that the tricuspid regurgitation in the present case was related to the aortic dissection for 2 reasons. One is the absence of significant tricuspid regurgitation before the acute onset of aortic dissection. The patient had led a normal life, without congestive heart failure, and tricuspid regurgitation noted on echocardiography 2 years prior had been trivial. The other reason for our belief that the tricuspid regurgitation was related to the dissection is that the displacement of the valve observed intraoperatively, with no abnormality of the leaflet itself, closely resembled that previously described [3]. We now evaluate the function of both the tricuspid and aortic valves in cases of type A aortic dissection.

Gibbs and colleagues [4] described a similar case in which an unruptured aneurysm of the sinus of Valsalva protruded into the right atrium adjacent to the septal leaflet of the tricuspid valve. This caused the patient to suffer from tricuspid stenosis and insufficiency.

We initially expected repair of the aortic dissection, including evacuation of hematoma followed by obliteration of the false lumen, to correct the displacement of the tricuspid valve and reduce the regurgitation, but this did not occur. The displacement was not easily restored because the false lumen continued to bulge after repair of the aortic dissection. We expected ring annuloplasty rather than suture annuloplasty to be better able to control the regurgitation because restoration of the displaced valve as well as reduction of annular size was necessary. The three-dimensional design and saddle-shaped configuration of the Edwards MC³ annuloplasty ring [5] is suitable for such a repair.

In conclusion, we report an extremely rare case of a patient who experienced tricuspid regurgitation resulting from an acute type A aortic dissection. Ring annuloplasty can be a reasonable solution to correcting a displaced tricuspid valve.

References