Title: Successful valve repair in delayed tricuspid regurgitation following blunt chest trauma

Seyed Mohammad Saeid Ghiasi, Assistant professor, Fellowship of cardiac anesthesiology, Baqiyatallah University of medical sciences, Tehran, Iran

Seyed Tayeb Moradian, Assistant professor, Atherosclerosis research center, Baqiyatallah University of medical sciences, Tehran, Iran (corresponding author).

Corresponding Author

Seyed Tayeb Moradian, Assistant professor, Atherosclerosis research center, Baqiyatallah University of medical sciences, Tehran, Iran (corresponding author).

Tel: 09123781448

Email: T.moradyan@yahoo.com

Keywords: Blunt chest trauma, echocardiography, tricuspid regurgitation

Word count: 580 words
Abstract

Successful valve repair in delayed tricuspid regurgitation following blunt chest trauma

Blunt chest trauma could lead to the cardiac valves damage. Flail anterior leaflet with severe tricuspid regurgitation is usually due to blunt chest trauma. Given that in many cases the symptoms are mild and progression is slow, diagnosis may be delayed for years or missed. In delayed cases, excessive fibrosis and shortening of the chordae can occur, so the chance of successful repair is low. A previously healthy, 26 years old man presented with chest pain to the cardiac clinic of Jamaran heart hospital, Tehran, Iran. Transthoracic echocardiography revealed a severe enlarged right ventricle with reduced function and moderate to severe tricuspid regurgitation caused by chordal rupture of the anterior leaflet, requiring surgery. First the anterior leaflet of the tricuspid was repaired by neochordae implantation and then annuloplasty was done using a 32-mm rigid ring. The follow up echocardiography showed successful results. The available evidence show that the chance of successful repair in delayed tricuspid regurgitation cases is low. Our result showed that the surgical repair is possible and surgeon assessment has an important role in decision making.

Keywords: Blunt injury, valve repair, tricuspid regurgitation
Learning objectives
Flail anterior leaflet with severe tricuspid regurgitation is usually due to blunt chest trauma. Given that in many cases the symptoms are mild and progression is slow, diagnosis may be delayed for years or missed. In conclusion, in all patients with non-penetrating chest wall trauma if cardiac injury is suspected, transthoracic echocardiography should be done. Also most of cases are treated with valve replacement. The assessment by surgeon is needed for the capability of valve repair.
Successful valve repair in delayed tricuspid regurgitation following blunt chest trauma

Introduction

In recent years the number of car accident injuries is increasing. Cardiac damage due to blunt chest trauma occurs in 0.25% cases (1). The most common injury is damage to the mitral followed by aorta and tricuspid valves (2). The isolated traumatic tricuspid injury is an extremely rare condition (3). In this study, we want to present a case with delayed tricuspid damage following blunt chest trauma.

Case report

A previously healthy, 26 years old man presented with chest pain to the cardiac clinic of Jamaran heart hospital, Tehran, Iran. The cardiac biomarkers were normal. Patient doesn’t have any history of chronic diseases. He had a history of blunt chest trauma and clavicle fracture, 15 years ago, treated with open reduction and plate screw (figure 1-A). A 3/6 systolic murmur was heard in tricuspid region. The electrocardiography showed a sinus rhythm with RBBB. Transthoracic echocardiography revealed a severe enlarged right ventricle with reduced function and moderate to severe tricuspid regurgitation caused by chordal rupture of the anterior leaflet, requiring surgery. Surgery was done using the cardiopulmonary bypass. First the anterior leaflet of the tricuspid was repaired by neochordae implantation and then annuloplasty was done using a 32-mm rigid ring. Patient was weaned from cardiopulmonary bypass easily. Intraoperative transesophageal echocardiography showed mild tricuspid regurgitation and annuloplasty ring was seen in the tricuspid valve (figure 3). In the follow up postoperative transthoracic echocardiography the patient had a mild tricuspid regurgitation and was free of symptom. The patient was discharged uneventfully.

Discussion

Tricuspid regurgitation following blunt chest trauma usually is due to the damage to the heart and increasing the right ventricle pressure and subsequently damage to the tricuspid (4). Based on the available reports tricuspid regurgitation is extremely rare (5). Given that in many cases the symptoms are mild and progression is slow, diagnosis may be delayed for years or missed (2). In some cases, the cause of tricuspid regurgitation is not found. Therefore, due to increased traffic accidents it seems that the number of cases is more (6). In most cases severe TR and flail anterior
leaflet is seen (7). Flail anterior leaflet with severe tricuspid regurgitation is usually due to blunt chest trauma. The TR is usually easily diagnosed with transthoracic echocardiography and surgery is needed in most cases (8). Despite the severity of regurgitation, in most cases the repair of the tricuspid valve is the preferred surgical strategy (1). Some studies report that in delayed cases, excessive fibrosis and shortening of the chordae can occur, and the chance of successful repair is low (7). So the replacement of the prosthetic valve is the treatment of choice. In our case, despite the long passage of time from the chest trauma, the valve repair was done easily without any complication.

The appropriate time of surgical intervention after traumatic tricuspid regurgitation is controversial. Traumatic tricuspid regurgitation can lead to deformation and failure of the right ventricle (7, 9). Hence, an early operation allows preservation of myocardial function. In general the symptomatic heart failure is a strong indication for surgery. Surgery may be not indicated in asymptomatic patients (10).

In conclusion, in all patients with non-penetrating chest wall trauma if cardiac injury is suspected, transthoracic echocardiography should be done.

Acknowledgement: The authors kindly thank the managers and staff of the Jamaran heart hospital specially staff of operating room.

Disclosure: The authors don’t have any conflict of interest.

References
Figure 1- (A) clavicle fracture that is treated with open reduction and plate screw in chest x ray (B, C) preoperative TTE showing severe tricuspid regurgitation.
Figure 2- Intraoperative image showing the anterior leaflet of the tricuspid valve (white arrowhead) and ruptured chordae

Figure 3- Intraoperative TEE showing adequate coaptation of the tricuspid valve with ring annuloplasty and mild tricuspid regurgitation after repair shown by TEE