

Repair of Tricuspid Insufficiency Following Blunt Trauma Chest - A Case Report and Review of Literature

Surendra Nath Khanna*, Mathews Paul, Rajesh Sharma and Krishnan K Sharma

Fortis Escorts Heart Institute, Okhla Road, New Delhi, India

*Corresponding author: Surendra Nath Khanna, Fortis Escorts Heart Institute, Okhla Road, New Delhi, India, Tel: 9810943535; E-mail: surendrank@hotmail.com

Received date: Sept 19, 2014, Accepted date: Sept 30, 2014, Published date: Oct 7, 2014

Copyright: © 2014 Surendra Nath Khanna et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Introduction

Heart valve injuries due to non-penetrating blunt thoracic trauma are rare. Isolated tricuspid incompetence due to detachment of a leaflet from the annulus after blunt trauma is uncommon. Young patients may tolerate chronic tricuspid regurgitation (TR), and can be undiagnosed for years until the right ventricular failure occurs. We report the case of a young adult male who sustained blunt chest trauma resulting in severe tricuspid regurgitation and underwent successful tricuspid valve repair.

Case Report

A 22 year old young obese male (114 kilogram) who suffered a blunt trauma in an automobile collision at the age of 18 presented to us with complaints of chest heaviness, palpitation and dyspnoea on exertion -New York Heart Association (NYHA) class III symptoms. On examination his vitals were stable, but chest auscultation showed soft S1 with a holosystolic murmur at the left lower sternal border. Bilateral pedal edema was also noticed. His recent chest radiograph revealed increased cardiothoracic ratio and ultrasound abdomen showed hepatomegaly. A diagnostic Trans-esophageal echocardiography (TEE) was done which demonstrated flail anterior tricuspid leaflet with large area of noncoaptation causing severe low pressure tricuspid regurgitation (Figure 1). Results of laboratory tests were normal except for elevated total bilirubin levels. Electrocardiogram showed nonspecific T wave changes in the precordial leads.

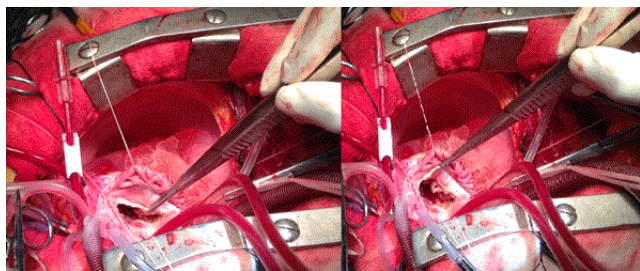


Figure 1: Trans-esophageal echo showing flail leaflet and Severe TR

Under general anesthesia, a midline sternotomy was performed followed by full heparinization and aortic and bicaval cannulation. The right atrium and ventricle were dilated and thin walled. On cardiopulmonary bypass, after aortic cross-clamping and adequate myocardial protection, the right atrium was opened and the valvular anatomy was inspected. The anterior tricuspid leaflet was completely detached in one third of the annulus from antero-septal commissure

(Figure 2). The annulus was found to be severely dilated (60 mm). The detached leaflet was sutured back to the annulus with a continuous 6-0 prolene suture. The commissure between chordae at septal and posterior leaflet was also torn and hence sutured using 6-0 prolene interrupted sutures. Tricuspid annuloplasty was performed using 31 mm St. Jude Taylor ring to reduce the annulus size in view of annular dilatation. After reconstruction, the competence of repaired valve was tested by injecting saline solution into the right ventricle and confirmed by TEE after coming off from cardiopulmonary bypass. He had an uneventful post-operative recovery. The transthoracic echocardiogram at discharge showed trivial residual TR.

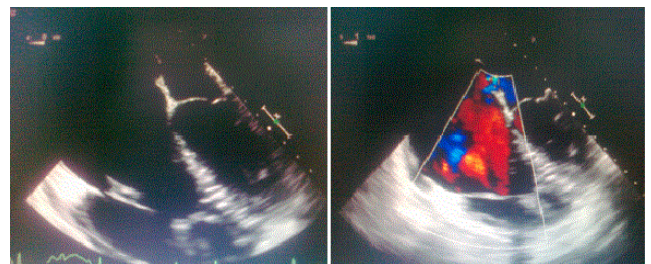


Figure 2: Intraoperative image showing detached anterior leaflet from the annulus

Discussion

Tricuspid incompetence after blunt chest trauma is a rare entity, but has been reported with an increasing frequency during the past decades, due to the increase in the number of traffic accidents, and availability of echocardiography [1]. Yet, the prevalence of tricuspid regurgitation due to trauma was not detected because chronic tricuspid insufficiency is usually well tolerated and most patients experience no symptoms early after the trauma until they have right ventricular failure [1].

Traumatic tricuspid valve regurgitation can be due to rupture of chordae, papillary muscles, avulsion or detachment of the valve leaflets, or complete valve destruction [2]. As the position of right ventricle in the chest is just behind the sternum, it has a predisposition for an anteroposterior compression type of injury. An increase in hydrostatic pressure results in an increase in intracardiac pressure. With this sudden increase in right ventricular intracavitary pressure during the end diastolic phase, when both the pulmonary and tricuspid valves are closed, a force is generated in the valvular and subvalvular apparatus [3]. Any violent compression of the heart during this period can cause rupture of the leaflet, chordae tendineae or papillary muscle leading to insufficiency [2].

Management of traumatic tricuspid regurgitation includes surgery – its timing and type of operation. The timing of operation depends on the clinical situation. Valve repair is naturally the first choice but valve replacement may be required if the valve is severely damaged. Valve repair is vital and better than replacement, especially in tricuspid position and for children and adolescents in whom further growth is expected [4]. Early repair of tricuspid valve will prevent right ventricular dysfunction and also reduce right atrial dilatation, thereby maintaining or restoring sinus rhythm.

In the case if partial avulsion of leaflets occurs as in our case, it is preferable to reattach the torn leaflet in situ. Annuloplasty is necessary either using a ring or DeVega's so that it can correct annular dilatation, increase leaflet coaptation by decreasing the dimension of the annulus, reduce tension on suture lines, and prevent future annular dilatation [5].

References

1. Chirillo F, Totis O, Cavarzerani A, Bruni A, Farnia A, et al. (1996) Usefulness of transthoracic and transoesophageal echocardiography in recognition and management of cardiovascular injuries after blunt chest trauma. *Heart* 75: 301-306.
2. Jahnke EJ Jr, Nelson WP, Aaby GV, FitzGibbon GM (1967) Tricuspid insufficiency. The result of nonpenetrating cardiac trauma. *Arch Surg* 95: 880-886.
3. Banning AP, Durrani A, Pillai R (1997) Rupture of the atrial septum and tricuspid valve after blunt chest trauma. *Ann Thorac Surg* 64: 240-242.
4. Bertrand S, Laquay N, El Rassi I, Vouhé P (1999) Tricuspid insufficiency after blunt chest trauma in a nine-year-old child. *Eur J Cardiothorac Surg* 16: 587-589.
5. Carpentier A, Deloche A, Dauplain J, Soyer R, Blondeau P, et al. (1971) A new reconstructive operation for correction of mitral and tricuspid insufficiency. *J Thorac Cardiovasc Surg* 61: 1-13.