



MINIMALLY INVASIVE REPAIR OF SEVERE ISOLATED TRICUSPID REGURGITATION AND MASSIVELY ENLARGED RIGHT ATRIUM.

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ABSTRACT

Untreated, severe tricuspid regurgitation is catastrophic. Existing literature describes tricuspid regurgitation treatment options. However, long-term research on which technique to use when and under what circumstances is rare. This report describes the etiology, structural, and functional aspects of isolated severe tricuspid regurgitation in our 14-year-old female patient, and we also discuss the successful TV repair and right atrial reduction through a mini-thoracotomy.

KEYWORDS : Isolated Tricuspid Regurgitation, Minimally Invasive Tricuspid repair, Dilated Right Atrium.

INTRODUCTION

Isolated Tricuspid Regurgitation is being increasingly recognized as a separate entity. The patients are mainly older patients with associated atrial fibrillation [1]. Severe tricuspid regurgitation has been associated with poor outcomes if left untreated [2]. We describe a young patient with isolated severe tricuspid regurgitation who was treated with tricuspid valve repair through a right mini-thoracotomy.

Case Report

A 14-year-old girl was evaluated for worsening dyspnea with exercise over the last 6 months. She had also been diagnosed with ascites and hepatomegaly when she was evaluated for Amenorrhea. She had also been diagnosed with hypothyroidism. On examination, she had the physical features of Turner's syndrome. Her blood pressure was 140/90 mmHg, HR -110/min, with a hyperdynamic pulse. Her Jugular vein Pressure was elevated. She had a webbed neck, short stature, and a shield-like chest. A cardiovascular examination showed a pan systolic murmur in the tricuspid region. All other systems were normal on examination. Her ECG revealed 'P Pulmonale' and Right Atrial Enlargement. Echo showed Severe tricuspid Regurgitation with a central jet; the tricuspid annulus was 42mm; Right ventricular function was adequate; the right atrium was massively dilated and measured 7.2 x 7 cm (fig. 1). Cardiac MRI showed a massively dilated Right atrium measuring 8.4 cm by 9 cm in dimension, a BSA-indexed volume of 218 ml/M2 ml, severe tricuspid regurgitation, and preserved Right ventricular function (Fig. 2a). It was decided that it would be prudent to repair the tricuspid valve and do the right atrial reduction. She was operated on through a Right anterior mini-thoracotomy (6cm, infra mammary) (Fig. 3). Inferior Vena Cava and Femoral Artery Cannulation was done through the right inguinal region. The superior vena cava cannulation was done through the mini-thoracotomy. The inferior vena cava and Superior vena cava were snared and snugged. The Right atrium was opened, and tricuspid valve ring sizing was done using the anterior tricuspid leaflet. The leaflets were found to be normal. The annuloplasty was done using a 32-mm Medtronic contour ring (Medtronic Inc., 710 Medtronic Parkway, Minneapolis). The valve was tested using saline, and good coaptation was noted. The right atrium was plicated using 4-0 prolene along its free wall. During surgery, a transesophageal echo showed that there was no regurgitation, the valve leaflets were closing properly, and the RA dimension had decreased significantly. (fig 2b) The patient had an uneventful recovery and was discharged on the third postoperative day.



Figure 1: Massively dilated RA

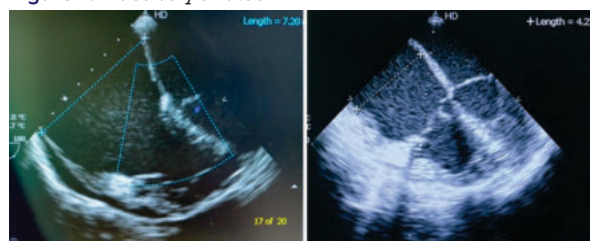


Figure 2(a)

Figure 2(b)

Figure 2: Measurement of RA a) Pre-operative b) Post-operative

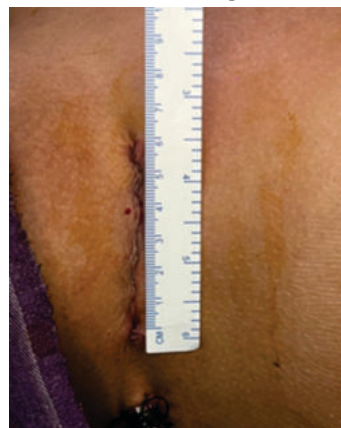


Fig 3. Right Mini Thoracotomy

DISCUSSION:

Tricuspid regurgitation (TR) can be classified as primary, secondary, and isolated TR. Secondary TR is defined as regurgitation occurring secondary to PAH. Isolated TR has normal RV and PA pressures and is frequently associated with Atrial Fibrillation. Our patient was young and had no AF or PAH. The negative impact of severe TR has been established with both primary and secondary TR. Isolated TR is likely to have a similar impact on survival^[2]. Isolated TR is associated with a poor prognosis, high mortality rates, and a 10-year survival rate of only 65%. The increasing severity of TR was associated with higher mortality and congestive heart failure^[3]. Patients with severe TR usually present with features of elevated central venous pressure and symptoms of right heart failure. Traditionally, repair or replacement has been the priority of management. Isolated TV surgeries are relatively rare, probably due to the higher mortality rates^[4]. Tricuspid valve interventions are underused and often applied when it is too late. Surgery is recommended in severe TR when the patient is symptomatic and in some patients with declining RV function even if they are asymptomatic. They have also recommended the liberal use of TV repair in secondary regurgitation. However, there are no recommendations for Isolated TR^[5]. Early surgical intervention may be protective and reduce mortality and morbidity. Minimally invasive Tricuspid repair has been shown to be feasible and safe, with several advantages over conventional sternotomy^[6]. Massive enlargement of the right atrium predisposes the patient to arrhythmia, airway obstruction, thromboembolism, and heart failure [7] and should be addressed at the time of TV repair. Our patient underwent successful TV repair and right atrial reduction through a Mini thoracotomy. There are several new percutaneous therapies being developed that may soon be an alternative to surgery for patients who are too high risk for surgical repair [8].

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REFERENCES

1. Prihadi EA, Delgado V, Leon MB, et al. Morphologic Types of Tricuspid Regurgitation: Characteristics and Prognostic Implications. *JACC Cardiovascular Imaging*. 2019 Mar;12(3):491-499.
2. Hahn RT, Predicting Outcomes for Isolated Tricuspid Regurgitation, Multimodality Imaging and Clinical Assessment, *Circulation: Cardiovascular Imaging*. 2021;14 Page e013349
3. Topilsky Y, Nkomo TV, Vaturi O, et al. Clinical Outcome of Isolated Tricuspid Regurgitation, *JACC: Cardiovascular Imaging*, Dec 2014(7), :1185-1194
4. Fender EA, Zack CJ, Nishimura RA. Isolated tricuspid regurgitation: outcomes and therapeutic interventions. *Heart*. 2018 May 1;104(10):798-806.
5. Vahanian A, Beyersdorf F, Praz F et al., 2021 ESC/EACTS Guidelines for the management of valvular heart disease: Developed by the Task Force for the management of valvular heart disease of the European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS), *European Heart Journal*, Volume 43, Issue 7, 14 February 2022, Pages 561–632
6. Abdelbar A, Kenawy A, Zacharias J. Minimally invasive tricuspid valve surgery. *J Thorac Dis*. 2021 Mar;13(3):1982-1992.
7. Zhang J, Zhang L, He Lin et al. Clinical Presentation, Diagnosis, and Management of Idiopathic Enlargement of the Right Atrium: An Analysis Based on Systematic Review of 153 Reported Cases, *Cardiology* (2021) 146 (1): 88–97.

8. Ascione G, Del Forno B, Carino D, et al , Treatment of isolated tricuspid regurgitation in 2020: an update. *Fac Rev*. 2020 Dec 21;9:26.