Late-onset severe post-traumatic tricuspid regurgitation

Insuffisance tricuspidienne post-traumatique sévère d'apparition tardive

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Summary

Traumatic tricuspid valve rupture is a rare yet serious complication of blunt chest trauma.

We describe the case of a 30-year-old man with a history of blunt chest trauma eight years prior, who presented with a holosystolic murmur. Echocardiography revealed severe tricuspid regurgitation with prolapse and flail of the anterior and posterior leaflets, leading to severe dilation of the right heart chambers. The patient underwent successful surgical repair.

This case highlights the importance of considering a remote history of chest trauma in the etiology of severe tricuspid regurgitation. Timely surgical repair can lead to an excellent prognosis and prevention of right ventricular failure.

Keywords

Trauma; Blunt cardiac injury; Tricuspid valve injury; Echocardiography; tricuspid regurgitation.

Résumé

La rupture traumatique de la valve tricuspide est une complication rare mais grave des traumatismes thoraciques contondants.

Nous décrivons le cas d'un homme de 30 ans ayant des antécédents de traumatisme thoracique contondant survenu huit ans auparavant, qui s'est présenté avec un souffle holosystolique. L'échocardiographie a révélé une insuffisance tricuspide sévère avec un prolapsus et flail des feuillets antérieur et postérieur, entraînant une dilatation sévère des cavités cardiaques droites. Le patient a subi avec succès une réparation chirurgicale.

Ce cas souligne l'importance de considérer des antécédents lointains de traumatisme thoracique dans l'étiologie d'une insuffisance tricuspide sévère. Une réparation chirurgicale opportune peut conduire à un excellent pronostic et prévenir la défaillance du ventricule droit.

Mots-clés

Traumatisme ; Lésion cardiaque contondante ; Lésion de la valve tricuspide; Échocardiographie; régurgitation tricuspide.

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INTRODUCTION

Traumatic tricuspid insufficiency is a rare but increasingly recognized complication of blunt chest trauma. It typically results from chordae rupture, papillary muscle avulsion, or leaflet tear due to sudden chest compression during late diastole or early systole [1,2]. Often asymptomatic, the condition may go undiagnosed for years because of low right heart pressures [3]. The wider use of transthoracic echocardiography (TTE) has led to more frequent and earlier detection [4]. Surgery is generally recommended in symptomatic or severe cases to prevent right ventricular dysfunction [5]. We report a case of severe tricuspid regurgitation diagnosed 8 years after blunt trauma.

CASE REPORT

We present the case of a 30-year-old male referred for evaluation of a newly detected systolic murmur. His past medical history was unremarkable, with the sole exception of a blunt chest trauma sustained eight years prior in a car accident.

Upon physical examination, the patient was hemodynamically stable (heart rate 70 bpm, blood pressure 110/70 mmHg). The predominant finding was a grade 3/6 holosystolic murmur, distinctly localized to the fourth intercostal space at the left sternal border, which intensified with inspiration, a classic sign of tricuspid valve involvement. Notably, there were no advanced signs of right heart failure, such as elevated jugular venous pressure, peripheral edema, or hepatomegaly, indicating a relatively preserved clinical tolerance despite the likely severity of the lesion.

The electrocardiogram revealed sinus rhythm with an incomplete right bundle branch block. A chest X-ray demonstrated an overall enlarged cardiac silhouette, suggestive of cardiomegaly.

Two-dimensional transthoracic echocardiography (2D-TTE) was revealing prolapse of the tricuspid valve leaflets into the right atrium. Critically, both the posterior and anterior leaflets appeared flail resulting in a major coaptation defect and severe tricuspid regurgitation (figures 1, 2 and3). Consequently, both the right atrium and right ventricle were severely dilated (figure1). The left ventricle and other cardiac valves were otherwise normal. The mechanism of this insufficiency was clearly attributed to a rupture of the tricuspid valve structures, a direct sequela of the prior blunt chest trauma.

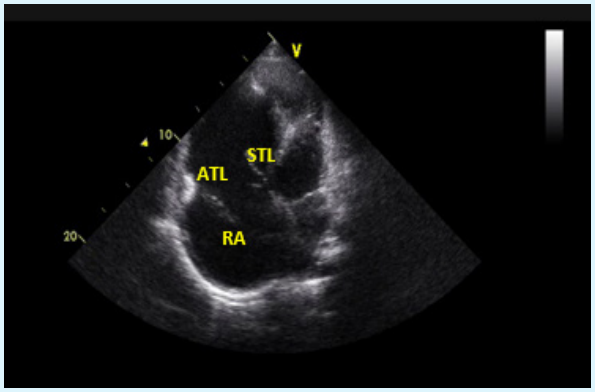

Figure 2 . Two dimensional transthoracic apical four-chamber view showed prolapse of the ATL and enlargement of the RA and right ventricle. (RA: right atrium; ATL: anterior tricuspid leaflet; STL: septal tricuspid leaflet.)

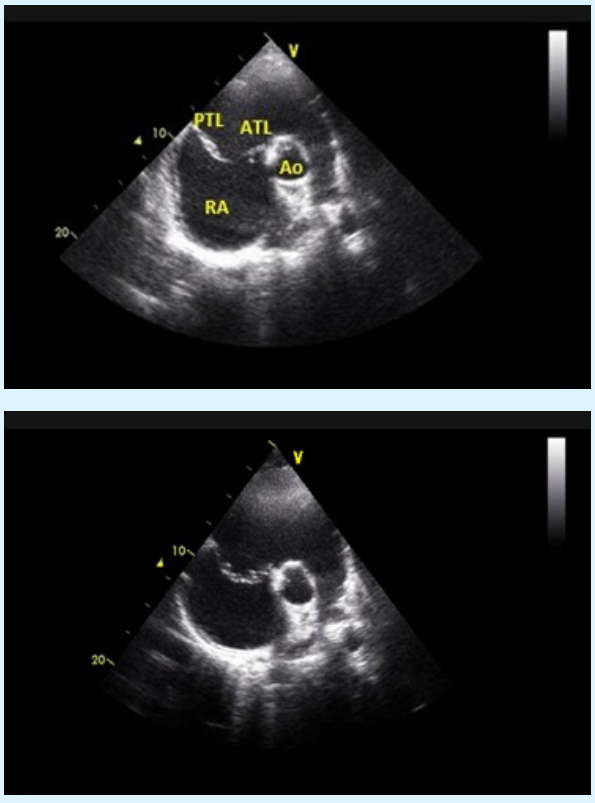

Figure 2 . Coroary Two-dimensional transthoracic parasternal short-axis view showed prolapse of the ATL and PTL of the tricuspid valves into the RA. (RA: right atrium; Ao: aorta; ATL: anterior tricuspid leaflet; PTL: posterior tricuspid leaflet)

Given these alarming echocardiographic findings, surgical repair of the tricuspid valve was planned as a semi-emergent procedure to prevent irreversible right ventricular failure.

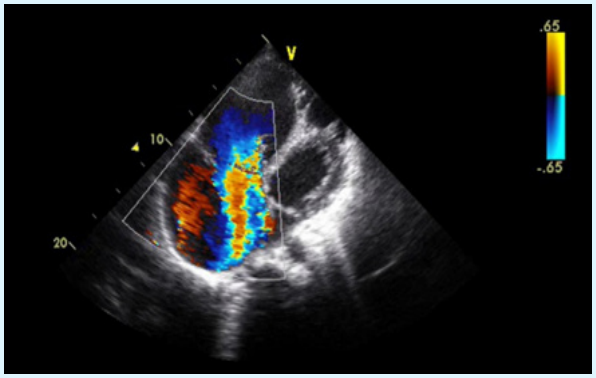

Figure 3 . Color flow Doppler in four-chamber view showed severe tricuspid regurgitation

The surgical intervention involved meticulous repair of the leaflets using polytetrafluoroethylene (PTFE) sutures to restore its competence, complemented by a tricuspid annuloplasty with an Edwards MC ring to stabilize the valve annulus. Post-operative echocardiography confirmed no residual tricuspid regurgitation and excellent leaflet apposition. The patient experienced an uncomplicated post-operative recovery, allowing for discharge after just six days.

DISCUSSION

Traumatic tricuspid regurgitation (TTR) is an infrequent consequence of blunt chest trauma, often resulting from high-energy deceleration injuries. The main mechanisms involve rupture of subvalvular structures, most commonly the chordae tendineae or papillary muscles [1,2].

Many patients remain asymptomatic for long periods, as the right side of the heart operates under low pressure, delaying the onset of symptoms or signs [3]. Consequently, TTR may be discovered incidentally, as in our case, years after the initial trauma. With the routine use of TTE in trauma protocols, early detection of such injuries is increasingly feasible [4,6].

When TTR is severe, surgical intervention is the treatment of choice, especially if symptoms develop or if there is evidence of right ventricular dilation or dysfunction [5,7]. Valve repair is preferred over replacement when anatomically feasible, as it preserves native valve function and is associated with better long-term outcomes [8,9].

Our patient benefited from timely surgical repair, including leaflet resuspension and ring annuloplasty. Current literature supports such an approach for durable restoration of valve competence and preservation of right ventricular function [9,10]. Transcatheter therapies for tricuspid valve disease are emerging but are currently limited to non-traumatic and high-risk surgical candidates [11].

CONCLUSION

This case highlights the importance of considering traumatic tricuspid regurgitation in patients with prior chest trauma even remote when a murmur or signs of right heart volume overload are present. Echocardiography remains the key diagnostic tool, and early surgical repair offers excellent outcomes in suitable patients.

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