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Severe traumatic tricuspid valvular insufficiency detected 28 years after blunt chest trauma – A case report

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ABSTRACT

INTRODUCTION: Tricuspid valvular insufficiency is a rare complication following blunt chest trauma. The prevalence of the condition may be underestimated due to subtle clinical symptoms.

PRESENTATION OF CASE: We report a case of tricuspid valvular insufficiency in a 44-year-old man detected 28 years after a high-energy moped-accident. Surgery was required, consisting of leaflet resuspension with an artificial chorda and a ring annuloplasty.

DISCUSSION: Tricuspid valvular insufficiency secondary to blunt chest trauma is sometimes first detected several years after the index event due to few symptoms. This may lead to a delay in treatment, and thus result in irreversible dilatation of the right-sided cavities.

CONCLUSION: Valve repair is preferable to valve replacement, since patients are typically young and active. Better surgical results and avoidance of late complications can be obtained if the patient is operated when still asymptomatic.

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1. Introduction

The incidence of blunt cardiac injury caused by trauma has been estimated at 0.26% [1]. Severe traumatic tricuspid valvular insufficiency after blunt chest trauma is rare with approximately 150 cases reported in the literature. Most of these cases are secondary to high velocity accidents with car accidents being the leading mechanism of injury [1]. The tricuspid valve is the most frequently affected valve following blunt chest trauma due to its anterior anatomical position between the sternum and the vertebrae [2]. Furthermore, the right side of the heart is not accustomed to sudden pressure changes, being a low-pressure system [2]. The pathological findings include chordal rupture, detachment and rupture of papillary muscles and laceration of valve leaflets [2]. The severity of the trauma does not necessarily correlate with the degree of valve injury [3], and even a mild chest trauma can cause a tricuspid valvular insufficiency. The condition is usually well-tolerated and can present up to 37 years after the trauma [1,6].

Here, we present a case of traumatic tricuspid valvular insufficiency in a 44-year-old man detected 28 years after a moped-accident.

The present work has been reported in line with the SCARE criteria [4].

2. Presentation of case

A 44-year-old man with no previous cardiac history was referred to our department of Cardiothoracic Surgery in Denmark due to atrial fibrillation and tricuspid valvular insufficiency. The patient had no symptoms except mild dyspnea. ECG showed incomplete right bundle branch block and echocardiography showed severe tricuspid valvular insufficiency with chordal rupture and grossly enlarged right-sided cavities (Fig. 1).

At the age of 16, the patient was involved in a high-energy moped-accident where he hit a truck and was found having respiratory arrest. Furthermore, he suffered from brain edema, fractures of his pelvis and severe lung contusion, the latter indicating a blunt chest trauma. At the time of the trauma, the patient had no symptoms of heart trauma, and heart stethoscopy was normal. No echocardiography was performed.

Intraoperatively, most chordal support to the septal part of the anterior leaflet was found to be lacking, causing the anterior leaflet to be retracted and prolapsing. Leaflet resuspension was performed using 5-0 GoreTex synthetic chordae and annulus was supported with a size 34-ring (mrk). In same séance, a modified MAZE IV-procedure was performed due to atrial fibrillation.

Postoperatively, echocardiography showed mild tricuspid valvular insufficiency (Fig. 2). The patient made an uneventful

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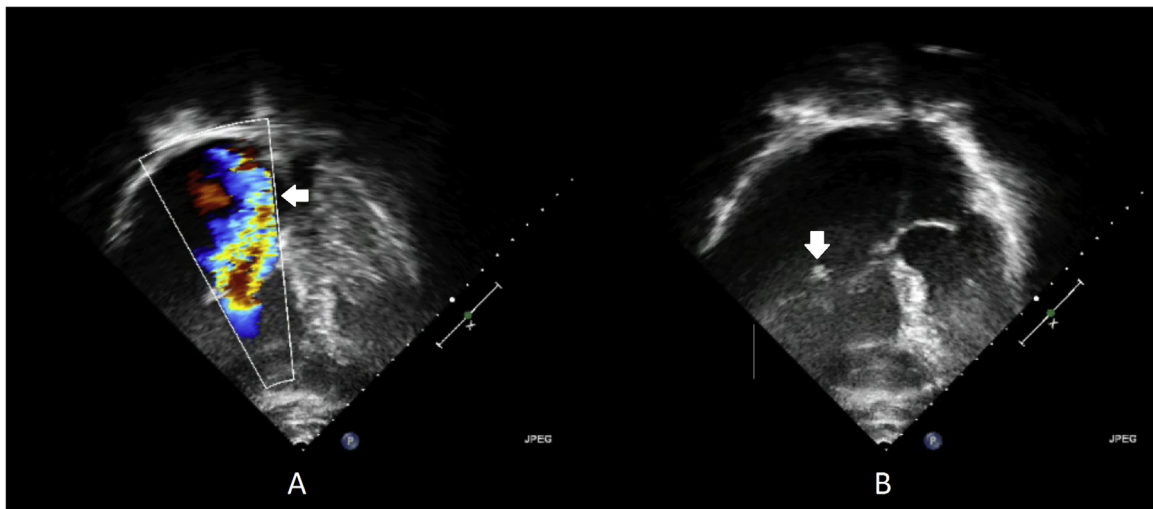


Fig. 1. A) Preoperative echocardiography with color Doppler showing severe tricuspid insufficiency (arrow); B) Preoperative echocardiography showing ruptured chordae tendineae (arrow).

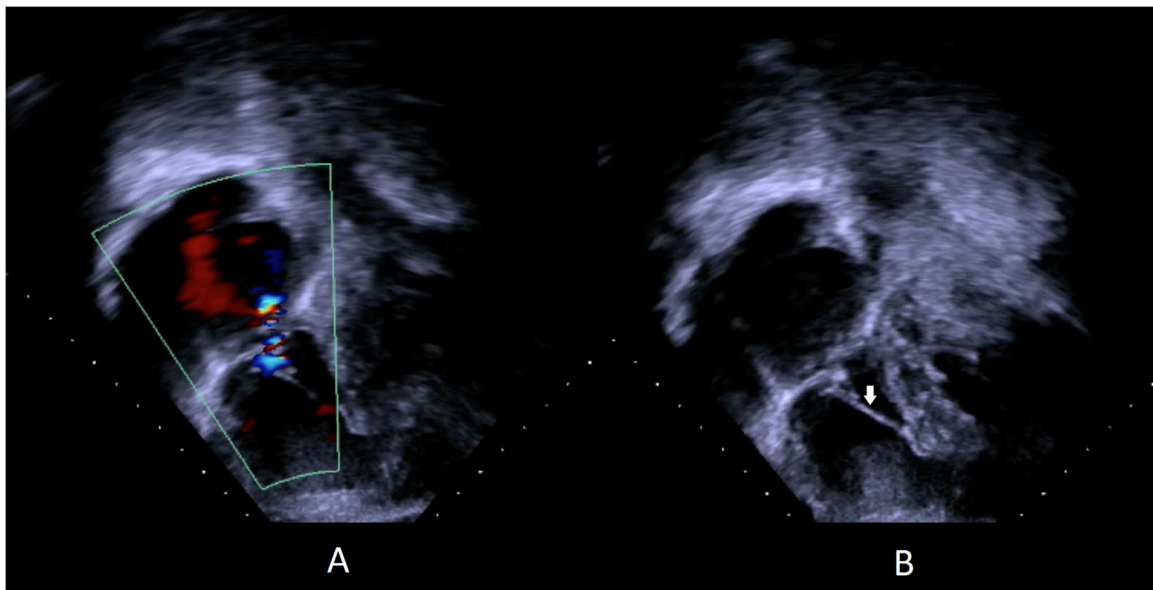


Fig. 2. A) Postoperative echocardiography showing the repaired tricuspid valve with mild tricuspid insufficiency with color Doppler; B) Postoperative echocardiography showing the synthetic chordae (arrow).

recovery and was discharged four days after surgery. Two years postoperatively the patient is doing well and echocardiography shows mild residual tricuspid insufficiency and almost normalized dimensions of the right ventricle.

3. Discussion

Tricuspid valvular insufficiency secondary to blunt chest trauma is often first detected several years after the index event due to few symptoms. This may lead to a delay in treatment, and thus result in irreversible dilatation of the right-sided cavities and atrial fibrillation, as seen in our patient. The most likely mechanism of traumatic tricuspid insufficiency is a “blow-out”-injury secondary to sudden impact during end-diastole. Furthermore, the right ventricle is vulnerable to injury due to its position behind the sternum and the sudden increase in intracardiac pressure after compression [5]. The indication for surgery in tricuspid valvular insufficiency is traditionally considered to be development of moderate-to-severe

right heart failure [6], but the high success rate of surgery and associated low mortality makes early surgical intervention attractive. It has been reported that the success rate of tricuspid valve repair decreases with prolonged interval between trauma and treatment, due to degeneration of the valvular apparatus, necessitating valve substitution [3]. Several surgical techniques have been proposed for traumatic tricuspid insufficiency, but due to a low number of cases reported in the literature, the experience is limited. In case of detachment and rupture of the papillary muscles, papillary muscle reimplantation to the right ventricular free wall with interposition of a 5-0 polytetrafluoroethylene (PTFE) suture or pledgeted 4-0 Prolene suture should be performed, if feasible. If the valve leaflets themselves are lacerated, one surgical technique is repair by autologous pericardial patch or direct suture of the valve laceration [7]. In our case of chordal rupture, it was possible to perform valve repair with an artificial chorda due to the tissue quality of the valvular apparatus despite the prolonged period between trauma and operation.

The right-sided cavities were severely dilated and therefore a downsizing annuloplasty was used in order to restore normal right ventricular size.

4. Conclusion

Traumatic tricuspid valvular insufficiency can present many years after a trauma due to subtle clinical symptoms, which may lead to a delay in treatment. Since patients with traumatic tricuspid insufficiency are generally young and active, valve repair is preferable to valve replacement, because of the limited durability and life-long anticoagulation associated with biological and mechanical valve prosthesis, respectively. Arguably, therefore it is important to perform surgery when the patient is still asymptomatic, in order to obtain the best surgical results and avoid the late complications associated with tricuspid valvular insufficiency.

Conflict of interest

No conflict of interest declared.

Funding

No funding was received for the study.

Ethical approval

Consent from the patient is sufficient and ethical approval is not needed in Denmark.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

All authors Dr. Smerup and Dr. Benhassen have taken part in conception of the study, drafting and revising the manuscript critically. All authors have given their final approval of the manuscript upon submission.

Registration of research studies

None.

Guarantor

Leila Louise Benhassen.
Morten Holdgaard Smerup.

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