Rare disease

Flail tricuspid valve secondary to blunt chest trauma

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Summary

A 78-year-old man admitted with complaints of breathlessness of 1 year and typical chest pain of 2 months duration. He had a blunt chest trauma 7 years back. Transthoracic echocardiography revealed severe tricuspid regurgitation due to a flail anterior leaflet of the tricuspid valve. It also revealed global left ventricular dysfunction. Flail tricuspid valve causing severe regurgitation is usually due to mechanical trauma. Since it is well tolerated for years, the diagnosis may be delayed or missed entirely. Echocardiography has allowed easier diagnosis of this condition resulting in earlier and, hence, more effective treatment.

BACKGROUND

Post-traumatic tricuspid insufficiency is a rare clinical entity that is mostly associated with traffic accidents causing non-penetrating chest wall injury. Here we report a patient with a flail tricuspid valve detected many years after blunt chest trauma.

CASE PRESENTATION

A 78-year-old man chronic smoker and alcoholic admitted with complaints of exertional breathlessness for 1 year and chest pain for 2 months. Chest pain was typical of angina. He did not have any history of systemic illness. However, 7 years back he had suffered a blunt chest trauma following road traffic accident. He was treated medically and since then he had remained well.

At admission the pulse rate was 90/min, blood pressure 100/70 mm Hg and respiratory rate 26/min. Physical examination revealed elevated jugular venous pressure with prominent V wave and Y descent, grade IV pansystolic murmur best heard at the fifth inter costal space along the left sternal border, which increases on inspiration and bilateral basal pulmonary crepitations.

INVESTIGATIONS

The ECG showed normal sinus rhythm with incomplete right bundle branch block and right-axis deviation. Routine investigations were normal. Cardiac enzymes were negative. Chest x-ray revealed cardiomegaly with right ventricular type of apex and dilated right atrium.

Figure 1 Two-dimensional apical four-chamber view showing dilated right atrium and ventricle with flail anterior tricuspid leaflet.

Video 1 Two-dimensional apical four-chamber view showing dilated right atrium and ventricle with flail anterior tricuspid leaflet.

Transthoracic echocardiogram showed dilated right atrium (dimension of 56×51 mm) and right ventricle (dimension of 30×80 mm). A flail anterior leaflet of tricuspid valve (figure 1, Videos 1–3) with Grade III tricuspid regurgitation was demonstrated (Video 4). Using the tricuspid regurgitation formula the systolic pulmonary arterial pressure was 45 mmHg (figure 2). Global left ventricular dysfunction without chamber dilatation (LVDD 5.3 cm) was also noted (figure 3). The ejection fraction calculated by Simpson's method was 37%. There was no abnormality in the valvular structures on the left side of the heart.

TREATMENT

It was concluded that the tricuspid valve had possibly become injured after the blunt chest trauma 7 years earlier. The cause for left ventricular dysfunction was thought to be of ischaemia secondary to coronary artery disease.

Patient was treated with antifailure medication and his general condition gradually improved. He was advised to undergo coronary angiogram to rule out coronary artery disease and repair surgery of tricuspid valve with chordae reconstruction and annuloplasty, but he opted against it and wished to continue medical therapy.

Video 2 Two-dimensional apical four-chamber view showing flail anterior tricuspid leaflet.

Video 3 Two-dimensional apical four-chamber view showing flail anterior tricuspid leaflet.

DISCUSSION

Post-traumatic tricuspid insufficiency is a rare clinical entity that is mostly associated with traffic accidents causing non-penetrating chest wall injury and can be identified years later.^{1–3} Its frequency is probably underestimated, because initial attention is usually placed on other organ injuries. The right ventricle is the most anterior part of the heart and immediately posterior to the sternum thus being vulnerable to blunt trauma. Acute elevation of right intraventricular pressure results in injury of the tricuspid valve apparatus. The most frequently reported mechanism of injury is chordal rupture, followed by rupture of the anterior papillary muscle and leaflet tear, primarily of the anterior leaflet.

The treatment for flail tricuspid valve is usually surgical, preferably valve repair.⁴ Although chordal rupture is associated with a more benign course extending from 10 to 25 years, papillary muscle rupture becomes symptomatic and requires operation, usually within weeks to months. According to the European⁵ and American guidelines,⁶ the indication for operation is symptomatic heart failure, with a class I and IIA recommendation respectively. However, when there are mild or no symptoms, even with right ventricular dysfunction, an operation is rather not recommended (class IIB and III recommendation, respectively).

Video 4 Two-dimensional apical four-chamber view with colour Doppler showing severe tricuspid regurgitation.

Figure 2 Continuous wave Doppler across tricuspid valve showing pressure gradient of 40 mm Hg.

Figure 3 M-mode echo showing left ventricular internal diameter (diastole—5.3 cm, systole—4.2 cm).

Learning points

- Our case highlights the clinically silent nature of the tricuspid valve injury secondary to blunt chest trauma.
- It also emphasises the importance of thorough clinical examination and routine echocardiographic evaluation of patients with blunt chest trauma.
- Early diagnosis could lead to early intervention and possible prevention of late complications.

Competing interests None.

Patient consent Obtained.

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