Right atrial tear associated with a tumour in the right atrium after blunt chest trauma

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Occult cardiac injury following blunt trauma is more common than generally suspected. Myocardial contusion is not rare, however, it is generally a benign disorder which often remains undiagnosed. We report a case of a right atrial rupture after blunt chest trauma causing a tamponade.

A 24-year-old man was involved in a violent car accident and he presented in a state of collapse. A multislice computed tomography indicated a pericardial effusion (Figure 1). A transthoracic echocardiography was performed and confirmed pericardial effusion which was hyperechoic (Figure 2, Movie 1). Concerns about a possible mass in the right atrium led to examination with transesophageal echocardiography (Figure 3, Movie 2) which revealed the presence of a voluminous mass in the right atrium. The patient successfully underwent cardiac surgery to remove the mass, identified as a blood clot, and to repair the atrial tear. The present case is of special interest because of the rarity of documented incidents of blunt chest trauma causing right atrial tear and illustrates the usefulness of transesophageal echocardiography in completing the diagnosis in the event of haemopericardium.

Introduction

Cardiac contusions are the most frequent type of cardiac trauma, but, as diagnostic criteria vary, their exact incidence is not known with certainty. Most patients presenting with myocardial contusion have been involved in car accidents. Although the majority of blunt heart injuries do not lead to severe clinical sequelae, life-threatening conditions such as arrhythmias and cardiac rupture may result. There are currently no formal guidelines to assist in diagnosis, which is generally based on electrocardiogram findings, cardiac biomarkers and transthoracic echocardiography.

We report a case of an isolated right atrial tear following blunt chest trauma associated with a thrombus in the right atrium that appeared similar to a cardiac tumour upon examination of transesophageal echocardiograms.

Case report

In May 2006, a healthy 24-year-old man with no medical history was involved in a violent road accident that resulted in him being ejected from his car. He was brought to the emergency department by ambulance within 30 min of the accident. Upon examination, he was classified 8 on the Glasgow coma scale with systolic blood pressure of 75/50 mmHg without vasoactive drugs. He was sedated and required endotracheal intubation.

 Twelve-lead ECG and a rhythm strip showed sinus rhythm without any abnormality. Heart rate was about 110 bpm. He had multiple rib and arm fractures. Multislice computed tomography indicated a pericardial effusion (Figure 1) and cerebral oedema without cerebral haemorrhage.

The patient’s haemodynamic findings were not encouraging and he required infusion of noradrenaline to stabilize his condition. Transthoracic echocardiography was performed and confirmed pericardial effusion (Figure 2, Movie 1), which was hyperechoic. There was no evidence of perforation of the cardiac chambers. Concerns about a possible mass in the right atrium led to examination with transesophageal echocardiography, which confirmed the presence of a mass in the right atrium near the superior vena cava. The mass was heterogeneous and was attached to the free wall of the right atrium. Presumptive diagnoses were as follows: a blood clot had formed around a right atrial tear, or a rupture of the right atrium with an undiagnosed tumour being a contributory factor (Figure 3, Movie 2).

The patient underwent a median sternotomy without cardiopulmonary bypass.

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A large amount of haemopericardium was evacuated and his haemodynamic status improved immediately. During repair of the cardiac injury, an isolated tear of the right atrium was found near the inferior vena cava. The mass in the right atrium, which was a blood clot, was removed with pliers. Part of the blood clot embolized in the pulmonary arteries. The tear was repaired with interrupted sutures.

After surgery, transthoracic echocardiography showed systolic pulmonary pressure to be 30 mmHg.

The patient recovered uneventfully and he was discharged 15 days after admission.

Discussion

Blunt chest trauma causing right atrial tear is rare and only a few cases have been reported in the literature. If there is a cardiac contusion, it usually involves the ventricles and the major arteries of the chest. However, as we report here for our patient, the right atrium may be affected.

Mechanisms of right atrial contusion secondary to blunt cardiac injury include direct myocardial compression by the sternum and indirect effects due to transfer of hydraulic pressure from the abdomen or extremities when compressed. Interestingly, in many of these patients, no significant external signs of thoracic trauma are noted.

Complications related to the right atrium may be peculiar and may remain undiagnosed by standard assessment methods, such as ECG and cardiac necrosis markers.

Some authors have implemented a screening strategy to identify patients at risk for cardiac complications. For patients with unstable haemodynamic status, as in the case of this patient, transthoracic echocardiography is advocated. The advantages of transthoracic echocardiography include its non-invasive nature and its ease of use at the bedside and in the emergency department.

However, when the transthoracic image is of poor quality, or if a doubt persists, we advise that transesophageal echocardiography be performed. Studies have shown that it gives a better assessment than transthoracic investigations, and that it is also safe. Two studies have reported no complications in 68 and 117 transesophageal echocardiography procedures, respectively, performed on severely injured trauma patients.

Conclusion

The present case is of special interest because of the unusual eliciting event and the rarity of the contusion site (right atrium). It is also the first reported observation of the concomitant presence of an atrial clot. If surgery is performed promptly, recovery is uneventful.

Supplementary material

Supplementary material associated with this article can be found in the online version.

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