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SHORT REPORT

Cardiac bullet embolus after thoracic vena cava penetrating injury causing tricuspid valve insufficiency

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KEYWORDS

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Introduction

Emboli of foreign bodies to the heart, although unusual, have been reported with increasing frequency since 1834 when Davis published the first case report of a bullet embolus.¹ Although bullets are one of the more common foreign body emboli to the heart and beyond, a cardiac ballistic embolus is a very rare situation.² In the literature very few reports were found, so far this is a unique case, because the patient had a very dangerous lesion which is the vena cava wound associated with a cardiac embolus causing tricuspid valve insufficiency.

Case report

A 25-year-old patient was admitted with a history of armed robbery, having been shot with a 38-

caliber revolver and presenting a gunshot wound in the right hemithorax. He entered the emergency room (ER) and physical examination revealed pervious airways with spontaneous breathing, stable hemodynamically, neurologically normal, with a penetrating injury above the right clavicle. No wound exit was noted. The PA and lateral chest X-ray showed a small hemothorax and a 38-mm special projectile (low velocity bullet) in the projection of the heart (Fig. 4) After that, a chest drain was placed and the patient suddenly developed a continuous bleeding via thoracostomy tube and was taken immediately to the operation room (OR) to be submitted to a right thoracotomy, which showed a hemothorax and a bullet entrance orifice in the superior vena cava. The bullet was not found and there was not an exit orifice for the projectile, the injury was treated with a 3-0 polypropylene running suture and closed thoracic drainage. Later, the patient was stabilized and immediately taken to the intensive care unit (ICU).

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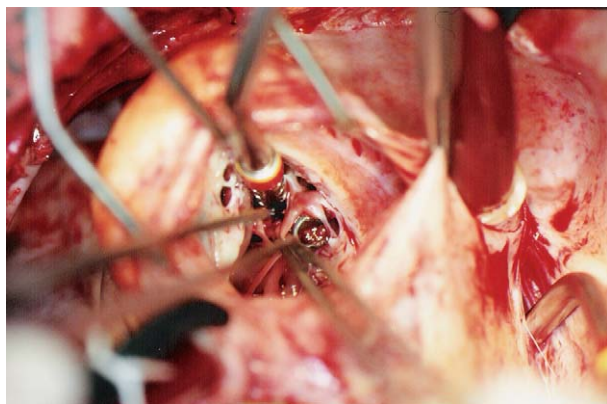


Figure 1 The 38 special bullet trapped in the chordae tendineae of the right ventricle, the uninjured tricuspid valve is also seen after the atriotomy with cardiopulmonary bypass.

After clinical improvement, the surgical and intensive care team looked for the projectile and the image of the bullet was found in the topography of the heart. The lateral chest X-ray showed a defocused bullet (characteristic of a cardiac embolus) so the team agreed that the bullet was moving because it was inside the cardiac chamber. A systolic murmur was also found, an echocardiography was preceded and the cardiologist found it normal; a radioscopy was done and the missile was found moving together with the heart so another echocardiogram was performed by the same cardiologist and at that time a tricuspid valve insufficiency and an image suggestive of a projectile inside the right ventricle were found. The surgical team discussed the possibility of percutaneous transvenous retrieval of the projectile, and the cardiothoracic team discarded this possibility because of the probable difficulty in assessing the bullet surrounded by the trabeculae of the right ventricle. The patient was prepared and submitted to a cardiac surgery; a median sternotomy with cardiopulmonary bypass and bicaval cannulation. A

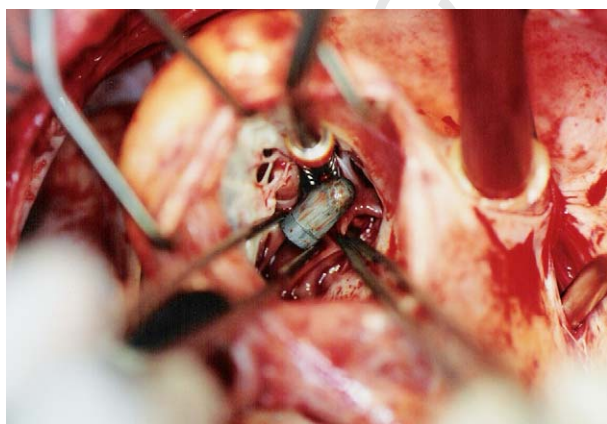


Figure 2 Retrieve of the projectile.

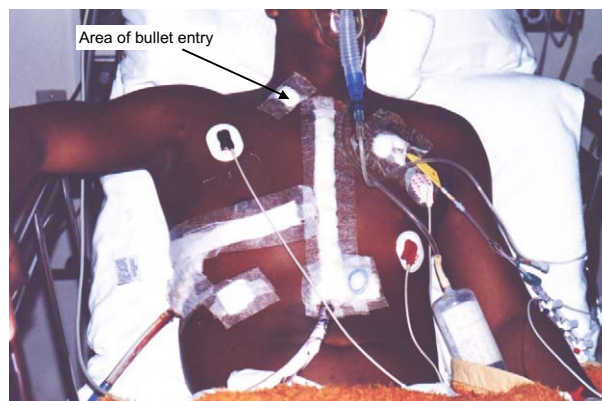


Figure 3 Patient at the ICU after the operation for the bullet retrieve.

right atriotomy incision was performed and the missile was successfully removed from the trabeculae of the right ventricle (Figs. 1 and 2). There was no evidence of injury to the internal structures of the heart. The postoperative course was without complications, and the patient was discharged on the 5th postoperative day (Fig. 3).

Discussion

The diagnosis of bullet emboli to the heart is usually not difficult when proper roentgenograms are obtained. The presence of a wound of entry, the lack of a wound of exit, and the absence of the bullet in the wounded part raise the index of suspicion.² It is important the attention while analyzing the Chest radiograph and observe the position of the projectile. If the bullet is blurred (defocused), it indicates the missile is moving together with the cardiac motion, and can lead to diagnose a cardiac embolus (Fig. 4A). Extremely critical patients requiring operative intervention prior to any X-Rays may have the diagnosis missed initially, but subsequent films will result in the discovery of the embolized missile,² as happened in this case. It is imperative to make an echocardiography to document bullet localization in the right ventricular cavity prior to surgical removal.³

The classical indications for the surgical removal of cardiac foreign bodies include preventing embolus of the foreign body to more dangerous sites, reducing the danger of bacterial endocarditis, preventing recurrent pericardial effusions, preventing erosion of cardiac wall and diminishing the incidence of myocardial damage.⁴ The presence of lead missiles in the cardiovascular system also may lead to lead toxicity (plumbism).⁵

Management of bullet embolization to heart can be treated conservatively in some patients. In this

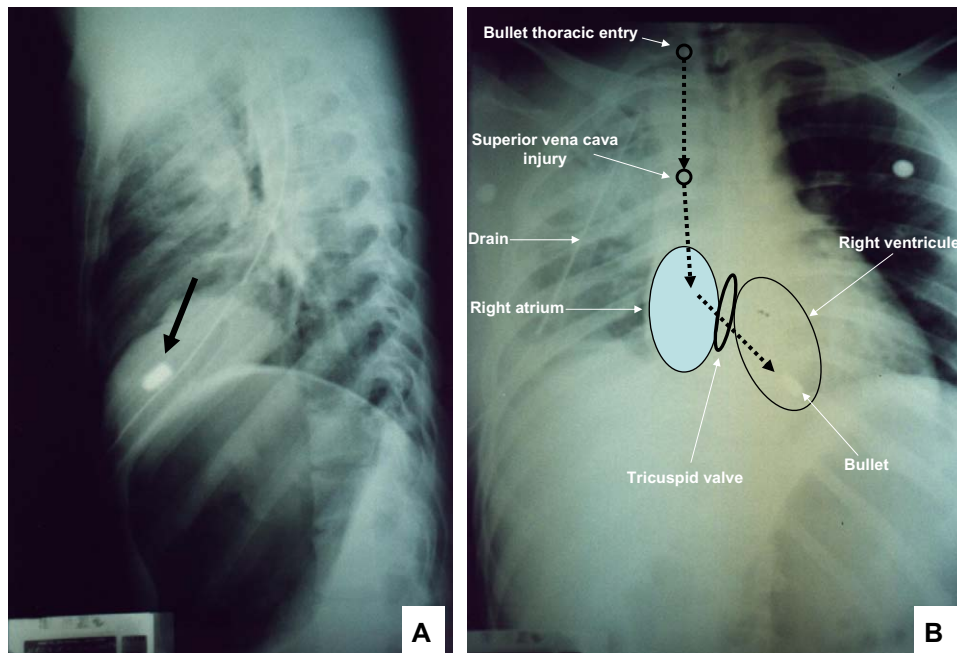


Figure 4 (A) Postero-anterior chest X-ray showing blurred bullet in the projection of the right ventricle. (B) Bullet trajectory.

case, we decided to retrieve the bullet due to the classical indications and because it was causing tricuspid insufficiency as shown by the echocardiogram (probably the bullet was pulling the chordae tendinae and causing this dysfunction). Missiles that are embedded in the subvalvar apparatus may require open excision to prevent systemic thromboembolism or chronic valvular dysfunction.⁶ Another issue to be considered is the possibility of the patient developing psychological problems related to the awareness that the bullet is inside the heart, causing "cardiac neurosis".⁷

There are in medical literature references of successful percutaneous retrieve of bullet embolus localized in the right ventricle, however, in our case this was not possible due to the probable difficulty in assessing the bullet surrounded by the trabeculae of the right ventricle and due to the indication of mandatory retrieve previously cited.

We conclude that a superior vena cava injury due to gunshot wound associated with a cardiac embolus is a challenging injury and the specialized

evaluation and treatment are essential in these cases.

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