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CASE REPORT AND REVIEW

Gunshot Wound to the Box: A Threat even on a Stable Patient

Paula A Ferrada, Dan W Parrish

ABSTRACT

Context: Penetrating trauma to the thoracic cavity can result in immediate or delayed injuries to the heart. These injuries include among others contusion of the cardiac muscle, and laceration of the coronary arteries resulting on ischemia. Although, non-operative management is a tempting option on a stable patient; close monitoring is guaranteed after this type of injury regardless of the initial vital signs.

Case report: We describe a case of a gunshot wound on a stable patient that was found to have blunt cardiac injury by the bullet. In the previous workup the missile appeared not to be penetrating the cardiac structures.

Conclusion: Awareness of this rare injury may provide a more rapid diagnosis, thereby preventing potentially catastrophic outcomes.

Keywords: Cardiac wounds, Pericardial tamponade, Cardiac box.

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RESUMEN

Contexto: el trauma penetrante en la cavidad torácica puede resultar en lesiones inmediatas onde presentación tardía en el corazón. Estas lesiones incluyen entre otras: contusión del músculo cardiaco, y laceraciones de las arterias coronarias resultando en isquemia. A pesar de que una cirugía inmediata no es una opción tentadora en un paciente estable, una exhaustiva vigilancia está garantizada después de este tipo de lesiones, independientemente de los signos vitales iniciales.

Caso clínico: Presentamos un caso de una herida de bala en un paciente estable, que posteriormente causo contusión del músculo causando arritmias. En el estudio diagnóstico previo que el misil no parecía estar penetrando las estructuras cardíacas o el pericardio.

Conclusión: El conocimiento de esta rara lesión puede proporcionar un diagnóstico más rápido, evitando así que los resultados potencialmente catastróficos.

Palabras clave: Taponamiento pericárdico, Cardiaco caja.

CASE REPORT

This is a case of a 33-year-old male who suffered a single gunshot wound (GSW) to the anterior chest. The patient arrived to the trauma bay with normal vital signs. (Vital signs at arrival were: Heart rate, 89; blood pressure, 132/83; respiratory rate of 21 SaO_2 100% in room air).

The primary and secondary survey was negative for any findings other than excruciating pain at palpation of the sternum. Chest X-ray in the trauma bay revealed no injuries. The focused assessment with sonography for trauma (FAST) exam was performed to rule out pericardial fluid associated with this trauma. There was difficulty in the visualization of the heart via subxyphoid window, secondary to pain and to shadowing produced by a metallic object presumed to be the bullet.

A limited echocardiogram was carried out which showed normal function, a full inferior vena cava and again shadowing secondary to the bullet. He had minimal amount of pericardial fluid.

A computer tomographic (CT) scan was obtained (Fig. 1). CT showed the location of the bullet to be close to the right ventricle, minimal pericardial effusion, shadowing effect, uncertain penetration to the pericardium.

The clinical decision of bringing the patient to the operating room was taken; with the operative plan of performing a midline sternotomy, since if the bullet had penetrated the ventricle we will have uncontrolled hemorrhage by performing only a pericardial window.

While the patient waited in the preoperative area he started complaining of chest pain, with episodes of supra-ventricular tachycardia at a heart rate of 160's beats per minute. Electrocardiogram showed no ST changes, cardiac enzymes were within the normal limits.

Upon entrance to the pericardium 20 cc of bloody fluid was evacuated. The right ventricle appeared bruised, the bullet was found to penetrate the pericardium and cause the

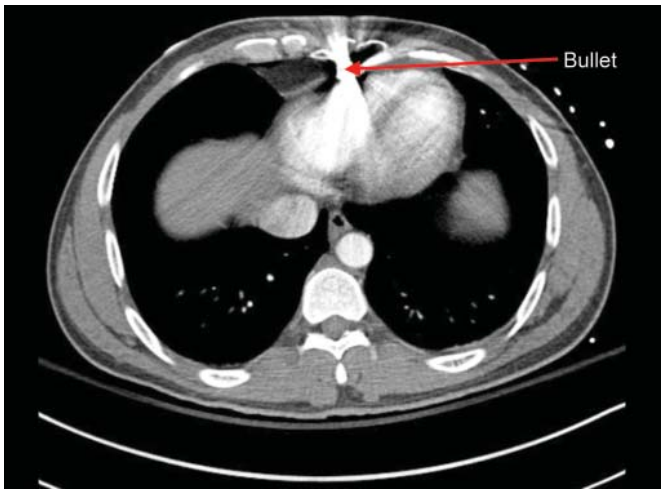

Fig. 1: The bullet close to the right ventricle with scattering effect

bruising to the heart (Fig. 2). During heart beat the tip of the bullet was rubbing the right ventricular wall, aggravating the bruising of the cardiac muscle and possibly causing the arrhythmias.

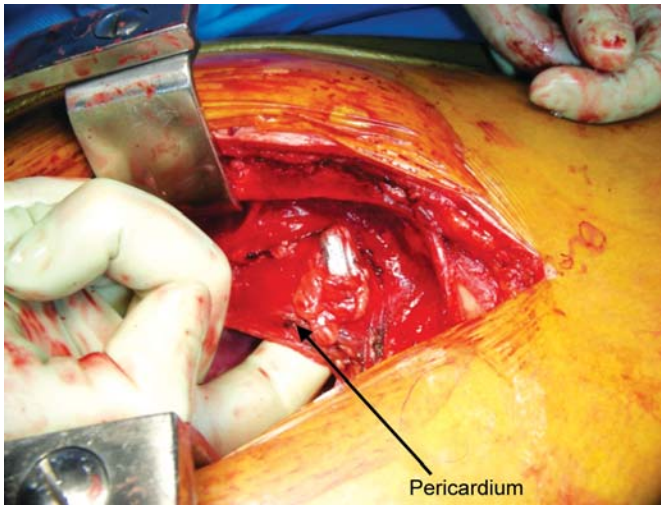

Fig. 2: The bullet penetrating the pericardium

The patient did well after the operating room and left home postoperative day 3.

Because of its anatomic location in the chest the right ventricle is the cardiac structure more commonly injured after penetrating trauma.[1] The coronary arteries rest superficially to the muscle in the heart, making these vessels especially susceptible to injuries by intimal tearing, laceration or thrombosis, even after minor blunt trauma.[2] Unrecognized injuries to the coronaries can result in myocardial infarction, even remote to the initial injury.[2]

FAST is a very sensitive test to evaluate for cardiac injury, however it is operator dependent, and it may be false negative if the defect in the pericardium is such that allows for the blood to be drained to the thoracic cavity.[3] Limited echocardiogram is a useful tool since it can evaluate the heart in four different windows and can provide with additional anatomic information, however has similar limitations to the FAST.[4]

In this particular case, surgical exploration was the only diagnostic method to evaluate with certainty the extent of this particular injury, as well as providing with the opportunity to remove the foreign object that was macerating the heart each time the heart touched the bullet. If left untreated this injury could have resulted in further injury to the heart muscle and complications, such as arrhythmias, possible muscle necrosis and perforation or aneurysm dilation of the ventricle.

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ABOUT THE AUTHORS

Paula A Ferrada (Corresponding Author)

Assistant Professor, Department of Surgery, Virginia Commonwealth University, VCU Health System, West Hospital 15th Floor East, 1200 E Broad Street, PO Box 980454, Richmond VA 23298, Richmond, Virginia, USA, Phone: 804-827-1207, Pager: 804-373-0237, e-mail: pfanand@gmail.com

Dan W Parrish

Surgical Resident, Department of Surgery, Virginia Commonwealth University, Virginia, USA