Asymptomatic Gunshot Wound to the Heart With Retained Intracardiac Pellet

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A 20-year-old man was transferred to our institution with multiple penetrating thoracoabdominal wounds from a shotgun. Imaging revealed several retained shotgun pellets, 1 of which appeared to be located in the left atrium. He was asymptomatic from a cardiac standpoint and was first taken to the operating room to manage his multiple abdominal injuries. Neither an intraoperative echocardiogram nor a formal postoperative echocardiogram definitively determined pellet location (myocardium versus chamber). Because of concerns for pellet embolus from left atrial positioning, the patient was returned to the operating room. After placing the patient on cardiopulmonary bypass, the pellet was identified within the wall of the left atrium and was successfully removed without complication.

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Penetrating cardiac trauma is largely fatal, with more than half of patients dying in the field, and another quarter dead on arrival to the hospital. Retained intracardiac missiles are rare, with only 322 cases reported in the literature from 1940 to 2009 [1]. We present a patient who sustained multiple penetrating thoracoabdominal wounds, including an asymptomatic penetrating wound to the heart with a retained intracardiac bullet.

A 20-year-old man with a medical history significant for schizophrenia was shot with a shotgun before being evaluated at his local hospital. He remained hemodynamically stable with complaints only of abdominal and lower extremity pain. He underwent computed tomography of the chest, abdomen, and pelvis, which reportedly revealed multiple retained pellets in the abdomen and thorax. Our facility was called to transfer the patient for a higher level of care. The patient arrived approximately 3 hours after his injury, without the images of his previous scans, and was evaluated according to Advanced Trauma Life Support protocol.

On evaluation, he was hemodynamically stable with normal sinus rhythm on electrocardiography and normal blood pressure. On examination, he had penetrating wounds to the left posterior torso, the right upper abdominal quadrant, and the buttocks and bilateral lower extremities with findings consistent with peritonitis. A chest roentgenogram revealed foreign bodies overlying the cardiac silhouette, the left lateral chest, and the liver (Fig 1), without hemopneumothorax or mediastinal widening. Focused Assessment with Sonography in Trauma showed positive results for fluid around the liver and spleen and negative results for any pericardial effusion. At exploratory laparotomy, findings included a wound to the left liver lobe without active bleeding, 2 gastrotomies, two enterotomies, a stable left retroperitoneal hematoma, and an injury to the body of the pancreas without evidence of ductal injury. Intraoperative transesophageal echocardiography showed no wall motion abnormality or pericardial effusion, but the foreign body was poorly visualized. The decision was made to take the patient to recovery to undergo formal echocardiography to identify the location of the intracardiac pellet.

His outside computed tomographic images had arrived at our facility by then and revealed a pellet in the left atrium with a possible tract through the left lung; however, the artifact from the pellet made exact localization difficult (Fig 2). Transthoracic and transesophageal echocardiography were performed and both revealed normal ventricular and valvular function without pericardial effusion, as well as a mass lodged between the left atrial appendage and the insertion of the posterior mitral leaflet. Neither was diagnostic for foreign body location within the atrial cavity itself.

The patient was then taken to the operating room and placed on cardiopulmonary bypass. There was no hemopericardium, and on exposing the posterior surface of the left ventricle, an entry wound through the posterior pericardium was identified. There was an entry wound to the posterior left ventricle approximately 1 cm from the atrioventricular groove. The left atrium was opened and the pellet was identified buried beneath the endocardium of the posterior left atrial wall. This was incised, the pellet was removed, and the wounds were repaired. There was no injury to the mitral valve, and after repair the patient was taken off of cardiopulmonary bypass without difficulty. He recovered without complication from his cardiac injury but ultimately remained in the hospital for longer than 3 weeks because of complications related to his pancreatic injury.

Comment

Patients presenting with retained cardiac missiles are rare in the reported literature. Those presenting acutely and without symptoms are extremely uncommon. Suggested guidelines for management recommend individualizing treatment based on timing of presentation, accompanying symptoms, and characteristics of the foreign body, including location. Localization of the retained missile is important in guiding treatment, and the most common modalities currently used include computed tomography and echocardiography. Although

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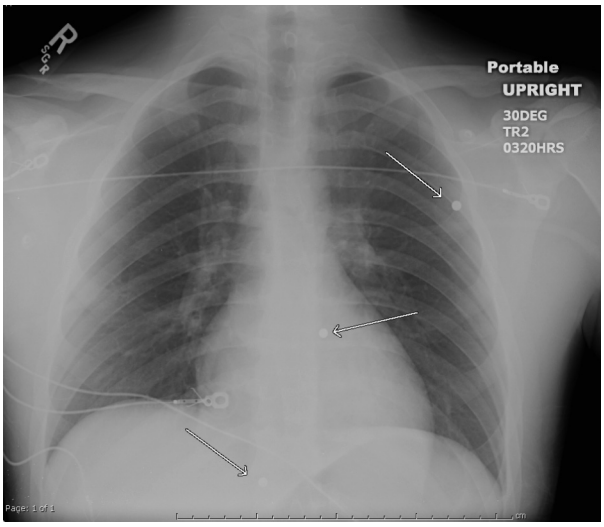

Fig 1. Chest roentgenogram reveals multiple foreign bodies (arrows), including the pellet overlying the cardiac silhouette. There is no notable hemopneumothorax or widened mediastinum.

2-dimensional echocardiography has been reported to be the most accurate method for localization [1, 4], this case highlights that even with the improvements in echocardiography, including intraoperative transesophageal echocardiography, the exact location of a foreign body may still be difficult to ascertain. This has important implications for management, because left-sided intracavitary foreign bodies require removal, whereas completely intramyocardial foreign bodies may be managed conservatively [1–3].

Fig 2. An axial slice of his computed tomographic scan reveals significant artifact from a foreign body that appears to be at the junction of the left atrium and ventricle. There is no notable hemopericardium or hemothorax.

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