Acute pericarditis following gunshot wound to the chest

Adam Gutierrez, Benjamin Franklin, Kazuhide Matsushima

CASE PRESENTATION
A middle-aged patient who sustained a gunshot wound to the left chest was brought to our emergency department. On presentation, he was noted to have a single wound to the left upper chest and was hemodynamically stable. Focused assessment with sonography for trauma was negative for pericardial effusion. A chest CT was then obtained which showed a moderate amount of left hemothorax and a retained missile posterior to the heart (figure 1). A left chest tube was placed with approximately 300 mL of bloody output, but minimal thereafter. The patient was admitted to the surgical intensive care unit (SICU) for observation. A transthoracic echocardiogram (TTE) was obtained which showed no evidence of injury to the intracardiac structures and there was no pericardial effusion. The exact location of the retained missile was unclear on the TTE.

On the evening of hospital day 1, the patient developed new ST segment changes on telemetry monitoring. A formal ECG showed diffuse ST segment elevations (figure 2) and his troponin level was 0.75 ng/mL, consistent with acute pericarditis. He was asymptomatic and remained hemodynamically stable. He was started on non-steroidal anti-inflammatory drugs. On hospital day 3, he had persistently elevated troponin levels (0.69–0.76 ng/mL), a two-view chest X-ray demonstrated persistence of retained missile immediately posterior to the heart, and bedside ultrasound showed a new moderate-sized pericardial effusion (online supplemental video S1).

WHAT WOULD YOU DO?
A. Continue observation with serial troponin, ECG, and hemodynamic monitoring in the SICU.
B. Perform pericardiocentesis to drain the pericardial effusion.
C. Perform a median sternotomy to drain the pericardial effusion and explore the pericardial space for retained missile.
D. Perform a subxiphoid pericardial window to drain the pericardial effusion and explore the pericardial space for retained missile.

WHAT WE DID AND WHY
C. Perform a median sternotomy to drain the pericardial effusion and explore the pericardial space for retained missile.

The retained missile in the pericardium was the most likely cause of acute pericarditis and pericardial effusion given their onset soon after injury. It was less likely the missile was in the myocardium, as there was no motion artifact on the CT images. The patient was taken to the operating room and a median sternotomy was performed. Other operative approaches considered included a subxiphoid pericardial window and left anterolateral thoracotomy. Given the rapid accumulation of pericardial effusion, there was some concern about cardiac injury. We chose to perform a median sternotomy rather than alternate approaches to provide optimal exposure of the heart to rule out cardiac injury and repair if needed. There was a rush of serous straw-colored fluid upon opening the pericardium. There was no blood in the pericardium. The heart was gently elevated and a free metallic object was retrieved manually from just posterior to the heart within the pericardial sac (figure 3). The patient had an uneventful postoperative course and was discharged on postoperative day 6. Repeat ECG and TTE were obtained prior to discharge with resolution of diffuse ST segment elevations and pericardial effusion.

Pericarditis is a rare complication following gunshot wounds to the chest. Valle described 42 patients who developed pericarditis due to retained missiles in the pericardium during the Korean War. Of these, 10 patients were initially managed conservatively as their retained missiles were less than 0.5 cm in size. All 10 of these patients were...
The current case highlights a rare complication of gunshot wound to the left chest. The patient developed acute pericarditis from a retained missile in the pericardium and underwent a median sternotomy to retrieve the missile. Although multiple operative approaches can be considered, the decision will depend on the location of the retained missile and suspected presence of concomitant cardiac or other thoracic injuries. We advocate for a low threshold to remove intrapericardial retained missiles due to the high risk of adverse sequelae.

Contributors Study concept and design: AG, BF, KM. Data collection and analysis: AG, BF, KM. Writing: AG, KM. Critical revision: BF, KM.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; internally peer reviewed.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/.

ORCID iD Kazuhide Matsushima http://orcid.org/0000-0001-9625-5363

REFERENCES
5 Munoz CA, Quitian JS, Garcia A, Ordonez CA, Buchelli VR. Videothoracoscopic approach to the extraction of a cardiac retained missile. Trauma Case Rep 2021;33:1–4.