CASE REPORT

Nail to the heart: no big deal. A rare case of post-traumatic pericarditis

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SUMMARY

This is a unique case report of a 32-year-old man who presented with pneumatic nail gun injury to his right chest at work. He removed the nail and continued to work through the day. With continued chest pain, he presented to the emergency room and an echocardiogram revealed moderate-size pericardial effusion. He was managed conservatively as he was haemodynamically stable. Serial echocardiograms revealed slow resolution of the effusion over 3 days. At his 3-month follow-up appointment, there was complete resolution of his effusion. This case highlights the importance of obtaining imaging studies in penetrating chest wall injuries and utilisation of medications to prevent expected complications.

BACKGROUND

Penetrating injuries of the chest wall in the vicinity of the heart can be fatal. Identifying haemodynamic compromise is important to direct the management of patients

CASE PRESENTATION

A 32-year-old man with no significant medical history presented to the emergency room with symptoms of nausea and non-radiating, burning-type substernal chest pain with 7/10 intensity. The pain started 30 min prior to presentation. He reported a nail gun accidentally being discharged few hours before presentation while he was working as a framing carpenter. The nail had penetrated his right chest next to the right sternal border. He removed the nail, which he described as being 3.5 inches in length, and continued working until the end of the work day.

Examination was significant for puncture wound at the right sternal border in the right fourth intercostal space and pericardial friction rub over the precordium.

INVESTIGATIONS

Labs including troponin were negative. ECG revealed diffuse ST-segment elevation consistent with pericarditis ([figure 1](#)). Chest X-ray showed widened mediastinum. CT of the chest revealed

Figure 1 ECG showing diffuse ST elevation consistent with pericarditis.

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Figure 2 Transthoracic echocardiogram at initial encounter.

moderate pericardial effusion and no other injuries. Cardiology was consulted and an emergent transthoracic echocardiogram (TTE) was performed. It revealed a moderately dilated right ventricular cavity and moderate pericardial effusion, larger on the right ventricle free wall (figure 2). No tamponade physiology or evidence of haemodynamic compromise was identified.

DIFFERENTIAL DIAGNOSIS

As right ventricle is localised just behind the sternum in the right fourth intercostal space, initial differential diagnosis pointed towards exclusion of haemopericardium and cardiac tamponade. Haemopneumothorax could also be a complication of penetrating injury in this area. Involvement of other heart structures or great vessels was less likely. Clinical presentation of our patient was most consistent with post-traumatic pericarditis with pericardial effusion.

TREATMENT

The patient was started on 50mg three times a day of indomethacin to prevent Dressler's syndrome and was admitted to the intensive care unit (ICU) for continued management. Cardiothoracic surgery was also consulted, who agreed with conservative management with no tamponade physiology. Serial TTEs were performed, which revealed decreasing size of the pericardial effusion (figure 3). He was continuously

monitored in the ICU, with no haemodynamic compromise. He was discharged after 3 days on indomethacin to be taken for a month.

OUTCOME AND FOLLOW-UP

The patient had a follow-up appointment 3 months later, when a TTE was done showing complete resolution of his pericardial effusion.

DISCUSSION

Penetrating cardiac injuries can be fatal, with a reported mortality up to 25%.^{1,2} In this case, the injury was to the pericardium. Had it been a myocardial penetration, it could have led to catastrophic haemodynamic instability from massive haemopericardium and tamponade physiology, which is commonly seen in these patients.³ Management of haemodynamically stable patients with penetrating chest wall injury comprises a chest X-ray, TTE and CT chest to rule out injury to the heart or other mediastinal structures.⁴

Management of haemodynamically compromised patients warrants urgent pericardiocentesis or surgical intervention with median thoracotomy/sternotomy, relieving the tamponade physiology, and if required heart-lung support.⁵ Mediastinal surgery to repair added injuries should also be performed in such patients.⁶ Haemodynamic status determines the imaging study of choice. TTE and CT scan are the standard to reveal the extent of haemopericardium and cardiac injury.⁵ In patients with additional mediastinal injuries, TTE images may be compromised and transoesophageal echocardiograms provide a detailed insight into the physiology and pathology of the heart and neighbouring structures.⁷ Penetrating injuries of the right heart usually have lower mortality compared with those of the left heart as it is a low-pressure system.⁶ In our patient, he removed the offending agent and was still able to work the rest of the day. Serial echocardiograms had revealed decreasing pericardial effusion, which enabled us to manage the patient conservatively with good clinical outcome.

In summary, nail gun injuries have a broad spectrum of presentations depending on the organ involved and extent of the penetrating wound. Evaluation of the cardiac injury is warranted as it is usually fatal due to rapid haemodynamic compromise. Our patient is an uncommon case of post-traumatic pericardial effusion requiring no invasive intervention.

Figure 3 Serial echocardiograms at 12 hours (A), 24 hours (B) and 48 hours (C) after presentation.

Learning points

- Importance of obtaining imaging studies in penetrating chest wall trauma to exclude cardiac or other mediastinal injuries.
- Post-traumatic pericarditis as a cause of pericardial effusion following penetrating chest wall trauma.
- Conservative treatment with watchful observation as the mainstream therapy of post-traumatic pericardial effusion without tamponade physiology.
- Utilisation of non-steroidal anti-inflammatory medications to treat pericarditis.
- Dressler's syndrome as complication of heart and pericardial injury.

Contributors DMZ was a resident admitting the patient. YA was a resident participating in the patient's care during admission. VG was an attending cardiologist responsible for the patient's care during the hospitalisation. JKK was a cardiologist who followed up with the patient in a cardiology clinic.

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