Case report

Delayed management of penetrating cardiac injury – Less urgency, more options

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\textbf{A R T I C L E  I N F O}

Article history:
Accepted 25 March 2011

\textbf{1. Introduction}

Delayed presentation of cardiac injury presents the managing clinician with many dilemmas. As these presentations are relatively rare, there is no uniform investigative or treatment strategy. Here, we present, a 34 year old with haemopericardium and cardiac injury that arrived at our unit 48 hours post assault. We outline his management and review options for investigation and treatment.

\textbf{2. Case report}

A 34 year old male sustained a stab injury to his left parasternal edge at the 4th intercostal space. Following a delay of 48 h, he presented to his local secondary hospital. At the time of admission he had a blood pressure of 73/38 mmHg – no other clinical signs of cardiac tamponade – and this normalised with intravenous fluids. Basic x-rays were performed and computed tomography (CT) of his chest was undertaken. This demonstrated a haemopericardium with left sided haemothorax (Fig. 1).

Following, the patient was urgently transferred to our Level 1 Trauma Unit. On arrival, vitals were normal. Arterial blood gas results were pH 7.44, lactate 0.4 mmol/L and base excess –7.3 mmol/L. Electrocardiogram demonstrated T wave flattening at lead 3 and ST elevation at V3. Retrospective analysis of his chest X-rays from the secondary hospital revealed straightening of the left heart border, highly suspicious of haemopericardium. Thoracic echocardiography was also performed and confirmed pericardial effusion. Troponin was elevated at 1.1 μg/L.

The patient was taken to the operating theatre. A pericardial window was initially performed which demonstrated haemopericardium and this was immediately followed by midline sternotomy. A pericardial haematoma was evacuated and examination of the right ventricle demonstrated grade II injury with slow but constant bleeding. This was repaired with 3-0 Prolene. The patient was subsequently admitted to the intensive care unit and made an uneventful recovery with discharge to a step-down ward at day 3 post-procedure.

\textbf{3. Discussion}

The time delay between injury and definitive management in the aforementioned case brings into question several management paradigms for the patient that is stable with cardiac injury.

Firstly, in a stable patient what is the appropriate investigative process to include or exclude penetrating cardiac trauma? Burack et al. addressed the issue by performing a retrospective study analysing triage and outcomes in patients with penetrating mediastinal injury.\textsuperscript{1} They concluded that CT, in combination with transthoracic echocardiography had high negative predictive value and patients with negative results can be observed safely. However, if either is positive, further investigation or operative exploration is required. This is in line with our experience in Johannesburg. The role of troponin in the investigative workup for cardiac trauma is less clear-cut. Again, it has greater negative predictive value. Troponin is less useful when positive, as injury severity and physiological parameters can increase troponin levels even when no cardiac injury is present.\textsuperscript{3}

Secondly, is there a role for less invasive treatment? There is much debate on the issue. Some authors advocate that penetrating cardiac injury in a haemodynamically stable patient warrants sternotomy and exploration.\textsuperscript{2} However, an ongoing prospective study in Cape Town, South Africa, suggests that stable patients with haemopericardium can be safely managed with a subxyphoid pericardial window, obviating the need for sternotomy.\textsuperscript{4} In our unit, significant haemopericardium is managed via sternotomy and exploration.
4. Conclusion

In summary, presentation of delayed penetrating cardiac injury is rare, however purposeful clinical workup is required. For stable patients CT of the chest and transthoracic echocardiography can provide valuable insights. The role of troponin is less clear-cut. In terms of treatment strategy, delayed presentation of haemopericardium, albeit debatable, should be managed with definitive intent.

Fig. 1. (A) Transverse CT section at T7 demonstrating pericardial fluid with left sided haemothorax. (B) Haemopericardium on Coronal CT section. (C) Intraoperative image demonstrating right ventricle with grade II injury. Clot is visible with slow ventricular bleed (arrow and inset). (D) Intraoperative image of the right ventricle post prolene repair (magnified in inset).

References