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Case Report

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Successful Management of a Stab Wound to the Left Ventricle in a District Hospital

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Abstract

Penetrating cardiac injury is associated with high mortality rates. Profuse bleeding from the cardiac wound and cardiac tamponade are the usual cause of death. We report a 29-year-old man who attempted suicide by self-inflicting stab wound to the left chest with a knife, causing cardiac tamponade and left ventricular injury. The patient was diagnosed by chest point-of-care ultrasonography in the emergency department and operated successfully in a district hospital without cardiac surgery service.

Keywords: Wounds, Stab; Cardiac tamponade; Thoracotomy

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INTRODUCTION

Penetrating cardiac injuries are uncommon but remain as highly lethal conditions. Only 6-30% of the patients reach the hospital alive, and often, most arrive in haemodynamic instability.[1] In 1896, Rehn successfully repaired an actively bleeding wound over the right ventricle, marking the beginning of cardiac surgery and leading to a significant decrease in mortality from cardiac injuries.[2] In this case report, we aim to emphasise that prompt workup and immediate surgical intervention are crucial to achieve a positive outcome in treating patients with penetrating cardiac injuries.

CASE REPORT

A 29-year-old man presented to the emergency department with a penetrating cardiac injury due to self-stabbing. He complained of chest pain and shortness of breath. Clinically, his respiratory rate was 33 breaths per minute with blood pressure 76/58 mmHg, and heart

rate ranging 140-160 beats per minute. His jugular venous pressure was raised. There was a stab wound over the left anterior chest at the fourth intercostal space near the midclavicular line. Air entry was reduced over the left chest and there was a muffled heart sound. Chest x-ray showed left haemopneumothorax (**Figure 1**). Chest tube was inserted over the left chest and drained 600 ml of blood immediately post insertion. Bedside point-of-care ultrasound (POCUS) of the chest revealed a cardiac tamponade and left haemothorax. Electrocardiogram (ECG) showed decreased QRS voltage with electrical alternans. After resuscitation with a litre crystalloid solution and packed cell transfusion, the patient was transferred to the operating theatre for left anterolateral thoracotomy.

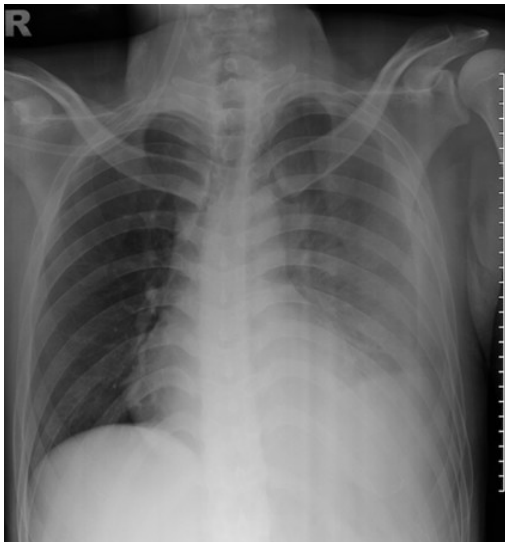

Figure 1: Chest x-ray with finding of left haemopneumothorax.

Upon entering the left hemithorax, there was a large amount of blood clots, and a puncture wound at the pericardium with active bleeding. The pericardium was opened and there was a 1.0 cm x 1.5 cm laceration wound over the base of the left ventricle (**Figure 2**). Mattress suture was done over the injured left ventricle. Post myocardial repair, the patient developed ventricular fibrillation which was reverted intraoperatively. There was no pulmonary structure nor left lung injury seen. A pericardial drain was placed postoperatively instead of fashioning a pericardial window. However, it was dislodged during the transfer to the intensive care unit. We kept a close monitoring for signs of pericardial tamponade, and fortunately the patient remained stable throughout. Repeated echocardiography revealed no pericardial recollection.

Postoperative day 4, he was extubated and transferred to the general ward. Further history from the patient and his family members revealed symptoms of major depressive disorder and auditory hallucination. He was referred to the psychiatric team for assessment and started on antidepressant and antipsychotic medications. He was subsequently discharged well from the hospital.

DISCUSSION

Based on a review of 1,198 cases of penetrating cardiac trauma, only 6% reached hospital alive.[3] This highlights that cardiac injury is associated with high mortality rates which requires urgent surgical intervention. Ideally, penetrating cardiac injuries should be managed in a tertiary hospital with cardiac surgery service and specialised postoperative care. However, attempting to transfer unstable patients to such facilities may pose an unacceptable risk – during the waiting and transfer periods. Given the high mortality rate, the delay associated with inter-hospital transfer can be fatal. In these emergency situations, especially in peripheral hospitals with no cardiovascular surgery unit, initial life-saving surgery may need to be performed by general surgeons. Prompt recognition and surgical access through thoracotomy can allow rapid control of haemorrhage and stabilise patients who might not survive transfer to a tertiary hospital.[4] However, this comes with a few limitations such as lack of specialised cardiac equipment needed for median sternotomy and unavailability of

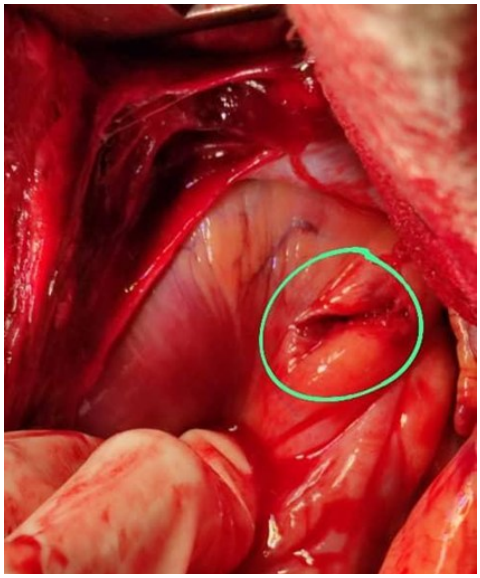

Figure 2: Intraoperative finding of laceration wound over the base of left ventricle upon opening up the pericardium (green circle).

onsite cardiopulmonary bypass facility. These limitations can impact both the surgical outcome and postoperative recovery.

Median sternotomy is the gold standard incision for cardiac surgery. It is widely used in emergency situations due to its rapid accessibility and offers excellent exposure of the great vessels. In peripheral hospitals with no specialised cardiac surgical equipment, such as a sternotomy saw, performing a median sternotomy can be challenging. In such cases, alternative approaches like left anterolateral thoracotomy may be considered as in our case. However, this alternative often provides suboptimal exposure and may complicate definitive repair. Therefore, when median sternotomy is technically feasible, it remains the preferred approach for cardiac injuries, provided that the surgical team is adequately trained and the necessary equipment is available.[5]

One of the most debated technical issues in emergency cardiac surgery is the choice between creation of pericardial window or placement of pericardial drain. A pericardial window allows for drainage and prevents accumulation of blood which can potentially cause cardiac tamponade. However, leaving a small pericardial window carries the fatal risk of cardiac herniation, and ventricular arrhythmias.[6] A large pericardial window should be created to ensure decompression and reduce the risk of cardiac herniation and strangulation. In contrast, a pericardial drain can be left in situ and provides continuous drainage.

Postoperative care following cardiac trauma is critical due to the risk of life-threatening complications such as pericardial effusion, cardiac arrhythmias, and myocardial dysfunction. Close monitoring in an intensive care setting with echographic surveillance is important to detect and manage these complications early.[7] In our patient, the main cause of penetrating cardiac injury was a suicidal attempt. Early involvement of psychiatric assessment and intervention are important in this case to address underlying psycho-social issues and to ensure long-term psychological support, reducing the risk of future self-harm.[8]

CONCLUSION

Penetrating cardiac injury is a life-threatening condition which requires prompt diagnosis and immediate surgical repair to ensure positive outcomes and survival. Successful surgical intervention is achievable by a general surgeon in a resource-limited setting.

Take Home Message

- Penetrating cardiac injuries are associated with high mortality rates.
- It remains a significant challenge in peripheral hospitals with limited resources.
- Prompt diagnosis and immediate surgical repair by general surgeons can be lifesaving and may offer the only chance of survival.

Abbreviations

ECG	Electrocardiography
POCUS	Point-of-care ultrasound

Declarations

Patient Consent

Patient consent has been obtained.

Disclosure and Conflict of Interest

The authors declare that they have no conflicts of interest and no financial disclosures relevant to this case report.

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None.

References

1.Zymantas J, Mindaugas B, Vytautas J, Gintaras K, Algis K, Arunas Z, et al. Cardiac Surgery Penetrating cardiac injuries: 28-year data analysis. Polish Journal of Thoracic and Cardiovascular Surgery. 2013;10:1–7.
2.Werner OJ, Sohns C, Popov AF, Haskamp J, Schmitto JD. Ludwig Rehn (1849-1930): the German surgeon who performed the worldwide first successful cardiac operation. J Med Biogr. 2012;20:32–4.
3.Campbell NC, Thomson SR, Muckart DJ, Meumann CM, Van Middelkoop I, Botha JB. Review of 1198 cases of penetrating cardiac trauma. Br J Surg. 1997;84:1737–40.
4.Ezzine SB, Bouassida M, Benali M, Ghannouchi M, Chebbi F, Sassi S, et al. Management of penetrating cardiac injuries in the Department of surgery, Mohamed Thahar Maamouri Hospital, Tunisia: report of 19 cases. Pan Afr Med J. 2012;11:54.
5.Ball CG, Lee A, Kaminsky M, Hameed SM. Technical considerations in the management of penetrating cardiac injury. Can J Surg. 2022;65:E580-E92.
6.Ohshima H, Takeuchi H, Yamaguchi T, Takanashi R, Tsunoda K. Late cardiac strangulation due to an iatrogenic pericardial defect. Chest. 1993;104:977–8.
7.DiMarco RF. Postoperative Care of the Cardiac Surgical Patient. Surgical Intensive Care Medicine [Internet] 2010; 535–566. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7120630/ (Accessed 1 May 2024)
8.Sarkhel S, Vijayakumar V, Vijayakumar L. Clinical practice guidelines for management of suicidal behaviour. Indian J Psychiatry. 2023;65:124-130.