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Approach to cardiac tamponade in limited conditions in the emergency department: A case report

Abstract

Penetrating thorax traumas have high mortality rates, especially when the heart is also involved. Patients with heart injuries should not be considered as lost patients due to high mortality rates. Early diagnosis and treatment of life-threatening conditions, rapid transport of patients in need of surgery, and the time of surgical procedure are the most important factors in the prognosis. Patients, especially those with right ventricular injury, can regain their health with timely and correct interventions. In this case report, a 29-year-old patient, who was admitted to the Emergency Department with a penetrating trauma in the chest and signs of tamponade appearing. In this study, we aimed to discuss the case of a patient who was diagnosed quickly in the emergency department and accompanied throughout a long transfer process and transferred to the trauma center, in the light of the literature, to emphasize the importance of emergency diagnosis and access to accurate and rapid surgical intervention.

Keywords: Heart injuries, cardiac tamponade, pericardiocentesis, emergency, traumatic injuries

INTRODUCTION

Patients with Penetrating Thoracic Traumas may present to Emergency Departments with a wide range of injuries, ranging from simple skin injuries to cardiac injuries. Mortality increases significantly in cardiac injuries because of cardiac tamponade, occlusion of the coronary arteries, and hypovolemia, which develop as a result of blood filling the pericardial cavity (1). Patients with heart injuries should not be considered as lost patients due to high mortality rates. Patients, especially those with right ventricular injury, can regain their health with timely and correct interventions (2).

In this article, we aimed to present the strategy we applied in a case with suspected cardiac injury in which we stabilized hemodynamics and successfully transferred to a center where open heart surgery could be performed.

CASE

A 29-year-old male patient who had no known history of disease and no history of drug use was admitted to the Emergency Department with a stab wound in the chest. The patient was taken to the Red Area in the Emergency Department. The patient, who was conscious, oriented, and cooperative, said that the incident occurred approximately 20 minutes ago. On admission, the patient's arterial blood pressure was 98/66 mmHg, pulse

rate was 125/min, and fingertip pulse oxygen saturation was 96. The physical examination of the patient revealed that there was a 1 cm skin laceration in the 3rd intercostal space in the left midclavicular line and a 2 cm skin laceration in the 5th intercostal space in the left mid-axillary line. Heart sounds were coming deeply. There were rales at the base of the left lung auscultation. External examination was normal. The patient was monitored. Two large vascular accesses were opened to the patient in his right and left arms. Blood samples were sent to measure the blood group, cross-match, hemogram, biochemistry, and coagulation values and normal saline replacement was initiated. The surgeon on duty at the hospital was informed. Distant organs may also be injured in penetrating trauma. The patient underwent a Computerized Tomography (CT) scan to see any injuries that would require emergency surgery. Hemorrhagic effusion that reached 3 cm in width and post-traumatic air were detected in the pericardial cavity. Pneumothorax and hemothorax that reached a depth of 5 cm were detected in the left hemithorax (Figure 1). No abdominal injuries were detected. While the patient was being transported from the Emergency Tomography Unit to the Red Area, 112 was called and a request for urgent transfer to the nearest trauma center was reported since there were no cardiovascular and thoracic surgeons in our hospital. A left thorax drainage tube was inserted into the patient and there was 400 ml of hemorrhagic fluid solution. The patient was given

antibiotics, Tetanus prophylaxis was applied and a Urethral Foley Catheter was inserted. While the 112 Team was awaited to arrive for referral, the heart rate of the patient increased to 152 beats/min, arterial blood pressure dropped to 62/40 mmHg, and he became confused. Because of these findings, cardiac tamponade was considered. It was decided to perform a pericardial puncture. If the patient's hemodynamics did not improve after the puncture, it was planned to consult the surgeon at the hospital for the patient have been intervened by consulting the cardiovascular surgeon. The researchers entered from the subxiphoid region to the chest wall at an angle of 15-20 degrees and proceeded toward the left shoulder. The plunger of the syringe was pulled backward during the advancement. As soon as hemorrhagic fluid reached the piston, advancement was stopped and 20 ml of hemorrhagic fluid was drained. The consciousness of the patient improved after the fluid was drained, pulse was measured as 135 beats/minute, and arterial blood pressure was measured as 102/65 mmHg. It was observed that the fluid taken did not clot. To prevent the development of tamponade again, a percutaneous dialysis catheter was inserted into the pericardium through the subxiphoid. The transport ambulance arrived at our hospital 20 minutes after the 112 call. The patient was intubated electively during this period to avoid wasting time before surgery in the advanced center and to ensure airway safety along the way.

The ambulance set off for the Trauma Center thirty minutes after the patient's admission to the hospital. Two units of cross-match compatible erythrocyte suspension were taken into the ambulance along with the patient. The patient was accompanied by the researchers throughout the transportation. It took 80 minutes for the patient to reach the Trauma Center. During this time, the patient's blood results were obtained and the results were reported to the hospital. The Trauma Center was reached 110 minutes after the patient was admitted to the Emergency Department and 130 minutes after the injury had occurred. At the Trauma Center, a total of 80 ml of pericardiocentesis was performed and a total of 500 ml came out of the thorax tube. The patient was delivered to the Trauma Center with the imaging results with a pulse of 127 per minute and an arterial blood pressure of 92/60 mmHg.

The patient presented to the Emergency Department with chest pain 13 days later. His previous file was evaluated on the E-NABIZ system on the internet, and it was found that he was operated on at the Trauma Center because of right ventricle injury and was discharged with recovery after the post-operative hospitalization period. The patient underwent CT again. Minimal pericardial fluid was detected on CT with a depth of 15 mm in the left lung (Figure 2). As a result of the examination, laboratory results, and evaluations in correlation with the electrocardiogram result, no urgent pathology was detected in the patient and he was discharged with recommendations. The patient was followed up for 1 year during which ECHO was performed intermittently by a cardiologist. It was reported in the ECO at the end of the first year that the left ventricular ejection fraction was 60%, there was no

wall motion defect, no pericardial effusion, the ascending aorta was normal, and the valve structure and functions were normal. It was also learned that the patient had no active complaints at the end of the 1-year follow-up after the stabbing.

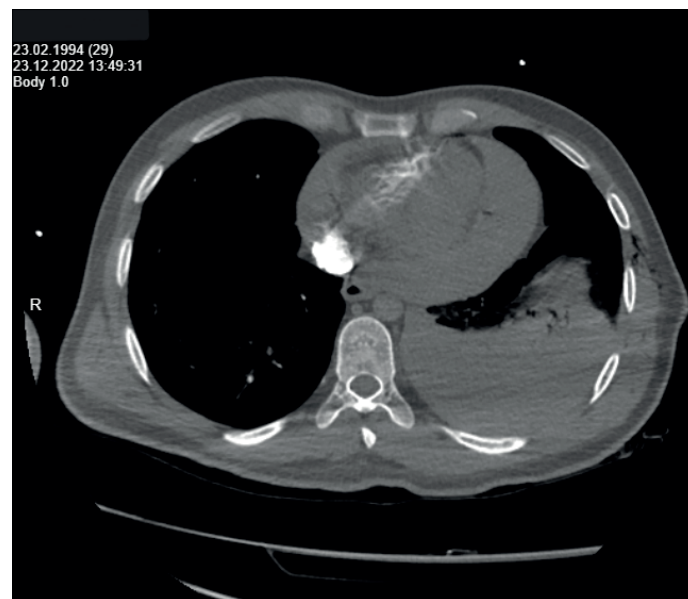


Figure 1. Computed Tomography image upon admission with injury

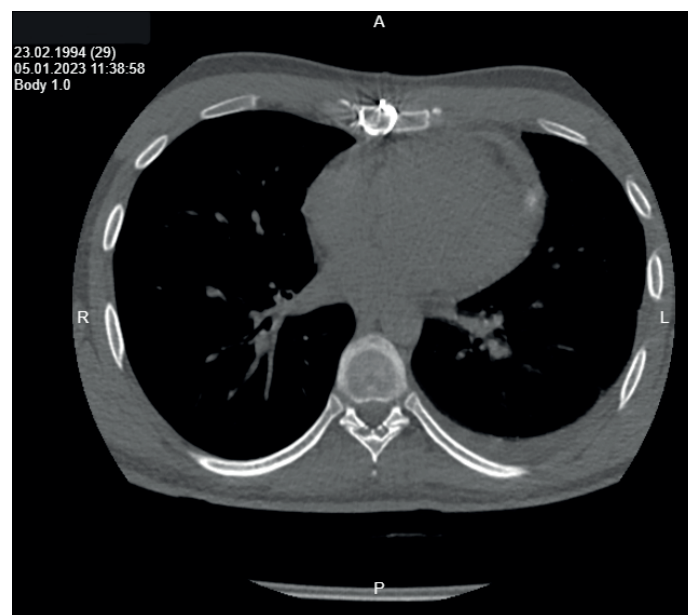


Figure 2. Computed tomography image taken at the emergency department admission after the surgery

DISCUSSION

In Penetrating Thoracic Traumas, the first-choice imaging technique is focused evaluation with sonography performed at the patient's bedside in extended traumas (e-FAST) (3,4). CT is another choice after e-FAST (3). There is a risk of iatrogenic injury in invasive interventions into the pericardial space, so it is recommended that the intervention be performed under

ECHO or ultrasound guidance. In the case presented here, the reason why CT was preferred instead of e-FAST as the first technique and ultrasound was not used during the interventions was the lack of ultrasound in the Emergency Department of our hospital. In-hospital transport is not recommended if the patient is hemodynamically unstable (5). In the case presented here, the researchers made a profit and loss calculation and took into account the benefit of taking the patient out of the Red Zone and having a CT scan to clarify the diagnosis, accelerating treatment and referral. The researchers took the patient to CT while monitoring.

The immediate treatment of tamponade is to drain the accumulated fluid. Percutaneous needle drainage is preferred in most cases and certainly in emergencies (6-8). It is recommended to perform rapid drainage until tamponade symptoms disappear, and to avoid rapid drainage after tamponade symptoms disappear (9). The patient's vital signs improved after the 20cc percutaneous needle drainage and the patient was accompanied during the transportation to the center where the surgical procedure would be performed, and his hemodynamics were preserved without signs of tamponade. Rapid drainage to the patient was avoided again. In patients with bleeding, high blood pressure increases the bleeding volume. SF infusion was made moderately, keeping the blood pressure at the lowest arterial level to protect hemodynamics.

The speed of evaluation, transport, and surgery in patients who have Percutaneous Thoracic Traumas is the most important factor in reducing mortality (10,11). It was reported that 78% of all deaths occur in the first hour after cardiac injury in Penetrating Cardiac Injuries (12). In the case presented here, there was a 30-minute interval between the patient's admittance to the Emergency Department and his exit to the Trauma Center by ambulance. The transport of the patient to the Trauma Center took 80 minutes during which the patient was accompanied and the necessary intervention was carried out to ensure that his preoperative hemodynamics were preserved. Prolonging the transport time in large vessel injuries such as aortic injury will significantly increase mortality. However, in more innocent heart injuries, the patient's chance of survival can be increased with a small intervention.

CONCLUSION

In conclusion, Penetrating Thoracic Traumas require urgent diagnosis and treatment. Heart, lung, and vascular injuries that result from traumas pose a high mortality risk. The duration of interventions is the most important factor in determining the survival of the patient. We think that the mortality and morbidity rates will decrease in Penetrating Thoracic Traumas if every physician who works in Emergency Departments has the knowledge and skills of emergency approach to penetrating traumas. It will also help if ultrasound devices are made available in emergency departments, transportation times are kept short, and patients who are expected to have hemodynamic deterioration

are transported by an ambulance team with a physician.

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Patient Informed Consent: Informed consent was obtained from the patient(s).

REFERENCES

1. Nisanoglu V, Erdil N, Battaloglu B. Complete left-sided absence of the pericardium in association with ruptured type A aortic dissection complicated by severe left hemothorax. *Tex Heart Inst J.* 2005;32:241-3.
2. Bamous M, Abdessamad A, Tadili J, Kettani A, Faroudy M. Evaluation of penetrating cardiac stab wounds. *Scand J Trauma Resusc Emerg Med.* 2016;24:6.
3. Zeiler J, Idell S, Norwood S, Cook A. Hemothorax: a review of the literature. *Clin Pulm Med.* 2020;27:1-12.
4. Lee A, Hameed SM, Kaminsky M, Ball CG. Penetrating cardiac trauma. *Surg Open Sci.* 2022;11:45-55.
5. Salt O, Akpınar M, Sayhan MB, Örs FB, Durukan P, Baykan N, Kavalcı C. Intrahospital critical patient transport from the emergency department. *Arch Med Sci.* 2018;16:337-44.
6. Spodick DH. Acute cardiac tamponade. *N Engl J Med.* 2003;349:684-90.
7. Adler Y, Charron P, Imazio M, et al. 2015 ESC Guidelines for the diagnosis and management of pericardial diseases: The Task Force for the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology (ESC) Endorsed by: The European Association for Cardio-Thoracic Surgery (EACTS). *Eur Heart J.* 2015;36:2921-64.
8. Armstrong WF, Schilt BF, Helper DJ, et al. Diastolic collapse of the right ventricle with cardiac tamponade: an echocardiographic study. *Circulation.* 1982;65:1491-6.
9. Nelson DM, Brennan AP, Burns AT, MacIsaac AI. Pericardial decompression syndrome with acute right ventricular failure: a case series. *Eur Heart J Case Rep.* 2023;7:ytad275.
10. Mataraci I, Polat A, Cevirme D, Büyükbayrak F, Saşmazel A, Tuncer E, et al. Increasing numbers of penetrating cardiac trauma in a new center. *Turkish Journal of Trauma & Emergency Surgery.* 2010;16:54-8.
11. Ovali C, Kocaoglu AS, Demirdizen G, Aydar Y. Penetrating heart injury repaired with peripheral cannulation: case report. *Prehosp Disaster Med.* 2021;36:793-6.
12. Buckman RF, Badellino MM, Mauro LH, et al. Penetrating cardiac wounds: prospective study of factors influencing initial resuscitation. *J Trauma.* 1994;34:717-25.