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PENETRATING CARDIAC TRAUMA WITH CARDIAC EXPOSURE AND RIGHT VENTRICLE LACERATION DUE TO A DOMESTIC ACCIDENT: CASE REPORT

Wanderley Paes dos Anjos
General Surgery Residency Program at:
Hospital Universitário Getúlio Vargas
Universidade Federal do Amazonas

Hitesh Babani
Medicine Student
Ceuni-Fametro, Manaus, Amazonas

Rodrigo Vaz Ferreira
Professor Doctor of Surgery
Universidade do Estado do Amazonas

Danielle Alcantara Barbosa Machado
General Surgery Residency Program at:
Hospital Universitário Getúlio Vargas
Universidade Federal do Amazonas

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Introduction: Traumatic causes are among the main causes of morbidity and mortality in the world, especially in people under 45 years of age. This is even more visible in Brazil and Amazonas, with approximately one third of deaths in this age group occurring from traumatic etiologies. Among these, cardiac trauma presents a dramatic situation with high mortality, generally arising from violent causes or automobile accidents. We present a case of cardiac trauma resulting from a domestic accident with a plate causing right ventricle laceration and cardiac exposure. **Report of case**: A previously healthy 49-year-old woman was transferred to a tertiary hospital after falling over a plate, which generated a linear blunt wound measuring approximately 7cm at the level of the sixth left intercostal space, parallel to the rib, generating cardiac exposure. She had multiple emetic episodes and dyspnea, and closed chest drainage was performed upon admission, maintaining hemodynamic stability with permissive hypotension. She was approached with thoracotomy extending the wound she already had, with pericardiotomy revealing hemopericardium and a laceration in the right ventricle next to the anterior interventricular artery. After digital tamponade, a Foley catheter with traction was used to maintain hemostasis until cardiorrhaphy was performed. She was discharged after 6 days of hospitalization without any functional deficit. **Conclusion:** Although very uncommon, other cases of accidents with objects that can become sharp have been reported and teams in trauma centers are subject to this. We report a case with good recovery following the same principles as treatment for stab wounds.
Keywords: cardiac trauma; hemopericardium; right ventricle laceration; cardiorrhaphy.

INTRODUCTION

Trauma is one of the main causes of mortality in the world, surpassing ischemic heart disease and stroke when considering the age group up to 45 years of age, the most affected age group (1). When considering disability-adjusted years of life lost (DALYs), traumatic causes also lead worldwide. In both cases, car accidents are the main contributors to the statistics, and traumatic brain injury (TBI) is the main cause (1).

The national reality partly maintains the pattern seen globally: traumatic causes are, once again, the main factor of mortality in the age group between 15 and 45 years. However, in Brazil, the percentage of trauma caused by violence is much more significant: while globally the proportion is 8.75% mortality due to car accidents and 4.2% due to violence (being surpassed by self-inflicted injuries), in Brazil it the opposite: 23.9% of mortality in this age group is due to violence and 12% due to car accidents. This proportion is even more discrepant when considering the local reality, in Amazonas, where violence reaches a level of 28.56% and accidents reach 7.89% (1).

When considering the important role of violent causes in the study and care of patients with some type of physical trauma, thoracic trauma – and, particularly, cardiac trauma – gains even more relevance (2,3). Although they also frequently occur in accidents and with a blunt mechanism, the prototype of the study of cardiac trauma is precisely that of violence causing penetrating injuries to the chest (4), whether by bladed weapons or firearm projectiles - which is why the main studies made in this regard are on members of security forces, such as police officers or soldiers (5). It is worth mentioning that the impact of traumatic cardiac injuries in trauma is potentially underestimated: as many of these injuries are lethal within seconds and a few minutes, they mainly contribute to the

first peak of trauma mortality, before the arrival of pre-hospital services (6).

Despite the great focus on the violent modality among penetrating cardiac traumas, accidental injuries, although rare, can occur (7). We report a case of a 49-year-old patient with an injury caused by a plate, accidentally, causing cardiac exposure and laceration of the right ventricle.

REPORT OF CASE

A previously healthy 49-year-old patient was admitted to ``Hospital e Pronto-Socorro 28 de Agosto``, a tertiary center, transferred from a smaller hospital with cardiac trauma 30 minutes ago. The patient reported falling from her own height, frontally. She was carrying a plate and fell on top of it, causing a linear cut-contus wound, at the height of the sixth intercostal space (hemiclavicular line, anterior axillary line or whatever) and parallel to the rib, measuring approximately 7cm, with cardiac exposure. She had significant dyspnea and multiple emetic episodes since the incident, but maintained a level of consciousness and relative hemodynamic stability, applying permissive hypotension.

The patient was surgically approached approximately 3h30min after admission, in a surgical center with asepsis respected. A thoracotomy was performed, extending the thoracic lesion presented by the patient, at the level of the sixth intercostal space, with opening in layers up to the parietal pleura. The patient had a transverse pericardial lesion, approximately 7 centimeters long, with hemopericardium and clots upon pericardiotomy, in addition to a lesion measuring approximately 3 centimeters in the right ventricle, next to the anterior interventricular branch of the left coronary artery.

To contain the profuse bleeding, digital tamponade was initially performed and then a Foley probe was used with cuff inflation and traction, which was successful, enabling cardiorrhaphy, using Prolene 2.0, using U-shaped stitches. foreign cells in the pericardial cavity, which was irrigated extensively using 0.9% sodium chloride. To enable anchorage, a pericardial flap was used.

There were no lung injuries, although there was a small hemothorax with clots. The left chest tube number 36 was repositioned, as it was in the mediastinal direction. There was no foreign body at the site, proceeding to closure according to plans.

On the sixth postoperative day, the patient had a non-functioning chest tube, maintaining stable vital signs, temporo-spatial orientation and walking freely. After a new chest x-ray showed no changes, she was discharged home with normal functional status.

DID YOU USE CH, IF YES, HOW MANY OTHER BLOOD DERIVATIVES FELL DURING OPERATION?

DISCUSSION

To penetrate cardiac traumas are inexorably serious, with high morbidity and mortality and intrinsically linked to violent injuries. However, we report a case of rare but dramatic injury, where a fall from height onto a plate of food generated cardiac exposure, hemopericardium and right ventricular injury, requiring cardiorrhaphy and chest drainage.

It is worth remembering that most cardiac injuries, especially when myocardial laceration or rupture of basic vessels occur, can be fatal within seconds or a few minutes: these injuries often make up the first peak of deaths from trauma. As Davis and employees (6) described, among deaths in the pre-hospital period, the thoracic region is only affected more than the skull and only 29% of these deaths could be avoided with medical care.

In this case, the patient did not request assistance from the Mobile Emergency Care Service (SAMU) or other pre-hospital service, looking directly for a hospital close to her residence and being transferred to the nearby trauma center. This can lead to a delay in care when compared to admission directly to the referral hospital, which, in turn, can influence the patient's outcome. However, Yeh and collaborators did not find significant differences in an analysis of more than 5,000 patients admitted due to trauma (8).

Although there are relevant differences between violent injuries in the case reported here, the similarity with stab wounds is great – in both cases affecting mainly the right ventricle, due to its more anterior anatomical position, that is, close to the chest wall, and with hemopneumothorax associated many times (3,9). Unlike what can occur in violent injuries, the case presents a single injury, which interferes with the degree of hemodynamic decompensation and, therefore, mortality (3)

Because of this, despite the dramatic scene of cardiac exposure and the size of the lesion, the patient presented a certain hemodynamic stability, maintained in permissive hypotension. It is worth noting that clinical treatment presents a relevant limitation in these cases, with immediate surgical treatment being the best choice for these patients - thus, in cases that arrive at the emergency department or trauma room already unstable, thoracotomy can be used promptly, which occurs in up to 15% of patients (10).

This measure, although potentially life-saving, has penetrating cardiac trauma as one of its few precise indications, with high mortality involved. There is little data in the literature regarding survival from the procedure separated by the reason for its performance and even less regarding medium and long-term outcomes (11,12). Therefore, its use must be reserved for situations requiring immediate action, which was not the case – which made it possible to transfer the patient to the operating room, with adequate preparation.

Although the surgical indication in this case is obvious – given the cardiac exposure – this is not always present in penetrating thoracic trauma, with great conflict in the conduct to be carried out in those who arrive asymptomatic. In recent years, there have been relevant developments in the safety of the screening used for these patients, with the current suggestion of observation for 1 hour using chest radiography and point-of-care ultrasound (13), following the evolution of studies on these patients, aiming to maximize the cost-effectiveness of the strategy (14–16).

We report a serious case with a very unusual mechanism, and we have not found trauma of this nature caused by the same item in the literature. Despite this, there was excellent organic and functional recovery using a strategy similar to that used in stab wounds, making it possible to discharge the patient from hospital without any deficit. Other patients and treating staff may benefit from this when managing penetrating cardiac trauma from other items not commonly studied.

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