

Case Report

Survivor of Transfixing Right Ventricle Stab Wound

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Abstract

Stab wounds are often encountered in the practice of forensic pathology as a mean of aggression and/or homicide. Cardiac stab wounds are particularly dangerous due to massive hemorrhage and immediate lethal potential. We present the case of a 39-year-old woman who was admitted to the hospital after being stabbed in the chest by her husband. Shortly after the aggression, she still able to run out of the house and seek help from passersby. The immediate open-heart surgery revealed a transfixing right ventricle stab wound, which was promptly resolved. She was discharged 7 days later, without any complications. Victims of potentially lethal lesions occasionally display actions of flight or fight or even become aggressors themselves, behaviour which is known as supravital reactions, a phenomenon still under debate in the medico-legal field of practice. Also, the unusual initial absence of common symptoms for this specific cardiac lesion was yet another factor against the odds of survival.

Keywords: Hemopericardium; Right ventricle; Supravital reaction; Transfixing stab wound

Introduction

Stab wounds represent the majority of homicides in the medico-legal field [1]. These are of major importance in forensic pathology and are encountered primarily in domestic disputes (female victim) and street violence (male victim) [2]. A stab wound is an incised wound that is deeper than it is wide. Though many penetrate only the skin and subcutaneous tissues, those seen by forensic pathologists are most often fatal, having entered vital deep structures. Stab wounds

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via knife are one of the most frequent modes of homicide. It is common for the knife to penetrate the thoracic cavity through intercostal spaces or costal cartilage and uncommon to penetrate the sternum [3].

Materials and Methods

We present the case of a 39-year-old woman, who was stabbed in the chest by her husband with a kitchen knife as a result of a domestic dispute. According to the police investigation and witness interrogation, soon after the stabbing, she was still able to leave the house and call for help. An ambulance was called by passersby. According to the clinical status at arrival in the Emergency Department, she was relatively stable, with a blood pressure of 110/70 mmHg and arterial oxygen saturation of 100%, presenting a left infraclavicular stab wound. The cardiac ultrasound examination revealed hemopericardium and cardiac tamponade. Regular blood work showed severe anemia with hemoglobin of 5 g/dl. An hour later, at the time of the admission in the Cardiovascular Surgery Ward, she became dangerously hypotensive (systolic blood pressure=45-70 mmHg), tachycardic (110 beats per minute) and complained of shortness of breath. She was rushed into surgery to resolve the source of active bleeding. A median sternotomy was performed, revealing massive left hemothorax (about 1000 ml) which was efficiently drained. The pericardium presented on its anterior side a 4 cm penetrating wound. A longitudinal pericardiotomy revealed hemopericardium (about 500ml) and a transfixing stab wound on the anterior wall of the right ventricle. The entry point seemed to be in the superior part of the wall (length of 2.5 cm) and the exit one near the apex (length of 1 cm). The cardiac and pericardial wounds were sutured. In the period of postoperative hospitalization (7 days) she was stable and conscious, in the end being discharged without complications (Figure 1).

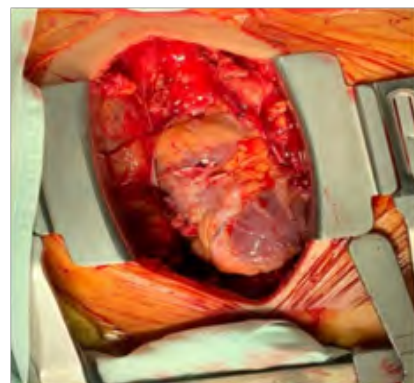


Figure 1: Open-heart surgery - anterior view of right ventricle - entry and exit point of transfixing stab wound.

Discussion

One of the main concerns in forensic pathology is the immediate behavior of victims following an apparently than a generator wound. It was theorized in the past that due to the uniqueness of different cells

and tissues, and their individual resistance to hypoxia, death does not occur at once in the entire human body, resembling more of a process which systematically takes over gradually.

This theory can explain the majority of cases cited in medico-legal literature where victims were able to perform certain actions shortly before dying:

- After a gunshot wound to the heart, the victim buttoned up his shirt. In a similar case, the victim managed to hang himself after the gunshot [4]
- After decapitation, the victim's trunk lifted in a position similar to orthostatism

The case presented is only similar to those aforementioned as the victim did not ultimately de cease. In this particular case, the fact that the victim was able to run out of the house and call for help was probably on account of the penetrating wound not affecting any major vessels, causing bleeding beyond therapeutic resources. Penetrating stab wounds in the right ventricle are more common because of its anterior location in the chest [5]. Generally speaking, they're more dangerous than in the left ventricle, due to copious bleeding from the inability of the thin wall to seal the wound. The transfixing ones even more so. It is more common for the left ventricle to partly or wholly seal a stab wound as the contractions of the thicker wall are more efficient and a mechanism of muscle overlap is possible [6].

Conclusion

In the medico-legal literature the behavior of aggression victims following a potentially fatal wound is known as supravital reaction which can manifest itself as various acts of violence/fight or flight. In the case presented it is expressed as flight - running out of the house to call for help. It is common knowledge in the medico-legal practice there are no general rules (anatomical, physiological or pathological) in classifying these reactions and that an individualized approach for each and every case is best. The case presented serves as an example of a dire situation which resulted in a potentially fatal complex cardiac lesion, with low survival rates [7,8]. Through this paper we wish to raise a question mark regarding existing theories related to the behavior of victims near death and also, to highlight the importance of not underestimating a stab wound based solely on initial patient condition. In cases as complex as transfixing cardiac stab wounds, there are numerous variables which interfere with how long the victim is able to carry out activities following the trauma. Factors such as location of stab wound, type of knife, force and direction of blow, type and caliber of blood vessels damaged and rate of bleeding, previous chronic diseases and co-existing intoxications (which can alter blood clotting) can make it very difficult to calculate how long the victim is able to carry out activities. In a legal setting such as a criminal trial, this can be a problematic matter. Also, the lack of clinical signs following such trauma must not lead medical professionals to underestimate the critical potential of such wounds; at they can be deadly in a brief period. Prompt diagnosis and immediate surgical treatment are key in the efficient management of stabbing victims.

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