

## Acute Traumatic Pericardial Tamponade.

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### Abstract

Acute traumatic pericardial tamponade is a serious and rapidly fatal injury. As penetrating chest wounds are becoming more common, early diagnosis of tamponade is important so that lifesaving treatment can be applied. The classical features of tamponade may be insidious due to hypovolemia and the presence of associated injuries. Acute tamponade may also be precipitated by rapid administration of large volumes of fluids. Echocardiography is limited by availability and operator dependence. Pericardiocentesis, sometimes lifesaving, is dangerous and limited in value.

A higher degree of clinical suspicion in patients with chest injuries, together with close monitoring and reevaluation, particularly during volume replacement, is essentially. We describe a case with cardiac tamponade which presented in the emergency department of University Hospital Centre "Mother Theresa", Tirana.

The majority of patients who arrive at hospital following a penetrating injury to the heart will have no vital signs. 1 Among those who make it alive, up to 16% will be relatively stable and there will not be any indication of their serious underlying injury. 2 Pericardial tamponade is a life threatening complication of penetrating cardiac trauma that will lead to rapid deterioration in a patient's condition and require emergency treatment. 3 It is important to identify and treat this group of patients before deterioration occurs. Classically the diagnosis is suspected from the presence of hypotension, distended neck veins, and muffled heart sounds, known as Beck's triad. 4 However, these signs are not present in many patients or are attenuated, making recognition more difficult.

**Keywords:** acute traumatic pericardial tamponade, chest wounds, treatment

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## *Full Text*

### *Case report*

22 year old adult male was admitted in the Emergency Service of "Mother Theresa" University Hospital Centre, after a knife injury in the anterior wall of the left hemithorax near the sternal border.

The patient was conscious with a heart rate of 115 per minute and an arterial pressure of 80/50 mmHg. Cardiac sounds were weak.

Chest X-ray was done while the patient was given 1000 ml of crystalloid solution intravenously.

No pneumothorax or hemothorax was noted in the X-ray but the cardiac silhouette was enlarged.

The general surgeon who consulted the patient asked for cardiac surgeon expertise.

The situation worsened, the patient complained of chest pain and he was cold and sweated on physical examination.

Heart rate increased to 150/min and arterial pressure declined to 50/30 mmHg. The patient lost consciousness and he was intubated.

Cardiac tamponade was suspected and echocardiography showed a large amount of pericardial fluid. The cardiac surgeon transferred the patient immediately in the cardiac surgery operating theatre where the heart-lung machine was available.

The patient underwent median sternotomy and the pericardial cavity was opened. 650 ml of blood was

drained and 1 cm laceration in the anterior face of the right ventricle was repaired.

The postoperative period was free of complications and the patient was discharged on the 6th postoperative day.

### *Discussion*

The incidence varies between hospitals, but UHC "Mother Theresa" deals with a large number of cases in comparison to other institutions. 5.6 Despite this, recognition of cardiac tamponade can still cause difficulty, as this case illustrates. In a review of emergency thoracotomies performed over a two and a half year period, four (80%) out of five pericardial tamponades were initially missed in patients with penetrating cardiac injuries. 6 This is partly because the patients are relatively stable in the early stages and diagnosis may be difficult due to the presence of alcohol or other injuries which mask subtle clinical features. The diagnosis requires experience and higher degree of clinical suspicion.

Significant hypotension must always be explained and frequent re - evaluation of the patient by experienced medical staff is essential. In this hospital patients with blunt and

penetrating chest trauma not requiring thoracotomy are usually managed by the Anaesthesiology & Emergency medical staff and admitted under their care. Patients with continuing haemorrhage or suspected cardiac trauma are referred directly to cardiothoracic surgeons.

General surgeons therefore have limited experience in chest trauma and opportunity of general surgical trainees to gain experience in these cases is still relatively small.

Despite this, a significant number of patients are treated by general surgeons because of concomitant or suspected intra-abdominal injury, particularly when the evaluation fails to reveal an obvious intrathoracic injury.

Chest wounds have been divided into two broad categories, central and peripheral, based on the likelihood of the injury to the heart and other major mediastinal structures.

The borders of the central zone are the suprasternal notch and the medial halves of the clavicle superiorly, the mid clavicular lines laterally, and the xiphoid and costal cartilages inferiorly.<sup>7</sup>

Wounds within these boundaries should raise the suspicion of serious cardiac injury. Our case had stab wounds within this "danger area".

Anyway, this statement is not always true, and any chest wound can result in central organ damage as its extent and trajectory cannot be determined by inspection, and local wound

exploration is unreliable and may be dangerous.

Associated injuries may distract attention from the chest, particularly if the patient appears stable.

The pathophysiology of tamponade is related to the impairment of ventricular filling caused by the presence of blood in the pericardial space, leading to raised end diastolic filling pressure and impairment of venous return. This should be evident from distension of neck vein caused from raised central venous pressure. In patients who are hypovolemic or have peripheral vasodilation due to alcohol this sign is often attenuated or absent until adequate volume replacement has been given, as happened in our case.<sup>8</sup> It may be argued that standard advanced trauma life support protocols, which advocate fast volume replacement in trauma patients may precipitate tamponade in those who would otherwise have been stable. There is growing evidence to support this point of view and some clinicians now advocate that victims of trauma who have low but stable blood pressure should have delayed and controlled volume replacement at the time of surgery. "This practice, however, should be reserved for those patients who are being cared by an appropriate and experienced surgical team".

In the face of these difficulties, pericardiocentesis has been advocated as a reliable method to diagnose and treat tamponade.<sup>11</sup> While this may be

a truly lifesaving procedure, it is often associated with attendant risk, and the number of patients in whom it is indicated is very small.

If the blood in pericardial cavity is clotted it cannot be adequately aspirated, a false negative result may be obtained and the tamponade will not be relieved. There is also danger of ventricular puncture and damage to the coronary arteries. For these reasons most agree that this procedure is of little value in cardiac trauma.<sup>12</sup>

Subxiphoidpericardiotomy has been advocated, although it is a more invasive procedure and requires more surgical skill. <sup>3</sup> It is more sensitive than pericardiocentesis but in some cases precipitous decompensation may occur, requiring immediate emergency thoracotomy for the control of bleeding.

Recently echocardiography has been used as a non - invasive diagnostic tool. <sup>14</sup> However though helpful in confirming the diagnosis, it cannot be relied on completely because the interpretation is operator dependent and false negativities occur. <sup>15</sup> The role of emergency room thoracotomy remains controversial <sup>16</sup>, but it is still widely accepted that it is of value in penetrating trauma for patients in extremis' and the best results are achieved in those suffering from cardiactamponade.<sup>18</sup>

## *Conclusions*

Traumatic pericardial tamponade is relatively rarely encountered in Albania because of various diagnostic problems. Clinicians must have a high degree of clinical suspicion when dealing with victims of penetrating chest trauma, particularly if the injury lies in the "cardiac danger area".

Although associated injuries need to be dealt with appropriately, the possibility of occult cardiac injury must always be kept in mind since a significant minority of patients remain stable and the signs of tamponade may be modified or absent because of compensatory mechanisms.

Decompensation can occur rapidly during fluid replacement and unless the clinical condition of the patient dictates otherwise this should be carried out cautiously, with close monitoring. Echocardiography may be helpful in confirming the diagnosis by non-invasive means but is not completely reliable.

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