CASE REPORT

Resuscitative thoracotomy after stab heart injury. Two cases of tamponade, managed in a rural hospital

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ABSTRACT

Two trauma cases are presented which were managed in a rural hospital by the same general surgeon team. The cases were two young men who were admitted to the hospital from prison in the last three years. Both of them sustained stab heart wound. They were hemodynamically unstable. The first one suffered a cardiac arrest after his arrival in the operating room. Both patients underwent an emergency left anterolateral thoracotomy according to the DSTC course principles and the current guidelines of Trauma Surgery. The first patient had a left ventricle wound and a lung laceration and the second a wound on the right ventricle. Both patients underwent definite surgical repair. They were referred hemodynamically and respiratorily stable to a cardiothoracic ICU in Athens. They were discharged with no postoperative complications a few days after the initial operation.

Keywords: emergency thoracotomy, stab heart, DSTC course , resuscitative thoracotomy , cardiac tamponade

Citation

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INTRODUCTION

Worldwide, most people have a little or no access to an organized trauma care system [1]. In USA 46,7 million citizens do not have access to a level 1 or 2 trauma center in less than 60 minutes (2005) [2]. Despite the development of better emergency medical systems in Europe, USA, Australia and South Africa the fact is that an appropriately trained surgeon is most of the time too remote from a patient in an emergency situation. Situation is more difficult in Greece if we take into account the geography of the country (many islands, mountains etc.), the bad road network and the lack of trauma centers and

specialized trauma services. These facts make the access for an injured patient to the closest medical care unit very difficult in Greece.

The scenario of a patient who arrives in the emergency department (ED) of a hospital with a stab wound in the chest , close to the nipple having : HR >120bpm, SBP <60 mmHg and distended jugular veins is not so uncommon. Most surgeons will have to manage a heart wound only once or twice in their career [3]. The success in the management of such cases depends on the presence of an appropriately trained surgeon at the moment of the patient's arrival.

The fundamental step for the patient's survival is the rapid access to the thoracic cavity and the management of the heart wound. Although thoracic trauma represents 25-50% of all injuries [4], and more than half of them can be managed conservatively, the mortality rate of a stab heart wound is 100% in the absence of a qualified surgeon [5].

Resuscitative thoracotomy is a way of exposing all the vital context of the thorax for rapid repair in patients presenting in shock [6, 7]. Left anterolateral thoracotomy in supine position is the recommended incision when performing resuscitative thoracotomy in a patient after penetrating thoracic trauma according to the Definitive Surgical Trauma Care course (DSTC) and the principles of trauma surgery [8]. This incision provides rapid access to the heart and the descending aorta and can easily be extended to a clamshell incision across the sternum for entering the right thoracic cavity [9-11].

CASES PRESENTATION

Case report # 1

A 30 year old male prisoner was transferred to the emergency department of Nafplion General Hospital from prison after injuring himself with a knife, impacted just under the left nipple. (Photo 1)

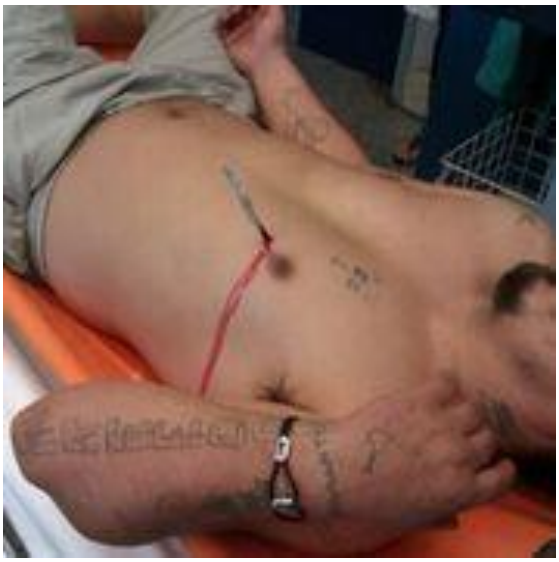
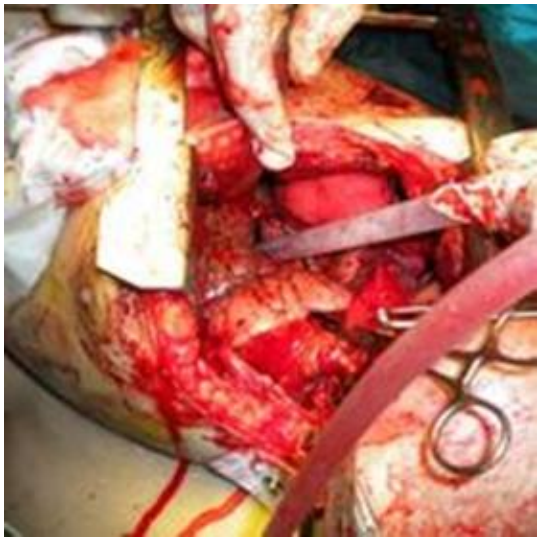


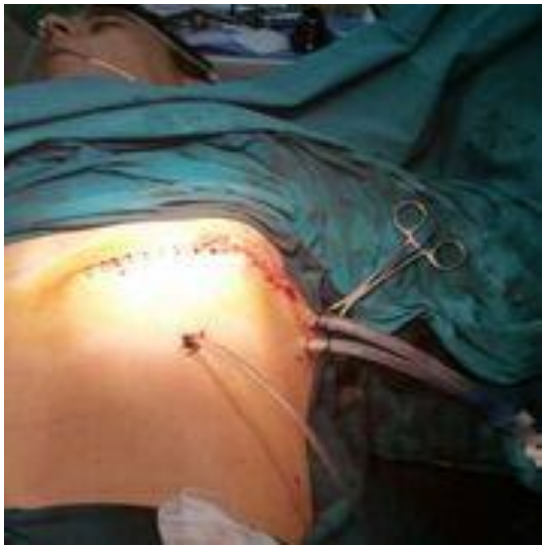
Photo 1. Stab injury to the 5th intercostal space (patient #1).

Patient was rapidly deteriorated hemodynamically in ED with BP: 70/40 mmHg, bpm> 150, and attenuation of cardiac sounds (two of Beck's triad) with no distended jugular veins. The onset of tamponade was obvious and the patient was rapidly transferred to the operating room. Just before the induction of anesthesia he suffered a cardiac arrest and he retrieved his cardiac activity after two minutes of CPR.

Just after intubation we performed a resuscitative thoracotomy through a left anterolateral incision and then pericardiotomy. Patient had a left ventricle wound and also a lung laceration. We

removed the impacted object and after evacuation of the pericardium we closed the heart wound by suturing with Prolene 2.0. Furthermore we repaired the lung injury by suturing the wound with PDS 2.0. We put one drain in the pericardial cavity and two chest tubes. (Photos 2, 3).





Photos 2 & 3. Drain in the pericardial cavity and two chest tubes (patient #1).

The patient hemodynamically and physiologically stable was admitted in a cardiothoracic ICU in Athens. He was discharged a few days after the operation with no postoperative complications.

Case report # 2

A 34 year old male prisoner was admitted to the emergency department of Nafplion General Hospital after fighting and being injured by a knife on the left chest bellow the left nipple, near the sternum. He was in extremis with BP <60, bpm> 160, distended jugular veins. The diagnosis of cardiac tamponade was obvious.

He was rapidly transferred to the operating room for resuscitative thoracotomy. After pericardiotomy through a left anterolateral incision, a wound at the right ventricle was recognized. We evacuated the clots and sutured the wounds with Prolene and PDS 2.0. During the repair of the injury we achieved bleeding control manually (photo 4).

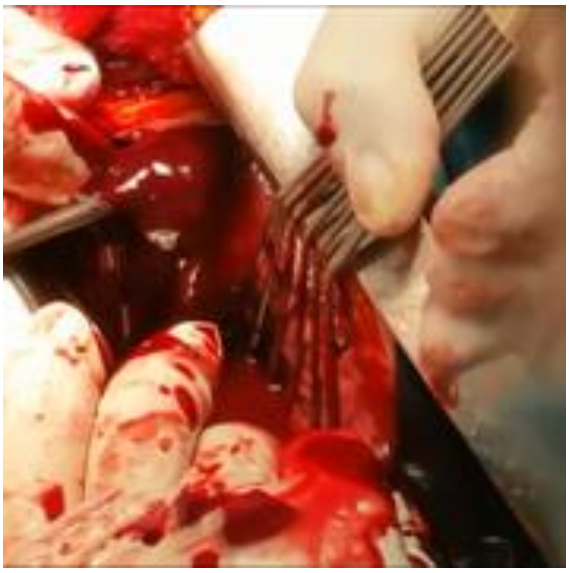


Photo 4. Manual bleeding control of the heart injury (patient #2).

We also put a drain in the pericardial cavity and two chest tubes (photo 5). The patient was admitted stable to the same cardiothoracic ICU in Athens. He was discharged from ICU on the second postoperative day and from the hospital after a few days with no postoperative complications.

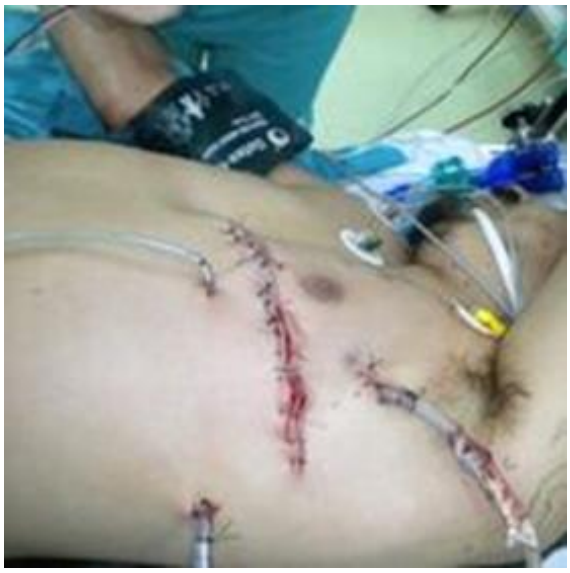


Photo 5. Drain in the pericardial cavity and two chest tubes (patient #2).

DISCUSSION

Cardiac tamponade is a fatal thoracic injury that a physician must recognize during the primary survey in the ED according to the advanced Trauma Life Support (ATLS) course principles [12].

Cardiac injuries, in urban trauma centers, are most common after penetrating trauma, representing about 5% of all thoracic injuries [7].

The diagnosis of cardiac injury in most cases is fairly obvious and the patient presents with cardiac tamponade and rarely acute heart failure. These with tamponade due to penetrating injuries usually have a wound between the nipples , distended jugular veins , decreased cardiac output , decreased blood pressure, narrow pulse pressure, decreased heart sounds and occasionally pulsus paradoxous [8, 10].

In the vast majority of cases, pericardial tamponade can be confirmed on clinical grounds. Fluid on Focused Assessment with Sonography in Trauma (FAST) is reliable when the diagnosis is not obvious (e.g. tension pneumothorax). Finally, an echocardiogram is useful when patient is quite stable hemodynamically on arrival and the team is not very familiar with trauma cases. Pericardiocentisis is not a very useful diagnostic technique neither a definitive treatment. Clots in pericardial cavity prevent adequate aspiration. Pericardiocentisis may be temporarily therapeutic in order to gain time before transferring the patient to the operating room for thoracotomy and definitive care.

The treatment of penetrating cardiac injuries is immediate thoracotomy. If thoracotomy is performed in the emergency room is called emergency department thoracotomy (EDT) and can be life saving for patients *in extremis*. The EDT is performed in order to control bleeding, maintain brain perfusion (aortic cross clamping) and perform internal cardiac massage [8, 11].

Resuscitative thoracotomy is held minutes to hours after injury in acutely deteriorating patient for control of hemorrhage and is performed in an operating theatre or intensive care unit [8].

These operations can be applied by thoracic surgeons, trauma surgeons or general surgeons with experience in thoracotomy. In Greece, general surgeons lack experience in thoracotomy because thoracic surgery is not obligatory in their training program. Furthermore trauma surgery does not exist as a subspecialty. The favorable outcome of both cases is due to the experience of the surgical team in acute trauma cases, as well as in thoracotomy.

CONCLUSIONS

On occasion of these two cases reasonable conclusions are:

1. ATLS course should be obligatory for every doctor who is working at emergency department and receives trauma patients.

2. DSTC course should be obligatory for every surgeon who is on call in a hospital which receives trauma patients

3. An official 6 months training in thoracic surgery for every resident in general surgery in Greece.

Emergency thoracotomy is the only realistic chance for survival in cases of hemopericardium and tamponade. General surgeons should be prepared to cope with these challenging injuries.

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ΠΑΡΟΥΣΙΑΣΗ ΠΕΡΙΣΤΑΤΙΚΟΥ

Επείγουσα θωρακοτομή μετά από νηγμώδη τραυματισμό της καρδιάς. Δύο περιστατικά καρδιακού επιπωματισμού και η αντιμετώπισή τους σε περιφερειακό νοσοκομείο

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ΠΕΡΙΛΗΨΗ

Η παρουσίαση δύο περιστατικών τραύματος που αντιμετωπίστηκαν σε ένα περιφερειακό νοσοκομείο από την ίδια χειρουργική ομάδα. Οι περιπτώσεις αφορούν δύο άνδρες οι οποίοι εισήχθησαν στο νοσοκομείο από τη φυλακή τα τελευταία τρία χρόνια. Και οι δύο είχαν υποστεί νηγμώδη τραυματισμό στην καρδιά. Οι ασθενείς προσκομίσθηκαν αιμοδυναμικά ασταθείς. Ο πρώτος υπέστη καρδιακή ανακοπή κατά την μεταφορά του στην χειρουργική αίθουσα. Και οι δύο ασθενείς υποβλήθηκαν σε επείγουσα αριστερή προσθιοπλάγια θωρακοτομή, σύμφωνα με τις αρχές του σεμιναρίου DSTC και τις κατευθυντήριες οδηγίες του ATLS. Ο πρώτος ασθενής είχε τραύμα στην αριστερή κοιλία και ρήξη πνεύμονα και ο δεύτερος τραύμα στη δεξιά κοιλία. Και οι δύο ασθενείς υποβλήθηκαν σε οριστική χειρουργική αποκατάσταση και μεταφέρθηκαν αιμοδυναμικά και αναπνευστικά σταθεροί σε καρδιοθωρακική μονάδα στην Αθήνα. Οι ασθενείς εξήλθαν από το νοσοκομείο χωρίς μετεγχειρητικές επιπλοκές λίγες ημέρες μετά την αρχική επέμβαση..

Λέξεις ευρετηρίου: επείγουσα θωρακοτομή, τραύμα καρδιάς, DSTC σεμινάριο, διασωστική θωρακοτομή, καρδιακός επιπωματισμός

Παραπομπή

Ι. Μασσαλής, Γ. Ευθυμίου, Ε. Παπαδήμα, Γ. Κωνσταντουδάκης, Ι. Πενταρά, Ι. Αθανασούλα, Π. Γκανάς. Επείγουσα θωρακοτομή μετά από νηγμώδη τραυματισμό της καρδιάς. Δύο περιστατικά καρδιακού επιπωματισμού και η αντιμετώπισή τους σε περιφερειακό νοσοκομείο. Επιστημονικά Χρονικά 2017; 22(1): 91-97

Συγγραφέας επικοινωνίας

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