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Emergency Thoracotomy- Isolated Internal Thoracic Artery Injury

Shariful Islam*, Shah J and Narayn Singh V

Department of Clinical Surgical Sciences, University of the West Indies, St Augustine, Trinidad and Tobago

Abstract

Aim: A tension haemothorax is an uncommon injury after penetrating chest trauma. **Presentation of a Case:** We present a case in which a 55 year old man sustained multiple thoracic stab wounds. He had emergency right antero-lateral thoracotomy and laparotomy. A massive haemothorax secondary to complete disruption of right internal mammary artery and a laceration to middle lobe of right lung was noticed. **Conclusion:** Penetrating thoracic injury with isolated internal mammary injury is a very rare cause of massive haemothorax and associated with high mortality. Emergent thoracotomy can be life-saving for these patients. **Introduction:** Anterior thoracic penetrating injuries may result in life-threatening complications. One of these is massive tension haemothorax with pericardial tamponade as a result of stab wounds to the internal mammary artery.

Case Report

A 55 year old chronic alcoholic, male presented to the San Fernando General Hospital of Trinidad and Tobago after sustaining multiple [1] stab wounds (SW) to the chest & upper abdomen [2]. He was in hypovolemic shock with a blood pressure of 70/30 mm Hg and pulse rate of 140 beats per minute. Multiple [3] stab wounds were noted, in his right anterior chest wall medial to mid-clavicular line and one in left parasternal area at 4th ICS just cutting through the cartilage but not penetrating into the chest and two stab wound just below the tip of xyphoid process of sternum of which one is penetrating into abdomen (Figure 1).

A right chest was placed and immediately drained 1200mls of blood FAST & CXR were done moment after arrival in ED. The FAST revealed no blood in pericardial sac, however minimal free fluid was noted in the abdomen. The CXR later on showed complete opacification of entire right lung (Figure 2).

Right chest tube continue to drain blood with further drop in blood pressure of 40/25 mm Hg, immediately take to OR within 15-20 minutes of arrival in ED. However, en-route to OR, patient had a sudden cardiac arrest which was successfully resuscitated with a minutes of CRP and proceeds immediately to the OR. The pleural cavity was entered through a right antero-lateral thoracotomy incision in the 4th intercostal space under aseptic condition (Figure 3).

Right hemothorax was confirmed with laceration of right internal thoracic artery with active bleeding and small 1x1cm laceration to

middle lobe of right lung. The pericardium was felt empty with no evidence of blood in the pericardial cavity. The bleeding vessel was controlled initially by digital pressure and then ligated proximally and distally. Simple repair of lung laceration was done (Figure 4).

A midline laparotomy revealed a 3 cm laceration to left lobe of liver with no active bleeding and there were minimal blood in the peritoneal cavity with no other visceral injury. The chest and abdomen was closed respectively leaving a 32 size chest tube in right pleural cavity. The estimated blood loss was approximately 6 litres. Patient received multiple transfusions of blood and blood products. Patient was managed in ICU for 2 day and subsequently transferred to the surgical ward where he developed delirium tremens secondary to withdrawal of alcohol. Patient recovered completely well from the incident and discharged home on 8th post-operative day.

Discussion

Injury to Internal mammary artery is infrequently reported in literature. It can be a result of penetrating or blunt trauma, both of rare in occurrence but still with serious consequences [4,5]. Others have described internal mammary injury that had occurred from central line insertion [5]. There are only five cases of isolated IMA injury patient with successful recovery after emergency thoracotomy has been reported in the literature.

Among the 4 penetrating injuries two [6,7] were hemodynamically unstable & the next 2 [8] were hemodynamically stable. Only one patient had early [7] and next two patients had late pericardial tamponade [9,10] and last one [6] presented with early external pericardial tamponade. Of the 4 penetrating injuries patients only 2 had early [6,7] and 1 had delayed massive hemothorax [8] however,



Figure 1: Sites of Stab wound on chest and wound.

*Corresponding author: Shariful Islam, Department of Clinical Surgical Sciences, University of the West Indies, St Augustine, Trinidad and Tobago, Tel: 868-797-4951; Fax: 868-797-4951; E-mail: shar_islam7@hotmail.com

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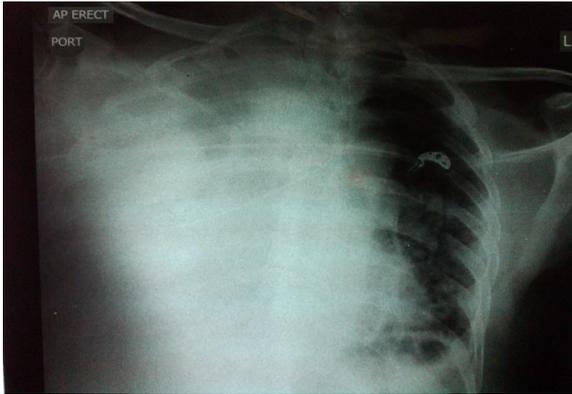


Figure 2: C x R AP showing complete white out of right hemi-thorax.



Figure 3: Right antero-lateral thoracotomy incision..

the next one had no massive hemothorax [9] Two of the penetrating injuries patients underwent median sternotomy [7,9] and the next two underwent anterolateral thoracotomy [6,8]. The lone blunt injury patient presented with delayed peri-cardial tamponade and was hemodynamically stable with no massive hemothorax and underwent median sternotomy [10] . Only one case has documented pre hospital arrest [6]. Our patient presented in a hemo-dynamically unstable condition with multiple stab wounds in the chest with massive tension hemothorax with early external cardiac tamponade. Our patient had a witnessed cardiac arrest just moment before OR, was successfully resuscitated and underwent emergency thoracotomy with ligation IMA with an excellent full recovery (Table I).

As noted from the above, the presentation of internal-mammary injury varies from relatively stable patient that can be studied in a timely manner to identify the source of hemothorax, to a delayed presentation of massive hemothorax that mandate thoracotomy [11,12] . The treatment depends on patient hemodynamic status. With simultaneous resuscitation with placement of a chest tube to immediately release the tension hemothorax is the first line of intervention in patient who has signs of life in ED. However, once cardiac arrest is witnessed 5 minutes prior to Ed or in ED ER thoracotomy should be performed, if there is a surgeon in the institution rendering the care. The injured internal mammary may be treated based on the clinical presentation. If patient is hemo-dynamically stable and facilities are available the angio-embolization of the injured vessels are recommended.

Conclusion

Penetrating thoracic injury with isolated IMA injury is a very rare cause of massive haemothorax and associated with high mortality. Appropriate and Quick selections of the ideal patients for ED or OR thoracotomy are paramount important for successful outcomes.

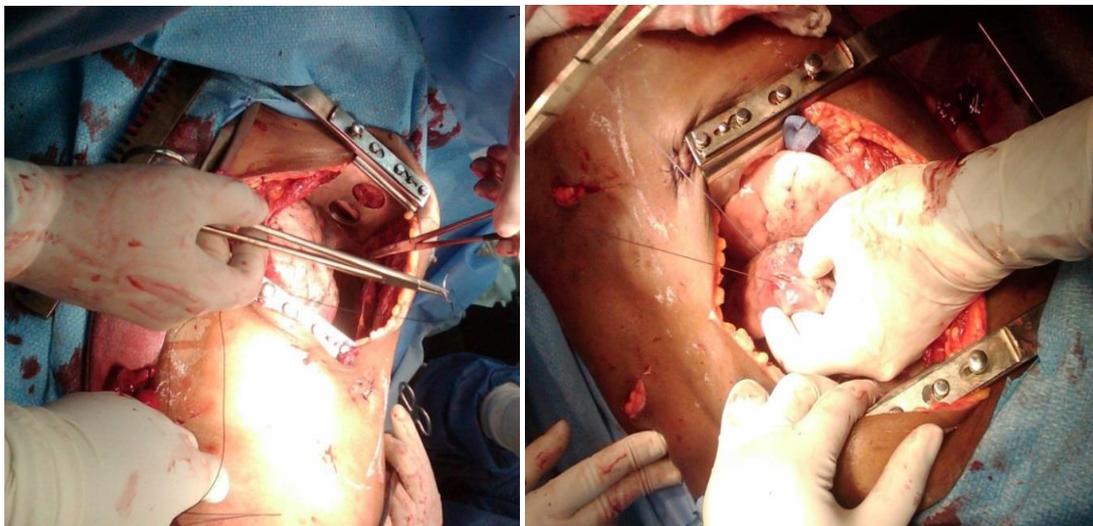


Figure 4: Chest opened & Right IMA is clamped & suture ligated, repair of lung laceration.

Table I: Summary of the Review of literature of internal mammary artery injuries.

Study	Mechanism of injury	Hemodynamic	Pericardial Tamponade	Massive Hemothorax	Surgery	Outcome
Curley et al. (1987)[12]	Penetrating	Unstable	Early	Early	Sternotomy	Alive
Vinces (2005) [6]	Penetrating	Stable	Delayed	Delayed	Thoracotomy	Alive
Holt et al. (2005) [11]	Penetrating	Stable	Delayed	No	Sternotomy	Alive
Irgau et al. (1995) [8]	Blunt	Stable	Delayed external	No	Sternotomy	Alive
Hassani (2012) [1]	Penetrating	Unstable	Early external	Early	Thoracotomy	Alive
Current case	Penetrating	Unstable	Early external	Early	Thoracotomy	Alive

Conflict of interest

The authors have no conflict of interest to report.

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