

A CASE PRESENTATION, MANAGEMENT, DISCUSSION AND SHARING OF INFORMATION ON PENETRATING CHEST INJURY

BY:

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General Data:

E.J.

29 –years- old

Male

Baseco, Port Area, Manila

Chief Complaint:

Stab wound, 5th ICS PAL, Left

HISTORY OF PRESENT ILLNESS

NOI: stabbing
TOI: 8:00 pm
DOI: October 4, 2006
POI: Port Area, Manila

Patient was walking alone after a drinking session when suddenly was approached by an unknown assailant and allegedly stabbed on the back by a “balisong”. Patient was then brought to our institution.

Physical Examination

- General Survey:
 - Conscious, coherent, not in respiratory distress
- Vital Signs
 - BP = 110/ 60 mmHg CR = 89 bpm
 - RR = 23cpm

Physical Examination

- HEENT:
 - pink palpebral conjunctivae, anicteric sclerae, PERLA
- Chest:
 - Symmetrical chest expansion, no retractions, decreased breath sounds on the Left lung field, dullness on percussion

Physical Examination



- Stab wound level of the 5th intercostal space , PAL , left (3cm)

Physical Examination

- Cardiac:
 - Normal rate, regular rhythm, no murmur

Physical Examination

- Abdomen:
 - Flat, soft, nontender, no mass
- Extremities:
 - Full and equal pulses, no deformities

Salient Features

- 29 y/o male
- Not in Cardiorespiratory distress
- Stabwound, 5th ICS PAL, Left
- Decreased Breath Sounds left
- Dullness on Percussion

ALGORITHM

Stab Wound, 5th ICS, PAL, Left

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graph TD; A[Stab Wound, 5th ICS, PAL, Left] --> B[Penetrating]; A --> C[Non-Penetrating]; B --> D[Lungs]; B --> E[Heart]; B --> F[Vascular];
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The diagram is a flowchart on a blue background. At the top, the text 'Stab Wound, 5th ICS, PAL, Left' is written in white. A vertical white line descends from this text and splits into two horizontal white lines. The left horizontal line leads to the word 'Penetrating' in white, and the right horizontal line leads to the words 'Non-Penetrating' in white. From 'Penetrating', three diagonal white lines branch out downwards to the words 'Lungs', 'Heart', and 'Vascular', which are also in white. The word 'Lungs' is split as 'Lung' on the top line and 's' on the bottom line. The word 'Vascular' is split as 'Vascula' on the top line and 'r' on the bottom line.

Penetrating

Non-Penetrating

Lung
s

Heart

Vascula
r

Initial Impression

	<i>Diagnosis</i>	<i>Certainty</i>
<i>Primary Diagnosis</i>	Hemothorax 2ndary to Penetrating Chest Injury	85%
<i>Secondary Diagnosis</i>	Non Penetrating Chest Injury	15%

Paraclinical Diagnostic Procedure

- Do I need to perform a paraclinical diagnostic procedure?

“Yes”

Goals of Paraclinical

- To be more certain in diagnosis.
- To determine my treatment plan.

Options

	Benefit	Risk	Cost	Availability
X-Ray	Sensitivity: 20.9 % Pneumothorax: (+) Hemothorax: (+) Specificity: 98.7 %	Exposure to radiation	P200	available
Ultrasound	Sensitivity: 48.8% Pneumothorax: (++) Hemothorax: (+) Specificity: 99.6%	No radiation exposure	P600	available
CT-Scan	Sensitivity: 100% Pneumothorax: (+++) Hemothorax: (+++) Specificity: 100%	Exposure to radiation	P6000	Not readily available

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Chest X-ray



Pre-treatment Diagnosis

	<i>Diagnosis</i>	<i>Certainty</i>
<i>Primary Diagnosis</i>	Hemothorax 2ndary to Penetrating Chest Injury	99%
<i>Secondary Diagnosis</i>	Non Penetrating Chest Injury	1%

Pre Treatment Diagnosis

Hemothorax, Left

Secondary to Penetrating Chest
Injury

GOALS OF TREATMENT

- Resolution of hemothorax
- Full re- expansion of left lung
- Monitor for ongoing bleeding

Treatment Options

	Benefit	Risk	Cost	Availability
Tube Thoracostomy	<ul style="list-style-type: none"> -Complete evacuation of fluid -can monitor ongoing bleeding 	<ul style="list-style-type: none"> - Injury to adjacent structure 	P10000	available
Thoracentesis	<ul style="list-style-type: none"> -Useful in small hemothorax -incomplete evacuation 	<ul style="list-style-type: none"> -Injury to adjacent structure 	P5000	available

Treatment Options

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Management

CHEST TUBE THORACOSTOMY, LEFT

Preoperative Preparation

- Informed consent
- Provide psychosocial support
- Optimize patient condition
 - Hydration
 - Antibiotics
 - ATS 6000 units TIM () ANST
 - TT 0.5 ml TIM

Operative technique

- Patient semi-sitting with the ipsilateral arm placed above the head to expose the lateral aspect of the chest
- chest prepared with antiseptic solution
- draped to create a sterile field
- large bore chest tube (F36) placed to facilitate adequate drainage

Operative technique



Operative technique

- 5th ICS midaxillary line identified and skin, periosteum, and pleura anesthetized with 1% lidocaine
- transverse incision made over the underlying space
- blunt dissection continued with Kelly clamp
- clamp passed adjacent to the superior surface of the rib to prevent injury to the intercostals neurovascular bundle

Operative technique



Operative technique

- entry into the pleural space confirmed with rush of blood-filled fluid
- finger inserted into the pleural space to identify any pleural adhesions
- Fr 36 chest tube inserted into the pleural space on a Kelly clamp and directed posteriorly
- tube secured with a silk 0 suture

Operative technique



Operative technique



Operative technique

- attached to a water sealed thora-bottle
- insertion site dressed gauze and covered with air-tight dressing
- initial and subsequent drainage recorded
- post-procedure chest film obtained

Operative Findings

- 550cc of fresh non clotted blood evacuated

Postoperative Management

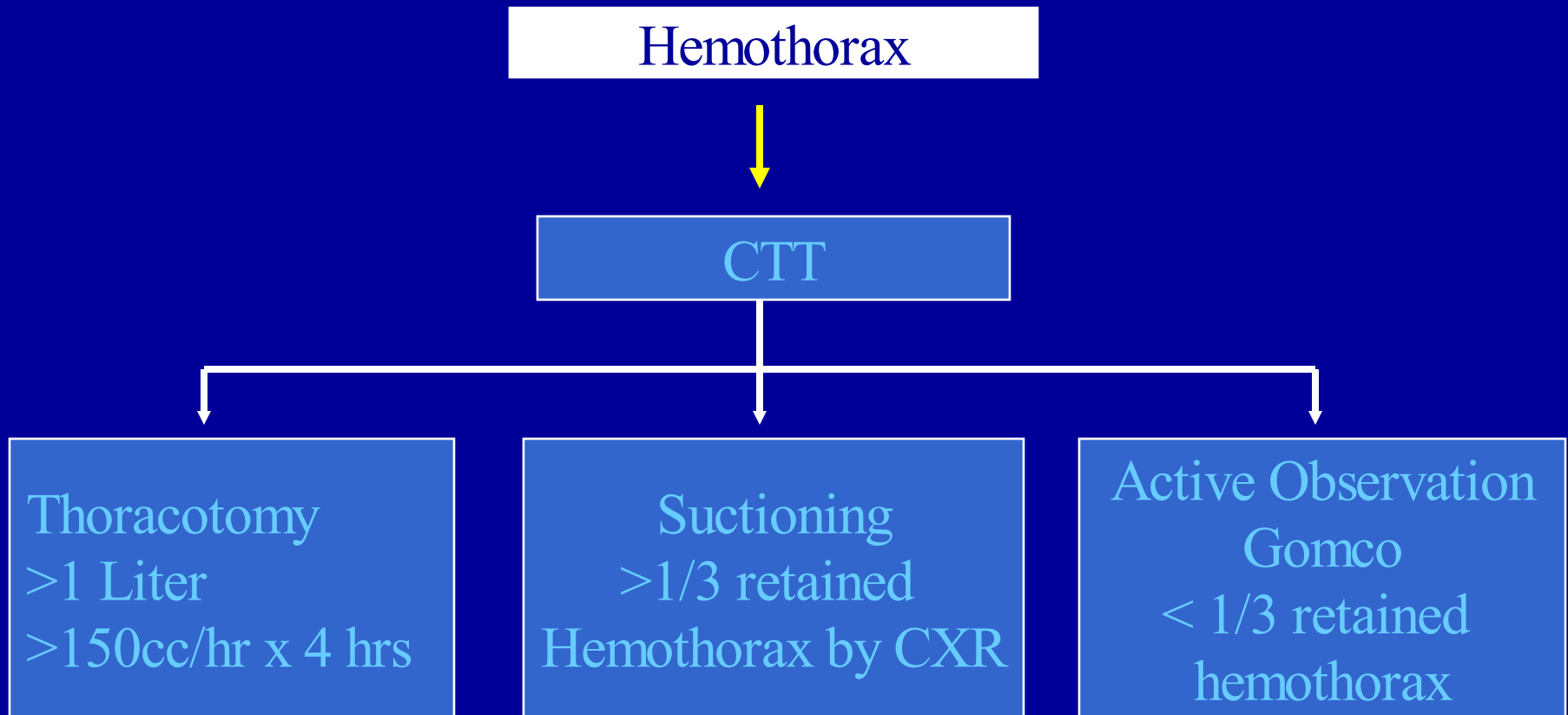
- Adequate analgesia
- Monitoring of CT output

Protocol on CTT

- May proceed to thoracotomy if:
 - initial output is ≥ 1000 cc of blood
 - There is continuous CTT output of more than 150cc/hour

Protocol on Prevention of Posttraumatic Retained Hemothorax

Department of Surgery, OMMC



•Turiñgan H, Hernandez D, Joson O. Posttraumatic Retained Hemothorax – Incidence, Prevention and Management with Suctioning. Published PJSS,2004

Post CTT CXR

- Marked resolution of Pneumohemothorax



Final Diagnosis

S/P Chest Tube Thoracostomy Left for
Pneumohemothorax, Left
Secondary to Penetrating Stab Wound
5th ICS Posterior Axillary Line Left

COURSE IN THE WARD

- 1st Hospital Day
 - DAT
 - Moderate to high back rest
 - Adequate Antibiotic
 - Adequate Analgesia
 - Blow bottle exercises

COURSE IN THE WARD

- 2nd-3rd Hospital Day
 - DAT
 - Moderate to high back rest
 - Adequate Antibiotic
 - Adequate Analgesia
 - Blow bottle exercises
 - Change of thorax bottle with CT output monitoring

COURSE IN THE WARD

- 4th Hospital Day
 - Repeat CXR done
 - Chest tube removed

COURSE IN THE WARD

- 5th Hospital Day
 - Patient discharged

Repeat Chest x-ray prior to discharge noted



PREVENTION AND HEALTH PROMOTION

- Advise given to patient regarding
 - Possible complications
 - Proper wound care
 - OPD follow up after 7 days for removal of sutures

SHARING OF INFORMATION

Evaluation & Management

1. Assess airway & establish adequate ventilation.
2. Stabilize circulation.
3. Get good history, P. E.

THORACIC TRAUMA

Potentially lethal injuries:

- *Hemothorax*
- *Pneumothorax*
- tension pneumothorax
- myocardial contusion
- sucking chest wound
- cardiac tamponade
- aortic rupture

Hemothorax

- collection of blood in the pleural space
- may be caused by blunt or penetrating trauma

Hemothorax

- Most are the result of:
 - rib fractures
 - lung parenchymal
 - minor venous injuriesand as such are *self-limiting*
- Less commonly there is an arterial injury, more likely to require surgical repair.



Pneumothorax

- the collection of air in the pleural space
- air may come from:
 - injury to the lung tissue
 - bronchial tear
 - chest wall injury allowing air to be sucked in from the outside.

Pneumothorax

- Simple pneumothorax
 - A simple pneumothorax is a non-expanding collection of air around the lung.



Pneumothorax

- Tension pneumothorax
 - the progressive build-up of air within the pleural space, usually due to a lung laceration which allows air to escape into the pleural space but not to return.



Diagnosis of Hemothorax

- Most small-moderate hemothoraces are not detectable by physical examination and will be identified only on Chest X-ray, **FAST** or CT scan.
- Larger and more clinically significant hemothoraces may be identified clinically and should be treated promptly.

Physical examination

- Chest examination may indicate the presence of significant thoracic trauma with external bruising or lacerations, or palpable crepitus indicating the presence of rib fractures.
- There may be evidence of a penetrating injury over the affected hemithorax.
- Don't forget to examine the back!



The classic signs of a hemothorax

- decreased chest expansion
- dullness to percussion
- reduced breath sounds in the affected hemothorax.

Complications

- Retained Hemothorax
- Empyema

Complications

- Failure to adequately drain a haemothorax:
 - initially results in residual, clotted haemothorax which will not drain via a chest tube
 - left untreated, these retained haemothoraces may become infected and lead to empyema formation

Complications

- If uninfected:
 - clot will organise and fibrose
 - resulting in a loss of lung volume → impaired pulmonary function

References

- **Mattox KL, Allen MK. Systematic approach to pneumothorax, haemothorax, pneumomediastinum and subcutaneous emphysema. Injury. 1986;17:309-312.**
- **Fallon W, Barnosci A, Mancuso C, Injury to the Chest, Complications and Management: Experience at a Level I Trauma Center, Top Emerg Med 1990.**
- **Turiñgan H, Hernandez D, Joson O. Posttraumatic Retained Hemothorax – Incidence, Prevention and Management with Suctioning Published PJSS,2004.**
- **Joson R. Management of a Surgical Patient, 2001**

Questions

#1 (MCQ)

On physical examination, all of the following are the classic signs of hemothorax except?

- c. Decreased breath sounds
- d. Decreased lung expansion
- e. Dullness on percussion
- f. Tracheal deviation

Questions

#1 (MCQ)

On physical examination, all of the following are the classic signs of hemothorax except?

- c. Decreased breath sounds
- d. Decreased lung expansion
- e. Dullness on percussion
- f. Tracheal deviation

Questions

#2 (MCQ)

The progressive build-up of air within the pleural space, usually due to a lung laceration which allows air to escape into the pleural space but not to return is also known as:

- c. Simple pneumothorax
- d. Open pneumothorax
- e. Tension pneumothorax
- f. All of the above

Questions

#2 (MCQ)

The progressive build-up of air within the pleural space, usually due to a lung laceration which allows air to escape into the pleural space but not to return is also known as:

- c. Simple pneumothorax
- d. Open pneumothorax
- e. Tension pneumothorax
- f. All of the above

Questions

#3 (MCR)

According to OMMC Department of Surgery Protocol, thoracotomy is indicated in the following conditions:

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

4. Initial output of 1,000 cc
5. Initial output of 1,500 cc
6. Output of ≥ 150 cc/hour
7. Output of ≥ 200 cc/hour

Questions

#3 (MCR)

According to OMMC Department of Surgery Protocol, thoracotomy is indicated in the following conditions:

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

4. Initial output of 1,000 cc
5. Initial output of 1,500 cc
6. Output of ≥ 150 cc/hour
7. Output of ≥ 200 cc/hour

Questions

#4 (MCR)

The following are possible complications of tube thoracostomy:

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

4. Empyema
5. Retained hemothorax
6. Volume loss
7. Subcutaneous emphysema

Questions

#4 (MCR)

The following are possible complications of tube thoracostomy

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

4. Empyema
5. Retained hemothorax
6. Volume loss
7. Subcutaneous emphysema

Questions

#5 (MCR)

Indications for Chest tube suctioning includes the following:

(a = 1,2,3; b = 1,3; c = 2,4; d = 4 only; e = all)

4. Non fluctuating chest tube
5. Retained hemothorax occupying more than 1/4 of the lung field
6. Output greater than 150 cc/hour
7. Retained hemothorax occupying more than 1/3 of the lung field

Questions

#5 (MCR)

Indications for Chest tube suctioning includes the following:

(a = 1,2,3; b = 1,3; c = 2,4; **d = 4 only**; e = all)

4. Non fluctuating chest tube
5. Retained hemothorax occupying more than 1/4 of the lung field
6. Output greater than 150 cc/hour
7. **Retained hemothorax occupying more than 1/3 of the lung field**

Thank you!