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REVIEW ARTICLE **OPEN ACCESS**

Thoracic Trauma and its Management

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ABSTRACT
PTSD is the recognized term for the psychological response to emotional trauma. Depression, anxiety, previously felt stressful memories, and recurrent nightmares are some of its symptoms. Receiving patient at the hospital with trauma is as important as managing patient at injury cite. The current study reveals that of not properly detected and treated during the main survey, thoracic injury—which is frequent in polytrauma patients—can pose life-threatening issues
Key Words: *Trauma Management, Anxiety, PTSD, Emotional Balance*

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INTRODUCTION

The Greek term for "wound" is trauma. Nowadays Trauma is generally used as something related to emotional scars or emotional wounds, even though the Greeks solely used the term to describe physical wounds. We now understand that psychological effects from a traumatic experience can last for a very long time after any physical wounds have healed. PTSD is the recognized term for the psychological response to emotional trauma. Depression, anxiety, previously felt stressful memories, and recurrent nightmares are some of its symptoms. It typically manifests after a highly stressful experience, such as loss of dear ones, uncalled calamities etc. Trauma is about assessing the patient rightly while assessing injuries, planning life preserving therapies, many of injuries, traumas and deaths can be prevented with early diagnosis and prompt treatment. Road traffic accident alone account for high mortality than any other systemic diseases. According to WHO: RTA will account for second most common reason for death in world. World's most common challenges are lack in technological advancement, inadequate infrastructure, unskilled caregivers. Most trauma deaths are due to lack of thorough survey which is required to be done in first hour of Trauma, also known as Golden Hour. Trauma care is depend on the first hour assessment done in Golden hour which decide the pathway and recovery progress in the patient with Trauma [1].

Preparation

Preparation is done in different settings, broadly it is divided into two major settings such as field i.e. events take place outside the hospital and clinical i.e. hospital setting where preparations are done to enable quick resuscitation of trauma patients.

Prehospital Phase (field):

During this field patient is monitored for airway management, management of excessive bleeding, shock, immobilization of the patient and prompt transfer to the nearest suitable facility, preferably a trauma center of recognized standing. In this phase providers must take prompt action to minimize the required time needed to shift patient to the nearest facility.

Information to be noted at the time of receiving patient during prehospital phase are as follow:-

1) **Time of injury/Trauma**
2) **Degree of Injury/Trauma**
3) **History of patient**
4) **Drug related history**

All these information is required to collect at prehospital phase in order to manage Triage. In triage hemodynamic management along with inspection of an injury to know the degree or severity of trauma. First, GCS monitoring→ measures of vital signs → anatomy of injury→ special patient such as older adults, children, patient with head injury, bleeding disorders, burns, pregnancy -----→ Transfer patient to nearest Trauma center for further managements.

Hospital Phase (Clinical setting):

Receiving patient at the hospital with trauma is as important as managing patient at injury cite. Hospital should assign designated team leader for receiving any trauma case from outside. Team leader should make sure that the all necessary information is provided to the resuscitation team on time, clearly, there should not be any confusion, and important information must be repeated twice.

1. Resuscitation place should be ready before receiving patient to the hospital.
2. All articles such as crash cart with airway management equipment must be ready at the bedside. Spare bed and crash cart should always be ready as a back-up
3. Intravenous colloids especially in warm condition should always be ready for the emergency condition.
4. Easy access to laboratory should be there, all investigation are to made on time to rule out the cause of injury/trauma.
5. Use of PPE/Standard precaution should be used in all cases, under any given scenarios.

Triage:

It is process of segregating patients according to the resources needed and the actual resources available in the hand. Treatment is based on (ABC model) protecting airway with cervical spine, Breathing and circulation with hemorrhage control. Triage is broadly divided into two management – multiple casualties and mass casualties.

Multiple Casualties:

It refers to the incidents with numerous casualties when the majority of patients and the degree of trauma is equal to or less than the facility's capacity to provide care. In these cases patient with potentially fatal issues, serious illness are tended to be treated first.

Mass Casualties:

It refers to the percentage of patients and the degree of their trauma do surpass the capacity of the hospital and personnel in mass casualty incidents. In these situations, the patients who have the best chances of survival and who require the least amount of time, resources, staff, and equipment, are treated first.

Primary Survey:

Based on the patients' injuries, vital signs, and the mechanisms causing the injuries, patients are evaluated and their treatment needs are prioritized. Based on the patient's overall assessment, logical and sequential therapy priorities are set. The critical functions of the patient must be evaluated immediately and effectively. Rapid initial survey and simultaneous resuscitation of critical management should be done for a patient to assess to vital functions.

Management hold up rapid and efficient primary survey which includes prompt recognition and resuscitation of vital functions followed by secondary management.

It includes:

Airway management with restriction of cervical spine
Breathing and ventilation
Circulation and hemorrhage control
Disability (assessment of level of consciousness and other various neurological functions)
Exposure and environmental control

Secondary Survey

When patient has undergone for all essentials of Primary survey then can move for secondary survey assessment. Whole resuscitation of airway, breathing, circulation, disability and exposure to be assessed thoroughly followed with secondary survey there should not be any information left to collect from primary survey, Personnel can be divided for the assessment- one personnel can take care of complete primary survey while other can start with the secondary, there should not be any interference of one personnel with other. Both the surveys to be rechecked by the Team leader or Head of the unit for the proper management. Secondary survey includes History taking, Physical examination from Head to Toe, assessment of vital signs and reassessment of any missing or unnoticed injury.

Thoracic Trauma

It is a substantial cause of death; in fact, many thoracic trauma patients pass away before getting to the hospital. An early and prompt diagnosis if made could avert these fatalities. <10% of chest injuries are blunt. About 15 to 30 percent of chest injuries are penetrating need active intervention. Many of the ideas mentioned may applicable to autoimmune thoracic injuries in this chapter such as pneumothorax or hemothorax from esophageal and central line placement damage is found to be caused during an endoscopy.

Primary Survey- Generally all the primary surveys of thoracic trauma include airway- related injuries or obstructions.

1. **Airway obstruction**

When vomit is swallowed into the airway, it can cause edema, hemorrhage, or airway obstruction by obstructing gas exchange. This kind of issue might be brought on by several damage processes. Major thoracic trauma, a neck-on-neck hit, an improperly positioned shoulder constraint across the neck, or a direct impact to the neck can all cause laryngeal injury. There are times when an airway obstruction results from the posterior dislocation of the clavicular head. On the other hand, penetrating injuries to the chest or neck might cause injury and blood, which causes obstruction. Acute airway obstruction caused by laryngeal trauma is a life-threatening injury, despite the clinical presentation being occasionally moderate.

In order to treat patients with airway obstruction, suctioning could be used to remove blood or vomit from the airway. This action is typically only

Creating a temporary airway and positioning a permanent one is required. Check your palps for any defects in the area of the Steno scapular-clavicular joint minimizing a posterior dislocation or clavicle fracture by stretching the patient's shoulders or grabbing the collarbone with a piercing hand towel clamp that can make the impediment less noticeable. The reduction usually stays steady as long as the patient is present or lying down in that position (supine).

2. Tracheobronchial Tree Injury

Injury of a major bronchus or the trachea is a rare but potentially lethal ailment. Within 1 inch (2.54 cm) of the carina, tracheobronchial tree injuries predominate. The majority of victims pass away at the spot due to these injuries, which can be serious. There is a high death risk among those who survive the journey to the hospital due to comorbid injuries, insufficient airway management, or the emergence of tension pneumothorax or tension pneumopericardium**.**

Increased respiratory rate and alterations in the patient's breathing pattern—often characterized by progressively shallow respirations—are important, though frequently subtle, indicators of chest injury and/or hypoxia. It's important to remember that cyanosis, a late symptom of hypoxia in trauma patients, can be challenging to see in people with darkly pigmented skin. Cyanosis is not a guarantee of sufficient oxygen consumption or a functioning airway.

3. Tension Pneumothorax

Tension Pneumothorax it is when a lung or chest wall develops a "one-way valve" air leak, air is pushed into to the chest cavity and eventually causes the damaged lung to collapse. By shifting the mediastinum to the opposite side, the opposing lung is compressed and venous drainage is reduced. Shock is brought on by a significant decline in venous return, which lowers cardiac output. Mechanical positive-pressure breathing in patients with visceral pleural damage is the leading cause of tension pneumothorax.

Analyze breathing pattern by assessing Tension pneumothorax symptoms include a hyper-resonant note on the percussion, a deviated trachea, swollen neck veins, and no breath sounds. Pulse oximetry should be used to measure arterial saturation because it will drop in the presence of tension pneumothorax. An extended FAST exam can be used to diagnose tension pneumothorax when ultrasound is available. Decompression is required right away for tension pneumothorax, which can first be treated by quickly inserting a sizable needle into to the pleural cavity. Needle decompression may not be successful due to the varied thickness of the chest wall, the catheter kinking, as well as other technical or anatomic issues.

4. Open Pneumothorax

An open pneumothorax, often known as a sucking chest wound, can arise from significant chest wall abnormalities that are still open. There is an instantaneous equivalence between intrathoracic pressure and air pressure. Whenever the incision in the chest is 3/4 the size of the trachea or larger, air travels predominantly through the chest wall gap with each inspiration because air prefers to take the path of least resistance. As a result, there is reduced effective ventilation, which results in hypoxia and hypercarbia. When treating an open pneumothorax, seal the wound as soon as possible using a sterile dressing that is big enough to overlap the margins of the wound. To allow for quick assessment to continue, any occlusive dressing (such as plastic wrap) may be applied as a temporary solution.

The dressing's open end permits air to exit the pleural area during exhalation. If a chest tube is not present, taping the dressing's four edges could result in a tension pneumothorax due to air building up in the thoracic cavity. As soon as it is possible, place a chest tube well away from the wound.

5. Massive Hemothorax

By squeezing the lung and inhibiting sufficient oxygenation and ventilation, a major hemothorax with a deposit of >1500 ml of blood on one side of the chest can seriously hinder respiratory efforts. Request an urgent surgical consultation, place a chest tube to assist ventilation and oxygenation, and start the required resuscitation procedures. Massive acute blood buildup causes shock and hypotension.

The neck veins in patients with significant hemothorax may be flat from severe hypovolemia or they may be swollen if there is a tension pneumothorax present. Massive intrathoracic blood seldom shifts the mediastinum enough mechanically to result in enlarged neck veins. When shock is accompanied by a lack of breath sounds or a dullness to percussion on one side of the chest, a huge hemothorax is a possibility.

The first step in treating a massive hemothorax is to decompress the chest cavity while also increasing blood volume. Establish large capacity intravenous lines, administer crystalloid, and start uncross-matched or type-specific blood transfusions as soon as it is possible. When necessary, blood from the tube can sometimes be collected in an autotransfusion-compatible device.

6. Cardiac Tamponade

Pressure of the heart caused by a buildup of fluids with in pericardial space is known as cardiac tamponade. Due to the heart's lower blood inflow, this causes a reduction in cardiac output. Given the permanent fibrous nature of the human pericardial sac, even a very little amount of blood can limit heart function and obstruct cardiac filling. The most frequent cause of cardiac tamponade is penetrating trauma, but blunt trauma can also lead the sac to fill with blood in the heart, major blood vessels, or epicardial arteries. Cardiac tamponade may develop gradually, necessitating some less immediate evaluation, or suddenly, necessitating an immediate diagnosis and course of therapy. Cardiac tamponade does not always result in the routine clinical trial of muffled heart sounds, low blood pressure, and dilated veins. It's challenging to hear murmured heartbeats.

In the busy resuscitation room, muffled heart sounds are challenging to detect, and hypovolemia may prevent the presence of neck veins that would normally be swollen. A real paradox venous pressure abnormality linked to tamponade is the Kussmaul's sign, which is the increase in venous pressure on inspiration when breathing naturally. PEA is indicative of cardiac tamponade although, as previously mentioned, it can also have other causes.

Secondary Survey-

Additional, in-depth physical examinations, continuing Electrocardiograph and pulse oximetry monitoring, arterial blood gas (ABG) measurements, upright chest x-rays throughout patient populations without suspected spinal column instability, and chest computed tomography (CT) scans in selected patients with suspected aortic or spinal injury are all part of the secondary survey of patients with thoracic trauma. The chest film should be examined for broadening of a thoracic cavity, a shift of the midline, and loss of anatomic detail in additional to lung expansion and the presence of fluid. Numerous rib fractures and fractures to the first or second rib(s) indicate that the thorax and underlying tissues were subjected to a large amount of stress. Pneumothoraxes and hemothoraces have both been identified using extended FAST. Other possibly fatal injuries, however, are not depicted clearly even on USG, X-ray is a necessary part for the evaluation.

Other potentially fatal injuries are frequently not apparent on initial physical examinations, in contrast to potentially life-threatening illnesses that are identified during the primary survey. High levels of suspicion and the proper application of supplementary studies are necessary for diagnosis. These injuries, if ignored, can cause more severe problems and even death. During the secondary survey, the seven potentially fatal injuries listed below should be recognized and treated:

1. **Simple Pneumothorax**
2. **Hemothorax**
3. **Flail Chest and Pulmonary Contusion**
4. **Blunt Cardiac Injury**
5. **Traumatic Aortic Disruption**
6. **Traumatic Diaphragmatic Injury**
7. **Blunt Esophageal Rupture**

SUMMARY

1) If not properly detected and treated during the main survey, thoracic injury—which is frequent in polytrauma patients—can pose life-threatening issues. The majority of the time, relatively straightforward interventions including elective intubation, mechanical ventilation, tube thoracostomy, or fluid resuscitation can be used to treat these individuals or temporarily alleviate their illnesses. Clinicians who possess the expertise to carry out the required procedures and the capacity to recognize these serious injuries can save lives. Management of Obstructions in airway and other above stated injuries are included in the primary survey.

2) The secondary survey comprises identifying and treating the above stated seven potentially fatal injuries along with prompt and early identification of diseases through Radiography. Chest crush injuries, subcutaneous emphysema, rib, scapula, and sternum injuries are only a few thoracic trauma symptoms that may signal a higher risk of additional injuries.

REFERENCES

1. Brasel K, Stafford R, Tenquist J, Borgstrom &, Weigelt J.(1998); Treatment of occult pneumothoraces from blunt trauma. The Journal of Trauma: Injury, Infection, and Critical Care. 1998;45(1):191.

2. Egan T. (2017). Gold standard perioperative analgesia for severe chest trauma 2013 meeting the nhs England major trauma services quality indicators.pp345
3. Clancy K, Velopulos C, Bilaniuk J, Collier B, Crowley W, Kurek S et al.(2012): Screening for blunt cardiac injury. Journal of Trauma and Acute Care Surgery. 2012;73(5):S301-S306.
4. Mayglothling J, Duane T, Gibbs M, McCunn M, Legome E, Eastman A et al.(2012): Emergency tracheal intubation immediately following traumatic injury. Journal of Trauma and Acute Care Surgery. 2012;73(5):S333-S340.
5. Yu H, Isaacson A, Burke C.(2017): Management of Traumatic Hemothorax, Retained Hemothorax, and Other Thoracic Collections. Current Trauma Reports. 2017;3(3):181-189.
6. M. Stewart R.(2018): Advanced trauma life support. 10th ed. 2018.

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