Case Report

Management of a Severe Thoracoabdominal Injury from Motorized Sawing Machine in a Temporary Semi-Urban University Teaching Hospital: A case report

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ABSTRACT

BACKGROUND: Report of our experience and outcome of a case of severe thoracoabdominal injuries by motorized sawing machine (a rare cause) in a Semi-Urban temporary University Teaching Hospital.

METHOD: Literature review on the topic was done using Pubmed. Relevant journals and topics were also reviewed. Textbooks on relevant topics were also searched

RESULTS: A 25 year old male timber-cutter was traumatized by motorized sawing machine injuring the left half of the chest, upper abdomen, the left shoulder and left hand. It is an unusual presentation of penetrating thoracoabdominal injury. There was open pneumotharax, 3th-8th ribs fractures, diaphragmatic laceration, and eviscerations of abdominal contents without affecting other thoraco-abdominal organs. Urgent surgical intervention done was the only option.

CONCLUSIONS: The challenges posed by severe motorized sawing machine thoraco-abdominal injuries in a Semi-Urban temporary University Teaching Hospital were successfully managed due to rapid pre-hospital transfer and co-ordinated team effort.

KEY WORDS: Severe thoracoabdominal injuries. Motorized sawing machine, Semi-Urban temporary University Teaching Hospital.

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INTRODUCTION

Thoracoabdominal injuries from motorized sawing machines are relatively unusual and uncommon as reported cases in the literature were hard to find from the internet and local manual search[1-3]. Management of severe thoracoabdominal injuries posses' challenges to surgeons and anesthetists[1-4] as the extent of injury is unknown and there is inadequate time for evaluation and resuscitation of the patient. We describe the successful management of a case of severe thoracoabdominal injuries from motorized sawing machine, first of its kind in our Semi-Urban temporary University Teaching Hospital without functional Intensive Care facilities. Informed consent was obtained from the patient for publication of this case report and the accompanying images.

CASE REPORT

A 25-year-old male timber-cutter presented at the Accident and Emergency Department of the Niger Delta University Teaching Hospital (NDUTH) Okolobiri with an hour history of injuries involving left aspect of the chest, upper part of the abdomen, the left shoulder (Photograph 1 and 2), and left hand caused by the motorized sawing machine (Figure 2) said to have slipped out of his hands. Resuscitation with intravenous infusions and oxygen by face mask was initiated at the Accident and Emergency Room. Patient is single with no significant past history of ill health. Patient smokes marijuana and drinks alcohol occasionally.

No family history of psychiatric disorder. On arrival, patient was conscious, well oriented but had excruciating pain. The pulse rate was 120 beats per minute, blood pressure 110/60 mmHg and his arterial oxygen saturation was 85%. Respiratory rate was difficult to record with open anterior chest wall with paradoxical respiration. Laceration of the left anterior chest wall was from the third rib extending to the umbilical area of the abdomen, exposure of the left lung and evisceration of stomach and intestine (Photographs 1 and 2). Patient also had other lacerations at the left deltoid region and left hand extending from the base of the little finger to the wrist.

Findings at urgent surgical intervention in theatre after general anesthesia with intubation were; -open pneumothorax, fractured 3rd to 8th ribs, laceration of the diaphragm of about 8cm without injuries to other thoracic organs. The anterior abdominal wall was completely lacerated with evisceration of the stomach and intestines but no bowel injuries.

A 32F chest tube was inserted via 6th intercoastal space, mid-axillary line and connected to under water seal bottle. The diaphragmatic laceration was repaired with chromic 1 and chest wound closed in layers with Nylon 2 sutures to appose the ribs and intercoastal muscles. Abdominal wound was closed by mass closure with Nylon 2 suture after copious irrigation with normal saline and insertion of uribag as drain. Part of the hand injuires was sutured and the rest were allowed to heal by secondary intention. Patient was transfused with 4units of whole blood. Prophylactic intravenous antibiotic cover, consisting of Ceftrazone, Mentronidazole and Gentamycin were administered. Post operative recovery was uneventful. However, on the 17th post-operative day, he displayed behavioral abnormalities and was seen by a Psychiatrist, who made an impression of Bipolar disorder, Manic, with psychotic features probable due to drug withdrawal. He was subsequently referred to a

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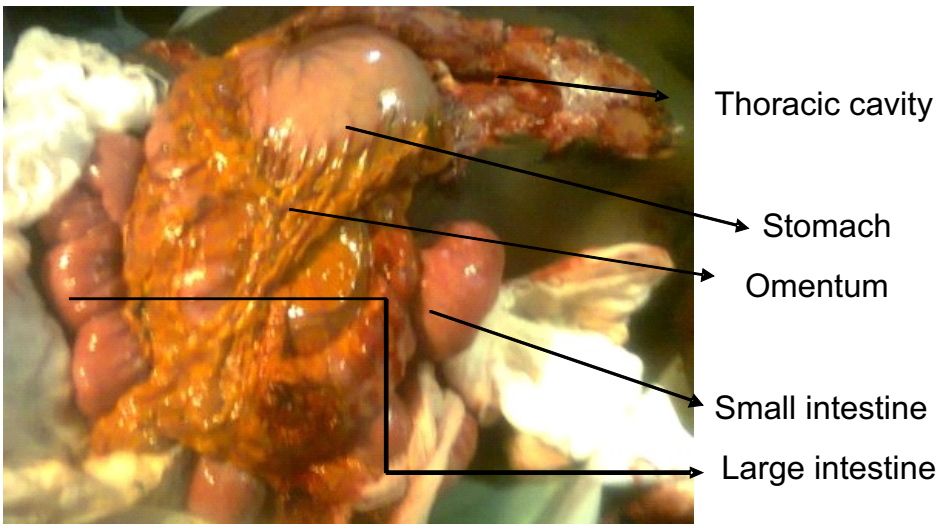
hospital with psychiatric facility for specialist care and has recovered fully. Chest tube was removed 30 days post operation after a check chest X-ray. He was discharged home for out-patient clinic follow-up.

Photograph 1: Exposed thoraco-abdominal enviserated abdominal organs



Photograph 2: Exposed Left lung and Fractured ribs

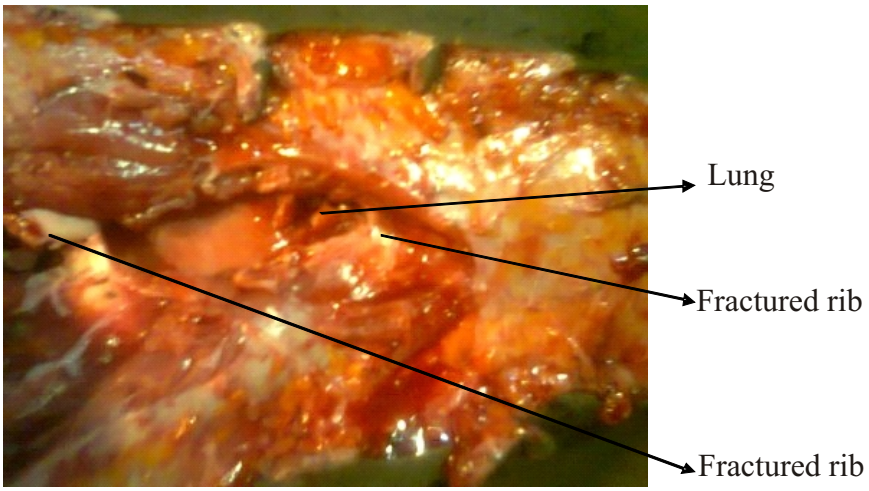


FIGURE 1: At discharge to show extent of thoracoabdominal laceration

FIGURE 2: Motorized Sawing Machine that caused thoracoabdominal injuries in this patient

DISCUSSION

Penetrating thoracoabdominal injuries from various impalements with various degrees of severity of penetrating trauma have been reported[1-5]. Motorized sawing machine as a cause of severe penetrating thoracoabdominal injuries is yet to be reported in our environment. Thoracoabdominal injuries usually involve vital organs, compromising the normal physiology of respiration and circulation. As in any other trauma scenario, there is a trimodal distribution of death. Early deaths occurring within 30 minutes to 3 hours are secondary to hypoxemia, airway obstruction, hemorrhage, haemothorax, cardiac tamponade and aspiration. Complications associated with chest trauma include tracheobronchial tree disruption, diaphragmatic tear, oesophageal disruption, myocardial contusion, pulmonary contusion and thoracic aorta rupture[1-5]. Our patient had injuries involving the left aspect of the chest , upper part of the abdomen, the left shoulder and left hand caused by the motorized sawing machine which could lead to serious morbidity and mortality in view of the proximity to the vital organs (Photographs 1 and 2).

Patients that survive penetrating thoracic injuries are more likely to have sustained injury on the right side, as there is reduced risk of striking the heart or great vessels which are on the left side[1-3]. In such situations rapid transportation of the critically ill patient, resuscitation and urgent surgical intervention are essential for survival. Patients who reach the hospital alive generally have high chances of survival. Our patient reached this hospital within one hour of the injury. Multiple life threatening injuries, unknown nature and extent of injury, perioperative management of penetrating thoracoabdominal injuries presents a challenge for anesthesia as well as surgery[4=6]. Major goals in thoracic trauma resuscitation are optimizing tissue oxygen delivery, control of bleeding and restoration of the intravascular volume.

Most reports suggest that patients in these situations should be rapidly assessed by a targeted examination[1-6]. Radiographic or other time-consuming investigations should not delay definitive management[1-6]. In our patient, only grouping and cross-marching of blood was technically possible and no other tests were deemed necessary for prompt management. Intravenous induction agents such as propofol and thiopentone may cause a fall in the blood pressure due to vasodilatation and direct myocardial depression[1,5]. Therefore these should be avoided or administered in titrated doses in hemodynamically unstable patients or patients with suspected cardiovascular compromise. Ketamine is considered useful and safe for inducing anesthesia in patients with cardiac tamponade as it produces sympathetic nervous system stimulation[1,5]. Ketamine was used for induction and intubation of our patient as there was no earlier history of psychiatric disorder in this patient. Ideally nitrous oxide should be avoided in cases where there is a possibility of closed, unventilated spaces as it makes the patient prone to atelectasis. Anesthesia was maintained with nitrous oxide in oxygen after excluding thoracic organ injuries. Post operative care without intensive care facilities was a big challenge in the care of this patient. Intermittent oxygen by simple face mask was administered for 72 hours as there was no respirator. At some centres, adequate pain relief using thoracic epidural catheter helps in early extubation of patients to enable deep breathing and coughing more effectively in thoracic injuires[1-3]. This facilitates patient's co-operation for chest physiotherapy. As this was not possible in this hospital, a combination of analgesics (Pentazosine and Diclofanac) was administered to relief pain in this patient. Adegboye et al[6] stated that associated abdominal and thoracic injuries were the commonest causes of mortality among the patients with diaphragmatic injuries in blunt trauma patients and diaphragmatic injury is said to be a predictor of severity of the injury. They reported 34.5% mortality in their study. This patient with severe thoracoabdominal injuries (Figure 1) from an unusual cause (Motorized Sawing Machine, Figure 2) survived in a centre in developmental stages with inadequate necessary required facilities.

CONCLUSION

A properly trained general surgeon can make appropriate decisions and perform life-saving surgery in severe thoracoabdominal injuries in emergency situations. Surgeons and anesthesiologists must be prepared to modify routine techniques in the face of unusual situations. Effective and timely interventions with a co-ordinate and trained team work are assets in reducing morbidity and mortality in such a patient.

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