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Case Report

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Loss of a Life that could be Saved: A Case Report of Gunshot Trauma and Review of Literature

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ABSTRACT

Thoracoabdominal gunshot wounds (GSWs) present a formidable clinical challenge due to the potential involvement of both thoracic and abdominal organs. We present the case of a 45-year-old male who sustained a self-inflicted gunshot wound to the left chest. Despite hemodynamic stability on admission, critical elements of trauma evaluation—including general surgery consultation and full secondary survey—were omitted. Initial CT imaging revealed pulmonary injury, hemothorax, minimal pneumothorax, and elevated left hemidiaphragm, but failed to identify intraabdominal pathology. The following day, the patient collapsed due to metabolic acidosis and septic shock. Exploratory thoracotomy and laparotomy revealed massive hemoperitoneum, a grade 4 splenic injury, and dual gastric perforations. Although surgical repair and resuscitative efforts were undertaken, the patient developed ventilator-associated pneumonia, refractory sepsis, and multiorgan failure, ultimately leading to death. This case illustrates the dangers of incomplete trauma assessment and overreliance on imaging in the evaluation of thoracoabdominal GSWs. Diaphragmatic injuries and associated visceral trauma can be subtle or initially occult, particularly on the left side. A high index of suspicion, adherence to trauma protocols, and early multidisciplinary collaboration are essential to avoid missed injuries and improve patient outcomes.

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Introduction

The overall incidence of truncal penetrating trauma has been decreasing and is estimated to account for approximately 10% of all trauma evaluations. Among these, nearly 50% are attributed to gunshot wounds (GSWs) [1]. According to the 2016 Global Burden of Disease Firearm Injury Report, firearm-related injuries increased globally from 209,000 in 1990 to 251,000 in 2016. Despite this, the overall mortality rate decreased from 4.2% to 3.4% [2]. Of these deaths, 64% were due to homicide, 27% to suicide, and 9% to accidental causes [2].

The thoracoabdominal zone, also referred to as the intrathoracic abdomen, is the anatomical region between the 4th intercostal space anteriorly, the 6th intercostal space laterally, the 8th intercostal space posteriorly, and the subcostal margin inferiorly [3]. Penetrating injuries in this zone can compromise multiple structures, including the diaphragm, lungs, heart, abdominal viscera, and major intrathoracic vessels [4]. The complexity of anatomy in this region makes gunshot wounds particularly challenging to assess and manage. The specific organs injured depend largely on bullet entry point and trajectory. The stomach, spleen, liver, and colon are among the most commonly affected, depending on the diaphragm's position at the time of injury [5].

The diaphragm is a musculotendinous structure separating the thoracic and abdominal cavities. Elevation or palsy of a hemidiaphragm can occur secondary to neuromuscular diseases, phrenic nerve injury, lung pathology, or cerebrovascular events [6]. These conditions are often asymptomatic and typically detected incidentally during chest radiography or computed tomography (CT) [7].

Case Report

A 45-year-old male presented to our emergency department via ambulance after a self-inflicted gunshot wound to the chest. He was hemodynamically stable upon admission, oriented, and without neurologic deficits. He had undergone prostate cancer surgery five months earlier and reported being severely depressed. He stated that he attempted suicide by shooting himself in the chest, aiming at his heart, using his own 9mm pistol. He was right-handed and had a Glasgow Coma Scale score of 15. His vital signs were consistent with Class I hemorrhagic shock heart rate 115 bpm and blood pressure 110/70 mmHg [8].

Examination revealed a gunshot entry wound beneath the left nipple and an exit wound at the inferomedial border of the left scapula. No other injuries were present. Auscultation revealed decreased breath sounds on the left hemithorax. The abdomen was soft and non-tender. Following primary resuscitation with intravenous fluids, thoracoabdominal CT was performed.

CT imaging showed an intrapulmonary hematoma, hemothorax, minimal pneumothorax, and an elevated left hemidiaphragm (Figure 1). A chest tube was inserted, and 300 cc of hemorrhagic fluid was initially drained. Echocardiography revealed no pericardial effusion, effectively excluding cardiac injury. Emergency physicians did not suspect intraabdominal involvement and did not request a general surgery consultation. Once stabilized, the patient was admitted to the thoracic surgery ward.

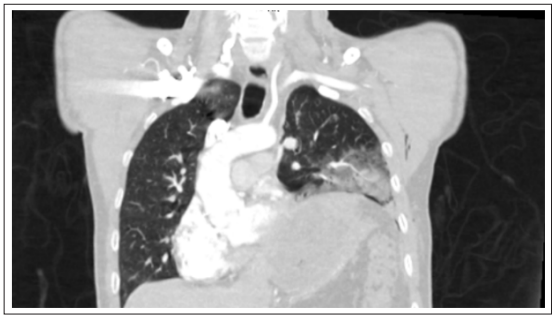

Figure 1: Initial CT coronary image showing intrapulmonary hematoma with hemathorax and minimal pneumothorax.

He remained under observation in the thoracic surgery service overnight. The next morning, while ambulating in the ward, the patient collapsed. Arterial blood gas analysis revealed severe metabolic acidosis: pH 6.96, serum lactate 6.5 mmol/L, and standard base excess (SBE) -22.3. The patient was stabilized with norepinephrine infusion and fluid resuscitation and transferred to the intensive care unit (ICU).

Within 24 hours, 600 cc of bilious, hemorrhagic fluid appeared in the thoracic drain. The patient became somnolent, developed septic shock, and required intubation. General surgery was finally consulted. Emergency surgery was scheduled in coordination with thoracic surgery.

Anterolateral thoracotomy revealed ongoing pulmonary bleeding, controlled with primary sutures. A 2 cm anterior diaphragmatic tear was identified and repaired. Midline laparotomy revealed more than 2000 cc of bile-stained and hemorrhagic fluid in the peritoneal cavity, a grade 4 splenic injury, and two gastric perforations (2 cm on the anterior wall and 1 cm on the posterior wall). The anterior gastric injury was resected with a stapler, and a splenectomy was performed. A 1 cm posterior diaphragmatic defect was also repaired (Figure 2).

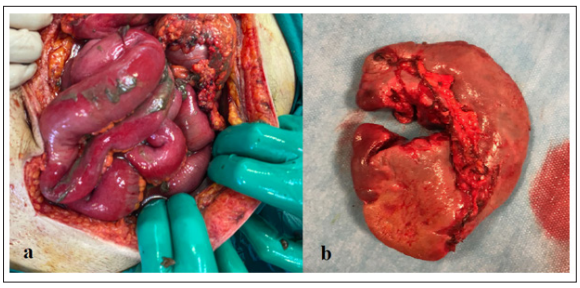

Figure 2: Peroperative findings. a) Intestinal and fibrinous material is shown on intestinal segments. b) Shattered splenic hilum and splenectomy specimen

Postoperatively, the patient was transferred to the ICU and monitored closely. Despite broad-spectrum antimicrobial and antifungal therapy, extubation was not possible due to persistent sepsis and respiratory compromise. On postoperative day 4, he developed bilateral ventilator-associated pneumonia (VAP), with progressive deterioration (Figure 3). Enteral feeding was initiated on day 7 once drain output became serous. However, oxygenation (FiO_2 requirements) and lung compliance failed to improve.

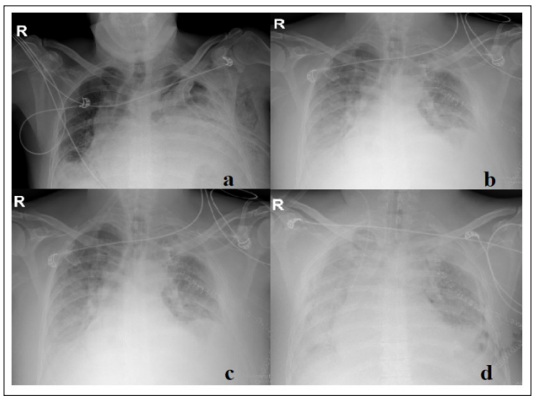

Figure 3: Stages of pnomonia. a) Preoperative b-c-d) Postoperative chest X-ray graphies showing progressive bilateral infiltrations.

On postoperative day 15, bilious drainage was noted in the abdominal drain. A methylene blue test via nasogastric tube revealed no dye in the drain output (Figure 4b). Urine output subsequently declined, and continuous hemodiafiltration was initiated. Given ongoing clinical deterioration and biliary drainage, re-laparotomy was attempted. However, dense adhesions precluded safe entry into the peritoneal cavity (Figure 4a). The patient succumbed to multiorgan failure the following day.

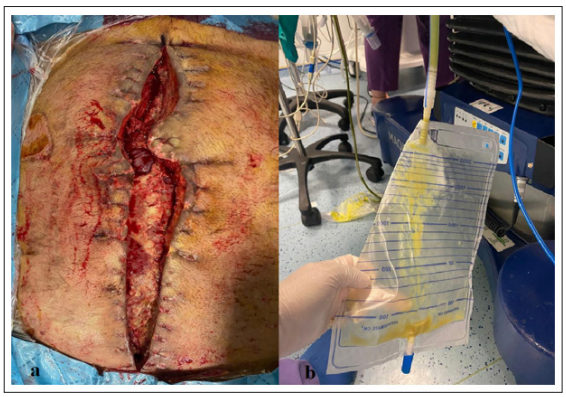

Figure 4: Second operation a) Intraabdominal dense adhesions forbidding any entry into abdomen b) Biliary drainage from abdominal drain, note that there is no methilene staining in the drain.

Discussion

Penetrating torso trauma has long been associated with high mortality, historically reaching up to 31% [9]. Although GSWs are less common than stab wounds, they are more lethal. Advances in imaging and resuscitation now allow for selective nonoperative management of some right-sided thoracoabdominal GSWs [10]. However, most cases—particularly those involving the left side—require surgical exploration.

According to Advanced Trauma Life Support (ATLS) principles, every trauma patient should undergo a complete primary and secondary survey [11]. In this case, critical elements such as nasogastric tube insertion, urinary catheterization, and general surgery consultation were omitted. The absence of these basic

assessments contributed to delayed recognition of intraabdominal injuries.

All trauma patients require a thorough head-to-toe physical examination, including a focused assessment of the thoracoabdominal region. In any case where peritoneal cavity violation is suspected, prompt evaluation by an abdominal surgeon is essential. The placement of a nasogastric (NG) and urinary catheter should be considered as part of the secondary survey, particularly when gastrointestinal or genitourinary tract injury is suspected. The presence of hemorrhagic output from either the NG tube or Foley catheter is an absolute indication for emergent laparotomy [12]. ncomplete physical examination remains one of the most critical and common errors in the initial evaluation of trauma patients.

The injury, although initially thought to be thoracic, was within the anatomical boundaries of the thoracoabdominal region. The elevated hemidiaphragm likely represented pre-existing diaphragmatic palsy, which further complicated clinical interpretation. Diaphragmatic injuries—especially on the left—are frequently missed on initial imaging. Correlation between predicted trajectory and actual injury has been shown to be as low as 31% [13].

For stable patients, triple-contrast CT is the most reliable imaging modality for evaluating thoracoabdominal injuries. In a study of 75 patients without clear indications for laparotomy, CT detected visceral injuries in 26 patients. Among the remaining 49 patients, only one left diaphragmatic injury was missed, the rest were true negatives [14]. n hemodynamically unstable patients, focused abdominal sonography for trauma (FAST) remains a rapid and effective tool, with 85% sensitivity and 98% specificity for detecting hemoperitoneum or hemopericardium [14,15].

Unfortunately, there are some errors to be mentioned in our patient from his first examination to his unfortunate death. Firstly the examination was not complete. A full examination should include NG, urinary catheter and rectal examination if needed. Considering his injury patient should have had a NG catheter, but it is not necessarily diagnostic. In experienced trauma center such as our hospital, a trauma patient should always evaluate such wounds. When there is no trauma surgeon present, gastrointestinal, cardiac and thoracic surgeons should manage such patients in a multidisciplinary fashion. It is a grave mistake not to evaluate other organs while obsessing over the patient's obvious injury.

Secondly, the patient underwent a CT scan; however, the radiology report failed to identify the splenic injury and the presence of free intraperitoneal fluid. Both findings would have constituted clear indications for emergency laparotomy and could potentially have altered the clinical course. It is important to recognize that CT interpretations—like all imaging modalities—are subject to human error, with reported miss rates ranging from 3% to 5% in trauma settings [16]. Therefore, critical images should always be reviewed collaboratively by the trauma team, and discrepancies should prompt reevaluation, especially when clinical suspicion remains high.

Errors in this case include the failure to conduct a complete trauma evaluation, premature dismissal of intraabdominal injury, and overreliance on CT without multidisciplinary interpretation. Radiological error rates for trauma imaging are estimated at 3–5%, necessitating image review in suspected cases [17]. Furthermore, the patient developed orthostatic hypotension despite minimal chest tube output, which should have raised suspicion for concealed intraabdominal hemorrhage [18].

Postoperative deterioration was further complicated by VAP and sepsis. While broad antimicrobial therapy was initiated, the report lacks microbiological data to guide escalation or justify antifungal therapy. Cultures (e.g., blood, drain, tracheal aspirate) would help clarify pathogen profiles and resistance. Early re-look laparotomy may have been beneficial but was delayed. By the time it was attempted, dense adhesions rendered further intervention impossible.

Conclusion

Gunshot wounds involving the thoracoabdominal region require high clinical suspicion and adherence to trauma protocols. Anatomic boundaries are not sufficient to exclude intraabdominal injury; bullet trajectory is often misleading. Comprehensive initial assessment—including nasogastric and urinary catheter placement, appropriate imaging, and early surgical consultation—is critical. In trauma care, early suspicion, repeated evaluation, and multidisciplinary teamwork save lives. This case tragically illustrates the consequences of missed injuries and delayed recognition.

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