

# Laparoscopic Repair of a Computed Tomography-Detected Diaphragmatic Stab Wound

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## Abstract

Traumatic diaphragmatic injuries are associated with delayed diagnosis and consequential morbidity and mortality, due to concomitant injuries of proximal organs overshadowing visibility of the diaphragm as well as the difficulty of the various available modalities to diagnose diaphragmatic injury. The presented case involved a penetrating computed tomography-detected diaphragmatic injury, repaired via abdominal laparoscopy/open technique.

**Keywords:** Diaphragm laceration; CT; Laparoscopic repair; Stab wound

## Introduction

Diaphragmatic penetrating trauma is rare, and often associated with delayed recognition due to late manifestation [1] or concomitant injury to the skeleton, lungs, central nervous system and/or abdominal viscera which obscure the diaphragmatic injuries [2]. Delayed diagnosis is correlated with high mortality rates [2,3], a direct consequence of herniation, strangulation and other complications. Such wounds typically involve a left side injury to the upper abdomen and lower chest, seemingly due to the protective effect of the liver and the typical right-handedness of the assailant [4,5]. An abdominal laparoscopic approach has proven effective in acute diaphragmatic wound closure in stable patients.

## Case Report

A 23-year-old man, self-admitted to the hospital emergency room, reported a stab injury to the left upper abdominal quadrant, the patient was hemodynamic stable and was treated and diagnosed on an ATLS basis, Fluids were administered and the patient remained normotensive. FAST did not reveal any free fluid in his abdomen, and though his clinical status nor did the local exploration of the wound mandated a CT, a high index of suspicion due to the stabbing location, convinced

us that CT will be appropriate. On physical examination, a 3 cm wound in his left upper abdominal quadrant was noted. The patient breathing was normal and no decrease was noted in his saturation. Moreover, no abdominal distention or tenderness was detected. FSAT evaluation of the abdominal area showed no evidence of injury. A Computed Tomography (CT) scan detected a single injury, a diaphragmatic laceration (Figure 1). An abdominal laparoscopic approach was taken for optimal accessibility and correction. However, the operation was converted to an open surgery due to air transfer from the abdominal cavity to the thorax which made the patient ventilation difficult. The diaphragm was corrected by a primary laceration repair approach. The patient was discharged on the 3rd postoperative day.

## Discussion

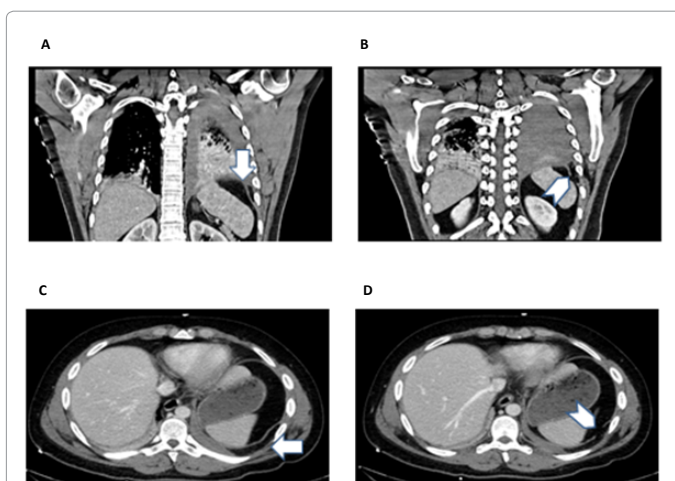
While occult diaphragmatic injuries are difficult to detect, the resulting pleuroperitoneal pressure gradients can be fatal. Thus, a high index of suspicion is necessary upon presentation of thoracic and abdominal injuries, or history of high velocity injuries.

## Conclusion

Diaphragmatic lacerations often go undetected and multiple detection modalities must be exploited, particularly when a suspicion of such injuries is high. Laparoscopic repair of diaphragmatic laceration is suitable and safe however conversion to open must take place once the patient ventilation is endangered.

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**Figure 1:** CT images of a diaphragmatic laceration caused by a stab wound in the thoracoabdominal region. (A,C) Intact spleen and fat at both sides of the diaphragm (arrows). (B,D) Detection of the diaphragmatic laceration (arrows).

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