Transabdominal Minimally Invasive Repair of a Left Chronic Traumatic Diaphragmatic Hernia

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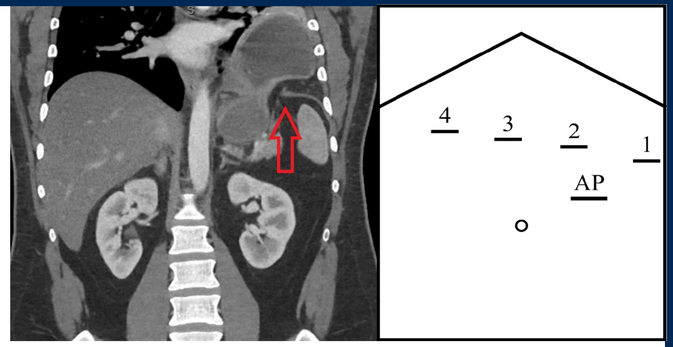
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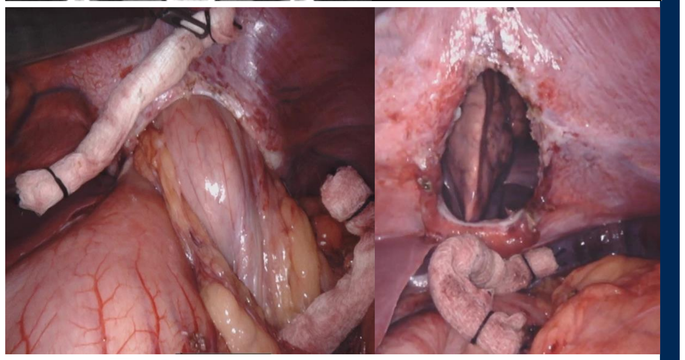
INTRODUCTION

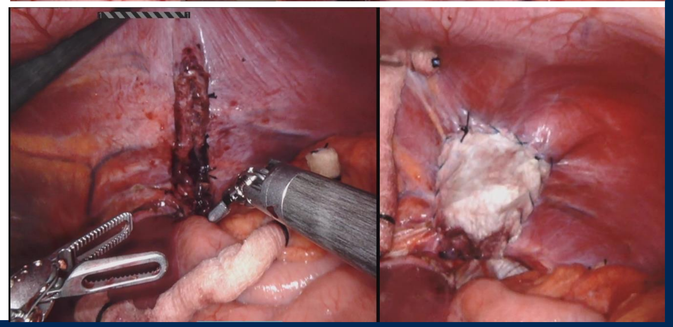
- Traumatic diaphragmatic hernia (TDH) is an entity of unknown incidence, reported to affect 0.8% to 6% of blunt trauma patients and greater than 17% in penetrating trauma.
- The left hemidiaphragm is thought to be more commonly injured due to protective effect of the liver on the right side.
- TDH can be subclassified based on timing after injury:
  - Acute phase - immediately after injury
  - Latent phase - after recovery from acute phase, at which time patients develop symptoms related to TDH
  - Obstructive phase – which begins at the time of incarceration of hernia contents. Patients may develop signs of ischemia, obstruction, or perforation.
- Missed TDH has the potential for serious complications associated with herniation of abdominal viscera.
- Traditionally, TDH is repaired via thoracotomy or laparotomy, but minimally invasive approaches have been described and are likely to confer the benefits associated with minimally invasive surgery.
- This poster describes a successful robotic assisted laparoscopic transabdominal repair of a chronic TDH containing stomach and omentum.
- Intraoperative video may be viewed by using this QR code:

CASE PRESENTATION

- A 32 year-old male was involved in an MVC, and presented to the ER via EMS with left chest and left flank pain. He was noted to be tachycardic and tachypneic. CT imaging revealed left 5th & 6th ribs, and sacral fractures.
- All injuries were managed non-operatively and patient was discharged home four days later.
- Retrospective chart review revealed a large left diaphragmatic defect on initial CT scan, which was missed by the radiology and trauma teams (coronal image on the right).
- He then returned to the hospital approximately two months after his initial presentation, with worsening left upper quadrant abdominal pain, nausea, and abdominal distention, which were exacerbated by oral intake.
- Imaging revealed a diaphragmatic hernia centrally located at the dome of left hemidiaphragm. For repair, we elected for a transabdominal laparoscopic robot-assisted approach.
- Four 8 mm robotic trocars were placed in the upper abdomen along with a 12 mm assistant port (shown in the diagram to the right). Patient was placed in steep reverse Trendelenburg position.
- Adhesions between the stomach, omentum, and diaphragm were lysed. Reduction of the omentum and stomach revealed 5 cm diaphragm defect and moderate amount of intrapleural fluid.
- The defect was closed using 0-silk ties in a horizontal mattress fashion in an anterior to posterior orientation.
- To prevent recurrence, a 10 cm x 12 cm reinforced tissue matrix mesh was also secured using 0 unidirectional barbed suture in a circumferential running fashion
- A left sided 24 Fr chest tube was also placed to evacuate the pleural fluid and allow for lung re-expansion.
- Post-operatively, the patient did very well. His presenting symptoms had completely resolved, and he was discharged home on post-operative day 5 after removal of his chest tube.







DISCUSSION

- The mechanism of TDH in blunt trauma is thought to be due to a sudden increase in the pleuroperitoneal pressure gradient.
- After diaphragmatic rupture, the negative pressure gradient in the chest, along with positive pressure gradient in the abdomen results in a physiologic estimated pressure differential between 7-10 cm H20, which results in frequent herniation of abdominal contents.
- Chronic TDH is traditionally treated via laparotomy or thoracotomy. However, the laparoscopic approach (including robotic assisted) provides excellent exposure.
- Advantages include decreased pain, decreased wound complications, shorter LOS, and quicker return to daily activity.
- Laparoscopy also allows for more complete evaluation of the entire abdominal cavity which may not be feasible with thoracoscopy or thoracotomy.

CONCLUSION

- TDH may be recognized on initial imaging after blunt or penetrating trauma, but is occasionally diagnosed during laparotomy or thoracotomy performed for other injuries.
- Chronic TDH presents has a high risk of strangulation and perforation of abdominal viscera.
- Traditionally, both right and left TDH are repaired via open approach. However, a minimally invasive approach a feasible option and may be more beneficial in post operative care.

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