

Ruptured Right Hemidiaphragm associated with a Ruptured Spleen after Blunt Assault

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1. Review Article

A 63-year-old homeless man presented after sustaining a blunt assault. He was found covered in mud and transported to a Level 1 trauma center. He was alert and oriented with a blood pressure of 130/67 and a pulse rate of 72. His GCS was 15. His abdomen was soft with exquisite tenderness in the right and left lower quadrants and left flank. His admission hemoglobin was 11.7 with a White blood cell count of 10,100 and a platelet count of 188,000. CT of the chest, abdomen and pelvis was performed. The right colon and liver were in the right chest and rupture of the right hemidiaphragm was suspected. There was a moderate right pleural effusion evident. See Figures 1 and 2. Left 9th and 10th rib fractures were noted along with a fragmented spleen and a large laceration extending to the hilum. Moderate to large hemoperitoneum was also evident. See Figure 3.

Although the patient was hemodynamically stable, he was taken to the operating room for definitive care. A ruptured spleen was evident and a splenectomy was performed. The small bowel was evaluated along with the left colon. No intestinal injury was evident. The liver and right colon could not be reduced from the abdominal incision and thus a right anterolateral thoracotomy was performed. The diaphragm was ruptured and the liver and colon were reduced into the peritoneal cavity. The diaphragm was repaired with non-absorbable suture using an interrupted technique. The liver was not bleeding. A right thoracostomy tube was inserted and the chest incision closed. The laparotomy incision was closed

and the patient was transferred to the ICU. He progressed well and was transferred to the floor on his third hospital day. A post-op CXR was performed after the removal of the right chest tube - See Figure 4. The right hemidiaphragm was intact. Mild left lower lobe atelectasis was evident but the patient remained asymptomatic. Post-splenectomy vaccinations were administered. Continuity of care was a major concern during his hospitalization because of the lack of housing. The patient shared that he had a brother. He was contacted and gave permission for the patient to stay with him. The patient was discharged under the care of his brother on hospital day 7.

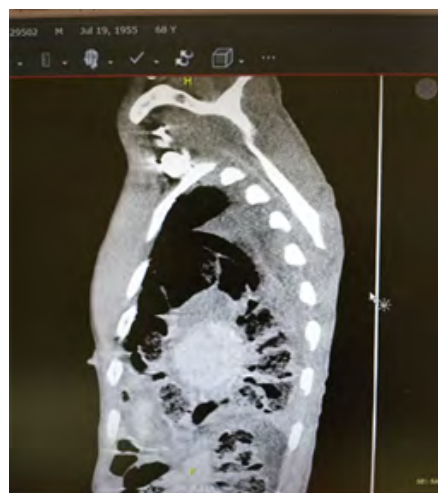


Figure 1:



Figure 2:



Figure 3:



Figure 4:

2. Discussion

Non-operative management for major solid organ injury has become a standard of care. This approach has proven to be safe for children and adults with significant spleen injury [1-4]. Non-operative care of spleen injuries should be pursued in the absence of peritoneal signs, with normal hemodynamics and a conscious and cooperative patient [5,6]. The most powerful predictor of outcome is the presence of normal hemodynamics [7]. Non-operative care was considered for this patient but because of the significant abdominal tenderness operative intervention was selected to exclude bowel injury. Another alternative would have been to repeat the CT with oral contrast and continue ICU observation. One study noted an increase in sensitivity for the presence of bowel injury with a repeat CT [8].

Given this patient lack of housing, it was not clear that consistent follow-up would be possible initially. This was another factor in the decision-making regarding surgery. The patient clearly had rupture of the right hemidiaphragm. This was likely secondary to trauma but was it related to the blunt assault that initially prompted admission. Acute ruptures can usually be reduced via a laparotomy incision. The fact that a thoracotomy was needed to achieve reduction in this instance raises the suspicion that this injury could have been sustained prior to the blunt assault. Repair with non-absorbable suture is routine and good results are usually seen. A final consideration would have been a laparoscopic approach to these injuries. Several reports have emerged highlighting reduction and repair of large diaphragmatic hernias via laparoscopy [9-11]. Evaluation of the diaphragm in patients with penetrating trauma can be facilitated by laparoscopy [12-14]. In the end this patient did well with open surgery. He received his post-splenectomy vaccinations and was seen as an outpatient progressing well.

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