

Late complication of diaphragmatic gunshot injury: appendix perforation due to colon incarceration

Diyafragmatik ateşli silah yaralanmasının geç komplikasyonu: Kolon inkarserasyonuna bağlı apendiks perforasyonu

Bilgi BACA, Tayfun KARAHASANOĞLU, Kaya SARİBEYOĞLU, Pınar ARICA, Ece KOL

Missing the diaphragmatic injury on first admission is often associated with late complications. A 38 year-old male patient is presented here as a case of missed diaphragmatic injury due to gunshot injury resulted with fecal peritonitis. Celiotomy revealed a distended appendix perforation due to herniated left colon obstruction through the left pleural cavity. Left colon and stomach were reduced to peritoneal cavity and diaphragm was repaired with interrupted polypropylene sutures. After being sure about the viability of the colon and stomach, appendectomy with cecal exteriorization was performed. Postoperative period was uneventful. The patient was discharged on the 10th postoperative day. A thorough inspection of the diaphragm is essential in thoraco-abdominal trauma. Repair of the diaphragmatic defects should invariably carried out to avoid life-threatening complications.

Key Words: Hernia, diaphragmatic, traumatic/complications/diagnosis/surgery; missed diaphragmatic injury; tomography, X-Ray computed.

Diyafragma yaralanmalarına ilk başvuruda tanı konulamaması sıklıkla geç komplikasyonlara neden olur. Burada ateşli silah yaralanmasına bağlı atlanmış diyafragma yaralanmasının neden olduğu fekal peritonitli 38 yaşındaki erkek hasta sunulmaktadır. Laparotomi sırasında sol plöral boşluğa fıtıklaşmış sol kolon obstrüksiyonuna ikincil diyastatik apendiks perforasyonu saptandı. Fıtık defekti genişletilerek, mide ve sol kolon karına doğru redukte edildi ve diyafragmatik fıtık polipropilen devamlı dikişlerle tamir edildi. Mide ve kolonun canlılığından emin olduktan sonra, apandektomiye takiben çekal eksteriorizasyon uygulandı. Ameliyat sonrası dönemde herhangi bir komplikasyonla karşılaşılma ve hasta ameliyat sonrası 10. günde taburcu edildi. Torako-abdominal travmalarda diyafragmanın tümüyle gözden geçirilmesi gereklidir. Yaşamı tehdit edici komplikasyonları önlemek amacıyla tüm diyafragma yaralanmaları onarılmalıdır.

Anahtar Sözcükler: Fıtık, travmatik diyafragma/komplikasyonlar/tanı/cerrahi; fark edilmemiş diyafragma yaralanması; tomografi, X-ışını kompütörize.

Although diaphragmatic injury due to trauma is not a rare, diaphragmatic herniation due to diaphragmatic gunshot injury is an uncommon clinical presentation. Penetrating thoracoabdominal injuries carry in particular the risk for overlooking an occult diaphragmatic injury which is commonly a small defect facilitating hollow viscus incarceration. The diaphragmatic injury can be diagnosed in exploratory laparotomy but the diagnosis still remains difficult in the absence of simultaneous organ injury. Diagnostic difficulty of the diaphragmatic injury on first admission is often associated with late complications such as strangula-

tion of viscus. Herein, we present a patient with a late diaphragmatic hernia complication due to gunshot injury.

CASE REPORT

A 38 year-old man was admitted to the gastroenterology department of another institute with complaints of constipation and vomiting for 20 days. Colonoscopy had demonstrated complete obstruction of the splenic flexure of the colon. Histopathologic examination of endoscopic biopsy specimen was active nonspecific colitis. Barium enema graphy had revealed

led two strictures in the splenic flexure presumably secondary to inflammatory bowel disease (Fig. 1). After this period, he was admitted to our emergency clinic with the symptoms of mechanical bowel obstruction. On physical examination, the abdomen was moderately distended. No mass was palpated in the abdomen. Abdominal X-ray showed multiple dilated loops of the small bowel and air-fluid levels (Fig. 2); chest X-ray demonstrated the lumpy contour of the left hemidiaphragm with a minimal pleural effusion (Fig. 3). He had a history of left thoracotomy due to a gunshot injury twenty-five years ago. Thoraco-abdominal CT scan revealed dilated loops of small bowel and colon to splenic flexure, and herniated left colon and stomach through the left hemidiaphragm (Fig. 4). Six hours before the planned elective operation, abdominal guarding was observed. Emergency abdominal exploration revealed feculent contamination in the abdomen caused by distended appendix perforation. Left flexure of the colon and stomach were herniated through a defect of 3x3 cm located in the posterior left hemidiaphragm which is due to a missed gunshot injury. Hernia contents were reduced to abdominal cavity without any iatrogenic injury. Diaphragm was repaired with interrupted 1/0 polypropylene sutures. After being sure about the viability of the colon and stomach, appendectomy with cecal exteriorization was performed.

The postoperative course was uneventful. Neither pneumothorax nor hemothorax occurred. The patient was discharged on the 10th postoperative day. Cecal exteriorization was repaired extraperitoneally three months after discharged. The patient has completely recovered without any sequelae.

DISCUSSION

It is difficult during the initial admission a diaphragmatic injury, especially in penetrating thoracoabdominal trauma, and it remains silent for many years unless a complication develops. In a study of 45 patients, the diagnosis of the diaphragmatic herniation was made in only 29 patients during first admission.^[1] There is usually no clinical symptom to diagnose isolated blunt diaphragmatic injury. The only diagnostic tool is to suspect a diaphragmatic injury.^[2] On the other hand, location of a bullet or stab wound may be helpful to demonstrate a previous missed penetrating diaphragmatic injury. A



Fig. 1. Barium enema graphy reveals partial obstruction in the splenic flexure of colon.



Fig. 2. Dilated small bowel loops in the plain abdominal X-ray.



Fig. 3. Chest X-ray shows elevated left diaphragm and minimal pleural effusion.

delay in diagnosis can be associated with a significant increase in mortality 3%-7% to 25%-30%.^[1,3] An increase in mortality is usually from herniation of abdominal viscera into the thoracic cavity, which subsequently become gangrenous and perforated.^[1,3-7]

Murray et al.^[5] reported that the majority of the patients (62%) with occult diaphragmatic injuries have a normal chest X-ray whereas Demetriades et al.^[3] and Miller et al.^[6] reported this rate as 11% and 43%, respectively. The diagnostic accuracy of the chest X-ray may increase by inserting a nasogastric tube with a radio-opaque tip, when a herniated stomach is suspected.^[3] Because of the lack of clinical and radiographic findings in these patients, authors recommend an aggressive policy in detecting occult diaphragmatic injuries in the acute setting to avoid complications associated with delayed diaphragmatic herniation.^[5] In the present case, although a left thoracotomy had been performed twenty-five years before the second admission, a small diaphragmatic injury at the left costophrenic angle had been overlooked.

The feature of the diaphragm as a partition-wall between abdomen and thorax is of greater importance than its respiratory function. Life threatening complications caused by the defect can include delayed diaphragmatic injury.^[8] Most diaphragmatic tears due to penetrating trauma are less than 2 cm long. Some authors reported that the pressure gradi-

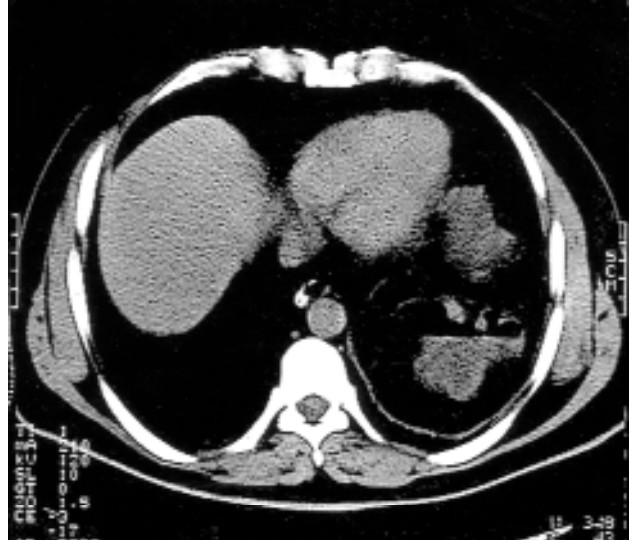


Fig. 4. Herniated left colon and stomach through the left hemidiaphragm are seen in thoraco-abdominal CT scan.

ent between the abdominal and thoracic cavity, and continuous movement of the diaphragm with respiration may enlarge the defect.^[3,8,9] If the defect remains stable as in our case, then it is associated with a higher incidence of strangulation.^[4] It is easier to diagnose the large traumatic rupture of the diaphragm than small ruptures on the first admission, but on the contrary long term results revealed that the complication is much more common in the presence of a small defect.^[1,4] Thus, penetrating thoracoabdominal trauma is particularly important regarding this issue. Review of the literature reveals that small diaphragmatic defects causes the involving organ perforation. A distended appendix perforation is a very rare presentation of a diaphragmatic hernia resulting from a gunshot injury. Laparotomy was performed and incarceration of the colon through the left hemidiaphragm was found to cause complete obstruction.

In the presence of penetrating or blunt thoraco-abdominal injuries, the surgeon should be suspect of a diaphragmatic rupture. The choice of the management depends on the surgeon's experience to diagnose diaphragmatic injury with either monitoring and commenting chest X-rays or performing emergency surgery. In most penetrating diaphragmatic injuries, patients are operated for acute abdomen and the diagnosis of diaphragmatic injury is made intra-operatively.^[3] There is now wide agreement that all left penetrating thoracoabdominal trauma should be surgically (laparoscopy, thoracoscopy, laparotomy

or thoracotomy) explored; for right sided penetrating thoracoabdominal injuries surgical exploration is carried out whenever a pathological sign is found on clinical examination (abdominal or thoracic signs) or imaging studies (hemothorax, pneumothorax etc.).^[10] In cases when an urgent thoracotomy or laparotomy is performed, a thorough inspection of the diaphragm is essential.^[2] Small defects can easily be missed. If the diaphragmatic injury is found, repair of the diaphragmatic injuries regardless of the defect size should invariably be carried out to avoid the need for more complex operations under emergency conditions later.

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