Traumatic abdominal hernia complicated by necrotizing fasciitis

Aleix Martínez-Pérez, M.D., Gonzalo Garrigós-Ortega, M.D., Segundo Ángel Gómez-Abril, M.D., Eva Martí-Martínez, M.D., Teresa Torres-Sánchez, M.D.

Department of General and Digestive Surgery, Hospital Universitario Doctor Peset, Valencia, Spain

ABSTRACT

Necrotizing fasciitis is a critical illness involving skin and soft tissues, which may develop after blunt abdominal trauma causing abdominal wall hernia and representing a great challenge for physicians. A 52-year-old man was brought to the emergency department after a road accident, presenting blunt abdominal trauma with a large non-reducible mass in the lower-right abdomen. A first CT showed abdominal hernia without signs of complication. Three hours after ICU admission, he developed hemodynamic instability. Therefore, a new CT scan was requested, showing signs of hernia complication. He was moved to the operating room where a complete transversal section of an ileal loop was identified. Five hours after surgery, he presented a new episode of hemodynamic instability with signs of skin and soft tissue infection. Due to the high clinical suspicion of necrotizing fasciitis development, wide debridement was performed. Following traumatic abdominal wall hernia (TAWH), patients can present unsuspected injuries in abdominal organs. Helical CT can be falsely negative in the early moments, leading to misdiagnosis. Necrotizing fasciitis is a potentially fatal infection and, consequently, resuscitation measures, wide-spectrum antibiotics, and early surgical debridement are required. This type of fasciitis can develop after blunt abdominal trauma following wall hernia without skin disruption.

Key words: Abdominal trauma; necrotizing fasciitis; surgery; wall hernia.

INTRODUCTION

Traumatic abdominal wall hernia (TAWH), with a low occurrence rate, is usually caused by high-energy traumas where patients can also present unsuspected injuries in the abdominal organs.

While bowel injuries are less frequent (6%),[1] the organs most frequently affected in blunt abdominal trauma are the spleen (30%), liver (25%), and kidney (20%).

In isolated bowel injury, sepsis originated from perforated intestinal loop is the principal severe postoperative complication and the main cause of death. Delay in presentation, diagnosis and treatment result in poor outcomes.[2] Helical CT can be normal in the early moments, leading to misdiagnosis. Necrotizing fasciitis is a critical illness produced by a blunt abdominal trauma causing abdominal wall hernia.

CASE REPORT

A 52-year-old man was brought to the emergency department after a road accident (impact after crashing his motorbike into a car), presenting blunt abdominal trauma (handlebar injury) without CET or loss of consciousness.

A preliminary examination was performed, where the patient remained stable with distended abdomen and presented a new apparition, a large non-reducible mass in the lower-right abdominal region, with eroded skin and surrounding hematoma. Early blood tests showed hemoglobin 13.2 mg/l and 21500 leukocytes with neutrophyia. A chest-abdominal CT was performed, indicating haemoperitoneum in the right hemi-abdomen and a TAWH, without signs of complication. Retroperitoneal and mesenterium hematoma compressing the vena cava were also evidenced.

The patient was admitted in the ICU, with empiric antibiotic therapy; three hours later he suddenly developed hemodynamic instability. After resuscitation, a new CT scan was requested
showing significant changes in the hernia including subcutaneous and intramuscular emphysema, and significant bowel wall thickening (Fig. 1). Due to the suspicion of hollow viscus perforation, the patient was transferred to the operating room.

After skin incision, an important subcutaneous collection with intestinal content was appreciated; however, infectious signs in soft tissues were not evidenced. Fascia and muscle were exposed, and perforation of the peritoneum, due to trauma, was observed. A complete transversal section of an ileal loop was also identified. Lavage of abdominal cavity and a manual terminal ileal anastomosis by suturing the mesenteric defect were performed, and the skin remained open.

Five hours after the procedure, the patient suddenly developed a new episode of hemodynamic instability and physical examination revealed induration of surgical wound with dark fluid flowing from it. Crepitation in adjacent skin was appreciated and was also noted in the thorax and right thigh. Due to the clinical suspicion of necrotizing fasciitis, the patient was immediately transferred to the operating room, where wide debridement was performed by excising necrotized tissues and through lavage using H₂O (Fig. 2).

The patient was re-admitted in the ICU, where his critical management continued with wide-spectrum antibiotics (meropenem, linezolid and fluconazole). A microbiological test of wound liquid indicated growth of E. coli, Enterococcus fecalis, and Streptococcus mitis (Fig. 3). He had a slow recovery consisting continued washing of the wound and decreased

![Figure 1.](image1.png) **Figure 1.** (a) Coronal CT scan upon admittance, showing haemoperitoneum in left abdomen and uncomplicated TAWH with small bowel loop. (b) Coronal CT three hours after ICU admission with important subcutaneous and intramuscular emphysema in the right flank and bowel wall thickening in the hernia, suggesting a bowel perforation.

![Figure 2.](image2.png) **Figure 2.** Day 5: Necrotizing fasciitis affecting the lower anterior abdominal wall and right thigh after wide surgical debridement. Penrose drainages were placed in order to prevent retention of secretions and facilitate subsequent washing.

![Figure 3.](image3.png) **Figure 3.** Antibiotics employed: Day 18: Meropenem was changed with the combination of Piperazilene-Tazobactam + Colistine due to cholestasis. Day 8: Linezolid was changed to Vancomycin for thrombocytopenia.
As observed, in case of high clinical suspicion of bowel perforation in blunt abdominal trauma with 26.3% false negatives, surgical exploration is mandatory. However, early intervention in patients with perforation, surgical exploration is mandatory. However, early intervention in patients with perforation, surgical exploration is mandatory. However, early intervention in patients with perforation, surgical exploration is mandatory. However, early intervention in patients with perforation, surgical exploration is mandatory. However, early intervention in patients with perforation, surgical exploration is mandatory. However, early intervention in patients with perforation, surgical exploration is mandatory.

DISCUSSION

Since the first case of TAWH reported in 1906 by Selby, there have not been many cases published or clinical guidelines validated for its management. This kind of injury is usually produced by high-energy blunt trauma; however, in our case, a low-energy impact (handlebar injury) was the origin. Increase in abdominal pressure associated with a combined tangential force was hypothesized to be the cause of muscle and fascial disruption.[2]

Principal CT bowel perforation signs include bowel wall thickening, bowel wall discontinuity, and presence of extra-luminal air.[3] There are studies on CT effectiveness in hollow viscus perforation in blunt abdominal trauma with 26.3% false negatives in the first CT, which decreases when repeated after 24-72h.[4] As observed, in case of high clinical suspicion of bowel perforation with negative CT, a new CT scan is required.

The infection was considered to have developed before the surgery, due to the presence of subcutaneous and intramuscular emphysema in the preoperative CT scan and the presence of intestinal microflora with absence of skin germs in the culture. It is possible that an earlier radical surgery would have improved the patient’s outcome, but the first intervention revealed no signs of infection, and thus, did not result in a more aggressive management. However, early intervention in TAWH without delayed diagnosis and intervention leads to a significantly better outcome.[5]

Necrotizing fasciitis (NF), not causing mionecrosis, is a potentially fatal infection involving skin, subcutaneous tissue and muscle. Streptococcus group A and Staphylococcus aureus (alone or in synergism) are usually considered the initial infecting bacteria shortly after the start of the onset of the disease contamination with their own aerobic and anaerobic microflora.

Regarding microbological findings, the patient presented NF type I, the most frequent type (70-80%), caused by polymicrobial symbiosis and synergism.[6]

Generally agreed NF therapeutic algorithm include patient’s resuscitation, broad spectrum antibiotics, which must later be adjusted to adequately cover organisms obtained in the initial culture, and early debridement of all dead tissue, which should be repeated every 24-48 hours, obtaining gram stain and culture from the wound. Other measures such as hyperbaric oxygen therapy can be considered in the hemodynamically stable patient, if available.

Antibiotherapy alone is not an option since, among other things, tissue hypoxia and ischemia do not permit an adequate delivery of antibiotics to the tissue. The combination of antibiotics should cover a broad spectrum of anaerobes and aerobes, gram-positive and gram-negative. A combination covering all was used in this patient including meropenem-linezolid-fluconazole; however, others such as penicillin, g-clindamycin-gentamicin have also been used with positive results. Due to the increasing number of MRSA infections, daptomycin or linezolid should be used until the infection is excluded (vancomycin is in use, but it has no effect on exotoxin damage).[7]

It is important to remember that in the case of a high suspicion of bowel perforation in a TAWH with negative CT, it should be repeated. Furthermore, if the second CT scan is also negative and there is still high clinical suspicion of bowel perforation, surgical exploration is mandatory.

There are cases reported in the literature linking NF after abdominal surgery procedures, such as inguinal hernia repair[8] or strangulated umbilical[9] and inguinal[10] hernia. However, we did not find previous reports of NF caused by traumatic abdominal wall hernia.

Conflict of interest: None declared.

REFERENCES

Nekrotizan fasiti ile komplike travmatik abdominal herni

Dr. Aleix Martínez-Pérez, Dr. Gonzalo Garrigós-Ortega, Dr. Segundo Ángel Gómez-Abril, Dr. Eva Martí-Martínez, Dr. Teresa Torres-Sánchez

Genel ve Sindirim Cerrahisi Servisi, Doktor Peset Üniversitesi Hastanesi, Valensiya, İspanya


Anahtar sözcükler: Abdominal travma; cerrahi; duvar hernisi; nekrotizan fasit.