Laparoscopic Repair of Blunt Traumatic Anterior Abdominal Wall Hernia

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ABSTRACT

Traumatic abdominal wall hernia is a relatively uncommon finding secondary to blunt trauma. We report a unique case of laparoscopic diagnosis and immediate repair of a traumatic anterior abdominal wall hernia after blunt abdominal trauma.

Key Words: Trauma, Hernia, Laparoscopy.

CASE REPORT

A 38-year-old woman was a restrained driver of a motor vehicle, traveling at 45 miles per hour, when a large tree branch crashed through the windshield and struck her in the lower abdomen. She was brought to our Level I trauma center awake and alert with stable vital signs. Her only complaint was right lower quadrant abdominal pain. Her past medical and surgical history were noncontributory. The physical examination was significant only for contusion over a tender bulge in the right lower quadrant with intact overlying skin. The patient was a thin individual who denied ever having lower abdominal or inguinal pain or masses; thus, the presence of an asymptomatic hernia was unlikely. The diagnostic workup included a spiral computed tomographic (CT) scan of the abdomen and pelvis with oral and intravenous contrast. The CT scan revealed free fluid in the pelvis with disruption of the musculoaponeurotic layers of the right lower abdominal wall (Figure 1). The patient was brought to the operating room for exploratory laparoscopy.

Exploratory laparoscopy was performed using 3 ports, two 5-mm ports placed in the right and left upper quadrants and a 10-mm port at the umbilicus. Initial inspection revealed a small amount of blood within the pelvis that appeared to be coming from the right lower quadrant where bowel was incarcerated through a defect in the abdominal wall (Figure 2). No other injuries were detected on exploration, including the small bowel from the ligament of Treitz to the ileocecal region. The hernia was reduced and contained the cecum that had a small serosal injury with surrounding contusion (Figure 3). No hernia sac was present. The peritoneal defect was oriented perpendicular to the musculoaponeurotic defect exposing the round ligament as it left the internal ring (Figure 4). Repair was performed using a 15 x 19-cm sheet of Gore-tex™ dual mesh (Flagstaff, AZ) via an intraperitoneal approach. The mesh was secured to Cooper’s ligament and the abdominal wall using an autosuture tacker (U.S. Surgical, Norwalk, CT) (Figure 5). The cecal injury was imbricated with a vicryl suture. The patient was discharged without complications on postoperative day 3.
DISCUSSION

Traumatic abdominal wall hernia is a relatively uncommon finding secondary to blunt trauma. We report a unique case of laparoscopic diagnosis and immediate repair of a traumatic anterior abdominal wall hernia after blunt abdominal trauma.

Abdominal wall injury from blunt trauma can range from a full thickness defect with evisceration to a simple contusion. Traumatic abdominal wall hernias are defined as those occurring after a significant force is exerted to the abdomen in patients without preexisting abdominal wall defects.\textsuperscript{1-3} Absence of a hernia sac is not necessary to define this entity.\textsuperscript{4,5} Our patient did not have a hernia sac or evidence of a preexisting hernia. The pathophysiology leading to hernia development is believed to be a result of a tangential shearing force on the musculoaponeurotic layers associated with an acute increase in intraabdominal pressure, as occurs during a Valsalva maneuver.\textsuperscript{2}

Traumatic abdominal wall hernias have been reported to occur in a variety of regions. The most common are the lower quadrants, lateral to the rectus sheath, and the inguinal area, often secondary to handlebar and seat belt injuries.\textsuperscript{4,6,9} Other mechanisms include crush injuries and falls. Traumatic abdominal wall hernias occurring in the supraumbilical regions are uncommon, probably due to the strength provided by the posterior rectus sheath, but are often accompanied by intraabdominal injuries.\textsuperscript{1} Flank and lumbar hernias have also been reported after blunt trauma.\textsuperscript{10-14} Associated intraabdominal injuries occur in 30% to 44% of patients with traumatic abdominal wall hernias.\textsuperscript{10,15} In a review by Brennenman et al,\textsuperscript{10} out of 910 blunt abdominal trauma victims, 9 had some form of abdominal wall disruption. Of these 9, 4 had rectosigmoid injuries, 6 had pelvic fractures, and 4 had thoracolumbar spine injuries associated with traumatic abdominal wall hernias.

Disruption of the abdominal wall musculature and concomitant intraabdominal injury may not be immediately evident by history and physical examination. Therefore, diagnostic imaging studies, such as CT scan or ultrasound, are indicated in the stable blunt trauma patient. CT may be the optimal radiographic modality allowing adequate visualization of the abdominal wall (enabling differentiation of abdominal hernia from rectus sheath hematoma) as well as for identifying other intraabdominal pathology.
The management of blunt traumatic abdominal wall hernias is dependent on the nature of the associated injuries and the hemodynamic status of the patient. Management at the time of presentation requires laparotomy or laparoscopy to diagnose and treat any intraabdominal injuries. Repair of the abdominal wall hernia can be performed at the time of initial operation or at a second operation. Reconstruction of the abdominal wall is often done by primary approximation of the defect or occasionally by using synthetic mesh. Vargo et al\textsuperscript{14} reported a case in which they successfully utilized laparoscopy to repair a left flank hernia identified in a patient 1 month after initial blunt abdominal trauma.

In our case, the patient underwent exploratory laparoscopy at the time of presentation. The only injuries identified were an acute herniation of the cecum into a defect in the right lower abdominal wall with a small serosal tear of the cecum. The abdominal wall defect was repaired with mesh in a manner similar to that of laparoscopic ventral and inguinal hernia repair. Postoperatively, our patient made an uneventful recovery and was discharged by the third day.

Abdominal wall hernias following blunt trauma although rare have been described in the literature. Diagnosis is made upon clinical suspicion based on the mechanism of injury combined with a careful physical examination, or a diagnostic imaging study, or both of these. Concomitant intraabdominal injuries must be ruled out using laparotomy or laparoscopy. Advantages of laparoscopic abdominal procedures often include a shorter length of stay, a decrease in pain medication require-
ment, and an earlier return to normal activity. Exploratory laparoscopy is increasingly being utilized in carefully selected, hemodynamically stable blunt and penetrating trauma patients to diagnose and treat intraabdominal injuries.\textsuperscript{16,17} When traumatic abdominal wall hernia is diagnosed on laparoscopy, with no obvious injuries that would necessitate laparotomy, repair may be completed laparoscopically. It is apparent that no one procedure may be optimal in all patients, thus each case must be individualized and the appropriate procedure selected.

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