CASE REPORT

Handlebar hernia: A misleading term

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Introduction

Traumatic abdominal wall herniae are a type of acquired hernia secondary to blunt trauma. More than 70 cases have been reported in the literature. A group of injuries differing in pathophysiology and severity of associated findings are included in this context. Two major types of traumatic hernia has been described. The first is a small defect caused by blunt trauma with small instruments, such as a handlebar or the blunt end of a gardening tool handle. The second type is a larger defect sustained during motor vehicle crashes or falls from a height, including the well-known seatbelt syndrome.

Traumatic herniae caused by impalement on a small blunt object are usually low-energy injuries, because high-energy focal impact commonly results in penetrating trauma. Previous investigations have reported conflicting observations on associated intraabdominal injuries. Some suggest that associated intraabdominal injuries are relatively infrequent, while others believe that there is a high rate of visceral injuries. This discrepancy may be explained by mechanism energy levels. Recently, Lane et al. proposed a classification on the basis of the mechanism of trauma. The authors separated traumatic abdominal wall herniae into low- and high-energy injuries, and recommended that their management should be approached based on the likelihood of associated injuries.

We present herein a case of traumatic hernia associated with occult mesenteric arterial tear, to emphasise that impact against a small blunt object represents a heterogeneous group of injuries. The close association of mesenteric injury with traumatic herniae is discussed.

Case report

A 40-year-old man presented to the emergency department with persistent lower abdominal pain after striking an oncoming car while riding his motorcycle at a speed of about 40 mph. The handlebar hit his lower abdomen as he was falling. On admission, he was alert and oriented with a blood pressure 110/70 mmHg and a pulse of 86 min⁻¹. An 8 cm oval swelling was evident in the right lower quadrant with overlying abrasions and bruising of the skin. There was slight guarding of the abdominal wall without rebound tenderness or other peritoneal signs. Bowel sounds were absent. Laboratory data, including a hematocrit of 42%, were within normal limits. Noncontrast computed tomographic (CT) scan showed a disruption of the abdominal wall musculature with herniation of small bowel (Fig. 1). Small amount of intraperitoneal fluid was present in Morison’s pouch. A diagnosis of traumatic
abdominal wall hernia was made. Diagnostic laparoscopy and laparoscopic herniorrhaphy were initially considered.

Half an hour later, prior to surgical intervention, sudden drop in blood pressure to 76/40 mmHg was noted. Emergency laparotomy was carried out through a midline incision. The right rectus abdominis muscle was found ruptured transversely at a level just below the umbilicus, with a loop of small intestine entrapped within the defect. There was no covering peritoneal sac. The peritoneal cavity was entered and approximately 2000 mL of free blood was encountered. There were hematomas of the transverse mesocolon. Profuse bleeding from a spurting vessel of mesocolon was discovered though the transverse colon appeared not devascularised. The bleeder was ligated, and a 4 cm serosal tear in the transverse colon was repaired. No other abdominal injuries were seen. The abdomen and hernia defect were closed using interrupted nonabsorbable sutures. The patient had an uneventful postoperative recovery and remains well without recurrence of hernia in follow-up at 2 years.

Discussion

Traumatic abdominal wall hernia has been defined as herniation through disrupted musculature and fascia with adequate trauma, without skin penetration. Handlebar injury is the commonest reported cause. In 1980, Dimyan et al. applied the term handlebar hernia to describe a patient who was thrown against the handlebar of the motorcycle in a head-on collision with a motorcar.

A number of classification schemes for traumatic herniae based on size of defect, severity of injury and location, and mechanism of injury have been proposed. Traumatic herniae produced by handlebar injuries are caused by sudden localised impact against a small blunt object. According to existing classifications, handlebar herniae are often thought as a focal type of traumatic hernia and associated intraabdominal injuries are infrequent. Nonetheless, transfer of a significant amount of energy from handlebar impalement is possible, such as in a high-speed motorcycle accident, as seen in our patient.

The mechanism of injury is a focal impact resulting in splitting of the muscle fibres without penetration. The skin is relatively elastic as compared to the contracted abdominal wall musculature and remains intact. In herniae with high-energy transfer, a tangential shearing stress of substantial magnitude is involved, because more direct blows allow the energy of impact to penetrate the abdominal wall. A tangential force of this nature to the lateral abdomen results in a defect parallel to the oblique and transversus muscles, whereas insult to the midline results in a defect perpendicular to the rectus fibres. The abdominal wall defect is usually found at anatomic weak points, in the inguinal region or lower abdomen lateral to the rectus sheath. It is suggested that an abrupt increase in intraabdominal pressure is responsible for the poor correlation between the site of impact and the resulting defect. However, an acute rise in intraabdominal pressure alone is more likely to result in a diaphragmatic rupture. The tangential force is a necessary component of the mechanism responsible for abdominal wall disruption. At times, avulsions of the muscles from their insertions in the pelvis or costal arch may be present.

For herniae with low-energy injury, either direct blow or tangential insult occurs at regions of anatomic weakness. This force of local trauma is distributed over an area large enough to prevent a penetrating injury, but not so large as to dissipate this energy. Of note, the common location of these vulnerable areas cannot differentiate low-energy from high-energy injuries. In view of this pathogenesis, it is not surprising that midline herniae are extremely uncommon. The presence of tough fascial envelope affords some inherent protection from this type of injury, thus necessitating a more powerful force to tear the rectus muscle. This explanation is consistent with the clinical observations that supraumbilical hernias are associated with a greater incidence of visceral injuries, probably because of the presence of the posterior rectus sheath above the arcuate line.

It has been shown that 67% of subjects with high-energy mechanism had associated intraabdominal
injury, in contrast with 13% of those with low-energy mechanism. Mesenteric and serosal tears are frequently identified in these patients. There are two possible mechanisms of blunt mesenteric injuries: (1) a crushing force applied to the bowel against the spine; and (2) shearing forces of the bowel and mesentery along the lines of attachment. Obviously, a tangential shearing and tearing force applied to the abdominal wall and points of mesenteric fixation constitutes the common pathophysiology, rather than increased intraabdominal pressure.

Mesenteric injuries may elicit haemorrhage and/or ischemia, in a clinically subtle manner. When devascularising injury is present, resection of the nonviable bowel is inevitable. CT scan has been recommended as the gold standard in the diagnosis of traumatic hernia. However, sensitivity of CT scan in the assessment of mesenteric injuries can be as low as 30%. As our case illustrates, a high index of suspicion is imperative, particularly when the abdominal wall disruption is seen in an atypical site implying that high-energy mechanism may be involved. Other modalities, including diagnostic peritoneal lavage, may be appropriate to this occasion if a negative CT scan is obtained.

In conclusion, the term handlebar hernia is not based on the magnitude of the traumatic force and may be misleading in diagnostic and prognostic evaluation. For patients with handlebar hernia from high-energy injury, the possibility of mesenteric injury must be considered. Awareness of this combination may help prompt recognition of occult injuries and reduce the morbidity as a consequence of the delay in diagnosis.

References