LETTER / Gastrointestinal imaging

Horse kick related injury: Significance of the line of impact

Keywords Horse kick; Injury; Renal contusion; Line of impaction; Delayed diaphragmatic hernia

Horse related injuries have drawn increasing attention due to growing popularity of horse-riding activities around the world [1—4]. A kick from the horse can transfer a huge force up to one ton, thereby resulting in critical blunt force injuries to the body [4,5]. We present a rare case of horse kick related intra-abdominal blunt injury emphasizing the importance of recognizing the path of injury from a line of impaction, which resulted in the hematomas in the subcutaneous region, retroperitoneum, left lower kidney and a delayed diaphragmatic herniation, which may be secondary to increased intra-abdominal pressure.

Case presentation

A 58-year-old farmer presented to our institution after being repeatedly kicked in the left flank and lower chest by his horse. The patient complained of severe left flank pain but remained hemodynamically stable. On physical examination, he was tender in the left lower chest wall and left flank with symmetric chest elevation during respiration; in addition, a 4-cm laceration was noted in the left flank region. Multidetector computed tomography (MDCT) imaging was performed to evaluate the severity of intra-abdominal injury, which revealed contusion of the left renal lower pole parenchyma with a small left perinephric hematoma and contusion with hematomas in subcutaneous and retroperitoneal regions and hematoma along the line of the horse kick impaction (Fig. 1). A follow-up MDCT performed on day 15 for evaluation of dull right upper quadrant pain showed interval involution of the left perinephric hematoma, but also revealed a 2-cm defect in the medial left mid-hemidiaphragm with resultant upward herniation of the intraperitoneal fat into the left lower paracardiac mediastinum, which was not evident on the prior MDCT (comparing Fig. 2A and B with Fig. 2C and D). These findings were compatible with a delayed traumatic diaphragmatic hernia given the fact that it was not seen on the initial CT although pre-existing focal congenital weakness of this diaphragmatic segment might have predisposed to it. Although most of these delayed post-traumatic hernias are filled with intraperitoneal organs and visceral fat due to their late diagnosis, it is possible that only fat herniation within the hernia in our case could be due its early diagnosis. Considering the hemodynamic stable condition, the surgery to correct the post-blunt traumatic delayed diaphragmatic hernia was temporarily withheld for an elective surgery at later date.

Discussion

Horse kick is the second most common form (13.4%) of horse related injury after fall from the horse (60.67%) [4]. Abdominal injuries related to horse kick are uncommon as most injuries occur to the head and face followed by the upper extremities due to the height of the horse [4]. According to the best of the authors’ knowledge, there are a few reports of horse kick injuries to the abdominal solid organs and intestine, but there are no reports of delayed post-traumatic diaphragmatic hernia from horse kick [2,4]. The overall reported incidence of post-traumatic diaphragmatic hernia following major blunt abdominal injury is between 0.8—8%, with 90% of these being from motor vehicle accident; however, it is a frequently unexpected complication which can

Figure 1. Delayed phase coronal reformatted image from the initial MDCT study of the abdomen performed at presentation reveals left renal lower pole contusion with associated small perinephric hematoma (arrow), left flank subcutaneous (bold triangular arrowhead) and retroperitoneal (small arrowhead) contusions and hematoma along the line of the horse kick force impaction.

Abbreviations: MDCT, Multidetector computed tomography.
remain undetected on laparotomy with risk for delayed strangulation of herniated abdominal viscera [6,7]. Traumatic diaphragmatic herniation most commonly occurs in the left posterolateral diaphragm due to increase in abdominal pressure during the trauma, while this portion of the diaphragm is particularly weak and prone to herniation due to its origin from the pleuropitoneal membrane [7]. MDCT is the most commonly used modality for assessing diaphragmatic injury, and there are multiple reported reliable radiologic signs for diagnosing diaphragmatic injury with the most common being diaphragmatic discontinuity (68%) [8–10] as seen in our patient. Other than contrast-enhanced MDCT, the unenhanced MDCT can also make the diagnosis [11]. However, prompt diagnosis of post-traumatic diaphragmatic hernia can still be challenging for both the radiologists and clinicians due to the scarcity of early clinical signs and diversion of attention to other associated injuries [7].

Our patient suffered renal contusion with perinephric hematoma, which regressed over time and did not require further intervention. In addition, our reported case also demonstrated the importance of understanding the abdominal injury as a line of impaction, which resulted in the hematomas in the subcutaneous region, retroperitoneum, left lower kidney and a delayed diaphragmatic herniation, which may be secondary to increased intra-abdominal pressure.

Disclosure of interest
The authors declare that they have no conflicts of interest concerning this article.

References


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