Closed abdominal trauma by bull’s horn

Clinical History:

A 50-year-old man with abdominal trauma due to a bull’s horn impact and enolic intoxication presented with diffuse abdominal pain. Physical examination revealed a painful and erythematous mass in the left lower abdominal quadrant with skin integrity, without signs of peritoneal irritation or presence of penetrating abdominal injury. The patient was haemodynamically stable.

Imaging Findings:

In an abdominal-pelvic CT examination, there was an abdominal wall herniation containing small intestine loops, along with herniated mesentery and extraluminal air in the herniation margin attributable to intestinal perforation, located between the lateral border of the rectus abdominis and left oblique muscles.

There was trabeculation of the retroperitoneal fat with fluid collection adjacent to the psoas iliacus and in the course of the left ureter, findings suspicious of the ureteral injury. To confirm it, the excretory phase was obtained and it revealed a laceration of the middle third of the left ureter with contrast extravasation through the herniation.

Discussion:

In closed abdominal trauma, both intestinal perforation and ureteral laceration and herniation of the abdominal wall are rare lesions and point to a severe contusive mechanism. There are three mechanisms that explain abdominal organ damage: deceleration, external compression and crushing [1, 2, 3].

Intestinal and mesenteric lesions occur in approximately 5% of patients with severe abdominal trauma [1]. In this case the mechanism of injury was the external compression that led to a sudden and abrupt increase of the intra-abdominal pressure causing intestinal perforation. The small intestine is the most frequently affected, followed by the colon and stomach [1]. The CT examination is used for a rapid and accurate diagnosis in these patients. Extraluminal air is a finding with a specificity of 95%, but is not pathognomonic for the diagnosis of intestinal perforation (sensitivity of 30-60%), therefore it is important to take into account other related imaging findings such as thickening of the intestinal walls and alteration of mesenteric fat [1,5].

Blunt ureteral and ureteropelvic junction injuries are rare and difficult to diagnose [7], it requires a mechanism of rapid deceleration and ureteral hyperextension that causes an increase in tension and subsequent laceration or avulsion of the ureter, mainly at the points of fixation along its path, such as ureterovesical and ureteropelvic junction [6, 8]. In our case, a complete lesion of the middle ureter is observed, which presents with a frequency of 31%
According to reports [8], delayed contrast CT imaging is the technique of choice for the evaluation of urinary tract trauma. The exam is performed according to specific indications such as: haematuria and injuries that associate renal damage, like rapid deceleration, fall from height, direct contusion or haematoma in the flank, fractures of the lower ribs or thoracic spine, independently of the presence of haematuria [6]. There are subtle findings suggesting ureteral injury: low density fluid located around the kidneys and ureters (as seen in our case) and perinephric haematomas [7]. It is crucial to differentiate a total ureteral avulsion requiring surgical treatment from an incomplete rupture in which conservative treatment is indicated [1].

The traumatic abdominal wall hernia is defined as a herniation through the muscles and disruption of abdominal fascia, without penetrating wound or presence of a previous hernia defect at the site of injury [4]. The injury mechanism consists of the application of external forces on the abdominal wall and shear forces that are distributed throughout the abdominopelvic cavity [3, 4]. A CT examination helps to assess complications such as obstruction, incarceration, and strangulation [5].

**Differential Diagnosis List:** Closed abdominal trauma with: Traumatic abdominal hernia; Small intestine perforation; Ureteral disruption.

**Final Diagnosis:** Closed abdominal trauma with: Traumatic abdominal hernia; Small intestine perforation; Ureteral disruption.

**References:**


Description: Herniation between the lateral border of the rectus abdominis and left oblique muscles (white arrow) with small intestine loops inside (yellow arrow). Herniated mesenteric tissue and extraluminal air in the eventration margin (blue arrow). **Origin:** Department of Radiology. General University Hospital of Valencia. Valencia-Spain
Description: In addition, it has fluid collected in the peritoneal cavity and inside the hernia (orange arrows). Origin: Department of Radiology. General University Hospital of Valencia. Valencia-Spain
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Description: There is trabeculation of the retroperitoneal fat with fluid collection adjacent to the psoas iliacus and in the course of the left ureter, findings suspicious of the ureteral injury (white arrow). Origin: Department of Radiology. General University Hospital of Valencia. Valencia-Spain
Figure 3

Description: Complete ureteral laceration with extravasation of contrast (red arrows). Origin: Department of Radiology. General University Hospital of Valencia. Valencia-Spain
Description: 3D reconstruction shows complete ureteral laceration (red circle). Origin: Department of Radiology. General University Hospital of Valencia. Valencia-Spain.
Description: Ureteral injury was suspected, and late contrast study is performed, revealing the laceration of the middle third of the left ureter (yellow arrow) with extravasation of excreted contrast through the herniation (red arrow). Origin: General University Hospital of Valencia. Department of Radiology. Valencia-Spain.
Description: Ureteral injury was suspected, and late contrast study is performed, revealing the laceration of the middle third of the left ureter (yellow arrow) with extravasation of excreted contrast through the herniation (red arrow). Origin: General University Hospital of Valencia. Department of Radiology. Valencia-Spain.