LETTER / Gastrointestinal imaging

Internal hernia of the broad ligament: CT diagnosis for laparoscopic management

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One per cent of cases of mechanical occlusion of the small intestine are caused by internal hernias, the rarest type being an internal hernia through the broad ligament of the uterus, and representing approximately 5\% of cases [1]. While “conventional” treatment of mechanical occlusions of the small intestine is based on laparotomy, a laparoscopic approach is feasible in nearly half of cases, with an acceptable rate of morbidity [2]. Preoperative diagnosis has for a long time been difficult but the usefulness has recently been emphasized of computed tomography [3]. We report the cases of two patients who presented an internal hernia of the right broad ligament diagnosed with CT who afterwards underwent laparoscopic surgery.

Observations

Case n° 1

A 24-year-old woman with no prior history arrived at the emergency unit with diffuse abdominal pain and had been vomiting for the past 4 hours. She was afebrile, haemodynamically stable but presented abdominal guarding. Laboratory tests showed leucocytosis. A B-HCG determination was negative. The image of the abdomen without preparation suggested an intestinal obstruction with pathological small intestine air fluid levels in a central position. An abdominopelvic CT scan with injection was performed using a 16-row scanner. This examination confirmed occlusion of the small intestine...
with a right pelvic transitional zone and, in particular, loops of small intestine on either side of the right broad ligament (Fig. 1). The uterus and rectum were displaced to the left. There was no sign of parietal damage. Given that there had been no previous surgery, an internal hernia through the broad ligament was diagnosed and laparoscopic surgery was therefore decided. This confirmed that a loop of small intestine was trapped in a peritoneal defect of the right broad ligament (Fig. 2), immediately under the fallopian tube and near the cervix. Treatment thus consisted of closing the defect after freeing and verifying the condition of the trapped loop. The postoperative period was uneventful and the patient returned home 2 days after surgery.

**Case no 2**

A 51-year-old woman came to the emergency unit with right lumbar pain radiating to the external genitalia. Her medical history included two pregnancies with vaginal delivery, an appendectomy and laparoscopic tubal ligation 20 years previously. A urine reagent strip indicated microscopic haematuria. Given the persistence of symptoms despite intravenous analgesia and antispasmodic treatment, the patient had an abdominopelvic CT scan. This showed mechanical occlusion of the small intestine with an internal hernia through the right broad ligament (Fig. 3). There was no sign of parietal damage. CT diagnosis allowed rapid laparoscopic management which confirmed the diagnosis and freed the ileal loop by suturing the defect. The postoperative period was uneventful and the patient returned home 2 days after surgery.

**Discussion**

An internal hernia of the broad ligament is an extremely rare cause of mechanical occlusion of the small intestine [1—3]. As our two cases illustrate, the broad ligament defect may be of congenital origin (our first patient’s case with no prior history), or more often secondary to trauma during pregnancy, childbirth or abdominal surgery [4]. In addition, the broad ligament defect commonly occurs on the left [5]. In this case, the diagnosis easily becomes apparent by assessing the point of convergence of the mesenteric layers of the

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**Figure 1.** Clinical case no 1. A 24-year-old woman with no surgical or obstetric history. The injected abdominopelvic CT scan in the portal phase suggests the possibility of an internal hernia through the right broad ligament. Moreover, it confirms the absence of signs of intestinal damage opening the way for laparoscopic treatment. Indirect signs predominate on the axial and coronal slices with: a: several dilated small intestine loops in the right part of the pelvis on either side of the uterus and therefore in an abnormal retro-uterine position (white arrow). The uterus (U) is displaced to the contralateral side, the rectum posteriorly. The right ovary (Ov) is also visible to the right of the herniated loop. The junctional level is within the anatomical region of the right broad ligament; b: on the coronal slice, the two proximal and distal parts of the herniated loop are easily identified (white arrows).

**Figure 2.** Peroperative photograph showing the parietal defect and the hernia orifice in the right broad ligament (black arrow). The trapped intestine was first released. Peroperative confirmation of the absence of signs of intestinal damage avoided surgical resection.
distended loops and by investigating the displacement of the pelvic organs: the point of convergence is indeed usually projected to the left of the uterus and is often associated with displacement of the uterus and the broad ligament to the right. This sign is a strong pointer to an internal hernia of the broad ligament, and can also be found in the rare situation of a paravesical hernia. However, in these particular cases, a mass effect is seen on the bladder by the hernia sac containing the trapped loops, which does not exist in broad ligament hernias. Intermesosigmoid hernias are also a differential diagnosis to be eliminated because of their pelvic topography. However, these are differentiated from internal hernias of the broad ligament by the projection of the point of convergence of the mesenteric layers being in the left iliac fossa, away from the para-uterine region [6]. The two cases that we are reporting stand out because of their unusual right topography.

The most frequently trapped structures are loops of small intestine, but cases have been reported where the colon, ovary or even the ureter have been trapped [7,8].

The literature proposes two classification systems [8,9]. The first is based on the anatomical location of the defects [9]:

- type 1: the hernia crosses the whole thickness of the broad ligament;
- type 2: the hernia develops between the mesovarium and mesosalpinx;
- type 3: the route is under the round ligament.

The second, or Hunt’s classification, differentiates between two types of defect [8]:

- the ‘fenestra’, where the defect concerns both the anterior and posterior peritoneal layers forming the broad ligament;

Figure 3. Clinical case n° 2. A 51-year-old woman with a history of appendectomy and laparoscopic tubal ligation. The abdominopelvic CT scan after injection in the portal phase shows an obstructive condition with a closed ileal loop: the point of junction is close to the uterus. a: axial slice: closed loop dilatation of the ileum in the pelvis, close to the uterus where there is a right latero-uterine double beak sign (*). The uterus is displaced forward (U); b: coronal slices from front to rear: the trapped loop is more easily seen on the coronal reconstructions. Note the very good visualisation of both parts (upstream and downstream) of this closed loop occlusion (b1, black arrows) and the ‘C’ arrangement of the herniated loop (b2, arrowheads).
• the "pouch", where the defect concerns only one of the two peritoneal layers.

Clinical diagnosis is difficult. The symptoms are non-specific and associate low abdominal pain, nausea and vomiting.

CT imaging is the key element in any obstructive condition, since it can confirm its organic nature, the exact location of the obstruction and its type [10, 11]. Helical abdominopelvic location, firstly without contrast and then after injection of an iodinated contrast agent in the portal phase, is generally sufficient. The signs and symptoms for both the observations reported here corresponded to those described in the literature [12] for internal hernias of the broad ligament, i.e. the para-uterine pelvic position of the point of convergence of the mesenteric sheets of the distended loops of the small intestine and the existence of a hernia sac, which compresses and moves the anatomical structures from their normal position. The uterus is displaced forward to the opposite side from the hernia, while the rectum and sigmoid are displaced posterolaterally.

The second step is to look for signs of damage to the digestive tube, which will determine the treatment strategy: lack of enhancement of the loops, infiltration of the mesentry, peritoneal effusion, the presence of pneumoperitoneum indicating intestinal perforation. If these signs of aggravation are absent, the obstructive conditions can be managed by laparoscopy [3], since the CT scan has provided the definitive diagnosis and also ensured that there are no signs of damage to the intestine, which, if present, would necessitate resection of the intestine by mini-laparotomy. As for other indications, the advantages of the laparoscopic approach are greater postoperative comfort and a shorter period of hospitalisation [2].

Conclusion

An internal hernia of the broad ligament is a rare cause of mechanical occlusion of the small intestine. It can be congenital or acquired, as these two clinical cases show. Computer tomography can provide a preoperative diagnosis after thorough analysis of the signs and symptoms, and in the absence of signs of intestinal damage, allows laparoscopic management, greatly facilitating postoperative recovery.

Disclosure of interest

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

References