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A RARE CASE OF EARLY ONSET TYPE OF ABDOMINAL TROCAR SITE HERNIA (TSH) WITH ATYPICAL EXTERNALIZING IN TWO-STEP: MULTI-DETECTOR ROW CT DIAGNOSIS

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We report a rare case of early onset type Trocar Site Hernia (TSH) producing in the right lower abdominal quadrant of a 64-year old obese woman. The patient was admitted in the emergency room for abdominal pain producing four days after laparoscopic adnexectomy. The hernia atypically externalized in two-steps creating two superposed concentric small bowel strangulating hernias producing through two distinctive superposed orifices. A precise and complete anatomic diagnosis was made by contrast enhanced 64-row multidetector computed tomography (MDCT). The imaging features are presented with a short review of the literature. The case emphasizes the high performances of MDCT for the early diagnosis of Trocar Site Hernias.

Key-word: Abdomen, interventional procedure.

Laparoscopic surgery developed in the eighties and rapidly emerged as a major innovation in surgery offering a drastic reduction of the classical complications of classical open surgery. Benefits include decreased postoperative pain, quicker return to normal activity, and less postoperative complications.

Nevertheless laparoscopic surgery can be associated with new specific type of complications including incisional hernia through the trocar site (1-2). This new type of incisional hernia occurring on the trocar incision site after minimally invasive surgery is called a Trocar Site Hernia (TSH) but the term of Port Site Hernia is also common.

We report a rare case of early TSH diagnosed four days after laparoscopic adnexectomy in an obese female and atypically externalizing in two-step. The detailed anatomic diagnosis was made by contrast enhanced Multidetector Computed Tomography. The imaging features are presented with a short review of the literature. The case emphasizes the high performances of MDCT for the diagnosis of acute Trocar Site Hernias (3-4).

Case report

A 64-year old obese woman was admitted in the surgery department for elective minimally invasive laparoscopic removal of a slow growing postmenopausal left ovarian cyst. Three trocars were used during laparoscopy comprising a 5 mm optical umbilical trocar, a 5 mm nonbladed trocar in the left lower quadrant and a 10 mm nonbladed main trocar in the right lower quadrant. Twin cysts of two centimeters were confirmed on the left ovary and subsequent bilateral classical adnexectomy was performed with endobag extraction of the specimens through the 10 mm right lower quadrant port site. The port sites were not specifically sutured. The patient was discharged after 24 hours.

Four days after surgery the patient was readmitted in the emergency department for abdominal pain. This pain lasted for 48 hours and had started the day after leaving the hospital. This pain had continuously amplified the next day to become constant at the time of readmission. It was maximal in the right lower quadrant where a 6-8 cm painful mass was clearly palpable. The patient remained afebrile and the laboratory tests were normal with a white cell count at 6800 mm^3 and a CRP level at 1, 79 mg/L (normal < 5 mg/L).

Emergency contrast-enhanced Multidetector Computed Tomography (MDCT) (Fig. 1) revealed a small intestine occlusion due to bowel strangulation through a "Spiegelian like" interstitial hernia of the right lower quadrant. This hernia produced through a 19 mm orifice through the transverse and small oblique muscles (nearly at the level of the Spiegelian line) and expanded under the distended large oblique muscle. Careful multiplanar analysis revealed another simultaneous but more superficial small bowel strangulating hernia producing through a more anterior and superficial 19 mm other orifice. This second orifice was situated in the anterior root of the distended large oblique muscle and presented with an angle of 90 degrees from the deepest orifice. The small subcutaneous strangulated intestinal loop represented a small portion of the intraparietal strangulated incarcerated loops. This atypical hernia complex appeared thus unusually constituted by two superposed concentric strangulating hernias as schematically represented (Fig. 2).

The final CT diagnosis was an early onset type Trocar Site Hernia (TSH) with atypical externalizing in two-step. Emergency laparotomy was immediately performed. Careful dissection through a re-aperture of the fresh cutaneous scar of the right lower quadrant trocar found the suffering dilated intestine loop in the deep subcutaneous fat. The superficial hernial orifice was carefully stretched and the superficial subcutaneous bowel hernia was reduced. The intestinal loop appeared being viable and segmental resection might be avoided. The intraparietal bowel loops were then pushed within the peritoneal cavity through the other deep hernial orifice. The different orifices were firmly sutured plane by plane. The post-operative period was uneventful.

Discussion

In 2004 Tonouchi classified TSH into 3 types (1, 5-6).

– The Early Onset Type is a dehiscence of anterior and posterior fascial plane and peritoneum characterized by an early onset after surgery. It usually occurs as a small bowel obstruction.

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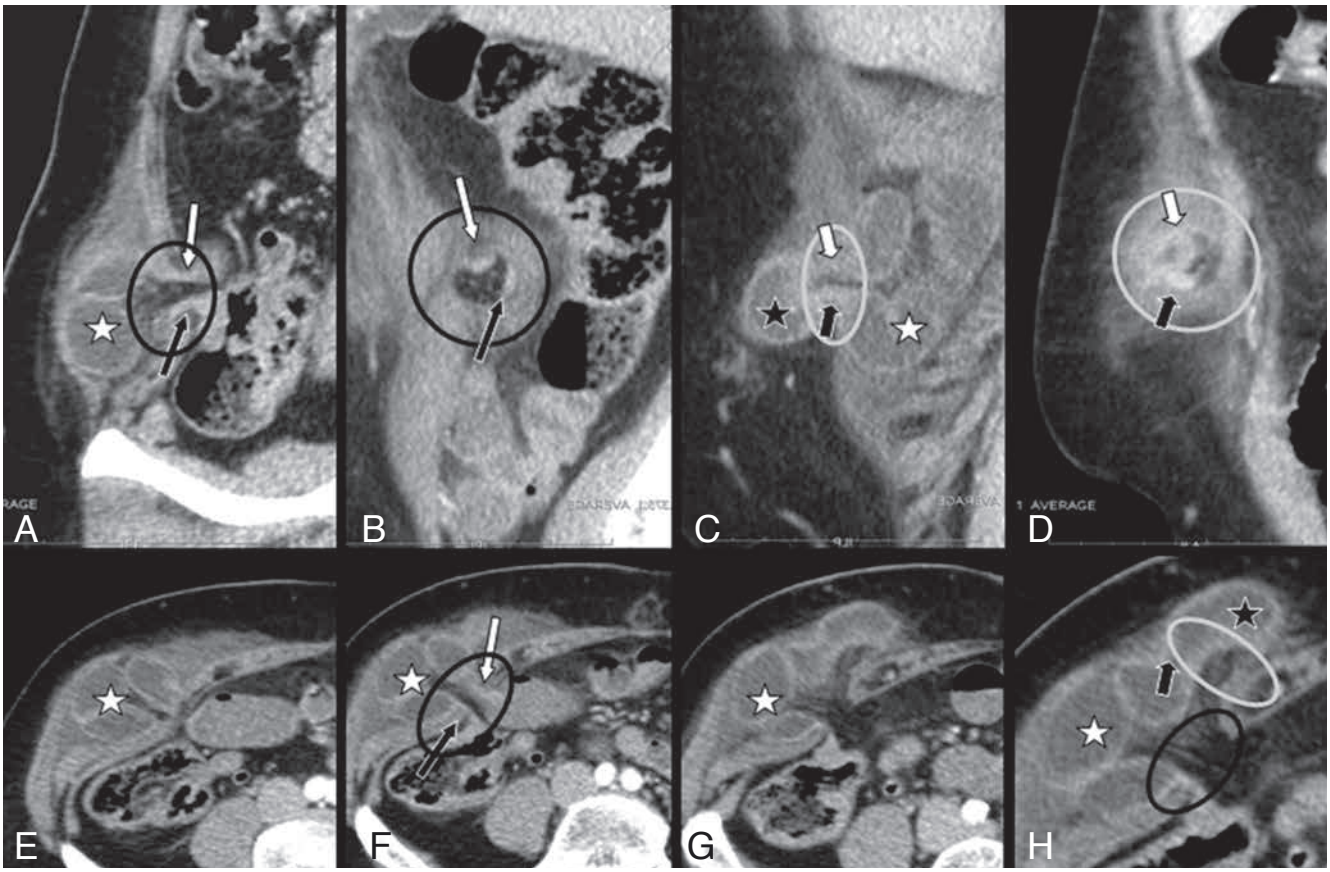

Fig. 1. — Contrast-enhanced Multidetector Computed Tomographic (MDCT) coronal oblique (A) and sagital oblique (B) multiplanar reconstructions obtained at the level of the deep hernial orifice; sagital (C) and coronal (D) multiplanar reconstructions obtained at the level of the superficial hernial orifice; (E to H) a series of cranio-caudal axial views. The deep "spiegelian like" component of the trocar site hernia (TSH) produces through a 19 mm orifice through the transverse and small oblique muscles (black rings); the entry (white arrow) and output (black arrow) of the interstitially herniated and strangulated loops (white star) are clearly seen protruding with mesenteric fat through this deep orifice. The superficial subcutaneous hernia produces through a 19 mm more superficial anterior orifice (white rings); the entry (small white arrow) and output (small black arrow) of the small superficially strangulated loop (black star) are clearly seen through this orifice. The superficial (white rings) and deep (black rings) orifices of the two steps TSH are clearly anatomically separated and appear perpendicular to each other (H).

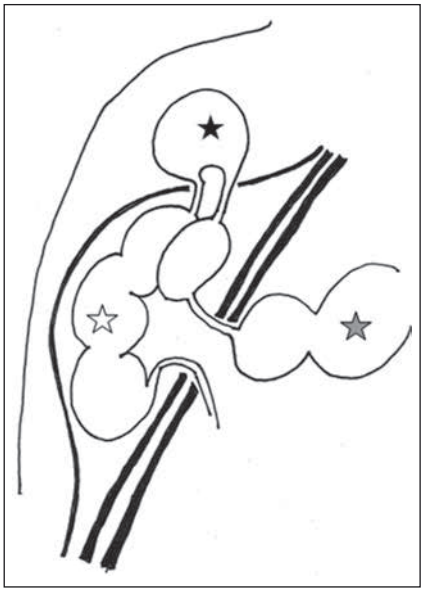

Fig. 2. — Schematic transverse illustration of the atypical two step trocar site hernia (TSH): grey star = intra-abdominal dilated small intestine; white star = strangulated loop within the "spiegelian like" deep interstitial component of the TSH; black star = subcutaneous strangulated loop in the superficial component of the TSH.

- The Late Onset Type is a dehiscence of anterior and posterior fascial plane. Peritoneum constitutes the hernia sac. Hernias usually develop several months after surgery, are not associated with small bowel obstruction and generally appear as an asymptomatic swelling by the wound site.
- The Special Type is a complete dehiscence of the whole abdominal wall. Transparietal protrusion of the intestine or omentum produces without any peritoneal sac. The onset is very early, immediately after surgery.
- The Early Onset Type and the Special Type represent emergency situations in the majority of cases.

Pamela et al. recently reported an extensive literature review. The incidence of TSH ranged from 0.007% to 22% with an average of 1.85% (1). Various interesting and sometimes extensive retrospective reports stressed the importance of predisposing factors.

For example an incidence of 0, 02% of herniations was reported from a 4,385,000 estimated laparoscopic procedures by the American Association of Gynecologic Laparoscopists in 1994 (1, 7). 17.9% occurred despite systematic fascial closure and 71, 3% of patients required a following surgical repair. 86.3% of hernias in which the size of the original fascial defect was scrupulously noted occurred in sites where 10 mm or larger diameter trocars had been placed. Only 10.9% were related to the use of 8-10 mm trocars and only 2.7% to minor diameter trocars (7).

This report stressed the importance of the diameter of the trocar as a predominant predisposing factor but also that TSHs may also produce after systematical surgical fascial closure.

In another series of 600 patients, the incidence of incisional hernia was estimated around 2% but exclusively noted in the periumbilical area (8). No case of incisional hernia was registered in extra-umbilical port sites, despite the fact that fascial suture on extraumbilical sites was not performed. This study underlined the fact that particular attention needs to be paid to periumbilical gap suture which is exposed to the trauma of trocar fixing, especially in obese and diabetic patients. But it also explains why no definitive consensus actually exists concerning the necessity of systematic suture of extraumbilical sites.

TSH have also been reported with the nearly the same percentages of incidence in pediatric surgery (9).

The risk factors classically associated with the occurrence of TSH are related both to the patient's features but also to the surgical technique (1, 6, 10).

When patient's features are considered, an important predisposing factor is obesity (increased BMI). Obesity is associated with increased morbidity related to port site due to various factors like the need for longer trocars, thick abdominal wall, need for larger skin incision to expose fascia adequately, and limitation in mobility of the instruments due to increased subcutaneous tissue (2, 5-6). Moreover advanced age, sex, nutritional status, smoking status, and other predisposing factors like uncontrolled diabetes mellitus, anemia, steroid therapy, renal insufficiency, but also cancer and port-site infection or pre-existing fascial defects also contribute to the occurrence of TSH (1, 5, 11).

When surgical technique is considered other factors may also increase the risk of herniation by widening the fascial defect. They includes the use of "fascial screws" to secure the port within the abdominal wall, long surgical procedures resulting in excessive manipulation of port sites, peritoneal defects larger than the trocar size, large ports, the type and size of trocars (bladed, nonbladed, radially expanding), undetected omentum or bowel entrapment into the intraperitoneal defect after trocar removal and the absence of suture of larger fascial defects (1, 5, 11). Midline insertion especially near the umbilicus but also other sites of trocar insertion such the lower quadrant port sites (more prone to hernia because of the absence of posterior rectus sheath under the arcuate line of Douglas) also seem more prone to develop TSH (1, 5, 11). Additionally, the stretching of the port site for removal of specimens or organs also represents an etiological factor (5, 11).

Since 1999 the attention has been focused on trocar-related problems with the conclusion that port sites created by nonbladed trocars could not require fascial closure because the wounds caused by these types of trocars were presumably narrower, shorter in length and width with less destruction of fascial tissues when compared with bladed trocars (1).

Whatever the type of trocar used, there is a significant consensus to consider that the closure of both the fascia and the peritoneum should be recommended if the incision is greater than 7 mm in adult patients and ≥ 5 mm in young children. The insertion of the 10 mm lateral trocar in an oblique way or as a Z-tract is also considered as a method able to reduce hernia formation by placing the external and internal fascias at different levels. Nevertheless systematic closure is not always completely protective and there is no clear consensus that all port sites must be closed (1, 5, and 10).

As a general consequence, careful postoperative management is recommended especially for patients with risk factors such as obesity, extensive manipulation of the trocar, and longer procedures (1, 12).

A list of tips has been proposed to limit the incidence of TSH (10):

- The closing of all port sites despite trocar size, especially if the surgical procedure was prolonged with a probably excessive manipulation of trocars.
- The removing of all ports would be performed under visualization.
- Careful deflating of the abdomen is necessary when removing ports because escaping CO^2 can draw bowel loops or omentum through the port sites.
- Removal of ports before deflation of CO^2 is preferable because their removal can be laparoscopically controlled.
- A careful examination of all port sites before closing the skin is useful to exclude any potential visceral herniation.
- Obese patients need close attention to closure.
- Abnormal slow return of bowel function should alert the physician to a possible bowel hernia.
- Placing drains through the port sites should be avoided.

Of course, patients can have a port-site hernia, but without bowel involvement and without symptoms. Nevertheless once bowel or omentum gets involved, patients may present with gastrointestinal symptoms (nausea, vomiting, port-site pain, abdominal pain, fever). Either small or large bowel can be involved depending on the site of hernia. Bowel involvement may occur in the form of incarcerated bowel, bowel obstruction, or bowel evisceration. All of these are considered surgical emergencies that can present a few days to weeks after surgery (10).

For patients who present with gastrointestinal symptoms after recent laparoscopic surgery, a differential diagnosis should include internal bowel hernia with or without incarceration/strangulation.

During the last decades Computed Tomography (CT) has emerged as the gold standard for follow-up after abdominal surgery and for the diagnosis of postoperative complications (13-15). Continuous technical developments have occurred. Today, thanks to its very high performances in term of spatial resolution, table speed and multiplanar reconstructions (MPR), 64-row MDCT offers unrivalled high quality images of the entire abdominal wall (AW) during a single short breath hold. MDCT thus appears particularly useful for the evaluation of AW hernias, allowing accurate identification of their contents, exquisite analysis of their anatomic landmarks, differentiation from other abdominal masses such hematomas or abscesses and planning of optimal surgical repair (3, 4). The reported case confirms the previous reported performances of CT for the evaluation TSH (3, 11, 16-17).

Bowel or omental evisceration, incarceration, and obstruction in cases of TSH scan are managed via laparoscopy or laparotomy, depending on surgeon's preference. In the reported case the perfect CT diagnosis of an atypical two-step concentric herniation with two distinct orifices appeared of primordial importance for the choice of direct prograde laparotomic dissection rather than retrograde laparoscopic exploration.

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