Incarcerated Grynfeltt-Lesshaft Hernia

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ABSTRACT

Superior lumbar triangle hernia, also known as Grynfeltt-Lesshaft hernia, denotes a subtype of abdominal wall hernia, and more specifically of lumbar hernia, occurring between the 12th rib, the internal oblique muscle, and the quadratus lumborum muscle. We report the case of a 92-year-old female patient in which this form of hernia occurred, complicated by incarceration and acute bowel obstruction. The discussion contains a short résumé of the different kinds of abdominal wall hernias.

CASE REPORT

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A 92-year-old female with a past medical history of obesity, hypertension, chronic renal failure and chronic obstructive pulmonary disease (COPD) was admitted to our emergency department with right sided abdominal pain, loss of appetite, nausea, and absence of gas and stool for 24 hours.

Physical examination revealed abdominal distension in association with high-pitched bowel sounds. At inspection, a right lumbar scar was noted, without any notion of former abdominal surgery in the patient's chart.

Imaging findings

Bowel obstruction was suspected and an abdominal plain film requested which showed dilated small bowel loops and cecum (Fig. 1). The patient then underwent unenhanced abdominal computed tomography (CT). One single acquisition with 2 mm thick slices was performed on a multi-detector row CT scanner (Mx800 IDT 16; Philips Medical Systems, Best, The Netherlands). Multiplanar images were reconstructed using OsiriX medical imaging software (Pixmeo, Bernex, Switzerland). The CT showed a herniation of a segment of the ascending colon and surrounding fat into the posterior abdominal wall, with the herniation sac located just below the right 12th rib (Fig. 2). The cecum and small bowel loops proximal to the hernia were dilated, suggesting bowel obstruction, and there was an area of fat stranding around the hernia sac. Intraperitoneal free fluid was present but no signs of bowel perforation.

Management

The patient underwent emergency abdominal laparoscopic surgery with reduction of the hernia and closure of the abdominal wall defect, with deployment of a nonabsorbable polypropylene mesh prosthesis. No intestinal resection was necessary.

Follow-up

The patient was discharged from the hospital ten days later. No radiological or clinical follow-up took place at our institution.

DISCUSSION

Etiology & demographics

Abdominal wall hernias, also called external hernias develop in 1.5% of the population and signify a protrusion of

abdominal structures through a defect in the abdominal wall, usually implicating a site of congenital or acquired weakness [1,2]. Herniating structures may be peritoneum, fat (properitoneum, greater omentum), hollow visceral organs including the gall bladder [3], solid organs (for example parts of the liver or kidney), or the urinary bladder. Their etiology may be congenital, traumatic, constitutional, or post-operative. The latter are designated as incisional hernias and may occur in up to 5% of patients after abdominal surgery, typically within the first year [2]. Parastomal hernia is a subtype of incisional hernia. A small percentage of incisional hernias may be clinically occult [2]. Their formation may be precipitated by factors associated with increased intra-abdominal pressure, such as abdominal mass, ascites, physical exertion, pregnancy, constipation or COPD [1].

Among the different hernia subtypes, groin hernias are common, constituting over half of all operated abdominal wall hernias [4]. Differentiation is made between indirect and direct inguinal hernias and femoral hernias. Direct inguinal hernias are located medially to the inferior epigastric vessels, whereas indirect inguinal hernias commence laterally of them. Femoral hernias protrude inferior to the inguinal ligament, remain usually located lateral to the pubic tubercle and may compress the femoral vein [5]. Femoral hernias are more common in females, with a ratio of 1.8:1 [1,6].

In a more posterior position, protruding between the adductor muscles is the rare obturator hernia.

Among the anterior, or ventral, hernias should be mentioned umbilical hernias, the second most commonly operated hernia, prevailing in women [6]. Other ventral midline hernias may be due to rectus abdominis muscle diastasis at the linea alba aponeurosis, with epigastric, paraumbilical, or hypogastric locations. Antero-lateral defects in the linea semilunaris, between the aponeuroses of the transverse and oblique abdominal muscles are called Spigelian hernia.

Lumbar hernias finally are more common in elderly men and have a predilection for the left side [7]. The most common age at presentation is 50-70 years [7]. As of 2008, about 300 cases had been described in the literature [1]. They are divided into two subtypes, depending on their anatomic location. When herniation is present through the lower lumbar triangle, bordered by the iliac crest, the external oblique muscle, and the latissimus dorsi muscle, it is called Petit hernia. Petit hernia has been described after iliac bone graft donation or non consolidated iliac fracture [7]. When the defect lies in the upper lumbar triangle, bordered by the 12th rib, the internal oblique muscle, and the quadratus lumborum muscle, it is called Grynfeltt-Lesshaft hernia. The upper lumbar triangle is covered internally by the transversalis fascia and externally by the external oblique muscle. It may also be covered by the latissimus dorsi muscle, but this muscle does not provide sufficient anatomical support for it [8]. Grynfeltt-Lesshaft hernia has first been described by Joseph Grynfeltt in Montpellier in 1866 [9] and then independently by Petr Lesshaft in Leipzig in 1870 [10]. It is more common than Petit hernia, the Petit triangle having a stronger musculofascial floor [11,12]. Very rarely, Grynfeltt-Lesshaft hernia may be congenital [13]. It may appear spontaneously [8], after trauma, or as an incisional hernia, the latter having accounted for 26% of reported Grynfeltt-Lesshaft hernias [11]. About 25% of lumbar hernias lead to bowel incarceration, and 10% result in strangulation [1].

Clinical & imaging findings

Abdominal wall hernias cause discomfort or a dragging or painful sensation [7] and may be clinically detected as an bulging mass, but sometimes prove difficult to diagnose on physical examination, particularly in obese or postoperative patients, as it was the case in our patient [2,4,7,13]. Lumbar hernias may simulate different parietal masses on physical examination, such as hematoma, abscess, seroma, lipoma, hemangioma, or fibroma [1,6]. Strangulation (compromise in vascularization) may be associated as well as incarceration (non reducibility) or volvulation. If bowel obstruction is present, typical clinical signs include nausea, vomiting and abdominal distention. In fact, hernias are the second most common cause of small bowel obstruction after adhesions. Intercostal neuralgia may also result from abdominal wall hernia [7].

Plain radiography has a limited role in showing signs of bowel obstruction, rarely may air be detected within the parietal hernia sac. Barium-enhanced radiographic studies are nowadays less commonly performed. For uncomplicated groin hernias real-time sonography is the imaging technique of choice [14], and multi-detector row CT for other kinds of abdominal wall hernia. CT should comprise multiplanar reconstructions and allows for detailed anatomic analysis of implicated muscular and fascial structures. As opposed to the case here presented, CT should generally be performed with intravenous injection of iodinated contrast media, in order to evaluate for vascular compromise [6]. Imaging acquisition under Valsalva's maneuver may help detect subtle and non incarcerated hernias [6]. Contrast-enhanced CT is also sensible for signs of intestinal suffering associated with an incarcerated hernia, namely wall thickening, lacking wall enhancement, fat stranding, and free fluid in the herniation sac or elsewhere in the peritoneal cavity [6].

Our patient revealed a previous right lumbar flank incision, for unknown reasons (the right kidney was present), at the site of her lumbar hernia. She had a history of COPD, a know risk factor for abdominal wall hernias. Having excess weight, she presented an example for a clinically difficult to detect abdominal wall hernia, not palpable in her case, and several other causes would have been conceivable for the signs of bowel obstruction she presented.

Treatment & prognosis

Even if asymptomatic, abdominal wall hernias should be surgically repaired with mesh-graft deployment, to prevent further complications such as incarceration with obstruction, or strangulation. A simple surgical technique has been described by Solaini et al. [15]. Surgical complications comprise infection, sterile fluid collections with symptomatic mass effect, fibrosis around mesh graft. Hernia recurrence may also occur.

Differential Diagnoses

None in imaging. Clinically abdominal wall tumor may be suspected, such as lipoma, hemangioma or fibroma, as well as other mass lesions like hematoma, seroma, or abscess.

TEACHING POINT

Grynfeltt-Lesshaft hernia designates a superior lumbar triangle hernia, a quarter of which are of postincisional origin. It is a subtype of abdominal wall hernia that may be difficult to detect clinically or simulate other parietal masses, the diagnosis is usually posed by CT.

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FIGURES

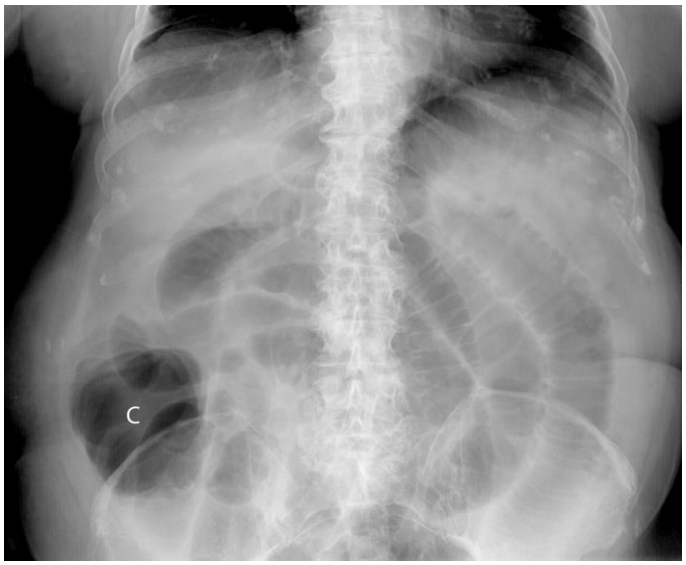

Figure 1: Grynfeltt-Lesshaft hernia. Abdominal supine plain radiograph of a 92-year-old woman with clinical bowel obstruction shows multiple dilated small bowel loops as well as distended cecum (C). The remaining colon is not aerated.

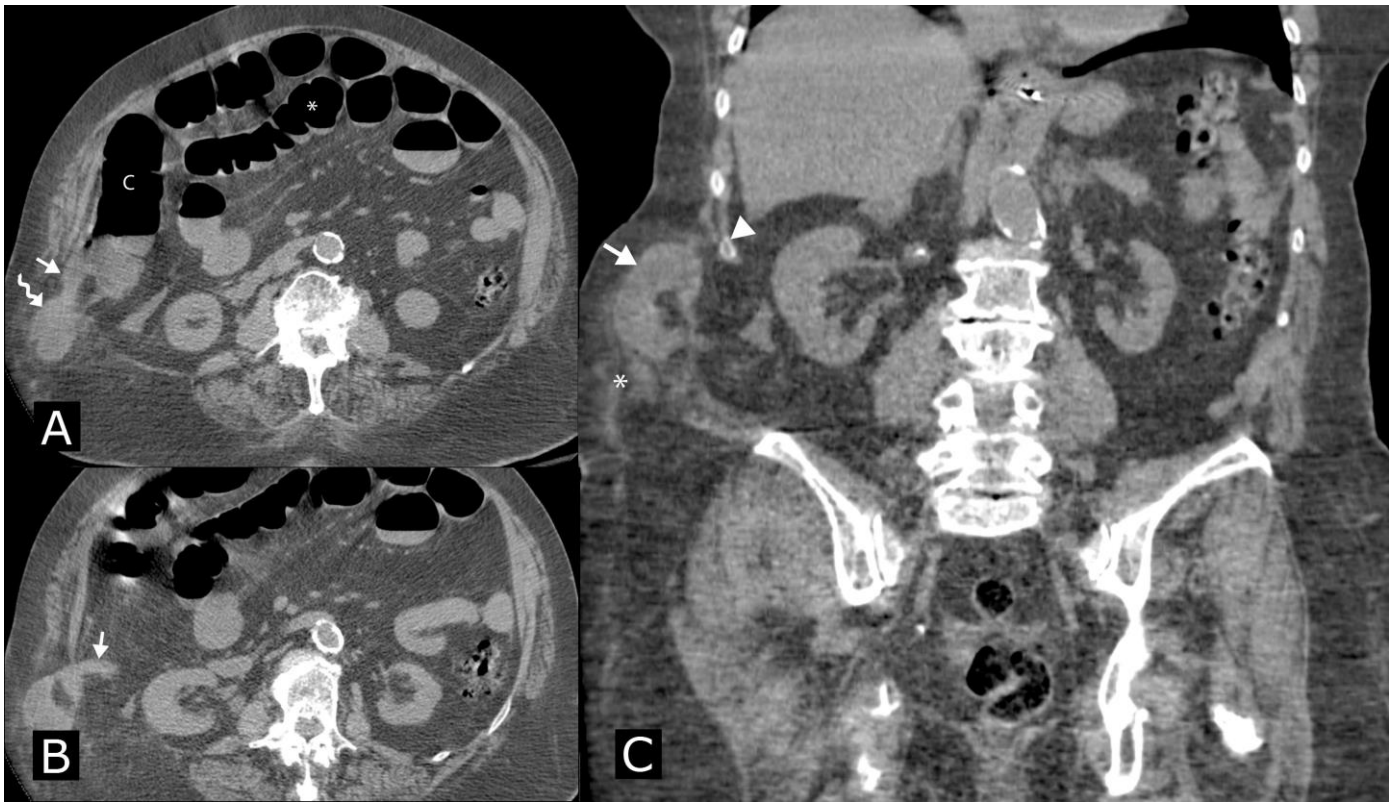

Figure 2: Grynfeltt-Lesshaft hernia in a 92-year-old woman. Axial (a, b) and coronally reconstructed (c) unenhanced abdominal computed tomography images show right posterolateral abdominal wall mass, consistent with incarcerated Grynfeltt-Lesshaft hernia containing right colon. (a) Hernia (squiggly arrow) is shown with afferent loop (straight arrow) in continuity with proximally dilated cecum (C). Note dilated small bowel loops (*). (b) Image slice at a slightly more cranial level shows efferent loop (arrow) leaving hernia sac. (c) Coronal reconstruction shows hernia sac in right abdominal wall (arrow). Right 11th rib is seen (arrowhead). Note also fat stranding next to hernia (*). Technical parameters: Philips Mx8000 IDT 16 CT scanner; tube voltage, 120 kVp; tube current 396 mA; slice thickness, 2 mm.

Etiology	Congenital (associated with abnormal musculoskeletal development), posttraumatic, postincisional, idiopathic
Incidence	Rare, exact incidence not known. 300 cases of Grynfeltt-Lesshaft hernia described as of 2008
Gender ratio	Male predominance (lumbar hernias)
Age predilection	May grow over a long period, lumbar hernias most often present between 50-70 years
Risk factors	Previous flank incision, increased intraabdominal pressure, muscular weakness
Treatment	Surgery with deployment of polyethylene mesh prosthesis is typically recommended, even in asymptomatic cases to prevent complications such as strangulation or incarceration
Prognosis	Favorable after surgery
Findings on imaging	Radiography: May show the presence of air in the parietal soft tissues if contained in herniation sac. Otherwise dilated loops in a setting of obstruction Computed tomography: Herniation sac protruding trough upper lumbar triangle, possibly containing intraperitoneal or retroperitoneal viscera. May reveal signs of intestinal obstruction and/or suffering with dilated, thickened and infiltrated bowel loops, lack of wall enhancement and ascites

Table 1: Summary table of Grynfeltt-Lesshaft hernia.

Differential	Ultrasound	CT
Lipoma	Hyperechogenic well delineated oval mass with fine septations	Well delineated homogeneous mass of fat attenuation
Sarcoma	Heterogenous but well-defined lobulated vascularized mass. Hyperechogenic calcifications may be seen as well as hypoechogenic zones of necrosis	Parietal mass of heterogeneous density depending on fatty and soft-tissue content, internal hemorrhage, necrosis, calcifications and myxomatous components. Enhancement is present
Hemangioma	Ill-defined vascularized mass that may be isoechogenic to muscle	Enhancing mass sometimes isoattenuating to muscle on unenhanced studies that may contain phleboliths. Vascular channels may be individualized after contrast injection
Abscess	Hypoechogenic collection with acoustic enhancement, may show internal septations, typically vascularized rim	Low-density lesion with peripheral enhancement. May contain bacterial gas
Seroma	Anechogenic collection with thin capsule. Acoustic enhancement	Fluid-density lesion with thin capsule, surrounding tissues not infiltrated
Hematoma	Hypoechogenic or cyst-like mass in acute stage	Homogenous or heterogeneous mass depending on clotting status of internal blood, hematocrit level may be seen, no internal vasculature

Table 2: Differential diagnosis table for Grynfeltt-Lesshaft hernia.
Clinically, an abdominal wall tumor may be suspected, such as lipoma, sarcoma or hemangioma, as well as entities like abscess, seroma, or hematoma. On ultrasound or CT, these masses are characterized by the absence of a wall defect and a hernia neck, as no communication exists between the parietal mass and the peritoneal or retroperitoneal space.

Hernia type	Imaging findings
Inguinal hernia, indirect	Protrusion follows inguinal canal and may descend into scrotum/labia majora, internal exit point is lateral to epigastric vessels
Inguinal hernia, indirect	Wall defect is located medial to inferior epigastric vessels
Femoral hernia	Located inferior to inguinal ligament and lateral to pubic tubercle, may compress femoral vein medially
Umbilical hernia	Herniation is through umbilicus
Spigelian hernia	Defect in the linea semilunaris, between the aponeuroses of the transverse and oblique abdominal muscles
Obturator hernia	Protrusion through obturator canal in the superolateral aspect of the obturator foramen, insinuation between adductor muscles
Grynfeltt-Lesshaft hernia	Herniation is through upper lumbar triangle, bordered by the 12th rib, the internal oblique muscle, and the quadratus lumborum muscle
Petit hernia	Herniation through lower lumbar triangle, between the iliac crest, the external oblique muscle, and the latissimus dorsi muscle

Table 3: Differential diagnosis table for parietal hernia.

ABBREVIATIONS

COPD = chronic obstructive pulmonary disease
CT = computed tomography
MRI = magnetic resonance imaging

KEYWORDS

Abdominal wall hernia; incisional hernia; Grynfeltt-Lesshaft hernia; upper lumbar triangle hernia; computed tomography