



# Internal Hernias: Report of Clinical Cases

Hernias internas: Presentación de casos clínicos



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## Key words (MeSH)

Hernia  
 Tomography, X-ray  
 Intestinal obstruction



## Palabras clave (DeCS)

Hernia  
 Tomografía por rayos X  
 Obstrucción intestinal

## Summary

**Introduction:** Internal hernias are defined as an abnormal protrusion of an abdominal organ through a normal or abnormal mesenteric or peritoneal aperture, with a relatively low incidence (<1%). It is the third most common cause of small bowel obstruction in developed countries. **Methodology:** We describe 3 cases of internal hernia that were diagnosed in the radiology service at FOSCAL and made a brief review of the literature. **Objective:** The objective of this article is to educate the physician about the radiological findings and to distinguish the clinical characteristics of these rare but important types of internal abdominal hernias. **Discussion:** Internal hernias are a rare cause of bowel obstruction, its preoperative diagnosis is difficult for both clinician and radiologist, because the risk of strangulation and the mortality rate remain high. Despite the various diagnostic methods, CT scanning has proven to be the best method to detect internal hernias. As evidenced in this article, the 3 diagnoses of internal hernias were made by computed tomography. When possible, urgent tomography is the most useful diagnostic method, which demonstrates the location of defects and / or signs of rare congenital anomalies. **Conclusion:** Internal hernia is an important and under-diagnosed condition. There are many types and it presents with multiple symptoms. The most useful diagnostic method for its diagnoses is the computed tomography, but there must always be, in the first instance, clinical suspicion from the doctor.

## Resumen

**Introducción:** Las hernias internas se definen como una protrusión anormal de una víscera de un compartimento abdominal a otro. Su incidencia es baja <1% y son la tercera causa más común de obstrucción del intestino delgado en los países desarrollados. **Metodología:** Se presentan tres casos clínicos de hernias internas que fueron diagnosticados en el servicio de imágenes diagnósticas de la FOSCAL; con una breve revisión de literatura de cada uno y de hernias internas en general. **Objetivo:** Educar al médico sobre los hallazgos radiológicos y distinguir las características clínicas de estos raros pero importantes tipos de hernias abdominales. **Discusión:** Las hernias internas son una causa rara de obstrucción intestinal, su diagnóstico preoperatorio es difícil tanto para el clínico como para el radiólogo, por este motivo el riesgo de estrangulación y la tasa de mortalidad continúan siendo altas. A pesar de los diversos métodos de diagnóstico, la tomografía axial computarizada (TAC) ha demostrado ser el mejor método para detectar hernias internas. Como se evidencia en este artículo, los tres diagnósticos fueron hechos por tomografía axial computarizada. Cuando es posible, la tomografía urgente es el método de diagnóstico más útil, que demuestra la localización de los defectos y/o signos de anomalías congénitas poco frecuentes. **Conclusión:** Las hernias internas son una condición importante pero infradiagnosticada, existen muchos tipos y se presenta de formas clínicas variables; el método diagnóstico más útil es la TAC, pero siempre en primera instancia debe existir la sospecha clínica por parte del médico.



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## Introducción

Internal hernias are protrusions of the viscera through the peritoneum or mesentery that remain inside the abdominal cavity. The openings have a normal anatomy (foramen of Winslow), paranormal (paraduodenal, ileocecal, supramesical fossa) and abnormal (transomental defect) (1). The majority of internal hernias originate in congenital anomalies that have occurred during the internal rotation of organs, mainly due to irregularities in their fixation elements. Other explanations for the development of internal hernias are atrophy of the omentum, dilation of the Winslow hole as a result of increased intra-abdominal pressure, inflammatory and ischemic processes of the cavity and, finally, iatrogenesis due to abdominal surgery (2). Internal abdominal hernias are rare, and their diagnosis remains a challenge for both the clinician and the radiologist. The incidence of internal hernias in autopsies is between 0.2% and 0.9%, and they are often forgotten by surgeons; however, they are becoming more common with the advent of bariatric surgery, liver transplantation and other more frequent procedures such as anastomosis by bowel resections (3). Its main manifestation is small bowel obstruction. The clinical presentation is not always clear because the symptoms may be intermittent or permanent, which leads to both a pre- and operative difficulty in diagnosis and the risk of strangulation, high. Each type of internal hernia has specific radiological characteristics (figure 1). As a general rule, barite studies and CT scan show certain diagnostic signs shared by several internal hernias, including the abnormal localization of an intestinal segment in susceptible regions, such as the minor sac; encapsulation and agglomeration of several small bowel loops within the confines of the peritoneal cavity; stasis of the contrast medium in its lumen and dilation of the most proximal bowel (3).

During the search of literature in Spanish, one can appreciate the emptiness that exists when talking about this pathology. The objective of this series of cases is to expose the clinical experience and to delve into the subject of internal hernias, their classification, symptomatology and radiological diagnosis.

## Classification

According to its topographic distribution and origin, internal abdominal hernias can be separated into eight large groups (table 1):

- » Left and right paraduodenal hernia
- » Hernia of the minor peritoneal sac (Winslow's hole)
- » Pericecal hernia
- » Hernias related to the sigmoid colon
- » Internal mesentery hernia of the small intestine
- » Transomental hernia
- » Paravesical hernia
- » Retro-anastomotic hernia

Table 1. Clinical and radiological findings of internal hernias

Hernia	%	Symptoms	Radiology	Observations
Left paraduodenal hernia	40	From intermittent digestive complaints and mild to acute intestinal obstruction. Postprandial pain with postural variation is a characteristic symptom.	Radiography: Encapsulated cluster of jejunum in the LUQ, lateral to the ascending duodenum. Mass effect that displaces the posterior wall of the stomach or the transverse colon inferiorly. Tomography: SI loops agglomerated between the stomach and the pancreas, behind the pancreas, or between the transverse colon and the left adrenal gland.	Small bowel loops that agglomerate to the left of the duodenum in the Landzert's fossa, which results from a congenital defect in the meso of the descending colon and is previously bordered by a peritoneal fold that covers the IMV and ACIA.
Right paraduodenal hernia	13		Encapsulated handles lateral and inferior to the descending duodenum. Associated with the non-rotation of the SI.	The proximal portion of the SI remains to the right of the SMA that may be trapped in the Waldeyer's grave.
Pericecal hernia	13	Chronic symptoms are confused with intestinal disease, appendicular disorders and other causes of obstruction.	Radiography: unusual relationship of the ileum with the cecum in association with SI obstruction. Tomography: dilated and fixed SI loops located posteriorly and laterally in relation to the cecum, often in the right paracolic canal.	Four different pericecal recesses have been described: the superior ileocecal recess, the inferior ileocecal recess, the retrocecal recess, and the paracolic sulcus.

*Keep going*

Continuation

Hernia	%	Symptoms	Symptoms	Observations
Winslow's hernia	8	Progressive epigastric pain and OID. Relief with forward flexion or squatting position. Jaundice has been described due to direct compression of the hepatic pedicle.	Radiography: dilation of bowel loops in the RUQ. Narrowing of the hepatic flexure in the barium enema if the hernia involves the cecum and the ascending colon. Tomography: dilation of the right colon posterior to the hepato-duodenal ligament with lateral displacement of the stomach. Mesenteric vessels elongated in front of the inferior vena cava and posterior to the portal vein, hydroaerial levels in the lower peritoneal sac with a peak directed towards the Winslow hole, absence of the ascending colon on the right side, two or more intestinal loops in the subhepatic spaces.	Normal peritoneal opening of about 3 cm, which allows a communication between the minor peritoneal sac and the rest of the peritoneal cavity. It is located below the upper limit of the right border of the east sack, cephalad to the duodenal bulb and deep to the liver, anterior to the inferior vena cava and posterior to the hepatoduodenal ligament.
Hernias related to the sigmoid colon	6	Signs and symptoms of intestinal obstruction.	Barium enema: typically, a portion of the jejunum or ileum is encapsulated between the sigmoid loops.	They are divided into: intersigmoid, transmesosigmoid and intermesosigmoid. No sign allows to distinguish between the three and is not necessary, because surgical exploration is mandatory.
Transmesenteric hernia	8	Severe periumbilical colics accompanied by hyperactive bowel sounds and progressive distension. You can feel a sensitive abdominal mass, which represents the Gordian knot of the herniated intestine.	Tomography: dilatation of SI loops pressed against the abdominal wall without omental fat causing central displacement of the colon segments. Because the defect is not visualized, the anomalies of the mesenteric vessels: stretched and agglomerated mesenteric vascular pedicle; displacement of the main mesenteric trunk, play an important role in the diagnosis.	Almost 35% of transmesenteric hernias affect the pediatric age group, in which they constitute the most common type of internal hernia. They can be confused or complicated for a volvulus what happens in hernias without a hernia sac, such as these and transomental ones.
Transomental hernia	4	The clinical findings are almost identical to those of transmesenteric hernias.	The radiological findings are almost identical to those of transmesenteric hernias.	They can be confused or complicated for a volvulus and this is especially true for hernias without a hernia sac, such as these and the transmesenteric ones.
Retro-anastomotic hernia	5	Signs and symptoms of intestinal obstruction.	Careful fluoroscopic evaluation of the gastrointestinal tract after administration of barium or water-soluble contrast medium reveals that the site of obstruction is not the gastric stoma, but is more distal.	This iatrogenic hernia should be avoided during the initial gastric operation by using a short afferent loop and closing the retro-anastomotic space with sutures.
Paravesical hernia	6	Signs and symptoms of intestinal obstruction.	CT scan: can show bowel loops near the bladder.	The preoperative diagnosis of these internal hernias is extremely difficult.

SMA: Superior Mesenteric Artery; RUQ: Right Upper Quadrant; LUQ: Left Upper Quadrant; ACIA: Left ascending colic artery; SI: Small Intestine; OID: Small bowel obstruction; IMV: Inferior Mersenteric Vein.  
Source: Own elaboration.

## Symptomatology

The main problem of internal hernias lies in the unpredictable development of acute intestinal obstruction that is often preceded by a variable period of abdominal discomfort of undetectable cause. The cardinal symptoms of intestinal obstruction are pain, nausea and vomiting, abdominal distension, decreased stools and flatus. The pain is classically colicky, which is reflected in increased peristaltic activity, as the bowel distends in response to the obstruction. The initial increase in motility is later replaced by reduced activity so that colicky pain can become a more constant pain. If the obstruction is more proximal, vomiting may relieve the pain. The pain of the blockage often increases slowly and may remain constant in severity. In closed loop obstruction, the pain may continue to increase until the bowel is perforated. Then, paradoxically, there may be a brief decrease in pain as distension is relieved, until signs of peritonitis develop.

The pain out of proportion with the physical examination suggests strangulation. Nausea and vomiting are common symptoms, but vomiting is more likely and profuse the more proximal the obstruction is. The abdominal distension is more pronounced the more distal the obstruction is. Low intestinal obstruction typically produces significant distension, while high obstruction may produce less distension due to the decompression generated by vomiting.

The final symptom of intestinal obstruction is the decrease in the passage of flatus and stool. The lack of liquid or solid stools is less specific because the bowel distal to the obstruction may continue to produce mucous secretions and the colon may contain an appreciable amount of fecal material that may continue to pass for some time (4).

Symptoms such as obstructive jaundice, biliary colic, secondary pancreatitis and sometimes, palpable abdominal mass may also occur. Sometimes, patients have nonspecific symptoms that last for years. Chronic symptoms are evident in approximately 70% of patients. However, 66% of all patients, regardless of the manifestation of symptoms, eventually develop acute obstruction or strangulation. If the internal hernia appears as an acute abdomen, the underlying problem is usually intestinal obstruction. In such cases, a mortality rate of up to 50% has been recorded (2).

## Clinical case

### Case 1

53-year-old female patient, who came for abdominal CT with contrast medium, ordered in an outpatient clinic due to a clinical picture of two months of generalized abdominal pain, associated with occasional diarrheal stools with worsening of symptoms in the last five days. The CT findings are compatible with a Winslow hiatus hernia (figures 1 and 2).

### *Winslow hiatus hernia*

The Winslow hole is a normal peritoneal opening about 3 cm approximately, which allows a communication between the smaller sac and the rest of the peritoneal cavity. It is located below the right border of the superior recess of the lesser sac, cephalad to the duodenal bulb and deep to the liver, anterior

to the inferior vena cava and posterior to the hepatoduodenal ligament, including the portal vein, the common bile duct, and the hepatic artery. This sac is also known as omental bursa or omentum transcavity and is a virtual cavity, because under normal conditions it has no content and is collapsed by intra-abdominal pressure (5).

The incidence of hernia through the Winslow hole is higher in men with a ratio of 2.5: 1, with a peak incidence between 20 and 60 years of age (6). The intestinal segment most commonly involved is the small intestine (60% -70%). The terminal ileum, the caecum and the ascending colon are involved at a rate of approximately 25% -30%. Hernias that affect the transverse colon, omentum and gallbladder are rare, although some have been reported in the literature (7). Some have suggested that cholecystectomy could be a risk factor. Other postulated risk factors include abnormally long mesentery, excessively mobile bowel loops, persistent meso of the ascending colon, large hepatic lobe, abnormally enlarged Winslow foramen, and a defect in the gastrohepatic ligament (8).

It manifests as progressive upper abdominal pain and acute onset of small bowel obstruction. A useful signal is the relief of pain with forward flexion or in the position of the knee in the chest. Jaundice has been described as a result of direct compression of the hepatic pedicle. Because patients often have non-specific symptoms, a delayed clinical diagnosis is often observed, resulting in intestinal strangulation and a high mortality rate, between 36% and 49%. The differential diagnosis is extensive; gastrointestinal pathology, pancreatitis, biliary and gynecological pathology. However, most of these diagnoses can be discarded by blood tests and simple additional images, such as ultrasound (6).

Radiographic features may vary depending on which of the organs is trapped. Abdominal radiography is rarely diagnostic, when it is improved with barium ingestion shows dilation of bowel loops and usually reveals the obstruction in the right upper abdomen. The narrowing or obstruction in the hepatic flexure can be visualized in the barium enema if the hernia involves the cecum and the ascending colon (7). CT with contrast medium describes the dilation of the right colon posterior to the hepatoduodenal ligament, combined with the lateral displacement of the stomach, as a typical sign for the diagnosis of hernia through the Winslow hole. Other classic signs include: elongated mesenteric vessels in front of the inferior vena cava and posterior to the portal vein, hydroaerial levels in the lower sac with a peak directed towards the Winslow hole, absence of the ascending colon in the right parietocholec canal, two or more bowel loops in the sub-hepatic spaces (7).

In all cases, the position of the cecum and the gallbladder should be evaluated. The hernia of the gallbladder in the minor sac can be diagnosed when the opacified gallbladder appears elongated and its fundus is badly positioned to the left. Manual compression of the epigastrium can reduce the hernia if the Winslow hole is large. Strangulation and perforation of the gallbladder in the minor sac may occur if the condition is not diagnosed and is not treated promptly (3).

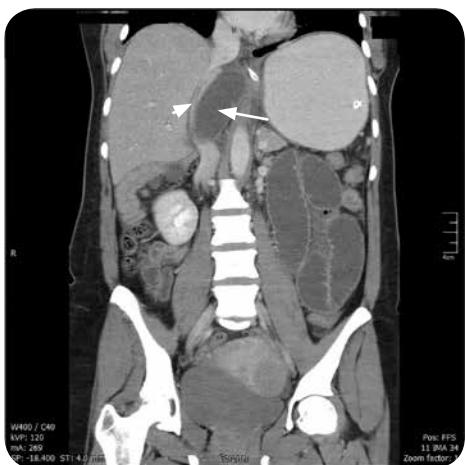


Figure 1. Abdominal CT with contrast medium, coronal section: a dilated intestinal loop is observed that displaces (arrow) and collapses the inferior vena cava (arrowhead).



Figure 2. Abdominal CT with contrast medium, sagittal section, with evidence of dilated intestinal (arrow) bowel in unusual site (adjacent to the vena cava [arrowhead]).



Figure 3. Liquid distension of thin intestinal loops (+), with increased fat density of the adjacent omentum (\*), without passage of contrast medium.



Figure 4. Abdominal CT with contrast medium, coronal section. Liquid distension of thin intestinal loops (+), with increased fat density of adjacent omentum (\*).

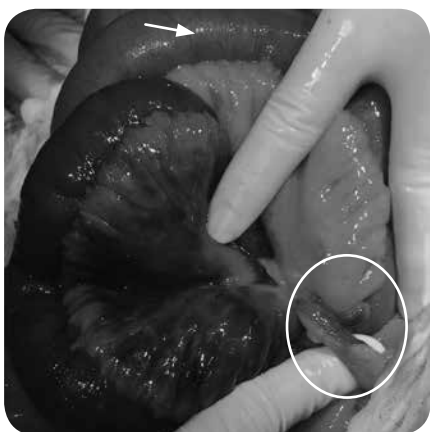


Figure 5. The surgical image shows the distension of thin loops (arrows) evidenced in the tomographic study. Additionally, it shows hyperemia of the fat of the omentum and defect through which the intestinal loops were herniated (circle).



Figure 6. Liquid dilatation of the thin intestinal loops (+) with increased mesenteric fat density (\*). Free fluid in the abdominal cavity.

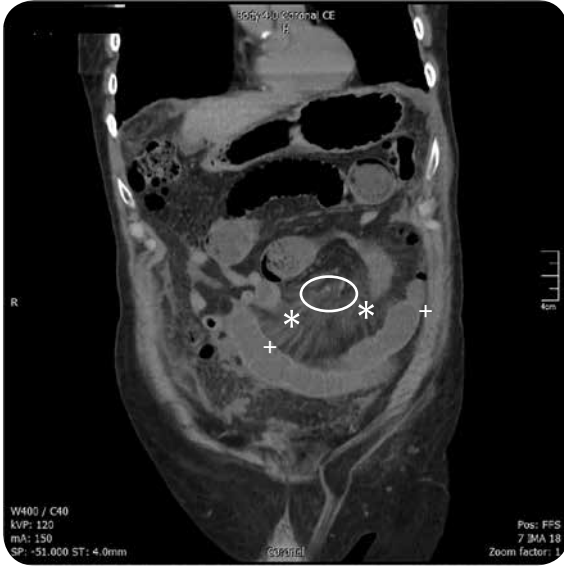


Figure 7. Abdominal CT, coronal section: Increase of mesenteric fat density (\*) and hernia defect (circle) with dilatation of thin loops (+).



Figure 8. Abundant free liquid in the cavity (\*), hernia defect (circle) and distension of the thin loops (+).

In 2011, van Dale and colleagues reported the first laparoscopic management of herniation through the Winslow hole. Since then, eight other cases have been described in which a laparoscopic approach was safe. Therefore, it is recommended to start the treatment laparoscopically in the case of the preoperative diagnosis of intestinal hernia through the Winslow hole. There is no consensus about prevention by closing the foramen, since doing so also leads to the risk of injury to the hepatic artery or bile ducts and portal vein thrombosis. Additionally, recurrence reports have not been made after surgery (9).

## Case 2

Paciente masculino de 69 años de edad, con antecedente de hipertensión. A 69-year-old male patient with a history of arterial hypertension was admitted to the emergency department for a three-hour clinical course of moderate intensity abdominal pain, predominantly in the epigastrium, which radiates to the right iliac fossa, accompanied by nausea and emesis, bladder tenesmus, oliguria, intolerance to the oral route, without stools 24 hours ago, with positive flatus. Physical examination revealed pain on palpation of the right hemiabdomen, without signs of peritoneal irritation, negative percussion fist, TA 114/76 mm Hg, MAP 99 mm Hg, HR 66 LPM, SATO2 96%, T 36.5 °C.

Renal colic was considered in the first instance, hydration, pain management and abdominal ultrasound were indicated, which showed: normal liver and bile duct, kidney without alterations, without pyelocalic dilation, dilation of intestinal loops with thickening of the mucosa predominating towards the hypogastrium. Faced with these findings, abdominal CT was performed with contrast medium and assessment by general surgery service. The abdominal CT showed a rounded image of soft tissue density of 13 mm in diameter, with homogeneous enhancement with the contrast medium adjacent

to the tail of the spleen, compatible with an accessory spleen without clinical involvement; liquid distention of the jejunal loops with an increase in the density of the adjacent omentum, scarce amount of free fluid adjacent to the dilation of the jejunal loops, as well as at the height of the right paracolic gout (figure 3); the colon without alterations. It was concluded that the findings could correspond to transomental hernia (figures 3 and 4).

The patient was assessed by the general surgery service who considered that he was suffering from intestinal obstruction due to transomental hernia and indicated emergency surgery; the patient underwent laparoscopy with a 15 mm Hg pneumoperitoneum finding. The revision of the cavity and the findings indicated conversion to open surgery, so they performed laparotomy and practiced lysis of adhesions. During the surgical procedure they found abundant free serohematic fluid in the cavity, with great distension of handles and an intestinal segment with signs of ischemia, segment of 25 cm of mottled thin intestinal loops, with positive peristalsis at 100 cm from the ileocecal valve (figure 5), with positive reperfusion when releasing adhesions. In the revision of the cavity, no other compromised segment was found; the liquid was sucked from the cavity and closed by planes. The patient, with adequate postoperative evolution, was dismissed from the institution.

## Transomental hernia

A transomental hernia through the omentum is rare, representing approximately 1% -4% of internal hernias. Transomental hernias are usually found in patients older than 50 years, in which case they are commonly iatrogenic and result from surgical interventions, Y-roux gastric bypass, liver transplant, small bowel or colon resection, trauma or peritoneal inflammation. In children, transgenic congenital hernias are common, the severity of the disease depends on the size of the hole and the length of the loops of the small intestine herniated. In

rare cases, internal hernias through the greater or less omentum occur spontaneously as a result of senile atrophy with no history of surgery, trauma or inflammation (1). Yamaguchi classified transomental hernias as type A (peritoneal cavity → greater omentum → peritoneal cavity), B (peritoneal cavity → omental bursa → peritoneal cavity), or C (peritoneal cavity → omental bursa) (10).

Transomental hernias are difficult to diagnose. Clinical manifestations are not specific and are similar to acute obstructive syndrome, which includes nausea, vomiting, abdominal pain, abdominal distention, and constipation. Compared with other types of internal hernias, trans-menial hernias are more common with narrowing of the small intestine. For this reason, they have a high postoperative mortality rate of 30%: therefore, their diagnosis and emergency treatment are critical (1).

Abdominal CT is useful for diagnosis; it can reveal the dilated loops of the small intestine with a “peak sign”, which is a triangular configuration of the transition zone between the proximal dilated intestines and the herniated intestinal segments or between dilated and herniated intestinal segments and distal and collapsed intestinal segments. The CT scan may also reveal a “swirling” pattern of the mesenteric vessels, prominent mesenteric vessels with a large impact on the surrounding organs and thickening of the intestinal wall. In addition, a transomental hernia should be suspected if the dilated loops of the small intestine are located in the lower sac, that is, surrounded to the right by the gallbladder and liver, to the left by the stomach and, later, by the pancreas. Management of acute intestinal obstruction will be adequate with decompression of the nasogastric tube, followed by immediate laparotomy. The surgical treatment is the reduction of the herniated intestinal segments. If there is necrosis, perforation or irreversible ischemia of the herniated viscera, an intestinal resection is necessary. In sequence, the defect of the omentum must be repaired to prevent posterior hernia (1).

### Case 3

88-year-old male patient with a history of diabetes mellitus, chronic kidney disease and hyperuricemia, who was admitted to the emergency department due to a 1-day clinical course of generalized abdominal pain of moderate intensity that did not yield with analgesics, to emesis, asthenia and adynamia. Physical examination revealed pain on superficial and deep palpation of the generalized abdomen, without signs of peritoneal irritation, TA 150/94, FC 111, FR 20, T 37° C, SATO2 98%, hematological picture with leukocytes of 19,130, neutrophils 91%, hemoglobin 16, hematocrit 47%, platelets 294,000, abdominal ultrasound with finding of liquid distension of the small intestinal loops, with abundant intestinal gas in the midline, perihepatic and perisplenic fluid without partitions in its interior.

With these results, the general surgery service requested abdominal CT with contrast medium, which showed significant dilation of the intestinal loops thin with liquid inside, suggestive of enteritis (figures 6, 7 and 8), abundant amount of fecal debris in the path of the colon, parietohepatic, parietosplenic and intraperitoneal free fluid. He underwent exploratory laparoscopy for diagnosis of abdominal sepsis. During the procedure he underwent hemoperitoneum

drainage of 700 cm<sup>3</sup>; the findings guided the conversion to exploratory laparotomy, in which they found severe adherent syndrome with internal transmesosigmoid hernia, thin intestinal loops with edema and erythema without ischemia and with preserved motility. They made release of adhesions, bowel, checked the vitality of the handles compromised by the hernia, washed the cavity and closed by planes, later the patient entered the intensive care unit (ICU) for strict surveillance, antibiotic therapy and management of comorbidities. The patient evolved favorably, with tolerance to the oral route, for which they gave hospital discharge.

### *Hernia related to the sigmoid colon*

Corresponds to 6% of internal hernias (11). It consists of the passage of small bowel loops dilated and medial to the sigmoid. There are three types of hernias that involve the sigmoid colon: Intersigmoid, which is the most common, with 65% in this group (12). The intersigmoid hernia titer has been used to designate a hernia in a congenital fossa, the intersigmoid fossa, located in the accessory of the lateral aspect of the sigmoid mesocolon (5). This fossa is formed during the fusion of the left peritoneal region of the sigmoid region of the mesentery with the parietal peritoneum of the posterior abdominal wall (7). It is said that the pit is between 50% and 75% of all bodies (13). The second type, transmesosigmoid, occurs when a loop of the small intestine herniates through the two layers of the sigmoid mesocolon (5). Its origin is uncertain, but it is probably analogous to similar defects in the mesentery of the terminal ileum (13). The third and less common type, intramesosigmoid, is the herniation of a viscus through only one of the layers of the mesosigma, so that the hernia sac is within the sigmoid mesocolon (13).

It is difficult, perhaps impossible, to distinguish these subtypes pre-operatively through radiographic images (13). Therefore, most radiologists and surgeons only refer to intersigmoid hernias.

### Discussion

Internal hernias are a rare cause of intestinal obstruction. Its preoperative diagnosis is difficult for both the clinician and the radiologist. For this reason the risk of strangulation and the mortality rate continue to be high. Even without risk factors such as previous abdominal surgery, trauma or peritoneal inflammation, the possibility of small bowel obstruction secondary to internal hernia should be considered (1). CT has proven to be the best method to detect internal hernias. It demonstrates the location of defects and / or signs of rare congenital anomalies. Here three cases of internal hernias are presented; hernia through the Winslow hiatus, transomental hernia and transmesosigmoid hernia, which have in common that they are rare conditions, difficult to diagnose, and risk factors are not always evident.

Finally, the treatment of internal hernias consists of closing the defect with sutures or in some cases, application of bio-organic or synthetic mesh (2). Due to the diagnostic uncertainty, even with high resolution CT, open surgery is usually performed. However, this has led some experienced surgeons to treat them initially with laparoscopy.

Laparoscopic treatment has established itself as a safe and effective alternative to an open approach, with all the benefits of minimally invasive surgery. The debate continues on whether the Winslow hole should be closed or not to prevent recurrence. Experts have warned of the possible and important negative consequences of closing the defect: thrombosis of the portal vein or obstructive jaundice (8).

These cases emphasize the need to consider internal hernias in the differential diagnosis of acute abdomen, due to their high risk of incarceration and intestinal damage, which requires prompt action to rule out more common differential diagnoses, in order to take into account this pathology and avoid loss of time before surgery.

## Conclusion

Differentiating the causes of abdominal pain remains a challenge for surgeons. Despite representing a smaller percentage, obstructions due to internal hernias are often a forgotten cause but have increased in incidence over time. The clinical diagnosis is a challenge, as well as the radiological one. However, as shown in this article, there are radiological and clinical signs that can guide the diagnostic suspicion to allow a rapid surgical treatment, to reduce the high mortality that these pathologies entail. CT is the mainstay of radiological exploration and it has already been demonstrated that laparoscopy is a safe method of surgical approach.

## References

1. Lee S, Lee S. Spontaneous transomental hernia. *Ann Coloproctol.* 2016;32(1):38-41.
2. Tepeš M, Kirac I, Glavan E, Doko M. Internal hernias in acute abdomen: Review of literature and report of four cases. *Coll Antropol.* 2015;39(2):475-9.
3. Gore R, Levine M. *Textbook of gastrointestinal radiology.* 3rd ed. Saunders; 2007.
4. Gore RM, Silvers RI, Thakrar KH. Bowel obstruction. *Radiol Clin N Am.* 2015;53:1225-40.
5. Mathieu D, Luciani A. Internal abdominal herniations. *Am J Roentgenol.* 2004;(August):397-404.
6. Duinhouwer L, Deerenberg E, Rociu E, Kortekaas R. Herniation of the colon through the foramen of Winslow-A case report. *Int J Surg Case Reports.* 2016;24:14-7.
7. Takeyama N, Gokan T, Ohgiya Y, Satoh S, Hashizume T, Hataya K, et al. CT of internal hernias. *RadioGraphics.* 2005;25(4):997-1015.
8. Leung E, Bramhall S, Kumar P, Mourad M, Ahmed A. Internal herniation through foramen of Winslow: A diagnosis not to be missed. *Clin Med Ins: Gastroenterol.* 2016;(9):31-3.
9. Van Daele E, Poortmans M, Vierendeels T, Potvlieghe P, Rots W. Herniation through the foramen of Winslow: a laparoscopic approach. *Hernia.* 2011;15(4):447-9.
10. Yamaguchi T. A case of incarceration of sigmoid colon into hiatus of greater omentum. *Rinsho Geka.* 1978;33:1041-5.
11. Martin LC, Merkle EM, Thompson WM. Review of internal hernias: Radiographic and clinical findings. *Am J Roentgenol.* 2006;186(3):703-17.
12. Donaldson CK, Smith GS, Sherbahn LC, Marn CS. 112 - hernias and abdominal wall pathology [Internet]. Fourth Ed. *Textbook of Gastrointestinal Radiology, 2-Volume Set.* Elsevier Inc.; 2017. 2053-2076 p. Disponible en: <http://dx.doi.org/10.1016/B978-1-4557-5117-4.00112-4>
13. Benson R, Killen D. Internal hernias involving the sigmoid mesocolon. *Ann Surg.* 1964;159(3):382-4.

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Received for evaluation: August 15, 2017

Accepted for publication: October 10, 2017