

Gajan Rajeswaran
Sadasivam Selvakumar
Chris King

Internal herniation of the caecum into the lesser sac: an unusual cause of an acute abdomen (2009: 10b)

Received: 2 November 2008
Revised: 7 March 2009
Accepted: 19 March 2009
© European Society of Radiology 2009

G. Rajeswaran (✉)
Radiology, Chelsea & Westminster
Hospital,
369 Fulham Road London,
London, SW10 9NH, UK
e-mail: grajeswaran@hotmail.com
Tel.: +44-2087468570

S. Selvakumar
General and Vascular Surgery,
Lister Hospital,
Stevenage, UK

C. King
Radiology,
Lister Hospital,
Stevenage, UK

Abstract Internal hernias are rare, occurring in 0.2–0.9% of autopsy cases. Hernias through the foramen of Winslow are even rarer, occurring in up to 8% of internal hernias. The clinical presentation is variable, making diagnosis difficult, and a delay in diagnosis can result in significant morbidity. As such, early radiological diagnosis is paramount. We report a rare case of caecal herniation through the foramen of Winslow in a 49-year-old female patient in whom the diagnosis was made radiologically and allowed appropriate and prompt management.

Keywords Hernia · Internal · Caecum · Foramen · Winslow

Case report

A 49-year-old woman presented to the Accident and Emergency department with a 6-day history of central abdominal pain made worse by eating. She had not moved her bowels during this period but was passing small amounts of flatus. She had lost her appetite but had not lost weight significantly.

She had no significant past surgical, medical or family history, and was not taking any prescription medications.

On examination, her blood pressure was 145/95 mmHg and her pulse rate was 96 beats/min. Abdominal examination revealed generalised abdominal tenderness, maximal in the epigastrium, and the suggestion of an epigastric mass. On auscultation, there were active bowel sounds. No abnormality was detected on rectal examination.

Blood tests revealed a white-blood-cell count of $21.6 \times 10^9/L$ (normal range $4-11 \times 10^9$) and a C-reactive protein of 295 mg/L (normal range 0–5).

A supine abdominal radiograph showed a large mottled opacity inferior to the stomach and displacing this superiorly. There were no overt signs of bowel obstruction or pneumoperitoneum (Fig. 1). The radiograph was felt to be consistent with an infected pseudocyst, but the serum amylase was normal and there was no history of a previous episode of pancreatitis.

A contrast-enhanced CT of the abdomen and pelvis was therefore performed. This showed a dilated viscus containing faecal residue, consistent with the caecum and proximal ascending colon, herniated into the lesser sac between the stomach and the pancreas (Figs. 2 and 3). There was no



Fig. 1 Abdominal radiograph showing absence of the caecum from its normal position in the right lower quadrant and presence of a large mottled opacity in the left upper quadrant adjacent and inferior to the stomach, representing the herniated caecum within the lesser sac

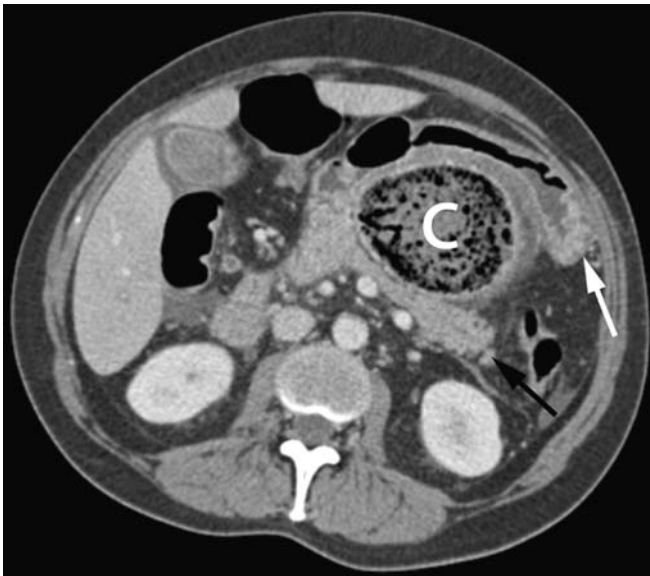


Fig. 2 Axial contrast-enhanced CT image showing the caecum (C) herniated into the lesser sac between the stomach (white arrow) and pancreas (black arrow)

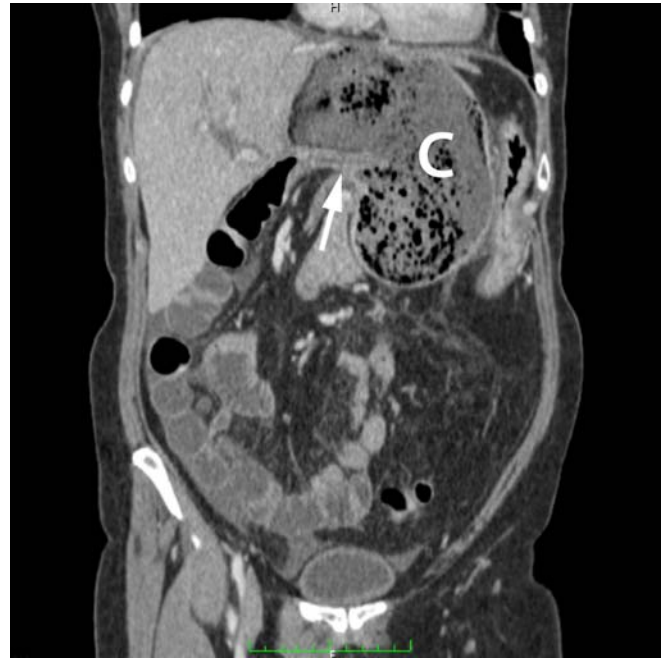


Fig. 3 Coronal contrast-enhanced CT image showing the caecum (C) in the lesser sac. The location of the hernia is revealed by the beaking of the bowel at the foramen of Winslow (white arrow)

evidence of pneumoperitoneum or proximal bowel dilatation, but there was a small amount of ascites. There was evidence of foregut malrotation with the duodeno-jejunal flexure lying on the right.

At laparotomy, the CT findings were confirmed with the faeces-filled caecum and the appendix internally herniated into the lesser sac. The herniated large bowel was decompressed and reduced. The caecum appeared patchily ischaemic so a limited right hemicolectomy was performed. A partial small bowel malrotation was also confirmed.

Histology confirmed an ischaemic right colon secondary to internal herniation with evidence of appendiceal inflammation.

The patient made an uneventful recovery and has had no further symptoms to date.

Discussion

An internal hernia is a protrusion of a viscus from its normal position through a peritoneal or mesenteric orifice. This hernial orifice may be a normal anatomical opening or a pathological opening, either congenital or acquired (due to previous surgery, trauma or inflammation) [1–4].

Internal hernias can be classified, according to location into paraduodenal (50–55%), pericaecal (10–15%), foramen of Winslow (8%), transmesenteric and

transmesocolic (8%), pelvic and paravesical (6%), sigmoid (6%) and transomental (1–4%) [1–4]. They are rare, having been reported in the literature with an incidence of 0.2–0.9% of autopsy cases. Whilst the most commonly herniated viscus is small bowel, internal hernias present as the cause of small bowel obstruction in only 0.6–5.8% of cases (usually as a closed-loop strangulated obstruction) [1, 3–5].

The clinical presentation can be variable, ranging from mild abdominal pain to signs and symptoms of acute intestinal obstruction. This is particularly the case where the hernia reduces easily, resulting in intermittent symptoms. As such, the clinical diagnosis is often delayed, only becoming apparent once the herniated bowel becomes strangulated or incarcerated. This delay in diagnosis can result in the development of gangrenous bowel requiring surgical resection, and this has been reported in 64% ($n=9/14$) of cases of internal hernia in one series and 22% ($n=11/49$) of cases in another [6–8].

Given the rarity of the condition, the difficulty in making the diagnosis clinically and the significant morbidity and mortality associated with a delay in diagnosis, radiological imaging is extremely important in making a prompt diagnosis pre-operatively. CT is the imaging modality of choice, ideally following oral and intravenous contrast although oral contrast is contraindicated in cases in which intestinal strangulation or closed-loop obstruction is suspected.

Hernias through the foramen of Winslow are a rare sub-group, occurring in up to 8% of internal hernias. The most commonly involved viscus is small intestine, having been reported in 60–70% of cases, but terminal ileum, caecum and ascending colon (and very rarely, transverse colon, omentum and the gallbladder) can also be involved [1–3].

Risk factors for hernias into the lesser sac include a larger than normal foramen of Winslow, long intestinal mesentery and persistent mesentery of the caecum/ascending colon resulting in a loose attachment to the posterior abdominal wall [1–3, 9, 10].

On the plain abdominal radiograph, the herniated viscus may be seen postero-medial to the stomach and there may be signs of bowel obstruction. In our case, the caecum was absent from its normal position in the right iliac fossa. CT findings include absence of the herniated viscus from its normal position (particularly when the caecum or ascending colon is involved), presence of the herniated viscus in the lesser sac with beaking towards the foramen of Winslow, two or more bowel loops in the high subhepatic space and mesentery located between the inferior vena cava and portal vein [1–3, 9, 10].

The main differential diagnosis for an internal hernia of the caecum through the foramen of Winslow would be that of caecal volvulus. This can only occur when there is a defect in peritoneal fixation of the caecum, allowing the caecum to become hypermobile and twist on itself. Volvulus occurs when this twist results in intestinal obstruction. Caecal volvulus can occur in a longitudinal axis (with the caecum twisting in an axial plane) or along an oblique axis (loop-type volvulus) in which the caecum twists and inverts to lie in the left upper quadrant of the abdomen. A variant, the caecal bascule, occurs when the caecum folds (but does not twist) to lie anterior to the ascending colon [11]. Whilst in both caecal volvulus and internal herniation of the caecum through the foramen of Winslow, the caecum lies in an abnormal position, in caecal volvulus, there will be no abnormality in the lesser sac. As such, these two entities are usually relatively easy to differentiate on CT.

Internal hernias that are not completely obstructed can be managed conservatively as long as the patient is closely monitored. However, surgery is the definitive management for this condition, particularly in cases involving complete obstruction [7, 12].

We have described the radiological findings of this rare condition which, if borne in mind, can be detected promptly allowing appropriate management and prevention of the significant complications associated with a delay in diagnosis.

References

1. Takeyama N, Gokan T, Ohgiya Y, Satoh S, Hashizume T, Hataya K et al (2005) CT of internal hernias. *Radiographics* 25(4):997–1015
2. Meyers M (2000) Internal abdominal hernias. In: Meyers MA (ed) *Dynamic radiology of the abdomen: normal and pathologic anatomy*, 5th edn. Springer, New York, pp 711–748
3. Ghahremani G (2000) Abdominal and pelvic hernias. In: Gore RM, Levine MS (eds) *Textbook of gastrointestinal radiology*, 2nd edn. W.B. Saunders, Philadelphia, pp 1993–2009
4. Martin LC, Merkle EM, Thompson WM (2006) Review of internal hernias: radiographic and clinical findings. *AJR Am J Roentgenol* 186(3):703–717
5. Leffall LD Jr, Quander J, Syphax B (1965) Strangulation intestinal obstruction. *Arch Surg* 91(4):592–596
6. Ghiassi S, Nguyen SQ, Divino CM, Byrn JC, Schlager A (2007) Internal hernias: clinical findings, management, and outcomes in 49 nonbariatric cases. *J Gastrointest Surg* 11(3):291–295
7. Newsom BD, Kukora JS (1986) Congenital and acquired internal hernias: unusual causes of small bowel obstruction. *Am J Surg* 152(3):279–285

-
8. Zarvan NP, Lee FT Jr, Yandow DR, Unger JS (1995) Abdominal hernias: CT findings. *AJR Am J Roentgenol* 164(6):1391–1395
 9. Wojtasek DA, Codner MA, Nowak EJ (1991) CT diagnosis of cecal herniation through the foramen of Winslow. *Gastrointest Radiol* 16(1):77–79
 10. Schuster MR, Tu RK, Scanlan KA (1992) Caecal herniation through the foramen of Winslow: diagnosis by computed tomography. *Br J Radiol* 65(779):1047–1048
 11. Moore CJ, Corl FM, Fishman EK (2001) CT of cecal volvulus: unraveling the image. *AJR Am J Roentgenol* 177(1):95–98
 12. Furukawa A, Yamasaki M, Furuichi K, Yokoyama K, Nagata T, Takahashi M et al (2001) Helical CT in the diagnosis of small bowel obstruction. *Radio-graphics* 21(2):341–355

Precisely correct answer was received by closing date from:

Khashayar Rafat Zand, Verdun, QC, Canada

Wolfgang Krampla, Vienna, Austria

Manabu Minami, Ibaraki, Japan

Siegfried Schwab, Erlangen, Germany

Mustafa Seçil, Izmir, Turkey

Annemie Snoeckx, Antwerpen, Belgium