

X-ray quiz: a 72-year-old man presenting with abdominal pain and distension

X 光照片猜謎：一名呈現腹痛及腹脹的 72 歲男子

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Case scenario and questions

A 72-year-old man complained of abdominal pain and distension for one week. His past medical health was unremarkable, with no history of previous surgery. He attended the Accident and Emergency Department and an abdominal X-ray was performed (Figure 1).



Figure 1. Plain abdominal X-ray.

1. What are the radiological findings?
2. What are your differential diagnoses?
3. What other investigations would be helpful?

He was admitted to the surgical ward. In view of progressing symptoms, computed tomography (CT) of the abdomen and pelvis was performed (Figures 2 & 3).

4. What are the CT findings?
5. What is the diagnosis?

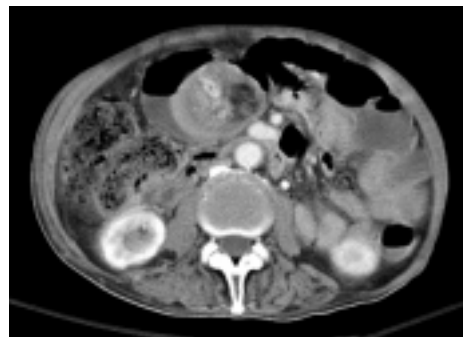


Figure 2. Axial abdominal CT scan.



Figure 3. Coronal CT scan of abdomen and pelvis.

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Answers

1. The abdominal X-ray shows multiple dilated small bowel loops. A soft tissue mass is noted at the epigastric region (Figure 4).
2. The differential diagnoses of small bowel intestinal obstruction in adult are shown in Table 1.¹
3. Other investigations include ultrasonography (USG) of abdomen and computed tomography of abdomen.
4. The contrast CT abdomen and pelvis are reconstructed in both axial and coronal planes. There is a large irregular mass in the right abdomen extending from the subhepatic region to the upper iliac region, with fat density and vessels inside (Figures 5 & 6). The proximal large bowel loops are difficult to delineate. There is no obvious free peritoneal gas. Multiple irregular hypodense lesions are seen in the liver, compatible with liver metastasis.



Figure 4. Anteroposterior abdominal radiograph showing multiple dilated small bowel loops with a soft tissue mass at the epigastric region (arrowheads). There is no free peritoneal gas.

Table 1. Causes of small bowel obstruction in adults¹

Extrinsic lesion	Adhesion
	External hernia
	Internal hernia
	Extrinsic tumour
	Abscess
	Aneurysm
	Haematoma
	Endometriosis (female)
Intramural lesion	Adenocarcinoma
	Carcinoid tumour
	Lymphoma
	Gastrointestinal stromal tumour
	Inflammatory lesion
	Crohn's disease
	Tuberculosis
	Eosinophilic gastroenteritis
	Vascular lesion
	Radiation enteropathy
	Ischaemia
	Haematoma
	Trauma
Intraluminal lesion	Gallstone
	Bezoar
	Foreign body



Figure 5. Axial abdominal contrast CT showing a large irregular mass at the right and central epigastrium (arrowheads), with fat density (asterisk) and blood vessels (#).

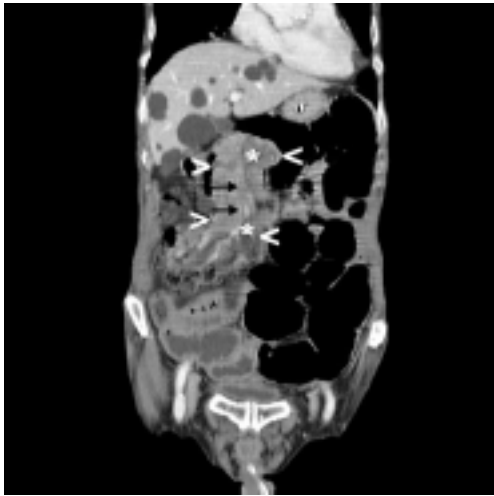


Figure 6. Coronal abdominal contrast CT showing the mass extending from the subhepatic to the upper iliac region (arrowheads), with fat density (asterisks) and blood vessels (black arrows). There are multiple liver secondaries (hypodensities).

- The diagnosis is suggestive of ileo-colic intussusception, probably the result of a carcinoma of the colon with multiple liver secondaries. At emergency laparotomy, a 5-cm diameter caecal tumour completely obstructing the ileocaecal junction was found, which together with the terminal ileum intussuscepted into the ascending colon. Right hemicolectomy and ileo-transverse anastomosis were done. The pathology report confirmed moderately differentiated mucinous adenocarcinoma of stage Dukes B.

Discussion

Intussusception is the prolapse of a segment of bowel into the lumen of the immediately adjacent segment of bowel. The intussusciens is the part of the intestine into which the adjoining portion has prolapsed, and the intussusceptum is the prolapsed segment.

Intussusception in adults is a relatively rare condition. It accounts for less than 5% of cases of bowel obstruction.² In contrast to cases involving infants, the

cause can be identified in over 90% of adult cases, such as neoplasm, adhesion, Meckel's diverticulum, foreign body, and prior history of abdominal surgery. Small bowel motility disorders such as coeliac disease or scleroderma are also possible causes. About 60% of adult intussusceptions are related to neoplasms.

Intussusception has been classified into four categories according to the site of origin: enteric, ileocolic, ileocaecal, and colonic.³ Enteric and colonic intussusceptions are confined to the small and large intestine respectively. Ileocolic intussusception is the prolapse of the ileum into the colon through the ileocaecal valve, while ileocaecal intussusception occurs when the ileocaecal valve acts as the leading point. However, in clinical practice it is difficult to differentiate between ileocolic and ileocaecal intussusceptions.

Adult intussusception usually presents with symptoms of intestinal obstruction such as abdominal pain, nausea and vomiting, abdominal distension, and change in bowel habit. On physical examination, a mass may be palpable in up to one-half of the patients. Abdominal X-ray may show evidence of small-bowel obstruction or the intussusception itself may be identified as a soft-tissue mass, sometimes surrounded by a crescent of gas and most frequently identified in the right hypochondrium. A 'target sign' may be seen, comprising two concentric circles of fat density lying to the right of the spine – often superimposed on the kidney. It is due to the layers of peritoneal fat surrounding and within the intussusceptum alternating with the layers of mucosa and muscle and seen 'end on' as it passes forward from the right paraspinous gutter into the transverse colon.

Ultrasound is highly sensitive for diagnosing intussusception (98-100%). The appearance of intussusception has been reported as a doughnut or pseudokidney, composing of a hypoechoic outer ring and a hyperechoic centre. Characteristic features of intussusception include the multiple concentric ring sign and crescent-in-doughnut sign on axial scans and

the sandwich sign and hayfork sign on longitudinal scans.⁴

In computed tomography, intussusception shows thickening of the affected bowel segment with a characteristic crescent-like, eccentric low density at the centre due to mesenteric fat being brought up into the lumen of the intussusciens behind the intussusceptum. The intussusception appears as a sausage-shaped mass or a target mass, depending on its orientation in relation to the plane of the CT.

Adult intussusception requires laparotomy rather than hydrostatic reduction, due to its high incidence of underlying pathology. Controversy remains as to whether reduction of the intussuscepting lesion should be attempted at operation. Early studies suggested reduction of intussusception before resection.⁵ The perceived disadvantage of this is that malignant cells may be disseminated during the reduction process despite the lack of clear evidence on this issue. The advantage of reducing the intussusception especially when the small bowel is affected is that it may be possible to preserve considerable lengths of bowel and prevent the development of the short bowel syndrome. Begos et al suggested resection without reduction when the bowel is inflamed, ischaemic, or friable and in obvious colo-colic intussusception (in view of the likelihood of malignancy).⁶ In other cases, reduction should be attempted initially. However, Azar and Berger suggested surgical resection without reduction as the preferred treatment in adults, as almost 50% of both colonic and enteric intussusceptions are associated with malignancy.⁷

Conclusion

Adult intussusception is a rare cause of intestinal obstruction. The diagnosis of this condition can be difficult as symptoms are non-specific. The most useful investigation is abdominal computed tomography. However, when computed tomography is not available, a water-soluble contrast enema examination is the other alternative. Treatment of adult intussusception requires resection of the involved bowel without attempting reduction in colonic lesions and in small bowel intussusception where the bowel is non-viable or when malignancy is suspected.

References

1. Herlinger H, Rubesin SE, Morris JB. Small bowel obstruction. In: Gore RM, Levine MS, eds. Textbook of gastrointestinal radiology. 2nd ed. Philadelphia, Pa: Saunders, 2000; 815-37.
2. Gayer G, Apter S, Hofmann C, Nass S, Amitai M, Zissin R, et al. Intussusception in adults: CT diagnosis. *Clin Radiol* 1998;53(1):53-7.
3. Weilbaecher D, Bolin JA, Hearn D, Ogden W 2nd. Intussusception in adults. Review of 160 cases. *Am J Surg* 1971;121(5):531-5.
4. Weissberg DL, Scheible W, Leopold GR. Ultrasonographic appearance of adult intussusception. *Radiology* 1977;124(3):791-2.
5. Brayton D, Norris W. Intussusception in adults. *Am J Surg* 1950;79:673-7.
6. Begos DG, Sandor A, Modlin IM. The diagnosis and management of adult intussusception. *Am J Surg* 1997; 173(2):88-94.
7. Azar T, Berger DL. Adult intussusception. *Ann Surg* 1997;226(2):134-8.