to distinguish between Addison's disease and acute adrenal insufficiency, especially during the first trimester of pregnancy. It is important to remember that mild cases can go undetected during pregnancy and become manifest as crises at parturition or in the presence of other illness such as urinary tract infection, dehydration, pre-eclampsia, etc.^{6,7}

In conclusion, acute adrenal insufficiency is a rare disorder whose diagnosis can be difficult during pregnancy. On the other hand, it is associated with high maternal and/or foetal

morbidity and mortality if allowed to progress. For this reason, early recognition and intervention are critical.

Final diagnosis

Acute adrenal insufficiency precipitated by urinary tract infection.

Keywords: adrenal insufficiency; pregnancy; urinary tract infection; vomiting; hypotension

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Fatal complication of coincidental operative finding

J S McCartney, S Karim, M Rahilly, R Dalling

A 65-year-old man with an established diagnosis of Crohn's colitis presented as an emergency with peritonitis and free subdiaphragmatic air on erect chest X-ray. At laparotomy, a grossly distended colon was noted, with two sites of perforation at the rectosigmoid and splenic flexure areas. Multiple non-dilated jejunal diverticula were noted coincidentally. Subtotal colectomy with cross-stapling of the rectum and formation of an end ileostomy was performed. He made an uneventful early postoperative recovery but during the fourth postoperative week he developed intermittent, colicky abdominal pain, vomiting and reduced ileostomy output. Subacute small bowel obstruction secondary to adhesions was diagnosed after clinical and radiological examination. Conservative treatment with intravenous fluids and nasogastric decompression produced an initial improvement but on the 32nd postoperative day the patient suddenly collapsed and died from a cardiorespiratory arrest secondary to acute renal failure and septic shock. At post-mortem examination, evidence of proximal jejunal diverticular disease with signs of acute diverticulitis and perforation were noted along with widespread peritonitis. No histological features of Crohn's disease were identified in the segment of perforated jejunum, or elsewhere in the bowel, and the inflammatory process was centred around the diverticulum (figure).

Figure Perforated jejunal diverticulum lined by inflamed granulation tissue. Some residual diverticular mucosa is visible on the right (arrow). The lumen of the perforation is indicated by *

Stobhill NHS Trust,
Balornock Road,
Glasgow G21 3UW, UK
Division of Surgery
J S McCartney
R Dalling
Department of
Pathology
S Karim
M Rahilly

Correspondence to
Mr JS McCartney, St
Mark's Hospital, Northwick
Park & St Mark's NHS
Trust, Watford Road,
Harrow, Middlesex HA1
3UJ, UK

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Questions

- 1 What is the incidence of small bowel diverticula?
- 2 What is the aetiology of small bowel diverticulosis?
- 3 List the common pre-operative clinical manifestations of small bowel diverticula.

Answers

QUESTION 1

Small bowel diverticula are uncommon, occurring in 0.5–2.3% of small bowel contrast studies¹ and 0.06–1.3% of post-mortem examinations.² They manifest most frequently in the sixth and seventh decades of life and were thought to occur more commonly in males,³ although one study has shown a preponderance for females.¹

QUESTION 2

Non-Meckelian small bowel diverticula are thought to be acquired pulsion defects caused by possible underlying abnormalities in peristalsis which in turn produce segmentally high intraluminal pressures.⁴ Jejunal diverticulosis has been described in association with systemic sclerosis and visceral neuropathy or myopathy.⁵ The diverticula of mucosa and submucosa emerge at natural weak sites where mesenteric vessels penetrate the intestinal wall explaining the observation that they are most commonly located at the mesenteric side of the bowel.⁶ Small bowel diverticula occur more frequently in the proximal jejunum and distal ileum where the vasa recti of greatest diameter are found.⁶

QUESTION 3

Common pre-operative complications associated with jejuno-ileal diverticula include haemorrhage, obstruction, diverticulitis, perforation, malabsorption, anaemia and chronic vague abdominal pain (box 1).⁶ The most common clinical signs include hyperactive bowel sounds, hyper-resonance with epigastric percussion and vague epigastric discomfort on palpation.¹ Complications of small bowel diverticula may manifest in different ways with varying frequencies according to their anatomical location (box 2).

Discussion

There are no reliable diagnostic tests to confirm the presence of small bowel diverticula. Erect abdominal X-rays may show air–fluid levels throughout the small bowel. The classic triad of features associated with jejuno-ileal diverticular disease consists of vague abdominal pain, anaemia and dilated loops of small bowel on abdominal X-ray.⁷ If the presence of small bowel diverticula is suspected then a small bowel barium follow-through study or enteroclysis can be performed. While the former easily demonstrates large diverticula, smaller ones may not be identified because of inadequate filling with contrast or due to extrinsic abdominal compression.⁸ Thus, a negative barium follow-through study does not exclude small bowel diverticular disease. Workers have shown that enteroclysis has a greater sensitivity at detecting diverticulae.⁸ This investigation should be borne in mind for the patient with persisting abdominal symptoms who has undergone negative endoscopic and standard contrast studies of both upper and lower gastrointestinal tracts.¹ Small bowel diverticulitis should also be included in the differential diagnosis of a small

Learning points

- the majority of small bowel diverticula are asymptomatic
- jejuno-ileal diverticula are more likely to have complications than duodenal diverticula
- duodenal diverticula are more likely to bleed
- jejuno-ileal diverticula are more likely to perforate/form abscesses
- asymptomatic small bowel diverticula can cause postoperative complications

Box 2

bowel inflammatory mass demonstrated by computed axial tomography.⁹ Upper gastrointestinal endoscopy and laparotomy are the two other main methods for diagnosing the presence of small bowel diverticula.⁵

In jejunal diverticular disease, obvious perforation, bleeding, or mechanical complications require resection with primary anastomosis. Failure of medical therapy in cases of blind loop syndrome or nonmechanical obstruction from severe jejunal dysmotility in the presence of diverticula may also benefit from resection of the affected segment. A dilated, hypertrophied segment of jejunum with large diverticula, suggestive of a progressive form of diverticular disease, which is found coincidentally at laparotomy should also be resected.⁶ The majority of ileal diverticulae on the other hand do not require operative intervention, except in cases of perforation, bleeding, or obstruction which occur less frequently than in jejunal disease. Excision of a coincidental, solitary, non-Meckelian ileal diverticulum in an adult is not warranted.^{1, 6}

Jejunal diverticula are probably more common than reported.⁷ They may be easily overlooked at operation as they are frequently present between the leaves of mesentery.⁴ In asymptomatic jejuno-ileal diverticular disease, noted coincidentally at operation or during radiological investigations, the risk of complications ensuing was 18% at a mean follow-up of 4.8 years in one series.¹⁰ The above case illustrates that serious complications of jejunal diverticular disease can arise in the early postoperative period. To date, there have been no reports in the literature of jejunal diverticular disease causing early postoperative complications. The coincidental finding of previously asymptomatic jejunal diverticula at laparotomy, whilst uncommon, should always be considered in the differential diagnosis of subsequent early postoperative symptoms suggestive of subacute small bowel obstruction. Failure to do so, with attention and management focussed on more likely causes for such symptoms may mask the true diagnosis with fatal consequences.

Final diagnosis

Fatal perforated acute jejunal diverticulitis complicating postoperative recovery following emergency subtotal colectomy for perforated fulminant Crohn's colitis.

Clinical manifestations of small bowel diverticulosis

- asymptomatic
- bleed
- obstruction
- perforation +/- abscess formation
- chronic abdominal pain
- volvulus
- enterolith formation
- anaemia
- malabsorption

Box 1

Keywords: jejunoileal diverticulitis; diverticulitis; small bowel perforation; Crohn's disease; enterocolitis

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Multinodular goitre, dysphagia and nodular shadows in the lung

A Bhansali, S Bhadada, R Kochhar, R Muralidharan, R J Dash

A 41-year-old woman presented in December 1997 with dry cough with streaky haemoptysis of 15 days duration. She had had a goitre for the last 25 years and had been diagnosed as having thyrotoxicosis on clinical and biochemical grounds (triiodothyronine (T_3) 2.8 ng/ml and thyroxine (T_4) 220 ng/ml) in September 1995. She had received carbimazole for 6 months and remained asymptomatic thereafter.

On examination, her body mass index (BMI) was 24.1 kg/m². She had no pallor, lymphadenopathy, clubbing, oedema or hyperkeratosis. Her pulse was 96 beats/min regular, blood pressure 110/70 mmHg. She denied a history of fever, weight loss, loss of appetite, or recent increase in goitre size, but had been dysphagic to solids for 2-3 days. She was a non-smoker and never consumed alcohol. She had a firm, grade III (WHO) non-tender multinodular goitre with retrosternal extension. Systemic examinations were normal except for diffuse bilateral rhonchi. Her haemogram and serum biochemistry, including thyroid hormone profile (T_3 0.86 ng/ml, T_4 78 ng/ml, thyroid-stimulating hormone 0.3 μ U/ml) were normal. Ultrasonography of thyroid confirmed the multinodular goitre with retrosternal extension with some areas of necrosis and specks of calcification. Ultrasound-guided fine needle aspiration cytology (FNAC) revealed follicular cells with nuclear grooving and psammoma bodies. Her radiological profile is shown in figure 1. Bronchoscopy could not be completed because of laryngeal spasm. Computed tomography (CT)-guided FNAC from pulmonary lesions was inconclusive.

Postgraduate Institute
of Medical Education
and Research,
Chandigarh 160012,
India
Department of
Endocrinology
A Bhansali
S Bhadada
R Muralidharan
R J Dash
Department of
Gastroenterology
R Kochhar

Correspondence to Prof
R J Dash

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Figure 1 Clinical and radiological profile of the patient

Questions

- 1 What is shown in figure 1?
- 2 What is your diagnosis?
- 3 What would be the approach to confirm the diagnosis?