

A 'wandering' gallstone

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When all three of the features of Rigler's triad are present on an abdominal radiograph, the cause of a small-bowel obstruction can be identified.

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Case report

A 71-year-old man presented with possible gastric outlet obstruction. Previously treated for ulcerative colitis, he had had a colectomy and had undergone Park's procedure (construction of an ileal-anal pouch).

At presentation, the patient's main complaint was a 4-day history of abdominal pain and vomiting. He was dehydrated, with associated metabolic alkalosis. He also had a history of acute-on-chronic renal failure, diabetes and hypertension.

On admission, plain abdominal radiographs (Figs 1 and 2) demonstrated signs of small-bowel obstruction, multiple radio-opaque stones (including one large one) in the region of the right hypochondrium, and intrabiliary gas. The patient therefore represented a classic case of Rigler's triad, indicating 'gallstone ileus'.

An ultrasound scan of the abdomen confirmed the pneumobilia and multiple small stones in the gallbladder. Also there was no intra- or extrahepatic bile duct dilation, and there were no signs of cholecystitis.

Initially treatment was conservative in nature, with resuscitation before surgery. Because of the patient's poor renal function, no pre-operative computed tomography (CT) scan of the abdomen was done.

Intra-operatively, extensive small-bowel adhesions, a cholecysto-enteric fistula, an impacted gallstone just proximal to the ileal-anal pouch anastomosis, distal small-bowel obstruction with fistulas and a large stone in the gallbladder were found.

Surgical intervention consisted of small-bowel adhesiolysis, intra-operative ileoscopy, resection and primary anastomosis of the distal small bowel, stone extraction and cholecystectomy with ligation of the cystic duct and cystic artery. The abdomen was washed out and a pencil drain was left in the gallbladder bed. A Foley's catheter was inserted into the ileal pouch-anal anastomosis and sutured to the anal skin. The patient was placed on an intravenous adrenaline infusion and was admitted to the intensive care unit postoperatively. Unfortunately he died 3 days later.

Discussion

The first case of gallstone ileus was reported by Bartholin (cited by Lassandro *et al.*¹) in 1654. Since then it has remained a rare but significant complication of gallstone disease.²



Fig. 1. A supine abdominal radiograph demonstrating multiple, radio-opaque stones in the right hypochondrium. (Some of these stones may be located in the gallbladder, but others are probably in the small bowel.) There are also dilated loops of small bowel and pneumobilia.



Fig. 2. Erect abdominal radiographs demonstrating multiple air-fluid levels, confirming small-bowel obstruction. Again, the multiple radio-opaque stones can be seen in the right hypochondrium and the pneumobilia is visible.

The term 'gallstone ileus' refers to mechanical small-bowel obstruction as a result of acute or chronic cholecystitis.¹⁻⁹ Subsequent inflammatory change in the gallbladder predisposes the gallstone to wear its way into the gastrointestinal tract, creating

a fistulous connection to the adjacent bowel.³ Frequent sites for these cholecysto-enteric fistulas are the stomach, colon, jejunum and duodenum.²

Generally these stones pass without difficulty. However, if they are large enough (typically more than 2.5 cm) and in a narrower portion of the bowel (such as the terminal ileum), the probability that they will cause mechanical obstruction increases.³ Other factors influencing the possibility of obstruction include the number of calculi, and segment motility.²

Gallstone ileus by and large affects elderly women.¹⁻⁹ In patients over 65 years of age it can be implicated in causing up to 25% of non-strangulated small-bowel obstructions.²⁻⁵ Because of the age of the population involved, the morbidity and mortality associated with the disease is increased.³ An estimated 15 - 18% mortality has been reported.³ (Our patient's advanced age, as well as his co-morbidities, had a negative impact on his surgical management.¹)

Twenty-five million Americans suffer from gallstones. A sedentary lifestyle, a poor diet and an inherited predilection, as well as obesity, diabetes and the use of oral contraception, increase the likelihood of gallstone development.⁶ According to Bortoff *et al.*, 15 - 20% of gallstones comprise enough calcium to be detectable on radiographs.⁶

Rigler's triad, documented in 1941, illustrates the classic radiographic features of gallstone ileus, namely: (i) partial or complete obstruction of the bowel; (ii) air within the biliary system; and (iii) a large ectopic gallstone that may change position on consecutive radiographs.^{2,3,7,8} However, the prevalence of all three of these features is as low as 17 - 35%.³ Features of small-bowel obstruction alone are most common.²

The role played by imaging in the diagnosis of gallstone ileus has been well documented.¹ In 1954, Thomas Dorr (cited by Zaliakas and Munson³) discussed the diagnosis of gallstone ileus by means of radiography. According to Dorr, radiological features were

under-reported and under-appreciated. In his study and research Dorr found that this diagnosis was rarely made pre-operatively – in as few as 20 - 50% of cases.

Ultrasound has proved to be far more sensitive than plain radiographs for the detection of gallstones and pneumobilia.^{3,6}

CT plays a significant role in identifying the primary pathology. The improved accuracy associated with CT facilitates planning of treatment, be it surgical or conservative in nature.¹ CT also helps to determine the size, number and site of obstruction of the offending stone/s,¹ as well as the site of the cholecysto-intestinal fistula.⁵

Conclusion

Since all three of the features of Rigler's triad were present on the patient's initial abdominal radiographs, the primary imaging played an essential part in the diagnosis.

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