CASE REPORT

The Norovirus epidemic...or just a stone? Revising the diagnosis with an abdominal radiograph

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SUMMARY

During an acute outbreak of Norovirus in the local area, a 77-year-old woman was admitted with a short history of diarrhoea and vomiting. A working diagnosis of viral gastroenteritis complicated by acute renal failure, secondary to dehydration, was made. Despite judicious fluid resuscitation and regular antiemetics, the patient's symptoms persisted with only mild improvement in her renal function. An abdominal radiograph revealed evidence of significant small bowel obstruction and subsequent CT of the abdomen and pelvis identified a 1.5 cm intraluminal density at a transition point raising the suspicion of gallstone ileus. An urgent laparotomy with stone removal was carried out without complications. The patient recovered well postoperatively and was discharged home after 3 days.

BACKGROUND

Gallstone ileus (GSI) is an uncommon complication of gallstone disease, which poses a significant mortality risk.¹ Although classic symptoms may prompt the clinician to a typical bowel obstruction, diagnosis is frequently delayed due to its variable presentation spectrum.²

Reflecting its prevalence among the elderly and the ageing population shift, GSI has been proposed to be a more common entity in the last few decades.³ This, coupled with its high associated morbidity, has highlighted the growing importance of early recognition of this condition.

Here, we report an unusual presentation of GSI, initially misdiagnosed as Norovirus-induced gastroenteritis. Our experience demonstrates the differing clinical pictures of GSI and how simple investigations may alert us to its presence. Moreover, it reminds the reader to consider GSI when approaching a patient with persistent symptoms.

CASE PRESENTATION

A 77-year-old woman was referred to the medical team with a 3-week history of diarrhoea and vomiting. Although her symptoms had originally improved following a course of antibiotics for urinary tract infection, she described worsening watery diarrhoea and green-yellow vomit recently; she denied any abdominal pain. Oral intake had been poor with minimal urine output in the 24 h prior to admission. There was no evidence of infectious contacts.

The patient's medical history comprised of a previous cerebellar infarct, for which she was receiving secondary prevention medication, and cervical cancer. In addition, she had a suprapubic catheter

for bladder outflow obstruction. She described no pertinent family history and drank mild volumes of alcohol.

Observations included a normotensive tachycardia and no fever. The abdomen was soft with mild periumbilical discomfort and normal bowel sounds. Neurological assessment demonstrated longstanding right-sided dysidiadochokinesis.

INVESTIGATIONS

Blood results on admission revealed significant renal impairment (urea 33.3, creatine 292, eglomerular filtration rate 13) with no elevation of inflammatory markers (white cell count 9.3, C reactive protein 4.3). The patient was hypokalaemic (K 3.4) and hyponatraemic (Na 123). Owing to the patient's history of a suprapubic catheter and her poor urine output after initial fluid resuscitation, a renal ultrasound was requested. Although this demonstrated marginally small kidneys, there was no evidence of hydronephrosis.

The day after admission, the patient's claim to feeling better was reflected by improving renal function tests (urea 26.1, creatine 184); however, she continued to vomit large amounts of green fluid and have loose stools. After 48 h of non-resolving symptoms, an abdominal radiograph was performed revealing dilated loops of small bowel and marked stomach distension (figure 1). This was surprising given the lack of clinical signs suggestive of bowel obstruction. As there were no obvious clinical causes of her obstruction, a CT of the abdomen and pelvis was organised for further evaluation (figure 2). A transition point was identified in the terminal ileum, which contained a 1.5 cm intraluminal density consistent with a gallstone. This was further supported by the presence of pneumobilia, indicating a potential fistula between the duodenum and gallbladder.

DIFFERENTIAL DIAGNOSIS

Following a provisional impression of Norovirus gastroenteritis, the patient was managed conservatively with intravenous fluids and rehydration. However, the diagnosis was revised when the patient continued to vomit and an abdominal film showed small bowel dilation. The commonest potential causes were excluded in our patient. There were no hernias palpable and, other than the suprapubic catheter, our patient had no previous abdominal surgery making adhesions unlikely. The radiograph appearance was not suggestive of a bowel volvulus. The possibility of a neoplasm was also considered.

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Figure 1 Plain abdominal radiograph demonstrating dilated small bowel. A suprapubic catheter is in situ. We were not able to identify pneumobilia or any gallstones.

TREATMENT

Upon assessment of the patient's imaging, a nasogastric tube was placed for symptom control, and to allow more time for a spontaneous evacuation of the gallstone, according to previously reported cases in the literature.^{4–6} With persisting symptoms after 48 h, a decision was made to undergo surgical removal. Further fluids were given to optimise renal function prior to the procedure. The patient underwent exploratory surgery 5 days after her initial presentation through a modified Lanz incision. The terminal ileum was dilated down to a transition point where a gallstone was impacted, and distally, the bowel was collapsed. A small enterotomy was performed and the stone was retrieved.

Figure 2 CT of the abdomen and pelvis showing a 1.5 cm density in the terminal ileum. The radiolucency of this suspected gallstone reflects its absence on the plain radiograph.

OUTCOME AND FOLLOW-UP

The patient quickly recovered after definitive treatment, with a dramatic improvement in her symptoms and biochemistry. She was discharged home 3 days after surgery.

DISCUSSION

GSI is an unusual sequela of cholelithiasis, which results from the passage of a gallstone from the bile ducts into the bowel, through a cholecysto-enteric fistula, leading to mechanical bowel obstruction. Although only up to 4% of mechanical bowel obstruction has been attributed to GSI, this rises notably to 25% in patients over the age of 65.⁷ Elderly women are at highest risk of acquiring GSI with a ratio to men of 3–6:1.⁸ Perhaps owing to its predominance in affecting the older population with more comorbidities, GSI continues to be associated with high rates of mortality (15–18%) and morbidity.⁹

Owing to its narrow intraluminal diameter, the terminal ileum is the most frequent site of impaction, but the jejunum, colon and even a Meckel's diverticulum can be involved.^{10–11} Previous literature has asserted that a gallstone must be larger than 2.5 cm to precipitate obstruction, due to the diameter of the small bowel and the ileocaecal valve.^{6–12} However, here we report a 1.5 cm gallstone leading to significant bowel obstruction and marked renal impairment. Small calculi (<2 cm) as a cause for GSI have been described in several case reports but we were unable to identify occasions where decompression by nasogastric drainage did not lead to their spontaneous evacuation.^{4–6} In our patient, bilious contents continued to be drained despite 48 h of decompression by a nasogastric tube, and therefore a decision was made to proceed to surgery.

Diagnosis of GSI is often challenging, with some groups reporting a mean delay of 4 days from symptoms to hospital admission.² Generally, about half of the patients are known to previously suffer from gallstones, and usually presentation includes symptoms of bowel obstruction, particularly abdominal pain and vomiting.¹³ A review of 22 patients, described all of their patients presenting with abdominal pain,³ which was not, however, mirrored by our patient. This may be due to the relatively small size of the gallstone, generating less bowel spasm.

Definitive diagnosis can be made following observation of Rigler's triad on the abdominal radiograph—an ectopic gallstone, pneumobilia and small bowel obstruction. However, with only a minority of gallstones being radiopaque, two of the three signs are seen in less than 50% of patients.¹⁴ Indeed in our case, only dilated small bowel loops were discernible. The advent of routine CT imaging for small bowel obstruction, where no obvious cause can be found clinically, has produced sensitivity and specificity rates of 93% and 100% respectively in GSI.¹⁵ Furthermore, the better resolution of CT allows confirmation of the calculus size and location, as well as the presence of a cholecysto-enteric fistula.

For a select group of patients, conservative or non-invasive measures, such as radiologically guided lithotripsy, have been suggested, but prompt relief of the obstruction by surgical means remains the cornerstone of management in GSI.¹⁶ Routine current practice involves gallstone extraction via an enterotomy with or without segmental bowel resection. Some have advocated combining stone removal with a cholecystectomy and fistula closure as this may reduce the risks associated with a persistently patent fistula, such as GSI recurrence, ascending cholangitis and gallbladder cancer.^{17–19} However, this prolonged operation carries significant associated morbidity and mortality, and is hence not widely practised.

Learning points

- ▶ Have a low threshold for an abdominal radiograph in the patient with persistent diarrhoea and vomiting
- ▶ Consider the diagnosis of gallstone ileus in the elderly, especially women, population with bowel obstruction
- ▶ Although small gallstones (<2 cm) can be managed with nasogastric decompression and supportive measures, surgical intervention may still be necessary
- ▶ Stone extraction by enterotomy alone has a reduced death rate when compared to the one-stage procedure

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Competing interests None.

Patient consent Obtained.

REFERENCES

- 1 Ravikumar R, Williams JG. The operative management of gallstone ileus. *Ann R Coll Surg Engl* 2010;92:279–81.
- 2 Zuegel N, Hehl A, Lindemann F, et al. Advantages of one-stage repair in case of gallstone ileus. *Hepatogastroenterology* 1997;44:59–62.
- 3 Ayantunde AA, Agrawal A. Gallstone ileus: diagnosis and management. *World J Surg* 2007;31:1292–7.
- 4 Ihara E, Ochiai T, Yamamoto K, et al. A case of gallstone ileus with a spontaneous evacuation. *Am J Gastroenterol* 2002;97:1259–60.
- 5 Mishin I, Ghidirim G, Zastavitsky G. Non-operative treatment for gall-stone ileus—a case report. *Pol Przegl Chir* 2011;83:223–6.
- 6 Farooq A, Memon B, Memon MA. Resolution of gallstone ileus with spontaneous evacuation of gallstone. *Emerg Radiol* 2007;14:421–3.
- 7 Clavien PA, Richon J, Burgan S, et al. Gallstone ileus. *Br J Surg* 1990;77:737–42.
- 8 Halabi WJ, Kang CY, Ketana N, et al. Surgery for gallstone ileus: a nationwide comparison of trends and outcomes. *Ann Surg* 2013 Jan 4. [Epub ahead of print].
- 9 Reisner RM, Cohen JR. Gallstone ileus: a review of 1001 reported cases. *Am Surg* 1994;60:441–6.
- 10 Lassandro F, Gagliardi N, Scuderi M, et al. Gallstone ileus analysis of radiological findings in 27 patients. *Eur J Radiol* 2004;50:23–9.
- 11 Nakamoto Y, Saga T, Fujishiro S, et al. Gallstone ileus with impaction at the neck of a Meckel's diverticulum. *Br J Radiol* 1998;71:1320–2.
- 12 Kasahara Y, Umemura H, Shiraha S, et al. Gallstone ileus. Review of 112 patients in the Japanese literature. *Am J Surg* 1980;140:437–40.
- 13 Kirchmayr W, Mühlmann G, Zitt M, et al. Gallstone ileus: rare and still controversial. *ANZ J Surg* 2005;75:234–8.
- 14 Lassandro F, Romano S, Ragozzino A, et al. Role of helical CT in diagnosis of gallstone ileus and related conditions. *AJR Am J Roentgenol* 2005;185:1159–65.
- 15 Yu CY, Lin CC, Shyu RY, et al. Value of CT in the diagnosis and management of gallstone ileus. *World J Gastroenterol* 2005;11:2142–7.
- 16 Muratori R, Cennamo V, Menna M, et al. Colonic gallstone ileus treated with radiologically guided extracorporeal shock wave lithotripsy followed by endoscopic extraction [abstract]. *Endoscopy* 2012;44(Suppl 2):P88–9.
- 17 Berliner SD, Byrson LC. One-stage repair for cholecyst-duodenal fistula and gallstone ileus. *Arch Surg* 1965;90:313–6.
- 18 Webb LH, Ott MM, Gunter OL. Once bitten, twice incised: recurrent gallstone ileus. *Am J Surg* 2010;200:e72–74.
- 19 Day EA, Marks C. Gallstone ileus. Review of the literature and presentation of thirty-four new cases. *Am J Surg* 1975;129:552–8.

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