CASE REPORT

Colonic gallstone ileus: the rolling stones

Roisin Mary Heaney

Department of Surgery, Mater
Misericordiae University
Hospital, Dublin, Ireland

Correspondence to
Dr Roisin Mary Heaney,
heaneyr@tcd.ie

Accepted 23 September 2014

SUMMARY

Gallstone ileus is a rare complication of cholelithiasis accounting for 1–4% of cases of intestinal obstruction with a predominance in the elderly population. Unfortunately, it has an insipid presentation and is associated with significant rates of morbidity and mortality. Controversy arises over the management of gallstone ileus, and while surgery remains the mainstay of treatment, the main point of contention surrounds the extent of surgery. We describe the case of an 85-year-old woman who presented with symptoms and signs of large bowel obstruction. Radiological evaluation revealed a 5 cm×3.5 cm gallstone impacted in the sigmoid colon. A laparoscopic-assisted enterolithotomy alone relieved the obstruction with minimal surgical insult and allowed for a swift and uneventful recovery. Our case emphasises the need for a high index of suspicion for the condition as well as highlighting the advantages of the use of laparoscopic surgery in an emergency setting.

BACKGROUND

Gallstone ileus (GSI) is an uncommon complication of cholelithiasis accounting for 1–4% of cases of intestinal obstruction.¹ GSI predominates in the elderly female population and 25% of cases of small bowel obstruction in those over 65 years of age are attributable to GSI.^{1 2} The condition has an insipid presentation and is associated with mortality rates ranging 8–20%, largely as a result of patient's comorbidities and delayed diagnosis.¹ The management of GSI remains controversial, and while surgery remains the mainstay of treatment, the main point of contention surrounds the extent of surgery.

CASE PRESENTATION

An 85-year-old woman presented to the emergency department of a rural hospital with a 10-day history of progressively worsening abdominal pain associated with abdominal distension, constipation and anorexia. Physical examination revealed low-grade fever and a tender distended abdomen with maximal tenderness in the left iliac fossa. She had a history of an episode of severe cholecystitis with gallbladder empyema 4 months previously, which was treated with cholecystostomy tube insertion. An interval cholecystectomy had not been pursued. There was no history of any abdominal surgeries.

INVESTIGATIONS

Laboratory values revealed a white cell count of $14.38 \times 10^9/L$, normal serum amylase and liver enzymes, and a coagulase negative *Staphylococcus* was isolated from peripheral blood cultures. The initial working diagnosis was a strangulated

Figure 1 Pneumobilia and a thickened gallbladder wall.

inguinal hernia. CT of the abdomen and pelvis discounted this diagnosis and revealed pneumobilia (figure 1), three gallstones in the sigmoid colon, the largest measuring 5 cm×3.5 cm at the junction of the descending and sigmoid colon (figure 2), and a cholecystocolonic fistula.

TREATMENT

An initial attempt at endoscopic retrieval of the stone via colonoscopy failed and the patient was transferred to a tertiary referral hospital for further management. A repeat colonoscopy was performed, which utilised the polypectomy snare, Roth net (US endoscopy), dormia basket and argon plasma coagulation. Unfortunately, this once again failed to extract the stone, which was found to be impacted at 40 cm and had caused local mucosal ulceration (figure 3). The area was ink marked to aid surgical retrieval of the stone. Following extensive discussion with the patient and her family, who were in

Figure 2 A 5 cm×3.5 cm gallstone lodged in the sigmoid colon.

CrossMark

To cite: Heaney RM. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2014-204402

Figure 3 Impacted gallstone at 40 cm with surrounding mucosal irritation.

favour of a minimally invasive approach, the patient proceeded to laparoscopic exploration and mobilisation of the sigmoid colon. The fistula was not identified. With the aid of the Alexis wound retractor (Applied Medical), the ink-marked colon was delivered through a short suprapubic incision and a longitudinal enterotomy was made to deliver the stone (figures 4 and 5). The defect was closed horizontally and actual stone measurements were found to be 6 cm×4 cm (figure 6). The remaining two smaller stones were not identified. Neither colonic resection nor a defunctioning ileostomy was required.

OUTCOME AND FOLLOW-UP

The patient was discharged home on day 9 postoperatively with no further complications. She remains well 6 months after surgery.

DISCUSSION

GSI is an unusual entity that occurs in 0.3–0.5% of all patients with gallstones³ and is responsible for 1–4% of all cases of intestinal obstruction.¹ Colonic impaction of a gallstone is even

rarer and occurs in only 4% of all cases of GSI.² The most common site of impaction is the terminal ileum and the ileocaecal valve due to the luminal narrowing at this site.² Gallstones that obstruct the colon tend to do so at the level of the sigmoid colon, most commonly due to a pathological narrowing such as, for example, diverticulitis.⁴

Biliary-enteric fistulas occur in the setting of inflammation, generally an episode of acute cholecystitis, and are a result of the formation of adhesions between the gallbladder and a nearby part of the bowel. Stones cause a pressure effect and erode through the gallbladder wall, entering the adherent gastrointestinal tract.^{5 6} While fistulas involving the colon and stomach have been documented, most instances of GSI involve fistulas to the small bowel and predominantly the duodenum (60% of cases).^{1 2 5} The gallstone should be a minimum of 2–2.5 cm in diameter to cause obstruction.^{1 2 7 8} The majority of colonic GSI occurs in the presence of a biliary-colic fistula and rarely a biliary-duodenal fistula as a cholelith that passes freely through the terminal ileum and ileocaecal valve is unlikely to obstruct in the rectosigmoid.⁹

The presentation of GSI tends to be insipid with the symptoms of bowel obstruction including abdominal pain and distension, vomiting and constipation, prevailing and occurring intermittently as the gallstone lodges and dislodges as it passes through the lumen of the bowel. This is known as the ‘tumbling phenomenon’ and frequently leads to a delayed or missed diagnosis.² A previous episode of biliary-tract disease is identified in less than 50% of cases and the presence of symptoms immediately prior to the diagnosis is atypical.¹ The classical radiological triad as described by Rigler *et al*¹⁰ of pneumobilia, dilated small bowel and a gallstone usually located in the right iliac fossa, is seen on plain film of the abdomen in less than 50% of cases.¹¹ The sensitivity of plain films and ultrasound alone is 40–70% and 74%, respectively, and this increases to 78–90% on combination of these two approaches.³ CT of the abdomen and pelvis remains gold standard with sensitivity and specificity rates of 93% and 100%, respectively.¹² Despite these advances in radiology, the diagnosis is frequently made on discovery of the gallstone during a laparotomy for intestinal obstruction of unknown aetiology.

The management of GSI remains controversial. A conservative approach is not usually advocated as spontaneous evacuation of the stone is rare and occurs in approximately 7% of

Figure 4 Ink-marked colon delivered through a suprapubic incision.

Figure 5 Longitudinal enterotomy to remove the stone.

cases.⁸ However, it may be reasonable to adopt such an approach, at least initially, if the gallstone is smaller than 2 cm on CT.^{12 13} Endoscopic retrieval of the stone is usually

Figure 6 Gallstone measuring over 6 cm×4 cm in size.

attempted but is rarely successful. It is technically difficult as there is little difference between the size of the stone and the lumen within which it is impacted, rendering it virtually impossible to pass the scope beyond the stone or successfully deploy a basket.^{14 15} Finding a basket large enough to carry the stone is yet another obstacle.¹⁶ In our case, two separate attempts at colonoscopy by two different endoscopists failed to extract the stone. The combination of endoscopy with lithotripsy has been successful in several cases. Bourke *et al*¹⁶ successfully fragmented a 2.8 cm stone in 130 min using electrohydraulic lithotripsy and recommend its use in elderly patients who, due to concomitant disease, may be unfit for general anaesthetic. Given the size of the stone and duration of therapy documented here, this treatment modality was not pursued in our case.

Surgery remains the mainstay of treatment. Controversy arises over the various approaches, which include an enterolithotomy, cholecystectomy and fistula repair as a one-stage procedure or enterolithotomy alone with or without an interval cholecystectomy. In a review of 1001 cases, Reisner *et al*² reported a mortality rate of 16.9% for the one-stage procedure versus 11.7% for enterolithotomy alone with only a marginal difference in recurrent GSI; 5.3% versus 6%, respectively. In a Croatian series, Doko *et al*¹⁷ documented morbidity rates of 61.1% and 27.3% for the one-stage procedure and enterolithotomy alone, respectively, with the one-stage procedure having a minimal 1.5% higher mortality rate. The general opinion is that an enterolithotomy alone is the treatment of choice except in cases of acute cholecystitis, gallbladder gangrene or for those who are low risk surgical candidates. Laparoscopic-assisted enterolithotomy is associated with less surgical trauma, an earlier discharge from hospital and a reduction in postoperative morbidity and mortality rates.^{18 19} In our case, had the fistula been identified intraoperatively or if the sigmoid colon was not amenable to laparoscopic mobilisation, an open approach would likely have been adopted. Unfortunately, given its rare occurrence, diagnostic difficulties and prevalence in the elderly and therefore higher risk patient group, it is implausible that a randomised trial comparing the various surgical approaches be implemented.

Learning points

- ▶ Gallstone ileus is an exceedingly rare complication of cholelithiasis and a cause of mechanical large bowel obstruction.
- ▶ One must maintain a low threshold of suspicion for gallstone ileus in patients over 65 years of age presenting with symptoms and signs of intestinal obstruction.
- ▶ Gallstone ileus poses diagnostic difficulties clinically and radiologically.
- ▶ A treatment dilemma regarding the extent of the surgery invariably ensues but ultimately the decision is guided by the patient's age, comorbidities and perioperative state.
- ▶ A laparoscopic approach can reduce hospital stay and postoperative morbidity.

Acknowledgements The author would like to thank Mr J Mulsow, under whose care this patient was treated, for allowing me to submit this case.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

REFERENCES

- 1 Clavien PA, Richon J, Burgan S, *et al.* Gallstone ileus. *Br J Surg* 1990;77:737–42.
- 2 Reisner RM, Cohen JR. Gallstone ileus: a review of 1001 reported cases. *Am Surg* 1994;60:441–6.
- 3 Ripolles T, Miguel-Dasit A, Errando J, *et al.* Gallstone ileus: increased diagnostic sensitivity by combining plain film and ultrasound. *Abdom Imaging* 2001;26:401–5.
- 4 Young WV. Gallstone ileus of the colon. Report of an unusual type of colon obstruction. *Arch Surg* 1961;82:333–6.
- 5 Abou-Saif A, Al-Kawas FH. Complications of gallstone disease: Mirizzi syndrome, cholecystocholedochal fistula, and gallstone ileus. *Am J Gastroenterol* 2002;97:249–54.
- 6 Ravikumar R, Williams JG. The operative management of gallstone ileus. *Ann R Coll Surg Engl* 2010;92:279–81.
- 7 Deitz DM, Standage BA, Pinson CW, *et al.* Improving the outcome in gallstone ileus. *Am J Surg* 1986;151:572–6.
- 8 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.
- 9 Milsom JW, MacKeigan JM. Gallstone obstruction of the colon. Report of two cases and review of management. *Dis Colon Rectum* 1985;28:367–70.
- 10 Rigler LG, Borman CN, Noble JF. Gallstone obstruction: pathogenesis and roentgen manifestations. *JAMA* 1941;117:1753–9.
- 11 Lassandro F, Gagliardi N, Scuderi M, *et al.* Gallstone ileus analysis of radiological findings in 27 patients. *Eur J Radiol* 2004;50:23–9.
- 12 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.
- 13 Syme RG. Management of gallstone ileus. *Can J Surg* 1989;32:61–4.
- 14 Bourke MJ, Haber GB. Transpapillary choledochoscopy. *Gastrointest Endosc Clin N Am* 1996;6:235–52.
- 15 Schneider MU, Matek W, Bauer R, *et al.* Mechanical lithotripsy of bile duct stones in 209 patients—effect of technical advances. *Endoscopy* 1988;20:248–53.
- 16 Bourke MJ, Schneider DM, Haber GB. Electrohydraulic lithotripsy of a gallstone causing gallstone ileus. *Gastrointest Endosc* 1997;45:521–3.
- 17 Doko M, Zovak M, Kopljak M, *et al.* Comparison of surgical treatments of gallstone ileus: preliminary report. *World J Surg* 2003;27:400–4.
- 18 Soto DJ, Evan SJ, Kavic MS. Laparoscopic management of gallstone ileus. *JSLs* 2001;5:279–85.
- 19 Moberg AC, Montgomery A. Laparoscopically assisted or open enterolithotomy for gallstone ileus. *Br J Surg* 2007;94:53–7.

Copyright 2014 BMJ Publishing Group. All rights reserved. For permission to reuse any of this content visit <http://group.bmj.com/group/rights-licensing/permissions>.
BMJ Case Report Fellows may re-use this article for personal use and teaching without any further permission.

Become a Fellow of BMJ Case Reports today and you can:

- Submit as many cases as you like
- Enjoy fast sympathetic peer review and rapid publication of accepted articles
- Access all the published articles
- Re-use any of the published material for personal use and teaching without further permission

For information on Institutional Fellowships contact consortiasales@bmjgroup.com

Visit casereports.bmj.com for more articles like this and to become a Fellow