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CLINICAL CASE

Enterolithotomy and early cholecystectomy, an application of damage control surgery for patients with gallstone ileus☆

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KEYWORDS
Gallstone ileus;
Recurrent gallstone ileus;
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Damage control surgery

Abstract
Background: Recurrent gallstone ileus is an uncommon mechanical intestinal obstruction secondary to occlusion of the intestine by an intraluminal biliary calculus.
Clinical case: A 75-year-old female, ischaemic heart disease (stent), arrived in our department complaining of abdominal pain and vomiting. Computed tomography showed gallstone ileus. The patient underwent an enterotomy with gallstone removal. Three months later, the patient came back with the same clinical symptoms and signs. A new computed tomography highlighted a gallstone ileus again. Enterolithotomy and gallstone removal, cholecystectomy and closure of cholecystoduodenal fistula were performed. The patient had a prolonged hospital stay due to the development of congestive heart failure.
Case 2. A 71-year-old male, ischaemic heart disease and aortocoronary bypass, seen in our department complaining of vomiting. Computed tomography showed aerobilia and gallstone ileus. The patient underwent an urgent enterolithotomy. Seven months later, the patient came back with the same clinical symptoms and signs. Computed tomography showed a new gallstone ileus. An enterotomy and gallstone removal, cholecystectomy and closure of cholecystoduodenal fistula were performed. The patient died due to multi-organ failure in post-surgery period.

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Conclusion: In the elderly patients with concomitant medical illnesses with the risk of a second laparotomy, it is justifiable to reconsider the definitive repair in the treatment of gallstone ileus. The enterolithotomy in acute phase followed by early cholecystectomy (4–8 weeks) may be a safe method for eliminating, not only the possibility of recurrent gallstone ileus, and probably the need for a second laparotomy, but also the exceptional possibility of developing a gallbladder carcinoma.

PALABRAS CLAVE
Íleo biliar;
Íleo biliar recurrente;
Obstrucción intestinal;
Cirugía de control de daño

Enterolitotomía más colecistectomía precoz, una aplicación de cirugía de control de daños para pacientes con íleo biliar

Resumen
Antecedentes: El íleo biliar recurrente es una obstrucción intestinal mecánica infrecuente, secundaria a la oclusión del intestino por un cálculo biliar intraluminal.
Casos clínicos: Mujer de 75 años, portadora de endoprótesis cardiaca, que acudió con dolor abdominal y vómitos, evidenciándose en la tomografía computada (TC) un íleo biliar. Se realizó enterolitotomía urgente. Tres meses después presenta el mismo cuadro clínico y la TC evidencia nuevo íleo biliar, por lo que se le practicó enterolitotomía, colecistectomía y cierre de fístula colecistoduodenal.
Caso 2. Hombre de 71 años de edad, con cardiopatía isquémica y pontaje aortocoronario, que acudió con cuadro de vómitos, evidenciándose en TC aerobilia e íleo biliar. Se realizó enterolitotomía urgente. Acudió 7 meses más tarde con el mismo cuadro clínico, visualizándose en la TC nuevo íleo biliar, y se le realizó nueva enterolitotomía, colecistectomía y cierre de fístula colecistoduodenal. En el postoperatorio el paciente falleció por disfunción multiorgánica.
Conclusión: En pacientes de edad avanzada con enfermedades concomitantes con riesgo de una segunda laparotomía se justifica reconsiderar la reparación definitiva del íleo biliar. La enterolitotomía en el momento agudo seguido de colecistectomía temprana (4-8 semanas) puede ser un método seguro, eliminando la posibilidad de íleo biliar recurrente, y probablemente la necesidad de una segunda laparotomía. Aunque el desarrollo de un carcinoma de vesícula es excepcional, también se evita su aparición.

Background

Gallstone ileus is defined as a mechanical intestinal obstruction, secondary to intestinal obstruction caused by intraluminal gallstones. It represents 1–4% of all intestinal obstructions.[1] In patients aged 65 and over it accounts for 25% of the mechanical obstructions of the small intestine.[2] Many patients who suffer from this pathology characteristically present major concomitant diseases such as diabetes mellitus, heart and pulmonary diseases.[1] The typical clinical presentation is in elderly female patients with episodic acute obstruction.

Recurrent gallstone ileus is defined as the mechanical obstruction, secondary to intestinal obstruction caused by intraluminal gallstone already present but that did not provoke occlusion at the moment of the previous ileus[1]; this gallstone may be located in the intestine or in the gallbladder during the first episode. The risk of recurrent gallstone ileus is 5%, and is related to a high mortality rate of up to 20%.[1]

At present, surgical management of gallstone ileus in patients with one episode remains controversial. The main options are: only enterolithotomy; enterolithotomy with chole-cystectomy and repair of the cholecysto-enteric fistula, as a one-stage procedure, and enterolithotomy at initial phase with posterior surgery of the cholecysto-enteric fistula and cholecystectomy.[3]

In this work we describe the clinical cases of two patients (20%) with recurrent gallstone ileus obtained from our experience of ten cases of gallstone ileus in a period of ten years. Both cases were associated to a great postoperative morbidity, even with the death of one of the patients.

Clinical cases

Case 1

A 75-year-old female was admitted with a history of seven days of advancement with nausea, vomiting and abdominal pain. A month before, the patient had suffered an

Figure 1 Computed tomography of abdomen shows obstruction of small intestine, secondary to a great gallstone in its interior.

acute myocardial infarction and was treated with vasoactive coronary stent. The preoperative diagnosis was made by a computed tomography (TC) examination that showed an obstruction of the small intestine and a large gallstone inside of it (Fig. 1). The intraoperative findings were: dilated proximal small intestine with gallstone of 3 cm diameter, impacted in the midgut. Inflammatory changes were observed in the superior right quadrant that did not allow the clear definition of the biliary anatomy or the identification of the fistulous connection with the duodenus, although it was possible to feel the gallstones in the gallbladder. The gallstone was eliminated by enterolithotomy, and a retrograde exploration of the intestine was performed without evidence of any other lithiasis at intestinal level.

Three months after surgery, the patient went to hospital with a history of 24 h of vomiting and abdominal pain. The CT showed an intestinal obstruction secondary to the migration of a second lithiasis in the gallbladder.

In the second surgery, the gallbladder inspection showed residual cholelithiasis and a cholecystoduodenal fistula of 2 cm. The gallstone obstructed the distal ileum and was removed by enterolithotomy. Cholecystectomy was performed and the fistula was closed. After 30 days of admission, after developing a congestive cardiac failure and a deep vein thrombosis, the patient was discharged.

Case 2

A 71-year-old male with a history of hypertension, dyslipidaemia, coronary heart disease and aortocoronary bypass made 4 years before.

He went to consultation with a history of 7 days of vomiting and abdominal pain. CT scan showed pneumobilia and obstruction of the small intestine. The intraoperative findings were: dilated small intestine and gallstone in the last 30 cm of the ileum with major inflammatory changes in the superior right quadrant. The gallstone was eliminated by enterolithotomy, without evidence of additional lithiasis in the rest of the intestine.

Seven months after surgery, the patient was readmitted in our centre with similar pain; and a new CT scan showed a new gallstone in the same location where the first was impacted. The inspection of gallbladder showed residual cholelithiasis and a cholecystoduodenal fistula of 3 cm. The gallstone that obstructed the distal ileum was removed by means of enterolithotomy. Cholecystectomy was performed and the fistula was closed. After surgery the patient presented multi-organ dysfunction syndrome, and finally died.

Discussion

Gallstone ileus is an important cause, although rare, of mechanical intestinal obstruction, which affects elderly patients and is associated with frequent comorbidities. The usual entry of gallstones into the intestinal tract is by way of a biliary-enteric fistula. 60% of cases are cholecystoduodenal fistulas, but cholecystocolonic and cholecystogastric fistulas have also been described. Once the gallstone has entered the intestine, an anterograde displacement of the lithiasis is produced although the Bouveret's Syndrome has been described as a gastric outlet obstruction from gallstone impacted in the duodenal bulb or in the pylorus.[4]

The symptoms presented in a gallstone ileus are characteristic of duodenal obstruction, including nausea, vomiting, abdominal distention, dehydration and abdominal pain. Some patients would present self-limiting obstructive symptoms, secondary to intermittent intestinal obstructions due to enteric intraluminal lithiasis.[5] More than one third of the patients have no history of biliary colic, and more than half of the patients do not have a history of previous lithiasis.[6,7] The preoperative diagnosis of gallstone ileus is made only in 50–60% of the patients.[8,9]

The classic radiographic criteria are pneumobilia, intestinal air-fluid levels and ectopic gallstone, included in the ''Rigler's triad'', present in 30–35% of the patients. Diagnosis of gallstone ileus is confirmed when two of these three criteria are present. Rigler's triad is present in the abdominal X-rays in 17–87% of the cases.[9–11] The abdominal ultrasound can identify the presence of cholecysto-enteric fistulas as well as the presence of lithiasis located in the small intestine. When combined with abdominal X-ray, the sensitivity of ultrasound for the diagnosis of gallstone ileus can increase by 74%.[1,9,11] The CT scan has 93% sensibility, 100% specificity and 99% reliability to diagnose this pathology.[12]

The main controversy in the management of this condition is the role played by surgery. Three surgical strategies for the treatment of this pathology have been described.

The *first* includes only enterolithotomy without the planning of future cholecysto-enteric fistula repair. This surgical approach, supported by authors such as Muthukumarasamy et al.,[3] is based on the evidence that the recurrent gallstone ileus is a rare condition (5–8%).[4,9,13–15] Another fact that supports this approach is that 80–90% of residual lithisases travel the different digestive tracts with no consequences. In the absence of residual lithiases, the majority of the cholecysto-enteric fistula close spontaneously.[8,9] Finally, the recommendation for this therapeutic approach is based on the lower aggressiveness of the procedure, the lesser technical difficulty and the reduction of the operating time.

Although only enterolithotomy is safe and effective for gallstone ileum treatment, the possibility of developing a recurrent gallstone ileus in patients with comorbidities provokes a high postoperative mortality and morbidity in those patients with severe consequences. In our series we were able to observe that one of the patients suffered, after the episode of recurrent gallstone ileus, a postoperative cardiac decompensation and another patient suffered from multiorgan failure followed by death. However, we must note that our series is biased by the high mortality and morbidity (2 cases, 20%), and further studies including series with larger number of patients are required. Therefore, if recurrence of 4.7% per 1001 cases[3] is accepted, cholecystectomy would have been unnecessary in 95% of the cases in which there were no recurrence.

Furthermore, the presence of longstanding gallstones of associated to gallbladder chronic inflammation could be related to the increase of bladder cancer rate; although, such a risk is too insignificant to be an argument for asymptomatic cholecystectomy.[16]

A *second* approach is the one-stage surgical procedure, which includes enterolithotomy, chole-cystectomy and repair of the cholecysto-enteric fistula. The advantage of the one-stage procedure for the treatment of the gallstone ileus and the cholecysto-enteric fistula is that it reduces the incidence of recurrent gallstone ileus. In addition, this approach prevents the development of a cholecystitis, cholangitis and a carcinoma of the gallbladder. However, mortality related to this management is higher (16.9%) than with the two-stages procedure (11.7%).[3] In a retrospective study of 9 patients with gallstone ileus, Pavlidis et al.[17] concluded that definitive repair, when possible, should be the first option and the enterolithotomy procedure must be reserved for difficult and unstable cases.

Nevertheless, Reisner and Cohen,[8] in a review of 1001 cases, presented a gallstone ileus global recurrence rate of 4.7%, which was 20% in our experience. These authors stated that the performance of a cholecystectomy in the same stage of the enterolithotomy does not protect all patients from recurrent gallstone ileus, for two reasons: calculi in the bile duct that may distally migrate due to manipulation of the gallbladder during cholecystectomy, producing intestinal obstruction; and, on the other hand, the presence of lithiasis inside the intestine, which may have been ignored, can also lead to recurrent episodes of obstruction.

Finally, a *third* strategy has been proposed: a two-stage surgical procedure that includes initial enterolithotomy followed by posterior cholecystectomy and the repair of the cholecysto-enteric fistula 4–6 weeks after the first intervention.[3] This surgical approach is characterised by being a minimal invasiveness surgery, with little technical difficulty and a reduction of the operating time, being suitable in the acute phase of obstruction caused by gallstone ileus for patients with important associated comorbidities. After recovery and optimisation of the patient, when a variable period has passed, but not longer than 4–6 weeks, definitive surgery would be performed in better conditions and with less risk. This therapeutic approach would be, in our opinion, a correct application of damage control surgery in patients with gallstone ileus; however, we believe it is important to preserve the right to choose the procedure believed to be more suitable and individualise each procedure, as the other two options have advantages and disadvantages. There are no comparative works that allow us to make solid affirmations.

Conclusion

In our experience, the high morbidity and mortality associated to the recurrent gallstone ileus, related to a high frequency of occurrence (20%), lead us to reconsider the surgical treatment of this condition, which impacts on the need for definitive repair of the biliary-enteric fistula, although this raises the question of when is the best time to perform it. Among the different alternatives described in the bibliography, we believe that in the acute phase the enterolithotomy followed by cholecystectomy and posterior repair of the fistula in an early stage (4–8 weeks) provides more safety and less morbidity than only enterolithotomy or enterolithotomy with immediate repair of the fistula. It also presents the concept of damage control surgery, which is new to this specific pathology. However, the other two procedures, as well as the one proposed by us, have advantages and disadvantages. In any case, each management should be personalised according to the characteristics of each patient, until new studies with larger number of cases allow us to define the procedure to follow.

Conflict of interest

The authors declare that there are no conflicts of interest.

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