International Surgery Journal
Ruíz JFM et al. Int Surg J. 2023 Dec;10(12):2000-2005
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: https://dx.doi.org/10.18203/2349-2902.isj20233686

Case Report

Gallstone ileus, controversies on current surgical management

José Francisco Madrid Ruíz[1]*, Karen Elena Hidalgo Artiaga[2], Asdrúbal Samuel Baéz León[1], José Manuel De Gante Aguilar[1], Omar Maximiliano Ortiz De Ora[3]

[1]Department of general surgery, General Hospital of Zone 1 ¨Nueva Frontera¨, Mexican Institute of Social Security, Chiapas Mexico, Faculty of Human Medicine of the Autonomous University of Yucatán (UADY), Mexico
[2]Institute of Higher Education of Chiapas "Universidad Salazar". Chiapas, Mexico
[3]Department of coloproctology, General Hospital of Zone 1 "Nueva Frontera", Mexican Institute of Social Security. Chiapas, Mexico

Received: 06 October 2023
Accepted: 09 November 2023

***Correspondence:**
Dr. José Francisco Madrid Ruíz,
E-mail: jfmadrid@outlook.es

ABSTRACT

Among the causes of bowel obstruction, the gallstone ileus represents a rare etiology in the general population, however, the incidence of cases increases in older adults. To make its diagnosis, a high clinical suspicion and extension studies are required. It is considered a surgical emergency, although the ideal approach continues to be debated today. We present the case of a 78-year-old patient with clinical and imaging findings compatible with gallstone ileus, the diagnostic and therapeutic approach, as well as a wide review of the literature about current surgical option.

Keywords: Gallstone ileus, Bowel obstruction, Bilioenteric fistula, Gallstone, Enterotomy

INTRODUCTION

Gallstone ileus is a pathology first described in 1654 by the Danish doctor Thomas Bartholin, characterized by a bowel obstruction caused by the passage of one or more large stones through a bilioenteric fistula.[1] It is related to cholelithiasis and represents 1-4% of cases of mechanical bowel obstruction. Its prevalence increases with age, being more common in people over 65 years of age, so it is important to take this clinical entity into account in elderly patients with alterations of the gastrointestinal tract and a history of recurrent episodes of biliary colic. Diagnosis is often challenging due to the non-specificity of the condition and its current management is controversial.[2]

CASE REPORT

A 78-year-old male, with a history of chronic kidney disease third stage. Illness begins 5 days prior to his arrival at the emergency department with clinical characterized by generalized abdominal pain colic type, oral intolerance, nausea and food vomiting. He went to a private medical service who began management with metoclopramide and hyoscine with slight improvement, later adding abdominal distention, increased pain, fever and persistent vomiting to the condition, so he went to the emergency room for evaluation. Laboratories are taken, which reported: Hb 15.4 gr/dL, Htc 44.7%, Pla 283 u/mcL, Leu 6.0 células/mcL, Neu 3.8 cells/mcL, Linf 1.4 cells/mcL, Glu 91.9 mg/dL, Ure 156.2 mg/dL, Cre 2.2 mg/dL, AST 27 u/L, ALT 29 u/L, amilasa 60 u/L, lipasa 56 u/L, Bt 1.5 mg/dL, Na 131 mEq/L, Cl 89 mEq/L, K 3.8 mEq/L, Ca 8.4 mg/dl, P 5.6 mg/dl, Mg 2.3 mg/dl, TP 14.1 seg, INR 1.2, TTP 28.6 seg. On physical examination, tachycardia, abdominal distention, generalized pain on palpation, decreased peristalsis and signs of peritoneal irritation. Medical management was initiated with opioid analgesics and antiemetics. An x-ray of the abdomen and pelvis was requested, finding

dilatation of intestinal loops without further pathological data and an abdominal tomography showing dilatation of small intestine loops, jejunum loops with the presence of pneumatosis and at the level of the terminal ileum a point of obstruction secondary to an ovoid image, increased peripheral density and hypodense center suggesting gallstone. (Figure 1). After carrying out extension studies, it was decided to perform exploratory laparotomy, finding small bowel obstruction secondary to a gallstone measuring approximately 4×4 cm 140 cm from the ileocecal valve and 280 cm from the ligament of Treitz, with no evidence of vascular compromise in the affected segment (Figure 2). Enterotomy with stone extraction (Figure 3) + enterorrhaphy with the Heineke-Mikulicz technique was performed without intraoperative complications. The patient progressed adequately postoperatively, tolerating oral administration on the third day, and discharged home on the 5th postoperative day.

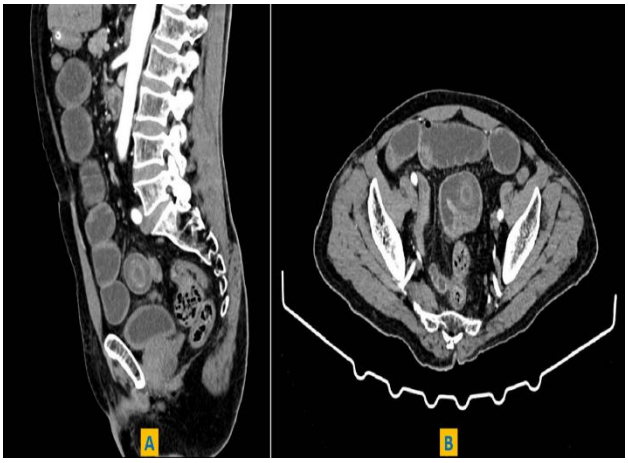

Figure 1 (A and B): Computed tomography sagittal and axial sections showing a site of obstruction in the ileum secondary to an ovoid image, with regular and hyperdense edges in relation to the gallstone.

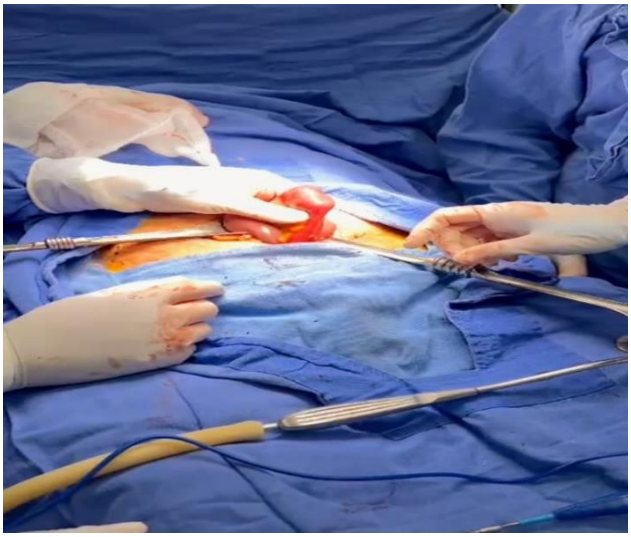

Figure 2: Exploratory laparotomy with finding of small bowel obstruction, intestinal loops without evidence of vascular compromise.

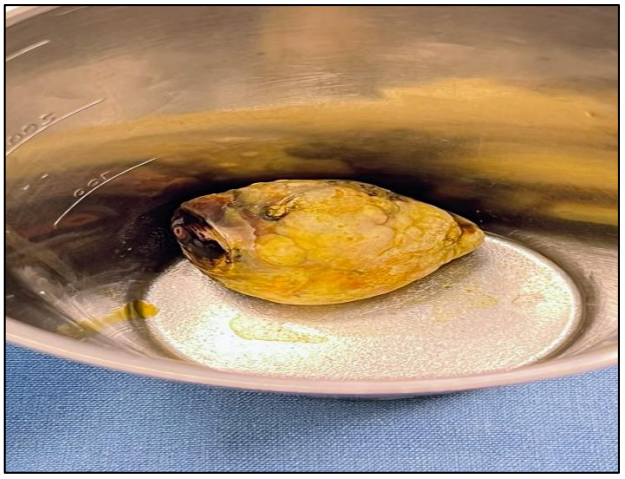

Figure 3: Gallstone extracted 4×4 cm.

DISCUSSION

Gallstone ileus (GI) represents less than 5% of cases of mechanical bowel obstruction, however, this percentage increases to 25% in adults over 65 years of age.[3] It occurs more frequently in women than in men with a proportion of 4:1 and generally appears as a rare complication in patients with cholelithiasis where 0.3-1.5% present GI as a consequence of a bilioenteric fistula, with cholecystoduodenal fistula being the most frequent (68-95%), followed by cholecystocolonic, cholecystogastric and choledochoduodenal.[4,5]

The pathophysiology of gall ileus includes recurrent symptoms of acute cholecystitis, the pericholecystic inflammation resulting from these episodes results in the formation of adhesions between the gallbladder and the gastrointestinal tract, more common with the duodenum due to proximity. The compression effect of the gallstone results in ischemia, necrosis and subsequent erosion of the stone through the gallbladder wall to the intestine forming the fistula tract.[6] Other mechanisms of gallstone ileus have been described such as the passage of stones that migrate through the ampulla of Vater, followed by in situ growth, small stones retained in a stenosed bowel (for example in Crohn's disease), or inadvertent migration of a gallstone during the manipulation of the gallbladder while performing a cholecystectomy.[2]

According to the literature, stones larger than 2.5 cm are the most likely to be retained, most are impacted in the ileum (50%-70%), followed by the jejunum (20-40%), the stomach and the duodenum (10%), colonic obstruction being very rare.[7]

There are pathological variants of gallstone ileus, Bouveret´s syndrome described in 1896 which is the result of the stone travels retrograde to the duodenal bulb where it prevents gastric emptying, occurs in 3% of patients.[1,2] Another variant known as Barnard syndrome occurs when stones obstruct the ileocecal valve, manifesting as a classic bowel obstruction.[8]

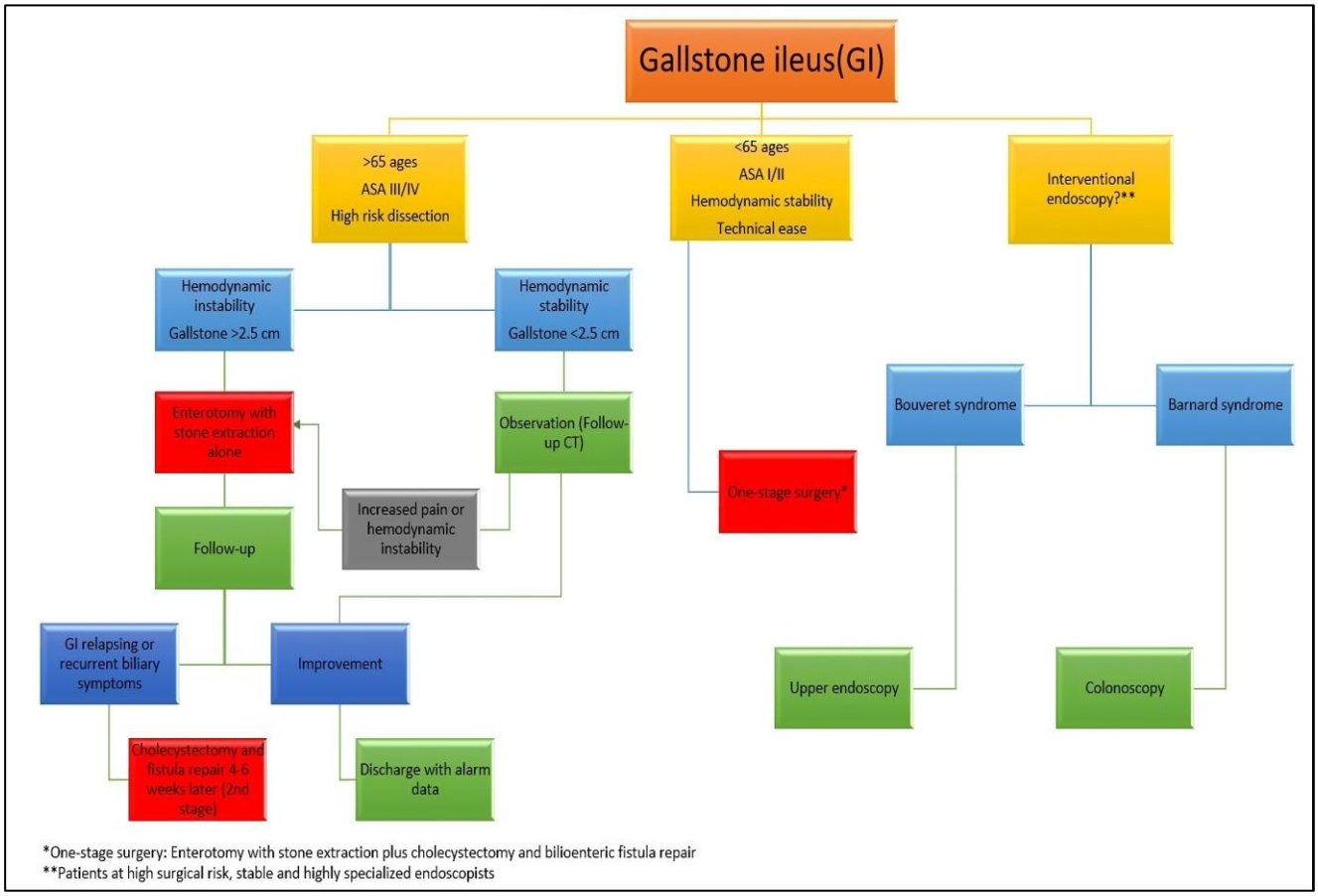

Figure 4: Gallstone ileus therapeutic algorithm.

The clinical presentation of GI can be acute, subacute or chronic, and varies depending on the site of the obstruction, with abdominal distension and pain, vomiting, absence of peristalsis, constipation and fluid imbalance are prevalent.[2] The acute form corresponds to the classic presentation of gallstone ileus, it is characterized by the sudden appearance of abdominal distension, vomiting and constipation; the subacute form, presents as a picture of partial bowel obstruction with the passage of flatus but not stools and; the chronic form, known as Karewsky syndrome, where the patient presents episodes of intermittent pain caused by the passage of stones through the bowel, alternating with asymptomatic periods.[8] In the elderly, dehydration, shock or peritonitis can complicate the clinical presentation. The Mordor triad (history of gallstone, signs of acute cholecystitis, and sudden onset of bowel obstruction). It can guide us to the diagnosis when it appears in an elderly patient.[3,9]

Laboratory findings are nonspecific, leukocytosis and an increase in acute phase reactants in relation to the inflammatory process are common.[4] As cabinet assistants, abdominal radiography has a sensitivity of 43% where it is possible to find Rigler's triad [pneumobilia (Gotta-Mentschler sign), stone and bowel loops distention], the presence of two of these three signs are considered pathognomonic of GI, however, it appears in less than 50% of cases. Evidence of a change in the position of the gallstone on a second abdominal radiograph is known as Rigler's tetrad.[2,10] Ultrasound has a sensitivity of 78%, while contrast-enhanced computed tomography (CT) has a sensitivity of 93% and a specificity close to 100%, which is why it is considered the reference method, with CT is possible to find the triad Rigler in 78% of cases.[7,11] When water-soluble oral contrast is used, it is possible to observe the Forchet sign or “snake's head” (presence of a clear halo of contrast medium around the stone) or the Petren sign (passage of contrast medium to the biliary tract).[12]

About the treatment of GI, there are 3 main surgical options: enterotomy with stone extraction alone, enterotomy with stone extraction plus cholecystectomy and bilioenteric fistula repair in 1-phase time, and the 2-phase procedure, which includes enterotomy with initial stone extraction with subsequent cholecystectomy and fistula repair. Each has advantages and disadvantages and the decision to use one over the other is based on the patient's conditions.[13]

Several factors must be considered in choosing the most appropriate surgical approach, preoperative conditions,

such as age, comorbidities, diagnostic delay and the need for urgent surgery have a significant impact on the choice of the best approach, which must be decided by means of a careful evaluation of the risk-benefit ratio.[14]

Enterotomy with stone extraction alone

It consists of making a full-thickness incision of the visceral wall and extracting the impacted gallstone. Once the abdomen has been approached and prior to performing the enterotomy, the stone must be manually moved into the bowel lumen approximately 15-20 cm proximal to the site of obstruction and make in this location a longitudinal incision in the antimesenteric border and through which the stone will be extracted in order to find better tissue conditions which will provide better possibilities of closure which will be carried out performed transversely in one or two planes in order to avoid stenosis.[9] It is generally accepted to omit revision of the bilioenteric fistula in patients with poor general conditions or multiple comorbidities; however, the entire bowel should be inspected for more gallstones, which have been reported to be present in up to 16%. of the cases.[15]

Enterotomy with stone extraction alone is a good approach for patients with significant comorbidities (ASA III/IV), hemodynamic instability, or high-risk surgical dissection.[2,12] Furthermore, expectant management after stone removal is completely justified, it has been observed that bilioenteric fistulas can close spontaneously in up to 50% of cases and the risk of GI recurrence with this management ranges from 4.7 to 17%.[12,15] Vera-Mansilla et al.[8] performed a retrospective review of patients who underwent surgery for gallstone ileus between December 1992 and December 2018 and follow-up until October 2020. During that period, 25 patients underwent surgery for GI, of which 72% (18) underwent enterotomy with extraction of stone alone without any other intervention, only 1 patient required cholecystectomy after the development of acute cholecystitis in the late postoperative period and 3 developed choledocholithiasis resolved by ERCP, however 83% did not present any cholecystobiliary complications during follow-up and urgent cholecystectomy was not performed. or delayed after the acute episode, the results of this review support this management in the approach to GI.

Proposing this therapeutic attitude is based on the less aggressive nature of the procedure, less technical difficulty and decreased operating time, which is why, due to its minimal risk of complications, enterotomy with stone extraction alone continues to be the most popular surgical procedure.[13,16]

One-stage surgery

Patients with low surgical risk (ASA I, II) can undergo cholecystectomy and closure of the bilioenteric fistula in the same surgical time as the enterotomy with stone extraction in addition to exploration of the common bile duct if necessary.[12] It is preferred to propose this resolution in patients with a longer life expectancy, without comorbidities and with greater technical facilities.[5]

In the largest review of historical data from reports published from 1953 to 1993, Reisner and Cohen, analyzed 1001 cases of GI, compared the mortality of patients who underwent enterotomy with stone extraction alone vs. one-stage surgery, finding a rate of lower mortality in the first group 11.7% compared to 16.7% for those who underwent a one-stage procedure ($p<0.17$).[17] However, advocates of a 1-stage definitive procedure cite the risk of complications arising from a persistent fistula as the primary reason for definitive surgery.[18]

Although is more complicated and technically demanding, the advantages of the one-stage procedure are avoiding the possibility of developing episodes of cholecystitis or cholangitis, reducing the risk of recurrence of GI, and reducing the probability of developing gallbladder carcinoma by 15%. to 1%.[13] More recently, Clavien et al and Zuegal et al have published data supporting a single-stage procedure in which mortality rates as low as 6% were reported, supporting this therapeutic attitude.[18-20]

Two-stage surgery

This surgical approach consists in the realization of an enterotomy with stone extraction and subsequently a second stage of cholecystectomy and repair of the fistula. It is characterized by being a minimally aggressive surgery, with little technical difficulty and a reduction in operating time, being ideal in the acute phase of obstruction caused by gallstone ileus for patients with associated comorbidities. Subsequently, after the patient's recovery and optimization, lapsed a period of no more than 4-6 weeks, definitive surgery would be performed in better conditions and lower risk.[13] It is suggested to perform interval cholecystectomy with bilioenteric fistula repair only in patients with recurrent symptoms.[3]

Laparotomy is the conventional approach to GI; however, it has a high associated morbidity (20-57%) and mortality (7-18%), recently, laparoscopy has been evaluated and seems successful, being increasingly used by experienced surgeons.[21] The overall morbidity rate is low after enterotomy with laparoscopic stone extraction, describing complications such as wound infection, pneumonia or myocardial infarction.[11] In 1993, Montgomery et al reported the first enterotomy with laparoscopic-assisted stone extraction for GI.[22] In 1994, Franklin et al performed an enterotomy with complete stone extraction.[23] Since then, the laparoscopic approach has been widely attempted; its use is preferred if performed by an expert laparoscopic surgeon with the necessary resources, in patients with low surgical risk,

hemodynamic stability and absence of cardiorespiratory diseases or coagulation disorders.[21]

In selected patients, laparoscopic management of GI is an effective and safe procedure and it seems reasonable to try it if the conditions and skills are available, providing a faster recovery, with minimal morbidity.[11]

In some cases, spontaneous resolution of gallstone ileus has been reported after passage of the stone through the digestive tract; therefore, there are those who support conservative treatment in patients who present a high surgical risk due to their comorbidities and in whom the stone generating of the obstruction does not measure more than 2.5 cm, achieving success in 14.2%.[1,24]

Some nonsurgical treatment options recently used in the treatment of this disease include endoscopic extraction and shock wave lithotripsy depending on the location of the stone.[24]

Interventional endoscopy in high-risk patients is a good treatment option; it is reserved for patients with Bouveret syndrome (upper gastrointestinal endoscopy) or terminal ileal or colonic obstruction (colonoscopy) and should be performed in stable patients and by highly specialized endoscopists.[2,8] The success rate is variable, reporting up to 26%. Among the factors that can lead to endoscopic failure are the size of the stone, diverticular disease, the presence of colonic stenosis and the experience of the endoscopist.[25]

Mortality due to gallstone ileus is estimated at 12 to 20%, with factors such as advanced age, concomitant diseases and non-specific symptoms contributing to the consequent delay in diagnosis and treatment.[1]

The most common postoperative complication is usually infection of the surgical wound, with an incidence of up to 32%, followed by closure or anastomosis dehiscence with 25%. Furthermore, the risk of malignancy in the bile duct ranges from 2-6% of cases.[5]

CONCLUSION

Gallstone ileus is a rare cause of bowel obstruction, although with significant morbidity and mortality in older adults, its diagnosis is difficult and a high suspicion must be had for its identification, with CT being the study of choice. Currently, there is great controversy regarding the ideal treatment in the management of gallstone ileus, its main objective being the early relief of obstruction, as well as minimizing morbidity and mortality. The most used approach is enterotomy with stone extraction alone because it is a safe and effective procedure, in addition to presenting low recurrence; however, there is no consensus on the best therapeutic option and it must be individualized according to the patient's conditions, resources and experience of the surgeon, that is why based on the review of the literature we designed a therapeutic algorithm that helps us make surgical decisions according to the characteristics of each patient (Figure 4).

ACKNOWLEDGMENTS

Author would like to thanks to department of general surgery of the HGZ 1 “Nueva Frontera” of the Mexican social security institute and the faculty of the human medicine of the autonomous university of Yucatán (UADY).

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Francisco Javier Mancilla Ulloa, David Rayas Ruiz. Íleo biliar: reporte de un caso y revisión de la literatura. Cir Gen. 2014;3(2):121-5.
2. Ploneda-Valencia CF, Gallo-Morales M, Rinchon C, Navarro-Muñiz E, Bautista-López CA, De la Cerda-Trujillo LF et al. El íleo biliar: una revisión de la literatura médica. Rev Gastroenterol Méx. 2017;82(3):248-54.
3. Reyes-Morales JM, Hernández-García LK. Íleo biliar: un reto diagnóstico y terapéutico. Presentación de un caso clínico. Rev Med Inst Mex Seguro Soc. 2023;61(1):106-10.
4. Jeffrey OMG, Verónica NBFMS. Íleo biliar como causa de dolor abdominal en el paciente anciano. Rev Esp Geriatr Gerontol. 2020;55(3):169-72.
5. Eder ASP, Sinuhé ÁÁ, Marco AMT, Gabrilea EGU, Jorge ERV, Luis MHL. Íleo biliar, experiencia en el Hospital General de México. Dr. Eduardo Liceaga. Cir Cir. 2017;85(2):114-20.
6. Morosin T, De Robles M B, Putnis S. Gallstone Ileus: An Unusual Cause of Intestinal Obstruction. Cureus 2020;12(3):e7284.
7. Jorge AMO, Manuel MCN, Germán FBM, Xavier ES-Q, Alba EGG. Obstrucción intestinal secundaria a íleo biliar: reporte de caso. Cir Cir. 2021;89(S2):31-3.
8. Cristina VM, Ana SG, Belen M, Fernando MM, Manuel DA, Francisca GMN. Surgical Treatment of Gallstone Ileus: Less Is More. Visc Med 2022;38:72-7.
9. Nikolaos K, Dimitrios P, Andrianos ST, Efstratios KL, Anargyros B, Konstantinos N et al. Gallstone Ileus in Octogenarians: Is Cholecystectomy Really Needed? Acta Med (Hradec Kral). 2022;65(4):153-7.
10. Marco DSF, Fernández PG, Ferré FB, Piqueras RMO. Diagnóstico por la imagen en el íleo biliar. Med Integr. 2000;36:267-71.
11. Matías O, Liumariel V, Alfredo C, Marcelo V, Pedro S. Laparoscopic management of gallstone ileus: A case report and literature review. Int J Surg Case Rep. 2021;85(1):106171.

12. Marcos ISJ, Javier AD, Mónica RFC, Fernando RY, Arianne ILA, Antonio HG. Íleo biliar, revisión del manejo quirúrgico. Cir Cir. 2018;86:182-6.
13. Jesica MP, Luciano DP, Alberto BG, Nieves LR, Guillermo BP, Vicente MA. Enterolitotomía más colecistectomía precoz, una aplicación de cirugía de control de daños para pacientes con íleo biliar. Cir Cir. 2015;83(2):156-60.
14. Santos SD, Louro J, Costa Almeida CM, Simões S, Fortuna J. Gallstone Ileus: A Rare Cause of Mechanical Bowel Obstruction. Cureus. 2023;15(2):e35588.
15. Abner ARL, Brenda K. Mata-Samperio, Fernando Solís-Almanza, Ricardo Casillas-Vargas, Luis A. Cuadra-Reyes. Comparison between surgical techniques in gallstone ileus and outcomes. Cir Cir. 2020;88(3):292-6.
16. Abdihamid MA, Sadettin ER. Gallstone ileus: Unusual complication of cholelithiasis: A case report. Ann Med Surg. 2022;75:103476.
17. Reisner RM, Cohen JR. Gallstone ileus: a review of 1001 reported cases. Am Surg. 1994;60:441-6.
18. Tan YM, Wong WK, Ooi LLPJ. A Comparison of Two Surgical Strategies for the Emergency Treatment of Gallstone Ileus. Singapore Med J. 2004;45(2):69-72.
19. Clavien PA, Richon J, Burgan S, Rohner A. Gallstone ileus. Br J Surg. 1990;77:734-42.
20. Zuegal N, Hehl A, Lindemann F, Witte J. Advantages of one-stage repair in case of gallstone ileus. Hepato-Gastroenterol. 1997;44:59-62.
21. Mirza GMK, Ahmed E, Mohammed SF, AbdulMohsen AM, Abdulrahim AA. Laparoscopic management for gallstone ileus, case report. Int J Surg Case Rep. 2019;51:268-71.
22. Montgomery A. Laparoscope-guided entero-lithotomy for gallstone ileus. Surg Laparosc Endosc. 1993;3(4):310-14.
23. Franklin ME, Dorman JP, Schuessler WW. Laparoscopic treatment of gallstone ileus: a case report and review of the literature. J Laparoendosc Surg. 1994;4(4):265-72.
24. Anupama T, Thingujam U, Satish KB, Shuchi B, Sumeet B, Meenakshi P et al. Resolution of Gallstone Ileus with Spontaneous Evacuation of Gallstone: A Case Report. Indian J Surg. 2013;75(3):228-31.
25. Andrea GM, Ignacio CW, Pedro AA. Successful gallstone ileus treatment by endoscopy. Rev Esp Enferm Dig. 2022:114(12):754-5.

Cite this article as: Ruíz JFM, Artiaga KEH, León ASB, De Gante Aguilar JM, De Ora OMO. Gallstone ileus, controversies on current surgical management. Int Surg J 2023;10:2000-5.