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**Paper Accepted\***

**ISSN Online 2406-0895**

**Case Report / Приказ болесника**

Džemail S. Detanac<sup>1,\*</sup>, Dženana Detanac<sup>1</sup>, Krstina Doklešić<sup>2,3</sup>, Džemil Bihorac<sup>1</sup>, Safet Muratović<sup>1</sup>

**Cholecystoduodenal fistula and gallstone ileus –  
diagnosis and surgical treatment**

Холецистодуоденална фистула и илеус изазван жучним каменом –  
дијагностика и хируршко лечење

<sup>1</sup>Novi Pazar General Hospital, Novi Pazar, Serbia;

<sup>2</sup>University Clinical Center of Serbia, Clinic for Emergency Surgery, Belgrade, Serbia;

<sup>3</sup>University of Belgrade, Faculty of Medicine, Belgrade, Serbia

**Received: December 22, 2021**

**Revised: July 18, 2022**

**Accepted: July 24, 2022**

**Online First: August 4, 2022**

**DOI: <https://doi.org/10.2298/SARH211222079D>**

\***Accepted papers** are articles in press that have gone through due peer review process and have been accepted for publication by the Editorial Board of the *Serbian Archives of Medicine*. They have not yet been copy-edited and/or formatted in the publication house style, and the text may be changed before the final publication.

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**\*Correspondence to:**

Džemail S. DETANAC

Sutjeska BB/AD/3/44, 36300 Novi Pazar, Serbia

E mail: [dzemail.detanac@gmail.com](mailto:dzemail.detanac@gmail.com)

## Cholecystoduodenal fistula and gallstone ileus – diagnosis and surgical treatment

### Холецистодуоденална фистула и илеус изазван жучним каменом – дијагностика и хируршко лечење

#### SUMMARY

**Introduction** Gallstone ileus is a complete or partial mechanical bowel obstruction due to gallstone impaction in the bowel lumen and most commonly occurs after stones migrate through the cholecystoenteric fistula.

**Case outline** We present a patient with signs of gallstone ileus after stone migration through the cholecystoduodenal fistula into the duodenum with hematemesis as the first symptom. Conservative treatment has been started, to which the patient initially responds well. On the eighth day from the onset of the disease, the condition worsens. Signs of the Riegler triad are identified on computed tomography and magnetic resonance imaging of the abdomen. Enterolytomy was successfully performed by open surgical method. Postoperative recovery is orderly, without any biliary problems.

**Conclusion** Physical examination, upper endoscopy, and radiological diagnostic procedures are complementary and necessary in monitoring the dynamics of stone movement and deciding on when to perform surgery.

**Keywords:** gallstone ileus; cholecystoduodenal fistula; computed tomography (CT); magnetic resonance imaging (MRI); surgery

#### САЖЕТАК

**Увод** Илеус изазван жучним каменом је парцијална или комплетна механичка опструкција црева настала као резултат опструкције цревног лумена, а најчешће настаје након миграције камена кроз холецисто-ентеричну фистулу.

**Приказ болесника** Приказујемо болесника са знацима билијарног илеуса након миграције камена кроз холецисто-дуоденалну фистулу у дуоденум са хематемезом као првим симптомом. Започето конзервативно лечење на које болесник иницијално добро реагује. Осмог дана од почетка болести долази до погоршања стања. На урађеној компјутеризованој томографији и магнетној резонанци абдомена идентификују се знаци Риглерове тријаде. Отвореном хируршком методом успешно урађена ентеролитотомија. Постоперативни опоравак уредан, без забележених билијарних тегоба.

**Закључак** Физикални преглед, горња ендоскопија и радиолошке дијагностичке методе су комплементарне и неопходне у праћењу динамике кретања камена и одлуке о тајмингу за хируршко лечење.

**Кључне речи:** илеус изазван жучним каменом; холецистодуоденална фистула; компјутеризована томографија (CT); магнетна резонанца (MR); хирургија

#### INTRODUCTION

Gallstones are a severe health problem and can be found in 10–15% of the adult population [1]. Most patients are asymptomatic, but complications can be serious and lead to acute cholecystitis, choledocholithiasis, pancreatitis, and gallstone ileus. Of all patients with gallstones, gallstone ileus occurs in 0.3–0.5% and represents 1–4% of all mechanical small bowel obstructions. Statistics show that it is more common in the elderly (over 60 years old) and women. Factors that can lead to gallstone ileus are long-standing cholelithiasis and recurrent episodes of acute cholecystitis [2]. It most often occurs as a result of stone migration through the resulting fistula between the gallbladder and the adhered portion of the gastrointestinal tract. Due to anatomical features, cholecystoduodenal fistula is the most common, but those with stomach, small and large intestine have also been reported [3].

Nevertheless, mortality remains high (12–27%), probably because of nonspecific symptoms that lead to high misdiagnosis rates and delayed discovery [2]. We present a case of gallstone ileus, the applied diagnostic procedures, as well as the operative method.

## CASE REPORT

A 70-year-old male was admitted to the Department of Surgery General Hospital Novi Pazar with mild pain in the epigastrium after he vomited contents the color of black coffee with fresh traces of blood. The pain started 2 hours before the admission to the hospital. Comorbidities included chronic calculous gallbladder, hypertension, and diabetes, with a BMI of 30.1 kg/m<sup>2</sup>. On admission normotensive, without signs of melena, laboratory parameters in the normal range, on the nasogastric tube hematemesis. On the performed native radiography of the abdomen without pathological changes. He had normal laboratory values. Initial esophagogastroduodenoscopy (EGD) shows the presence of ulcers on the D2 duodenum without signs of active bleeding but indicating erosive gastritis and biliary reflux. Conservative treatment initiated (proton-pump inhibitors, fluids, and other symptomatic therapy). Patient responded well to the therapy, and discharged on the 4<sup>th</sup> day of hospitalization for home treatment, due to the reduced capacity of hospital beds in the non-Covid part of the hospital and the large influx of Covid 19 positive patients.

On the eight day after the onset of the disease, the patient admitted to a Gastroenterology department General Hospital Novi Pazar due to nausea, emesis and severe pain in the epigastrium and periumbilical. The radiograph showed no signs of pneumoperitoneum and hydroaerial levels. Abdominal ultrasound (US) showed collapsed gallbladder with suspected intraluminal gas and pneumobilia in the biliary tree, no free fluid in the abdominal cavity. EGD was performed and cholecystoduodenal fistula was verified, with calculus in the duodenal lumen, with no signs of bleeding. Both EGDs were performed by the same gastroenterologist. The general condition of the patient was good, with no vomiting. At the first abdominal Computed tomography (CT) examination, after the calculus in the gallbladder known to the patient could not be visualized by abdominal US, the gallbladder was found to be contracted, fibrously altered and without a lumen, and something that resembling a calculus was seen in the D2 duodenum. As an additional diagnosis, since CT is insufficient in the visualization of cholesterol calculus, a rapid magnetic resonance imaging (MRI) examination of the abdomen without contrast was performed in the sagittal, coronal and transverse planes in T1W and T2W

sequences where a calculus about 50 mm in diameter was observed in the D2 duodenum (Figure 1). Since the general condition of the patient was good, we decided to observe the patient and follow the calculus migration. Next day, abdominal MRI examination was observed again according to the same protocols, when we found migration, of previously seen, calculus in the distal part of the ileum and congestion of the small intestine and signs of ileus (Figures 2–5) Surgery was scheduled and the patient was transferred to the surgery department of the General Hospital in Novi Pazar. After preoperative preparation, we opted for an open surgical approach. Under general anesthesia, the midline laparotomy incision was made. The gallbladder was identified without the possibility of safely identifying the contents of Calot's triangle. Calculus was identified in the lumen of the distal ileum, 60 cm from the ileocecal valve. An enterotomy was performed with calculus extraction. The patient was discharged on the 7th postoperative day without postoperative morbidity. Postoperatively patient was monitored for 9 months, there was no signs of complications.

We obtained verbal and written informed consent of the patients to publish the case report. This article was planned in compliance with the Patient Rights Directive and ethical rules by considering the principles of the Declaration of Helsinki.

## DISCUSSION

Gallstone ileus does not present with unique symptoms, making diagnosis difficult. It most often occurs as a result of chronic cholecystitis. Inflammation of the gallbladder and surrounding structures leads to adhesions which in recurrent attacks of infection, due to the pressure of the stone on the wall of the gallbladder, leads to ischemia and the creation of a fistula between the gallbladder and the digestive tube, and the migration of the stone into the digestive tract and its further pathways [3, 4]. The most common type of fistula is cholecystoduodenal, up to 70%, but less common, are cholecystojejunal, cholecystogastric fistula, cholecystocolonic. The stone can reach the digestive tract through the ampulla of Vater or by iatrogenic transmission (during ERCP or a cholecystectomy) and thus lead to intestinal obstruction [5].

More than 2/3 of intraluminal stones will pass spontaneously and be eliminated by stool, while those larger than 2.5 cm pose a risk of intestinal obstruction [6]. The presence of intestinal

adhesion, tumor changes, Crohn's disease, etc. can reduce the intestinal lumen and increase the risk of mechanical obstruction.

Gallstone ileus is a geriatric disease because it is most common in the elderly, and since gallstones are more common in women, gallstone ileus is slightly more common in women [5, 7]. As a result of untreated biliary-enteric fistula with cholelithiasis, the literature reports an estimated risk of Recurrent gallstone ileus (RGSI) of 5% -8% [7].

The symptoms of gallstone ileus are not specific. Physical examination may be nonspecific and completely orderly if the obstruction is not present at the time of the examination. Data from the literature show that patients usually appear 4-8 days from the beginning of the disease, most often with signs of nausea, vomiting, abdominal pain, constipation. Only 10-30% of patients with gallstone ileus have symptoms of acute cholecystitis. Partial obstruction or distal migration of the gallstone may be the cause of not reporting to the physician in time [5, 8].

All diagnostic radiological procedures have their place in the diagnosis of gallstone ileus. Plain abdominal radiographs are a quick and easy procedure that works in 40-70% of cases [9]. In order to notice the stone in the lumen of the digestive tract, it must have a high level of calcium. The presence of two signs of Rigler's triad (pneumobilia, ectopic gallstone, and intestinal obstruction) is pathognomonic in up to 50% of cases, but sometimes it is identified only in retrospective observation [4, 5, 8].

The US is a highly sensitive diagnostic method for gallstone ileus, and in combination with radiography, it is accurate up to 74% [4, 5]. CT has a sensitivity of up to 93% [10, 11].

Our case was an older man whose first symptoms were haematemesis and epigastric pain without signs of ileus and peritoneal irritation. Since duodenal ulcer and erosive gastritis were seen on the initial EGDS, and the radiographs were normal, there was no indication for additional diagnostics, and conservative treatment was continued, to which the patient responded well. During the second hospitalization, due to recurrence of symptoms, the 2<sup>nd</sup> EGD was performed and cholecystoduodenal fistula was verified, with calculus in the duodenal lumen (calculus was not seen at the first EGD), with no signs of bleeding. Additional CT and MRI scans were performed and confirmed a stone in the duodenum. The good general condition of the patient allows further monitoring of the dynamics of stone movement, and the MRI showed a calculus in the lumen of the small intestine as the cause of intestinal obstruction.

Gallstone ileus management is surgical, but there is no consensus as to which of the different surgical techniques is the procedure of choice. The surgical approach can be: a) a one-stage procedure- enterolithotomy or enterolithotomy with cholecystectomy and fistula closure

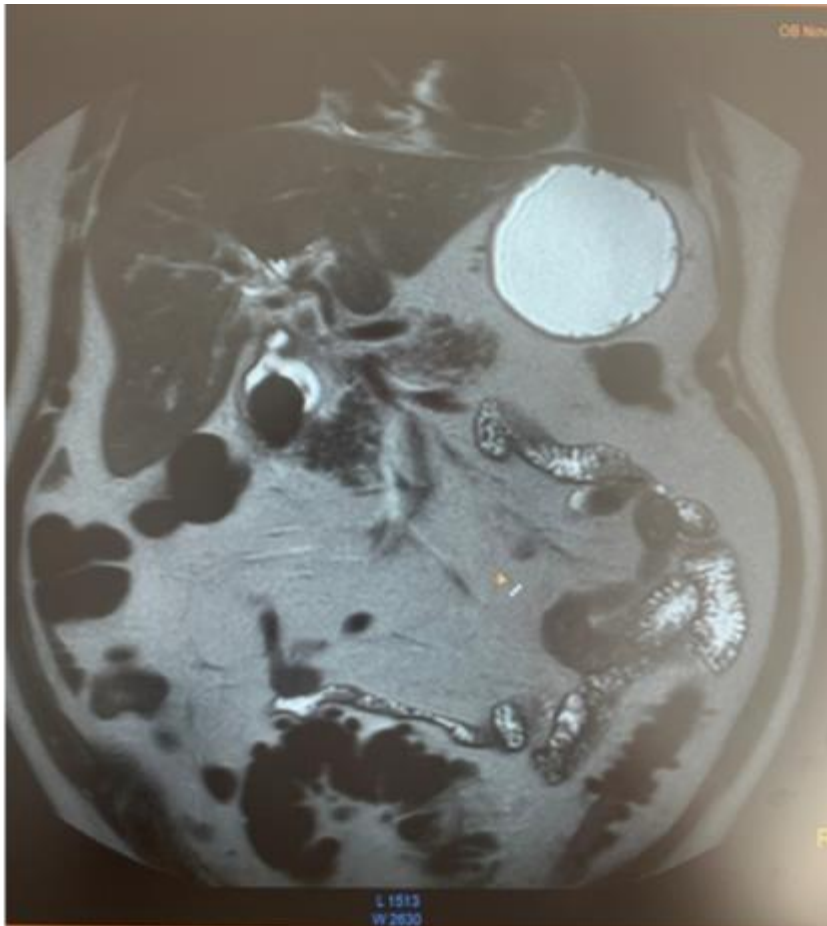
b) a two-stage procedure- enterolithotomy with cholecystectomy in the second act. Surgical approaches for managing the gallbladder and cholecystoenteric fistulas remain debated due to worse postoperative outcomes compared to enterolithotomy alone. Spontaneous closures of cholecystoenteric fistula were reported leading to a reduction in the need for surgical intervention in the second stage [4, 12, 13, 14]. Our surgical approach was enterolithotomy alone because surgical management of the gallbladder and cholecystoenteric fistula in high-risk patient was difficult due to severe adhesions and no possibility of safely identifying the contents of Calot's triangle. Postoperatively patient was monitored for 9 months, there was no signs of complications.

In conclusion, gallstone ileus is an infrequent complication of gallstone disease whose outcome is influenced by timely diagnosis and treatment. Endoscopy, CT, and MRI play a significant role in diagnosing this disease when other methods are unavailable or false negative. Surgical treatment saves lives, and enterotomy with calculus extraction, without gallbladder surgery and fistula resolution in the same act is a justified and satisfactory approach.

**Conflict of interest:** None declared.

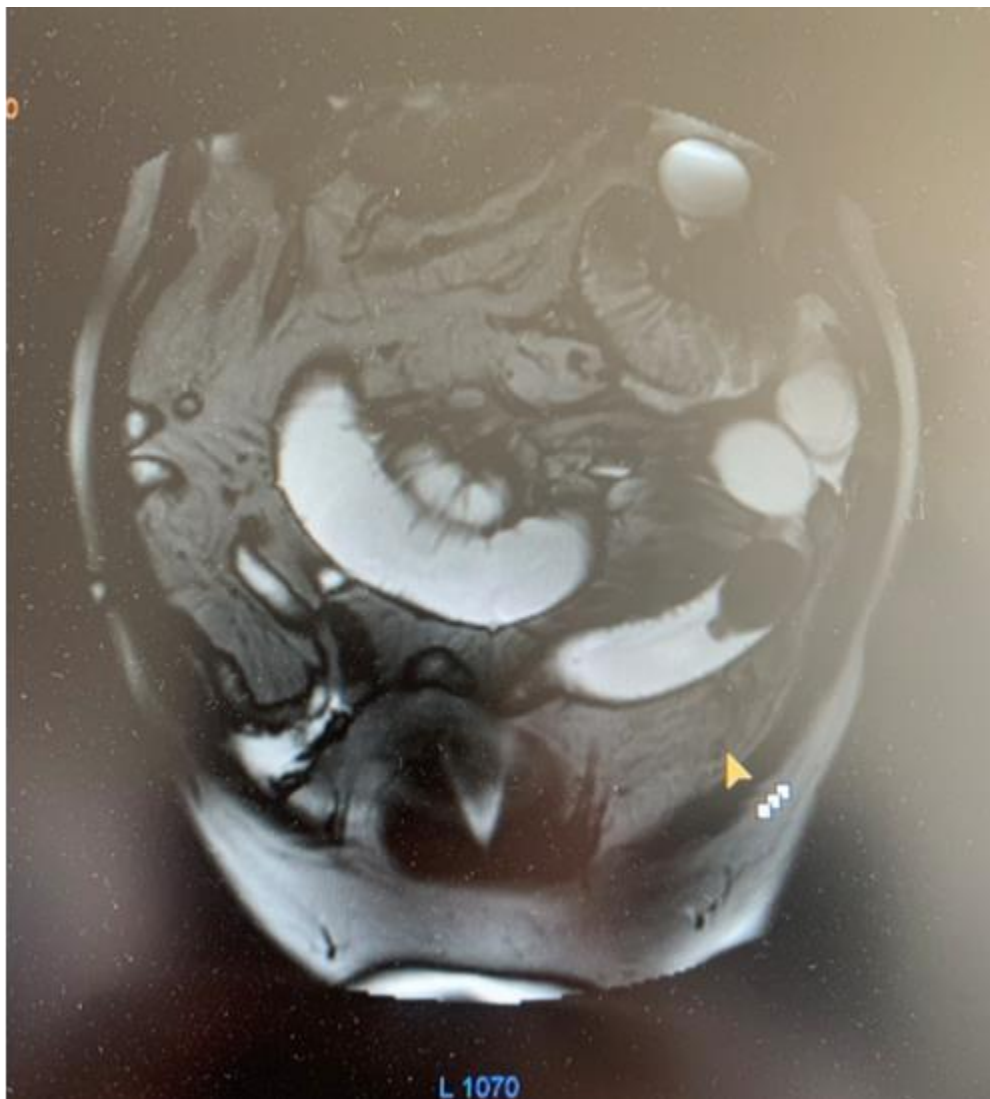
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**Figure 1.** Magnetic resonance imaging – gallstone in the duodenum





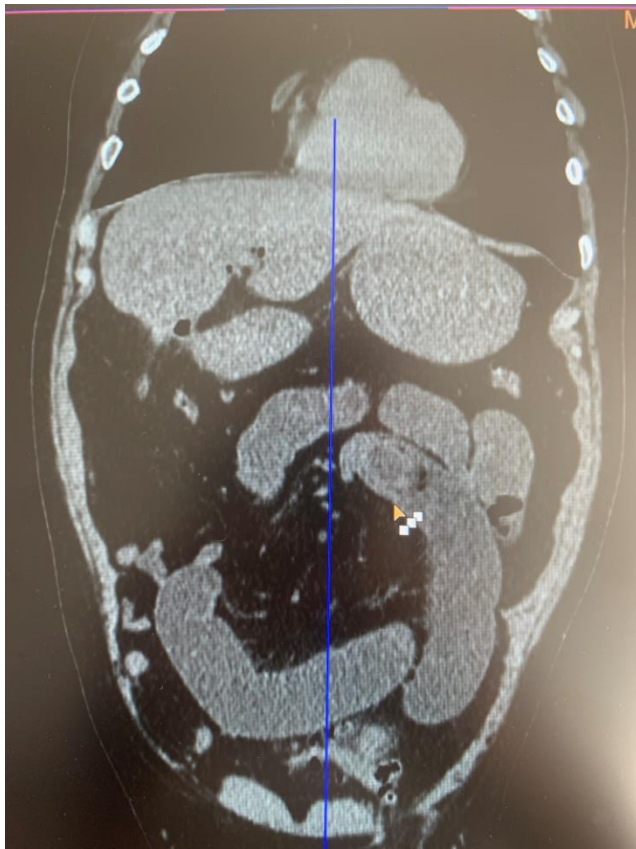
**Figure 2.** Magnetic resonance imaging – gallstone in the ileum



**Figure 3.** Magnetic resonance imaging – gallstone in the ileum



**Figure 4.** Magnetic resonance imaging – collapsed gallbladder



**Figure 5.** Abdominal computed tomography – gallstone in the ileum