

other ports: in the left hypochondrium, in the epigastrium, and in the right flank.

Laparoscopic exploration revealed dense adhesions between the gall bladder, the stomach, and the colonic hepatic flexure; the colonic hepatic flexure and the stomach presented thickened walls in contact with the gallbladder. After a long-lasting adhesiolysis, we discovered the presence of a double complete CCF and CGF originating from the gall bladder (Figure 1).

Once we excluded any involvement of the CBD and the proximal duodenum, a careful dissection allowed us to safely identify the fistula tracts. A laparoscopic

cholecystectomy was, therefore, performed, followed by the repair of the colonic and gastric defects with endo-gastrointestinal anastomosis (GIA) stapler (Figures 2 and 3). Intraoperative leak test with methylene blue via nasogastric tube was negative.

Postoperative course was uneventful with oral intake on the third postoperative day (POD).

The patient was discharged on the fourth POD.

Definitive histologic exam showed no neoplasia in gastric and bowel specimen, thickened gall bladder with multiple gallstones with signs of chronic cholecystitis, and evidence of the aforementioned complete fistula tracts.

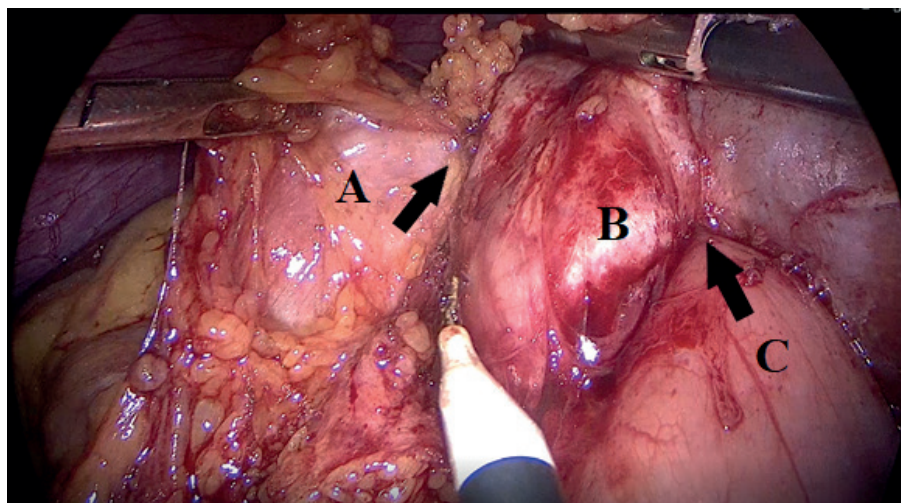


Figure 1. A double complete CCF. A: Right colon; B: gall bladder; C: stomach; arrows: fistulas.

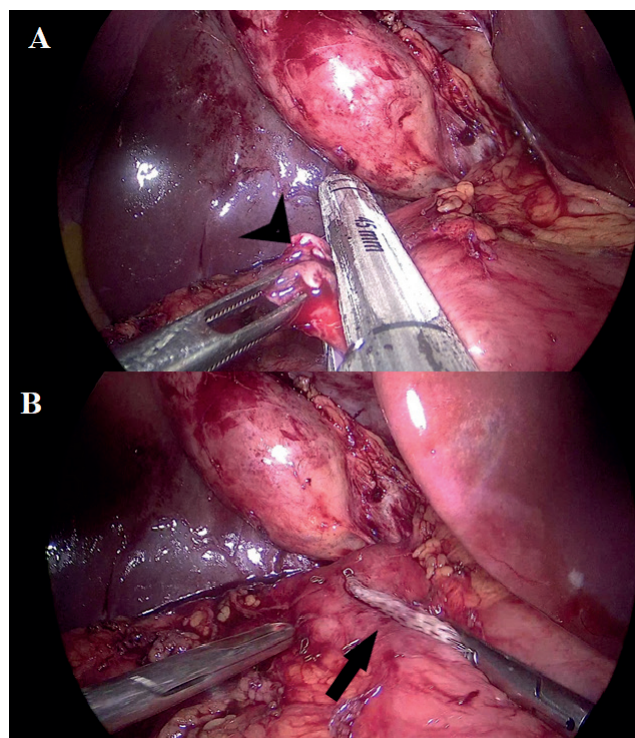


Figure 2. CGF fistula. A: Stapling the fistula; B: fistula after stapling; arrowhead: fistula; arrow: mechanical suture line.

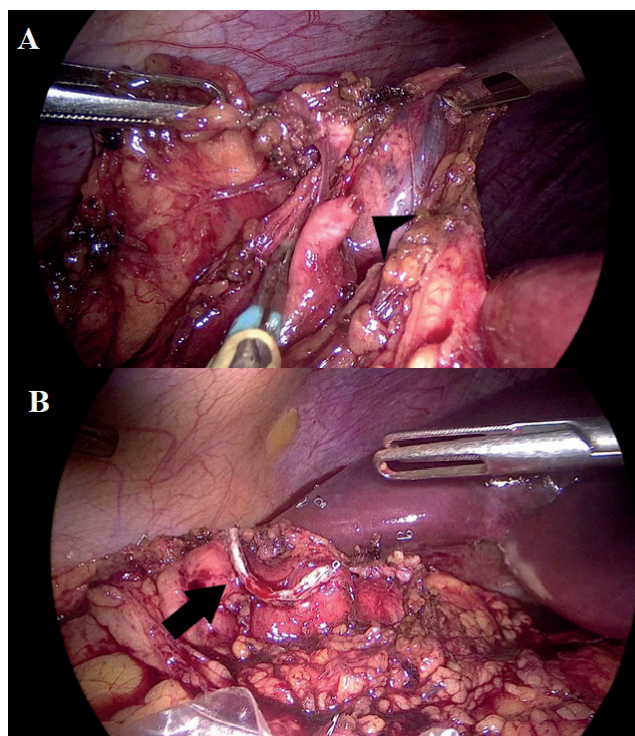


Figure 3. Cholecystocolonic fistula. A: Fistula after dissection; B: fistula after stapling; arrow-head: fistula; arrow: mechanical suture line.

At 1-year follow-up, the patient remains asymptomatic.

Discussion

CEF associated with gallstone disease is a rare entity: the incidence of CEF occurs in 3%-5% of patients with cholelithiasis and in 0.15%-4.8% of all patients who undergo surgeries of the biliary tract. The presence of a double fistula is anecdotal with very few cases described in the literature.

Patients with CEF are often asymptomatic or pauci-symptomatic, while severe clinical scenarios are luckily uncommon.

Most patients have a history of gallstone disease hiding the presence of CEF itself. In fact, these patients are often “labeled” with the diagnosis of gallstone disease and pending surgery further episodes of biliary colic, cholecystitis, or cholangitis can slowly lead to a subclinical adhesive syndrome, forming fistulas that are not investigated in the meantime.

Due to the advancements in computed tomography (CT) scan resolution, the application of endoscopic methods, such as endoscopic retrograde cholangiography (ERCP) or colonoscopy, and the development of high sensitivity exams, like gadoteric acid and magnetic resonance cholangiography, preoperative diagnosis of CEF have been greatly improved [11].

A patient with choledocolithiasis usually undergoes ERCP to remove gallstones before surgery. When a coexisting CEF is present, cholangiography at the end of procedure may reveal the presence of the fistula allowing for endoscopic treatment [12-14]

When CEF is preoperatively known, a non-operative management can be tempted. In case of CEF with gallstone disease or bleeding, endoscopic extraction, laser/mechanical/electrohydraulic lithotripsy [15-18] or hemostasis [19,20] can be done, with or without the placement of a stent.

Nevertheless, less than 30% of the cases treated with endoscopic methods are successful, thus making surgery necessary [21].

However, the diagnosis of CEF is usually an intraoperative finding and given the high incidence of gallstone disease and subsequent laparoscopic cholecystectomy in daily general surgery practice, this complication should be always kept in mind.

Although open cholecystectomy with the closure of the fistula is the gold standard treatment for non-obstructing biliary-enteric fistulas, the optimal treatment for CGF has not been established.

Since CEF is usually an unexpected finding with no fully codified management, it leaves us a bit baffled that the young surgeons who may not have enough expertise, often leading to open conversion.

However, recent reports suggest that the laparoscopic approach may be safe and feasible [22-26] and improving laparoscopic skills led to a gradual reduction of the conversion rate during this kind of surgery, especially in high-volume centers.

To our knowledge, this is the first reported case of a double complete fistula treated by laparoscopy.

First, a thorough assessment of the hepatic hilum anatomy is imperative, as CBD and/or proximal duodenum

involvement requires conversion to open surgery even in experienced hands. Intraoperative cholangiography, as well as combined laparoscopic and endoscopic approaches, may be useful for intraoperative observation of the fistula and the suture line [27].

A stapled cholecystofistulectomy may be the procedure of choice since it avoids contamination of the abdominal cavity. An omental patch can also be used to assure complete closure [28-30].

Another modality that emerged over the years was the two-stage approach: initial removal of gallstone, with cholecystectomy, and fistula repair to be done later [31]. We believe that the one-stage approach should be preferred when the anatomical situation is favorable, in order not to expose the patient to the risk of multiple interventions, often hampered by increased difficulties.

Conclusion

CEF is more common than we think, so we should know how to handle it. Double fistula is much rarer and needs careful evaluation to manage it correctly.

Complete laparoscopic management of double CEF is feasible and safe in well-equipped high-volume centers, taking advantage of the benefits of the minimally invasive approach; in this setting, endoscopy may play a role in reducing the rate of conversion to open surgery.

The choice of technique of closure and timing of surgery (one vs. two-stage) should be guided by the patient's clinical condition, local expertise, and the research for the best postoperative outcome.

List of Abbreviations

CBD	Common bile duct
CCF	Cholecystocolonic fistula
CEF	Cholecystoenteric fistula
CGF	Cholecystogastric fistula
VLC	Video-laparoscopic cholecystectomy

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

What is new?

To our knowledge, this is the first described case of double complete CGF and CCF successfully treated with a complete laparoscopic approach.

Funding

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Consent for publication

Written and informed consent was taken from patient to publish this case report.

Ethical approval

Ethical approval is not required at our institution to publish an anonymous case report.

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Summary of the case

1	Patient details	27-year-old female
2	Symptoms	Recurrent biliary fistula
3	Final diagnosis	CGF and CCF
4	Medication	None
5	Clinical procedures	Laparoscopic cholecystectomy with gastric and colonic fistulectomy
6	Clinical specialty	General Surgery