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A case report of laparoscopic choledocholithotomy and transductal T-tube insertion with indocyanine green fluorescence imaging and laparoscopic ultrasound

Reviewers' comments:

Reviewer #1:

Dear Author, Firstly, I would like to express my gratitude for submitting your research findings to our journal. As a reviewer, I am pleased to have the opportunity to review your paper. Throughout the review process, I have carefully read your manuscript and thoroughly analyzed and evaluated its content. This article describes a case of laparoscopic choledochectomy for the treatment of a patient with a large common bile duct stone, in which the near-infrared indocyanine green fluorescence imaging system and intraoperative ultrasound were introduced during the treatment process. During the reading process, I noted your discussion on the application of the near-infrared indocyanine green fluorescence imaging system and intraoperative ultrasound in the treatment of biliary system diseases. This is an important topic worth exploring. I understand the potential significance and clinical prospects of these new technologies in the treatment of biliary stones. Moving forward, I would like to provide you with some suggestions and feedback that I believe will further improve and enhance your research. Please note that these suggestions are intended to foster academic discourse and promote quality, and are not intended as a personal criticism of you or your research.

1. The introduction of the patient's general condition and medical history is not sufficiently detailed, lacking many important details, such as the decision-making process regarding the management of the gallbladder.

Thank you for reviewing our study in detail. According to the reviewer's comment, we added a more detailed description of the patient's general condition and medical history to the CASE PRESENTATION section of the revised manuscript as follows:

He had no previous history of tuberculosis, hepatitis, or allergies. He also had no previous abdominal surgical history.

Gallbladder (GB) stones with tensile distension of the GB and diffuse wall thickening were also noted on the CT scan.

Initially, we planned to perform ERCP first, followed by laparoscopic cholecystectomy.

2. The introduction of the near-infrared indocyanine green fluorescence imaging system in the patient's case lacks specific information on its usage, effectiveness, and presentation of results.

I thank the reviewer for this comment. I added a more detailed description of the usage and effectiveness of the near-infrared indocyanine green fluorescence imaging system and results to the TREATMENT section of the revised manuscript as follows:

The near-infrared ICG fluorescence scope effectively showed the exact anatomy of the biliary tree and dilatation of the CBD in light green color during the surgery.

The near-infrared ICG fluorescence scope confirmed that there was no bile leakage from the suture site. Possible injury to another site of the bile duct was checked, and no injury was found.

3. Did the use of ICG exacerbate the patient's liver dysfunction or hinder the resolution of

jaundice due to the patient's pre-existing jaundice?

We thank the reviewer for this comment. Because we succeeded in decompressing the bile duct with endoscopic retrograde biliary drainage before surgery, we could operate on the patient with mild liver dysfunction presenting as jaundice. And there was no postoperative exacerbation of the patient's liver function or jaundice. As you suggested, we added a more detailed description of the patient's liver function and jaundice to the CASE PRESENTATION and TREATMENT sections as follows:

However, the gastroenterologist successfully inserted a plastic stent into the CBD. The total serum bilirubin level decreased to 1.7 mg/dL, and the AST and ALT levels were 26 and 44 U/L.

On the third postoperative day, the total serum bilirubin level was decreased to 1.1 mg/dL, and the AST and ALT levels were 13 and 12 U/L.

4. The use of ICG carries certain risks, such as allergies. Were comprehensive allergy tests conducted prior to the surgery, and were appropriate contingency plans prepared during the procedure? Were the patient's consent obtained regarding the related risks and financial burdens?

Thank you for the comment. The reported incidence of adverse reactions to indocyanine green (ICG) varies according to studies and has an overall incidence that ranges from 0.05% to 0.2%. We usually do not conduct allergy testing prior to surgery, but we are discussing conducting comprehensive allergy tests for ICG with the Allergy and Pulmonology department in our hospital due to your considerate comment. If there is an allergic reaction when ICG is injected, we usually administer chlorpheniramine maleate at 4 mg intravenously. If the reaction is very severe, we use hydrocortisone at 100 mg. The patient's consent to the risks and financial burdens was obtained before surgery.

批注 [오전1]: If this is the official name of the department, it should be capitalized.

5. The discussion section of the article is not sufficiently in-depth, lacking a thorough comparison of the advantages and disadvantages of the near-infrared indocyanine green fluorescence imaging system in the biliary system and its comparison with ultrasound as described in the literature.

Thank you for your thoughtful comment. I added a more detailed comparison of near-infrared indocyanine green fluorescence imaging system and laparoscopic ultrasound to the DISCUSSION section of the revised manuscript as follows:

ICG is a water-soluble molecule and binds to protein after intravenous administration. It is exclusively metabolized by the liver and excreted primarily through the biliary system.

Although adverse reactions to ICG can occur, the total adverse reaction rate is around 0.2% to 0.34%, and the allergic reaction rate is approximately 0.05%. Also, the cost of a 10 mL vial of ICG is approximately \$80, so the cost is not burdensome compared to its usefulness.

While ICG fluorescence can show the exact anatomy of the biliary tree in superficial depth, deep structures can be detected by laparoscopic ultrasound. The detection of bile leakage is one of the unique features of ICG fluorescence guidance, whereas laparoscopic ultrasound provides a way to check flow in vascular structures using the Doppler mode.

批注 [오전2]: This is the comment I left on this sentence in the paper:
This sentence is unclear as "superficial" (surface) and "depth" (deep) are opposites. Do you mean, "While ICG fluorescence can show the exact anatomy of the biliary tree in detail, deep structures can be detected by laparoscopic ultrasound" or something else? Please revise to clarify.

6. The conclusion section does not mention the intraoperative ultrasound and near-infrared indocyanine green fluorescence imaging system.

I changed the sentence according to the reviewer's comment as follows:

Laparoscopic choledocholithotomy by the transcholedochal approach and transductal T-tube

insertion with indocyanine green fluorescence imaging and laparoscopic ultrasound is a safe and feasible option for patients with very large-sized and impacted CBD stones.

Thank you again for reviewing our study in detail. We hope that our responses and revisions are satisfactory.

Reviewer #2:

This is an exquisite case report, with a very interesting history. Some little issues might need clarification: Figure 1b, large duodenal diverticulum... but the mainstream of the paper is about a large, impacted stone. Was the diverticulum an incidental finding / if not, what relations had this with the stone(s)

Thank you for your thoughtful comment. A large duodenal diverticulum is one of the reasons that gastroenterologists give up performing endoscopic retrograde cholangiopancreatography (ERCP). Both large impacted common bile duct stones and a large diverticulum are reasons they give up trying to remove stones by ERCP. ERCP is known to be more difficult, and the complication rate of ERCP is higher when the papilla is closely associated with a diverticulum. Therefore, the gastroenterologist consulted me (hepatobiliary surgeon) about this case, and I decided to operate. According to the reviewer's comment, we added a more detailed description of the large duodenal diverticulum to the CASE PRESENTATION section of the revised manuscript as follows:

The success rate of ERCP is low, and the complication rate is high when the papilla is located close to a periampullary diverticulum.

Thank you again for reviewing our study in detail. We hope that our responses and revisions

批注 [오전3]: What is it "more difficult" *than*? Please add words to explain the comparison being made.

批注 [오전4]: These words are unclear. Do you mean "to operate" or "on the surgical procedure?" Please revise to clarify.

are satisfactory.

