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Contents

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EDITORIAL

- 3643** Obesity-Surgery is not the end
Ma R, Jiang PQ, Liu SY, Yang DQ, Jiao Y
- 3647** Current status and future of hepato-pancreatico-biliary surgery fellowship training in China
Feng YY, Jin Y
- 3650** Advances in minimally invasive treatment of malignant obstructive jaundice
Kang LM, Xu L, Yu FK, Zhang FW, Lang L
- 3655** Preoperative gastric retention in endoscopic retrograde cholangiopancreatography patients: Assessing risks and optimizing outcomes
Zhou NY, Hu B
- 3658** Correct understanding and intervention of postoperative nausea and vomiting can provide reference for clinical practice
Wang JC, Wang L
- 3663** Dexmedetomidine in colon cancer surgery: Evaluating its impact and efficacy
Solanki SL, Sharma J

MINIREVIEWS

- 3666** Evolution of surgical treatment for hepatolithiasis
Ye YQ, Li PH, Wu Q, Yang SL, Zhuang BD, Cao YW, Xiao ZY, Wen SQ

ORIGINAL ARTICLE

Case Control Study

- 3675** Protective effect of appendectomy against the onset of ulcerative colitis: A case-control study
Cui M, Shi C, Yao P

Retrospective Cohort Study

- 3685** Laparoscopic anatomical SVIII resection *via* middle hepatic fissure approach: Caudal or cranio side
Peng JX, Li HL, Ye Q, Mo JQ, Wang JY, Liu ZY, He JM

Retrospective Study

- 3694** Comparison of endoscopic and laparoscopic resection of gastric gastrointestinal stromal tumors: A propensity score-matched study
Gu BB, Lu YD, Zhang JS, Wang ZZ, Mao XL, Yan LL

- 3703** Efficacy of multi-color near-infrared fluorescence with indocyanine green: A new imaging strategy and its early experience in laparoscopic cholecystectomy
Li JY, Ping L, Lin BZ, Wang ZH, Fang CH, Hua SR, Han XL
- 3710** Onset and prognostic features of anastomotic leakage in patients undergoing radical surgery after neoadjuvant chemoradiation for rectal cancer
Wang L, Zhang WS, Huang GJ
- 3720** Risk factors for lymph node metastasis and invasion depth in early gastric cancer: Analysis of 210 cases
Xiang Y, Yao LD
- 3729** Value of serum pepsinogen ratio screening for early gastric cancer and precancerous lesions in Youcheng area
Han X, Yu W
- 3737** Effects of comprehensive nutrition support on immune function, wound healing, hospital stay, and mental health in gastrointestinal surgery
Zhu L, Cheng J, Xiao F, Mao YY
- 3745** Effect of hyperthermia combined with opioids on cancer pain control and surgical stress in patients with gastrointestinal cancer
Qian J, Wu J, Zhu J, Qiu J, Wu CF, Hu CR
- 3754** Analysis of the efficacy and safety of endoscopic retrograde cholangiopancreatography for the treatment of pediatric pancreatobiliary diseases
Wang XQ, Kong CH, Ye M, Diao M
- 3764** Intraoperative thermostatic nursing and failure mode and effects analysis enhance gastrectomies' care quality
Wang XY, Zhao YL, Wen SS, Song XY, Mo L, Xiao ZW
- 3772** Long-term survival and risk factors in esophageal squamous cell carcinoma: A Kaplan-Meier and cox regression study
Ren ZT, Kang M, Zhu LY, Li P
- 3780** Robotic-assisted Kasai portoenterostomy for child biliary atresia
Xing GD, Wang XQ, Duan L, Liu G, Wang Z, Xiao YH, Xia Q, Xie HW, Shen Z, Yu ZZ, Huang LM
- 3786** Comparative analysis of conventional laparoscopic surgery and single-incision laparoscopic surgery in gastric cancer treatment: Outcomes and prognosis
Cao C, Tian X, Wang XZ, Wang Q
- 3794** Prognostic value of combined systemic inflammation response index and prognostic nutritional index in colorectal cancer patients
Li KJ, Zhang ZY, Sulayman S, Shu Y, Wang K, Ababaike S, Zeng XY, Zhao ZL
- Observational Study**
- 3806** Novel techniques of liver segmental and subsegmental pedicle anatomy from segment 1 to segment 8
Wang SD, Wang L, Xiao H, Chen K, Liu JR, Chen Z, Lan X

- 3818** Diagnostic value of digital continuous bowel sounds in critically ill patients with acute gastrointestinal injury: A prospective observational study

Sun YH, Song YY, Sha S, Sun Q, Huang DC, Gao L, Li H, Shi QD

Randomized Controlled Trial

- 3835** Effects of high-quality nursing on surgical site wound infections after colostomy in patients with colorectal cancer

Cheng Y, Chen YX

Basic Study

- 3843** Zinc pretreatment for protection against intestinal ischemia-reperfusion injury

Cheng MZ, Luo JH, Li X, Liu FY, Zhou WJ

CASE REPORT

- 3857** Recurrent small intestinal perforation from gastric mucosal heterotopia: A case report

Li ZW, Jiang TF, Yang CK, Xu ZJ, Zhu WB, Li E

- 3862** Pathological diagnosis and clinical feature analysis of descending duodenal mucosal adenocarcinoma: A case report

Zhang JY, Wu LS, Yan J, Jiang Q, Li XQ

- 3870** Laparoscopic cholecystectomy with communicating accessory hepatic duct injury and management: A case report

Zhao PJ, Ma Y, Yang JW

- 3875** Pulmonary hypertension post-liver transplant: A case report

Alharbi S, Alturaif N, Mostafa Y, Alfahid A, Albenmoussa A, Alghamdi S

LETTER TO THE EDITOR

- 3881** Therapeutic efficacy of immunotherapy for gastric cancer metastasis

Xie FF, Qian ST, Zhao HY, Liu QS

- 3887** Feeding jejunostomy in post-gastrectomy nutrition management for gastric cancer

Chalkoo M, Habib M, Bhat MY

- 3890** Colorectal cancer lymph node dissection and disease survival

Morera-Ocon FJ, Navarro-Campoy C, Cardona-Henao JD, Landete-Molina F

- 3895** Does lymph node dissection improve the prognosis of patients with colorectal cancer?

Wang L, Liu SS

- 3899** Surgical approach for lower postoperative anal stenosis

Ghanem Atalla AD, Nashwan AJ

- 3903** Landscape of transarterial chemoembolization represented interventional therapy for hepatocellular carcinoma

Fu YY, Li WM, Cai HQ, Jiao Y

ABOUT COVER

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The primary aim of *World Journal of Gastrointestinal Surgery* (WJGS, *World J Gastrointest Surg*) is to provide scholars and readers from various fields of gastrointestinal surgery with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJGS mainly publishes articles reporting research results and findings obtained in the field of gastrointestinal surgery and covering a wide range of topics including biliary tract surgical procedures, biliopancreatic diversion, colectomy, esophagectomy, esophagostomy, pancreas transplantation, and pancreatectomy, etc.

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Laparoscopic cholecystectomy with communicating accessory hepatic duct injury and management: A case report

Peng-Ju Zhao, Yan Ma, Ji-Wu Yang

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Abstract

BACKGROUND

Laparoscopic cholecystectomy is considered the gold standard for the treatment of patients with gallstones. However, bile duct injury is one of the most serious complications of this surgery, with an incidence rate of 0.3%-0.7%. Variations in anatomical structures are one of the main reasons for such injuries.

CASE SUMMARY

We report a 26-year-old male patient who presented with repeated upper abdominal pain for 1 year. Ultrasound examination and blood tests indicated gallstones accompanied by chronic cholecystitis. The patient underwent laparoscopic cholecystectomy. During the surgery, a communicating bile duct connecting the gallbladder neck and the right hepatic duct was discovered and injured. Meticulous dissection identified it as a communicating accessory hepatic duct, which was then definitively ligated. Postoperatively, the patient recovered well, magnetic resonance imaging and magnetic resonance cholangiopancreatography showed no intrahepatic or extrahepatic bile duct strictures. The pathology report showed chronic cholecystitis with gallstones.

CONCLUSION

Carefully manage communicating accessory bile ducts in cholecystectomy using cholangiography or meticulous separation, followed by ligation is effective.

Key Words: Laparoscopic cholecystectomy; Bile duct injury; Accessory hepatic duct; Anatomical variation; Case report

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Core Tip: This case report highlights the significance of recognizing and managing accessory hepatic duct injuries during laparoscopic cholecystectomy. Utilizing intraoperative cholangiography or indocyanine green fluorescence cholangiography can help identify biliary anomalies, while expert evaluation by a hepatobiliary surgeon is crucial. For confirmed communicating accessory hepatic ducts, total cholecystectomy with duct ligation offers an effective solution to prevent further complications.

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INTRODUCTION

Laparoscopic cholecystectomy is considered the gold standard for patients with gallstones. Bile duct injury is one of the most severe complications of cholecystectomy, with an incidence rate of 0.3%-0.7% [1,2]. One of the main causes of this injury is the variability in bile duct anatomy. Studies have shown that up to 47% of the population has anatomical variations in the biliary system [3].

The accessory hepatic duct is an anatomical variation of the biliary system, which is easily misidentified during surgery. Goor and Ebert defined communicating accessory hepatic ducts as those that communicate between major bile ducts but do not drain parts of the liver [4]. However, the actual prevalence rate is not clear. Correct identification and management of communicating accessory hepatic ducts during laparoscopic cholecystectomy is important. We share a case of communicating accessory hepatic duct injury and management during laparoscopic cholecystectomy.

CASE PRESENTATION

Chief complaints

We report a 26-year-old male patient who presented with recurrent upper abdominal pain for 1 year.

History of present illness

The patient experienced persistent abdominal distention pain in the upper abdomen a year ago after consuming fatty foods. The pain radiated to the right shoulder and was accompanied by nausea, but there were no symptoms of vomiting, fever, palpitations, shortness of breath, or chest pain. After taking ibuprofen, the symptoms were somewhat relieved. Since then, the abdominal pain has recurred multiple times. One month before admission, the abdominal pain worsened, and an ultrasound examination diagnosed "gallstones". The patient used traditional Chinese medicine for treatment, but the abdominal pain continued to recur.

History of past illness

The patient denies any history of chronic diseases such as hypertension, heart disease, or diabetes, and reports no history of surgery, trauma, or blood transfusion. There is no known drug allergy history, and the patient denies any history of acute or chronic infectious diseases.

Personal and family history

The patient's place of origin is Dali. The patient does not have smoking or alcohol habits. Both parents are alive and have no history of chronic diseases. There is no family history of hereditary diseases.

Physical examination

At the time of consultation, his vital signs were normal. Physical examination revealed tenderness in the right upper abdomen, with no signs of peritonitis, and a negative Murphy's sign.

Laboratory examinations

Blood tests were normal, including white blood cells, transaminases, alkaline phosphatase, and bilirubin levels.

Imaging examinations

Ultrasound examination showed that the size of the gallbladder was normal, but the wall was irregular, with an echogenic mass of approximately 23 mm accompanied by a shadow.

FINAL DIAGNOSIS

Based on the examination results, the final diagnosis was gallbladder stones with chronic cholecystitis.

TREATMENT

The patient was sent to the operating room. During the laparoscopic surgery, the cystic duct and the anterior branch of the cystic artery were separated. A duct connecting the gallbladder infundibulum and the right hepatic duct was found within the cystohepatic triangle. This duct was ruptured and bile leaked out during its separation. Careful separation during surgery confirmed this as a communicating accessory hepatic duct, and the stump was clamped. Postoperative exploration showed no bleeding or bile leakage from the stumps of the anterior branch of the cystic artery, the cystic duct, the posterior branch of the cystic artery, and the communicating accessory hepatic duct ([Figure 1](#), [Video](#)).

OUTCOME AND FOLLOW-UP

Postoperatively, the patient's liver function showed no significant changes. He was discharged 3 days later. During the 2 weeks postoperative follow-up, magnetic resonance imaging and magnetic resonance cholangiopancreatography showed no signs of intrahepatic or extrahepatic bile duct stricture, and the patient was in good condition. The pathology report showed chronic cholecystitis with gallstones ([Figure 2](#)).

DISCUSSION

Accessory hepatic ducts are bile duct branches that drain bile from liver lobes, segments, or subsegments and connect directly with extrahepatic bile ducts, cystic ducts, or the gallbladder body. However, there is no consistent definition for them. 94% accessory hepatic ducts drain the right lobe of the liver, and only 6% drain the left lobe[5]. Hisatsugu and their colleagues divided accessory right hepatic ducts based on their convergence with the cystic duct into the following types: (1) Type I, cystic duct converges with the accessory right hepatic duct; (2) Type II, accessory right hepatic duct and cystic duct converge at the same location on the common bile duct; (3) Type III, accessory right hepatic duct drains into the common hepatic duct; (4) Type IV, accessory right hepatic duct drains into the distal common bile duct of the cystic duct; and (5) Type V, accessory right hepatic duct drains into the cystic duct[6].

Intraoperative cholangiography plays an important role in understanding biliary anatomy and can reduce the incidence of bile duct injuries during laparoscopic cholecystectomy[7]. However, the procedure is complex, extends operation time, and involves radiation exposure, so it is not routinely performed in many institutions. In recent years, numerous studies have shown that using fluorescent laparoscopy for indocyanine green fluorescence cholangiography can significantly reduce the risk of bile duct injury[8,9]. Simultaneously, if bile duct injury is detected during surgery, it should ideally be handled by an experienced hepatobiliary surgeon who performs careful separation and exploration to identify the type of injury and anatomical anomalies, avoiding thermal damage from electrocautery[10,11]. In this case, intraoperative exploration and postoperative magnetic resonance cholangiopancreatography showed no segmental intrahepatic bile duct dilation, confirming that the abnormal duct communicated with the right hepatic duct on one end and the gallbladder infundibulum on the other, suggesting it was a communicating accessory hepatic duct.

According to Kurahashi *et al*'s classification[12], an abnormal duct communicating with the cystic duct is classified as type A, which is considered high risk. Subtotal cholecystectomy can avoid bile duct injury but was not included in this study[12]. Goor and Ebert[13] classified communicating accessory hepatic ducts into four types: (1) F1, connecting the right hepatic duct and the common hepatic duct; (2) F2, connecting the right hepatic duct and the cystic duct; (3) F3, connecting the right hepatic duct and the gallbladder neck; and (4) F4, connecting the right and left hepatic ducts. In cholecystectomy, F2 and F3 types are mainly involved. Therefore, for patients with communicating accessory hepatic ducts found during laparoscopic cholecystectomy, total cholecystectomy combined with ligation of the communicating accessory hepatic duct is a viable option.

CONCLUSION

Our study indicates that if bile duct injury is found during laparoscopic cholecystectomy, an experienced hepatobiliary surgeon should carefully separate and explore the injury type and anatomical anomalies, and intraoperative cholangiography or indocyanine green fluorescence cholangiography should be performed when necessary. If confirmed as a communicating accessory hepatic duct, total cholecystectomy combined with ligation of the communicating accessory hepatic duct should be considered. In conclusion, we further validated the effectiveness of this research through a surgical video that we produced. This video not only offers a detailed demonstration of the key steps but also enhances the understanding of the communicating accessory hepatic duct ligation.

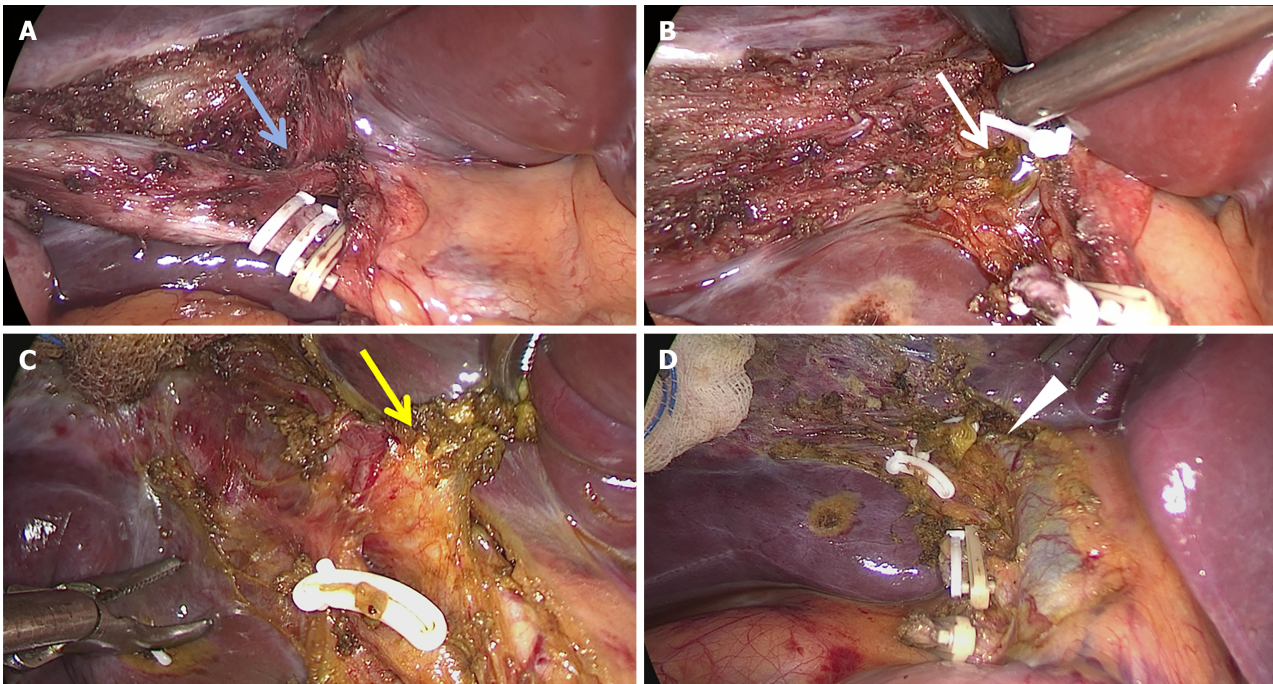


Figure 1 Laparoscopic view during cholecystectomy. A: Anomalous duct (blue arrow) was found extending from the gallbladder ampulla to inside the liver; B: Bile leak (white arrow) was detected from the cut end of the anomalous duct, confirming it is an aberrant bile duct; C and D: Confirmation that the other end (yellow arrow) of the injured bile duct was connected to the right hepatic duct (white arrowhead), identifying it as a communication accessory hepatic duct, which was clipped with a vascular clamp.

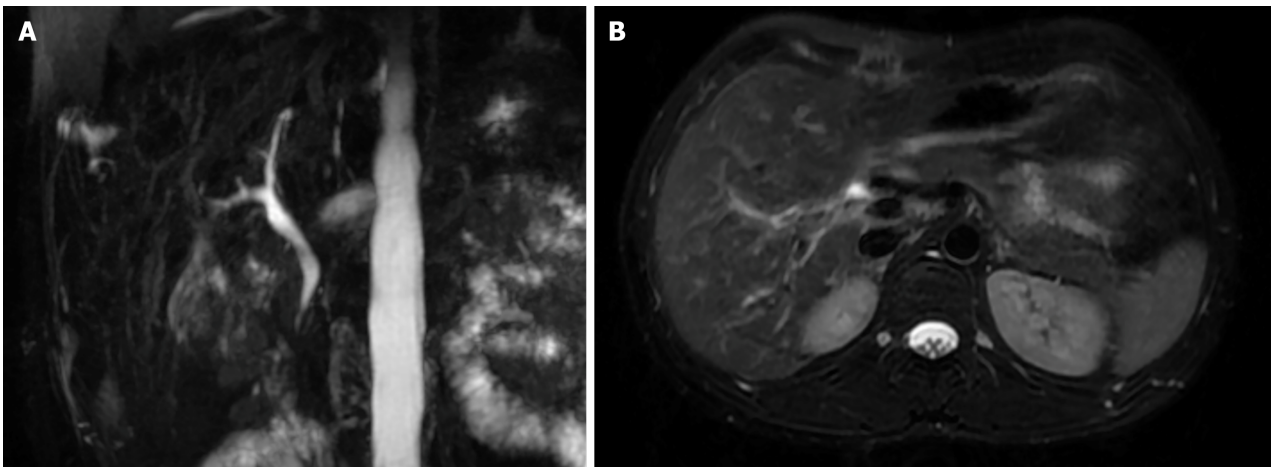


Figure 2 Magnetic resonance imaging and magnetic resonance cholangiopancreatography after surgery. A and B: Two weeks after surgery, follow-up magnetic resonance imaging and magnetic resonance cholangiopancreatography showed no intrahepatic or extrahepatic bile duct strictures or dilatation.

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FOOTNOTES

Author contributions: Zhao PJ participated in the surgical procedure and collected data; Ma Y supported postoperative management and rehabilitation; Yang JW supervised the surgery and managed the clinical aspects; Zhao PJ, Ma Y, and Yang JW wrote the manuscript.

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