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Laparoscopic Anatomical Left Hepatectomy for Intrahepatic Bile Duct Papillary Mucinous Cystadenoma With Intraoperative Vascular Repair

A Case Report

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Abstract: Laparoscopic hepatectomy has been widely performed for patients with benign liver tumors such as hepatic hemangioma, focal nodular hyperplasia, and hepatic adenoma.

We here present a case of a 78-year-old female patient who was initially admitted to our department due to fever and jaundice for 2 days. Abdominal enhanced computed tomography scan showed intrahepatic and extrahepatic bile duct dilatation with liver atrophy of left lobe. Unenhanced nodules were seen within the left intrahepatic bile duct. Ultrasonography revealed intrahepatic and extrahepatic bile duct dilatation with viscous fluid, tubular adenoma? Tumor markers including alpha fetoprotein, carcinoembryonic antigen, and CA19-9 were normal. Preoperative total bilirubin was 64.4 mmol/L.

Laparoscopic anatomical left hepatectomy and common bile duct exploration were performed. In this procedure, a lot of mucus was seen within the common bile duct and left intrahepatic bile duct. No bile duct stones were found after the exploration. During parenchymal transection, intraoperative hemorrhage from middle hepatic vein was met, and we repaired middle hepatic vein by laparoscopic suture (5-0 Prolene). No air embolism and hypotension were met. This operation took 232 minutes and estimated blood loss was 300 mL. Postoperative ultrasonography indicated a normal outflow of middle hepatic vein and there was no stricture. The patient's postoperative course was uneventful and was discharged on the 6th day after surgery. Postoperative pathological diagnosis was intrahepatic bile duct papillary mucinous cystadenoma.

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Abbreviations: HVI = hepatic vein injury, LH = laparoscopic hepatectomy.

INTRODUCTION

Laparoscopic hepatectomy (LH) has now been widely performed in experienced centers.¹⁻⁶ Benign liver tumors such as hepatic hemangioma, focal nodular hyperplasia, and hepatic

adenoma are thought to be good indications of LH. However, there are still technical difficulties with LH related to liver mobilization, hemorrhage controlling, and unexpected vessels injuries. Among them, hepatic vein injury (HVI) during LH is especially dangerous, because it may cause conversion, air embolization, fatal hemorrhage, or even death.

PATIENTS AND METHODS

We here present a case of a 78-year-old female patient who was initially admitted to our department due to fever and jaundice for 2 days. Preoperative abdominal enhanced computed tomography scan showed intrahepatic and extrahepatic bile duct dilatation with liver atrophy of left lobe. Unenhanced nodules were seen within the left intrahepatic bile duct. Ultrasonography revealed intrahepatic and extrahepatic bile duct dilatation with viscous fluid, tubular adenoma? Tumor markers including alpha fetoprotein, carcinoembryonic antigen, and CA19-9 were normal. Preoperative total bilirubin was 64.4 mmol/L. A laparoscopic left hepatectomy and bile duct exploration were performed for this patient due to its left lobe atrophy and bile duct dilation.

Surgical Procedure

Laparoscopy was performed under CO₂ pneumoperitoneum. This patient was placed in the reversed Trendelenburg position, with the surgeon standing by the patient's right side. Three 12 mm and two 5 mm trocars (Ethicon Endo-Surgery, Cincinnati, OH) were usually inserted.

The whole left lobe was mobilized by an ultrasonic shears. The common bile duct was dilated significantly. After cholecystectomy was completed, the left bile duct, left hepatic artery, and left portal vein were meticulously dissected and transected. The exact transection line was marked by electric cautery. The liver parenchyma was transected by ultrasonic shears. The hepatic vein branches of segment II and III were dissected and clamped by Hem-o-lok. And the transection line was along the left side of middle hepatic vein. A 5-0 Prolene running suturing was used to fix the middle hepatic vein hemorrhage. The left hepatic pedicle tissue and left hepatic vein were transected by laparoscopic linear stapler (Endopath Endocutter; Ethicon Endosurgery) with 60 mm white cartridge. The common bile duct was explored and a #26 T tube was placed from the distal of left bile duct.

Ethics Statement

All clinical investigations were in accordance with the ethical guidelines of the Declaration of Helsinki. Ethical approval was obtained from the Committee of Ethics in West China Hospital of Sichuan University. Written informed consent was obtained from both patient and her family in this study.

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RESULTS

During operation, a lot of mucus was seen within the common bile duct and left intrahepatic bile duct. No bile duct stones were found after exploration. During liver parenchymal transection, intraoperative hemorrhage from middle hepatic vein was met, and we repaired middle hepatic vein by laparoscopic suture (5-0 Prolene) No complication including air embolization, hypotension, or oxygen saturation decreasing was met during and after surgery. This operation took 232 minutes and estimated blood loss was 300 mL. Postoperative ultrasonography indicated a normal outflow of middle hepatic vein and there was no stricture. The patient's postoperative course was uneventful, and was discharged on the 6th day after surgery. Postoperative pathological diagnosis was intrahepatic bile duct papillary mucinous cystadenoma.

DISCUSSION

LH has gained worldwide acceptance and use over the past decade. Although control of the hepatic vein can be laparoscopically obtained, this is not always possible.⁷ As a result, intraoperative hemorrhage is extremely dangerous. In this case, the patient who underwent LH suffered intraoperative HVI. Several causes were included: wrongly ultrasonic shears manipulating; wrong anatomical recognizing. Ultrasonic shears were supposed to be a safe method for blunt dissection. However, the lack of complete view on surgical field always mistook local structures from their right anatomy. A good camera manipulating and general observation were very important to identify the right anatomy of hepatic vein. In this case, when intraoperative hepatic vein bleeding occurred, the first assistant used a forceps to retract the left lobe to the left side by one hand and used an aspirator to clean the surgical site bleeding by the other hand. The scopist changed the camera angle (zoom out) and showed a complete view of surgical site to identify where the bleeding came from. Then, the scopist zoomed in the camera when the precise stitching and HVI repairing were performed.

This case was successfully treated by laparoscopic stitching. No air embolization, hypotension, or oxygen saturation decreasing was met during and after LH. Three factors might contribute to it: good exposure of bleeding site by an experienced first assistant; skillful stitching for HVI; and good

communications among surgeon, anesthetist, and nurse. Air embolization might be the most concerned risk for surgeons. Generally speaking, it was thought that air embolism could possibly occur due to the pneumoperitoneum.⁸ However, because of the higher solubility rate of carbon dioxide in the blood than in the air, although carbon dioxide gas embolism frequently occurs throughout laparoscopic liver surgery, it is not clinically significant.⁸ As a result, the risk of air embolism may be less with the laparoscopic approach than with the open approach because pneumoperitoneum is obtained with carbon dioxide gas rather than air.⁸

In conclusion, this is the first case about laparoscopic anatomical left hepatectomy for intrahepatic bile duct papillary mucinous cystadenoma. And we should pay more attention to the details when performing LH, to avoid HVI. Skillful stitching, experienced surgeons, and smooth cooperation can effectively handle HVI.

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