

Isolated Segment 8 Liver Resection: Experience at Lampang Regional Hospital

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Abstract

Objective: Segment 8 liver lesion is rare, and limited resection of this lesion is difficult to perform because of its location, and parenchyma transection is often needed to obtain the line of ischemic demarcation on liver surface. The aim of this study was to present our experience of segment 8 of liver resection with intraoperative duplex ultrasound guide.

Method: Isolated segment 8 liver resection was performed on four patients with liver tumors between October 2013 and September 2014. The Glissonian pedicle approach at hilum of liver without parenchyma dissection was done, after complete mobilization of right lobe of liver. Transparenchymal ligation of segment 8 portal venous branches, using intraoperative ultrasound guide, was used to accomplish the resection with the kellyclasia technique

Results: There was no perioperative complication and no mortality. The mean transection time was 206 minutes. The average amount of blood loss was 400 mL. Pathological examination showed adequate margin of tumor resection.

Conclusion: Isolated segment 8 liver resection performed with “Glissonian pedicle” approach is safe, and achieved adequate anatomical resection margin. This parenchyma sparing resection is an effective alternative to major hepatectomy.

Keywords: Segment 8 Liver resection, Glissonian pedicle approach

INTRODUCTION

Hepatic resection is the most effective treatment for benign or malignant liver pathology. For malignant tumors, curative treatment must include liver resection. Improvement in operative technique and perioperative care, have improved outcome, decreased morbidity and mortality. With knowledge of hepatic anatomy and increased use of intraoperative ultrasound^{1,2,3}, resection of individual segment or sector is increasingly used. For small lesions, an alternative to extensive hepatectomy is anatomic segmentectomy in selected cases⁴, which can help prevent postoperative liver

failure while providing adequate oncological resection margin.

Segment 8 resection (Couinaud’s classification⁵; or anterosuperior liver segment, according to Healy and Schroy’s classification⁶) is one of the most complicated liver resection procedures. Under the guidance of intraoperative duplex ultrasound, dorsal branch of the right anterior portal vein, right hepatic vein and middle hepatic vein can be defined. Ischemic demarcation can be used during anatomic segment 8 segmentectomy.

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MATERIAL AND METHODS

Between October 2013 and September 2014, four patients with liver tumor located at Couinaud's segment 8 underwent isolated segment 8 of liver resection, based on Glissonian's pedicle approach, without liver dissection, as reported by Couinaud in 1985 and Tagasaki in 1986, at the Department of Surgery, Lampang Regional Hospital. Individual patient data were collected by reviewing each patient's medical record, with consent.

These 4 patients consisted of 1 men and 3 women, with ages ranging from 45 to 59 years (mean $\pm$ SD, 55.25 ± 6.89) and had no underlying disease. All liver lesions were located in Couinaud's segment 8. Preoperative assessment of liver function of all patients were classified as Child-Pugh grade A, and contrast enhance CT scans were carried out. The liver lesion was outlined using the portal and hepatic veins as landmarks for segmental division⁵.

Operative technique

The abdomen was entered via Makuuchi's "J" incision. After standard mobilization, intraoperative ultrasound (BK Medical Flex focus ultrasound scanner 1202 with 5-12 MHz convex, 10-4.3 MHz T-shape probes) was used to define the segmental liver anatomy around the tumor location, and the relation of the tumor to the right and middle hepatic veins, and the anterior branch of the right portal vein.

The gallbladder was removed to expose the hepatic hilum. The cystic plate dissection was done, which then exposed the right anterior Glissonian pedicle. The right anterior pedicle was dissected completely and looped with a rummel tourniquet. Temporary clamping helped confirm the area of the middle segments (S5, S8), while intraoperative duplex ultrasound helped determine the area of segment 8 liver lesion, fed by right anterior segmental branch pedicle. Discoloration demarcation on the liver surface helped define the transection plane along the right

and middle hepatic vein.

Hepatotomy was begun along the ischemic demarcation of the main hepatic fissure, starting from the caudal edge, using CUSA⁷ or kellyclasia, dividing and ligating the right anterior portal branch along the way. An isolated segment 8 could then be demonstrated.

Further liver parenchyma dissection was performed, and bleeding from raw surfaces was controlled by division and ligation, Argon beam coagulation, or diathermy cauterization. Intermittent Pringle's maneuver could be used to control inflow, to limit blood loss during liver transection. After hemostasis was obtained, two closed suction drains were placed and the abdomen closed.

RESULTS

Four patients underwent liver lesion of segment 8, according to Couinaud's classification, whose characteristics are presented in Table 1. Preoperative imagings are shown in Figure 1.

All cases were performed using standard anatomic liver resection of segment 8 (Figure 2), based on extrafascia dissection technique⁸, as described previously. There was no conversion to a major hepatectomy procedure. The operative time ranged from 145 to 270 minutes. The estimated intraoperative blood loss ranged from 300 to 700 ml, no patients required blood transfusion, and no postoperative complication was observed.

Two patients with chronic abscess (pre-operative imaging study had suggested malignancy, with normal tumor marker levels) had single lesions, of size 2.0 cm and 2.2 cm in diameter. One patient had cholangiocarcinoma, of size 7.0 cm in main extent, with capsular involvement but no vascular invasion. One patient with metastatic sigmoid colon cancer had 2 lesions, 8.5 cm in diameter at segment 8, and 1.2 cm in diameter at segment 5. All patients are still alive without recurrence from 18 to 40 months after surgery.

Table 1 Characteristics of patients undergoing S8 segmentectomy

No	Sex (age)	Disease	Operative time (hr)	Blood loss (mL)	Length of stay (days)
1	M (60)	Chronic cholangitis	4.00	300	9
2	F (54)	Chronic abscess	2.25	300	7
3	F (61)	Cholangiocarcinoma	4.30	700	12
4	F (46)	Metastatic colon cancer	2.50	300	6

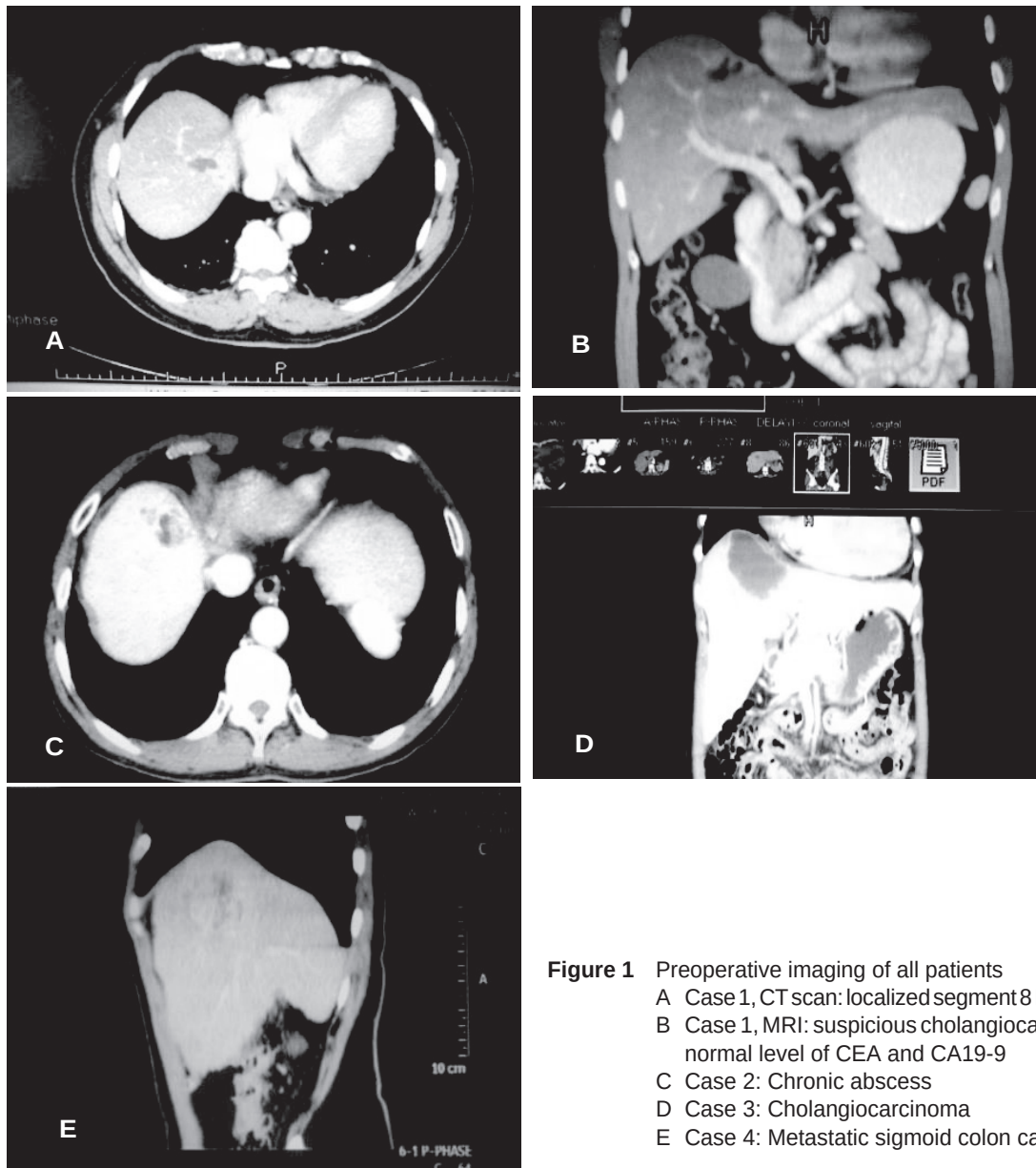


Figure 1 Preoperative imaging of all patients
 A Case 1, CT scan: localized segment 8 IHD dilatation
 B Case 1, MRI: suspicious cholangiocarcinoma with normal level of CEA and CA19-9
 C Case 2: Chronic abscess
 D Case 3: Cholangiocarcinoma
 E Case 4: Metastatic sigmoid colon cancer

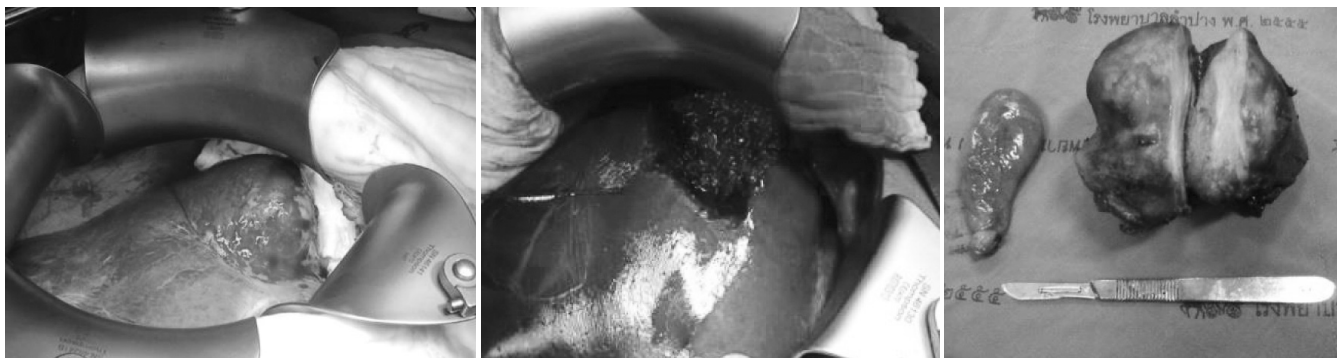


Figure 2 Surgical finding and surgical specimen for segment 8 CCA: Case 3

DISCUSSION

Liver resections are defined according to the International Hepato-Pancreato-Biliary Association terminology and the Brisbane classification⁹. The advantages of liver segmentectomy consist of the conservation of a larger volume of future liver remnant, and fewer postoperative complications than major liver resection¹⁰. Oncologically, anatomic-based segmental resection is likely to achieve a negative margin than wedge resection¹¹.

Traditionally, wedge resection, right anterior segmentectomy and right hepatectomy have been performed for neoplasm limited to segment 8. The right anterior segmentectomy (one-third of the whole liver volume)¹² and right hepatectomy are feasible only for patients with good liver function. For patients with primary liver tumor, who may have cirrhosis or chronic hepatitis, or for patients with secondary liver tumor who also have chronic liver disease, extensive liver resection might not be safe. Surgical resection of segment 8 (anterosuperior subsegment of the right lobe) can be performed by deep wedge parenchyma transection, with the help of intraoperative duplex ultrasound, along the main hepatic fissure, as described. Therefore, patients with tumor located in Couinaud's segment 8 can be treated by this safe technique with less complications while obtaining tumor free margins and preservation of liver tissues.

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บทคัดย่อ **ประสบการณ์การผ่าตัดตับเฉพาะ segment 8 ในโรงพยาบาลลำปาง**
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วัตถุประสงค์: พยาธิสภาพในตำแหน่ง segment 8 ของตับพบได้น้อยมาก และการผ่าตัดทำได้ค่อนข้างยาก เนื่องจากตำแหน่ง segment 8 อยู่ชิดกะบังลม และการกำหนดขอบเขตของการผ่าตัดทำได้ไม่ชัดเจนจากบริเวณผิวของตับ จุดประสงค์ของการผ่าตัดเฉพาะในตำแหน่ง segment 8 โดยการใช้ duplex ultrasound เพื่อที่จะกำหนดขอบเขตของการผ่าตัดโดยใช้ตำแหน่งของหลอดเลือดดำที่ไปเลี้ยงเฉพาะส่วนในแต่ละ segment เพื่อหวังผลที่จะเหลือปริมาณของเนื้อตับหลังการผ่าตัดให้ได้มากที่สุด โดยที่การผ่าตัดจะได้ขอบเขตที่เพียงพอสำหรับการผ่าตัดเนื้องอกโดยเฉพาะมะเร็ง และมีผลแทรกซ้อนจากการผ่าตัดค่อนข้างต่ำ

วิธีการ: ได้ทำการผ่าตัดตับเฉพาะในตำแหน่ง segment 8 ทั้งหมด 4 ราย ช่วงระหว่างเดือนตุลาคม 2556 ถึง เดือนกันยายน 2557 โดยวิธีการ Glissonian pedicle approach โดยไม่มีการตัดผ่านเนื้อตับก่อนเพื่อที่จะคลี่หลอดเลือด (extrahepatic) มีการใช้เครื่อง duplex ultrasound เพื่อจะดูแขนงของหลอดเลือดดำ portal ที่ไปเลี้ยงบริเวณ segment 8 เพื่อกำหนดขอบเขตที่ผิวของตับหลังจากการเลาะเย็บช่องท้องที่หุ้มรอบตับ และผ่าตัดเนื้อตับโดยใช้เข็มจับหลอดเลือดผ่าตัดเอาพยาธิสภาพออก

ผลการศึกษา: ไม่พบมีผลแทรกซ้อนหรือผู้ป่วยเสียชีวิตหลังการผ่าตัด การผ่าตัดใช้เวลาเฉลี่ย 206 นาที มีการเสียเลือดระหว่างการผ่าตัดเฉลี่ย 500 มิลลิลิตร การตรวจชิ้นเนื้อพบว่ามีขอบเขตพยาธิสภาพเพียงพอ มีการตัดออกได้ทั้งหมด

สรุปผลการศึกษา: วิธีการตัดเนื้อตับตำแหน่ง segment 8 โดยวิธี Glissonian pedicle approach เป็นวิธีที่ปลอดภัย และสามารถตัดพยาธิสภาพได้ขอบเขตที่เพียงพอ ซึ่งวิธีการผ่าตัดชนิดนี้เป็นทางเลือกหนึ่งที่ใช้ในกรณีที่ต้องการเหลือเนื้อตับให้ได้มากที่สุดเมื่อเทียบกับการผ่าตัดเดิมที่จะต้องตัดเนื้อตับออกทั้งข้าง
