

## Case Report

### **Acute afferent loop necrosis after Roux-en-Y cholangiojejunostomy**

Daisuke Hashimoto<sup>1</sup>, Tetsumasa Arita<sup>1</sup>, Hideyuki Kuroki<sup>1</sup>, Yutaka Motomura<sup>1</sup>, Shinji Ishikawa<sup>1</sup>, Atsushi Inayoshi<sup>1</sup>, Naoko Udaka<sup>4</sup>, Tadashi Tanoue<sup>2</sup>, Masahiko Hirota<sup>1</sup>, Yasushi Yagi<sup>1</sup> and Hideo Baba<sup>3</sup>.

<sup>1</sup> Department of Surgery and <sup>2</sup> Department of Anesthesia, Kumamoto Regional Medical Center, 5-16-10 Honjo, Kumamoto 860-0811, Japan.

<sup>3</sup> Department of Gastroenterological Surgery and <sup>4</sup> Department of Pathology and Experimental Medicine, Kumamoto University Graduate School of Medical Sciences, 1-1-1 Honjo, Kumamoto 860-8556, Japan.

Correspondence to:

Hideo Baba, MD PhD

Department of Gastroenterological Surgery, Kumamoto University Graduate School of Medical Sciences

1-1-1 Honjo, Kumamoto-city, 860-8556 JAPAN

Tel: 81-96-373-5213 Fax: 81-96-371-4378

E-mail: hdobaba@kumamoto-u.ac.jp

## **Abstract**

Afferent loop necrosis after Roux-en-Y cholangiojejunostomy biliary reconstruction is rare. We present a 36-year-old woman with acute necrotic afferent loop obstruction. The peripheral area of the Roux-en-Y limb, including the cholangiojejunostomy portion, was twisted just proximal to the cholangiojejunostomy. Cholangiojejunostomy was completely separated due to necrosis of the Roux-en-Y jejunum. In addition to the case report, we discuss features of cholangiojejunostomy that require special attention.

**Key Words:** Afferent loop necrosis, cholangiojejunostomy, Roux-en-Y reconstruction

## **Introduction**

Afferent loop syndrome is a rare complication after Roux-en-Y reconstruction [1-5].

We report a patient who developed acute necrotic afferent loop obstruction, 8 months after Roux-en-Y cholangiojejunostomy. The biliary reconstruction was performed after extended left lobectomy of the liver for intrahepatic cholelithiasis.

## **Case Report**

A 36-year-old woman was admitted to our hospital with an 8-h history of acute epigastric pain and nausea. She had undergone left lobectomy of the liver and resection of the extrahepatic bile duct for intrahepatic cholelithiasis 8 months ago in another hospital. Plain computed tomography (CT) at admission showed ascites and localized dilatation of the intestine. There was no dilatation of the intrahepatic bile duct. Dilatation of the distal part of the Roux-en-Y limb from the hepatic hilum was shown (Fig. 1a). There was a caliber change in the Roux-en-Y limb at the hepatic hilum. We did not perform enhanced CT; therefore, we could not see correctly whether the dilated intestine was necrotic. However, CT did not show any sign of ischemia, such as edema of the intestinal wall and mesentery. White blood cell (WBC) count, total bilirubin, and C-reactive protein (CRP) were 5,600/ $\mu$ L, 0.8 mg/dL, and 0.1 mg/dL, respectively. Adhesive ileus was suspected, and nasogastric decompression was performed. On the next day, her symptoms were exaggerated, and signs of sepsis and hepatobiliary dysfunction developed. Creatine kinase (CK) level was normal (119 IU/L). However, WBC count decreased to 1,900 / $\mu$ L, and total bilirubin and CRP were elevated to 2.6 mg/dL and 13.3 mg/dL, respectively. Hence, we decided to carry out an emergency operation.

Laparotomy revealed that biliary reconstruction was done by retro-colic Roux-en-Y cholangiojejunostomy at the first operation (Fig. 2a). The length of the afferent loop was about 80 cm. Twenty centimeters of the Roux-en-Y limb, from the peripheral stump to the cholangiojejunostomy portion, was necrotic due to torsion of 360° (Fig. 2a). Cholangiojejunostomy was completely torn down (Fig. 1b and c). There was no strand around the twisted portion. Pan-peritonitis with contaminated ascites was induced. The necrotic portion of the Roux-en-Y limb was resected (Fig. 2b). The hilar bile duct was not necrotic. There was no apparent remaining stone. Cholangiojejunostomy was re-performed in an ante-colic fashion to avoid adhesional stenosis at the mesentery of the transverse colon (Fig. 2c).

Microscopic examination revealed that the intestinal wall, including the cholangiojejunostomy portion, was totally necrotic, with hemorrhage (hemorrhagic infarction) (Fig. 1d). Disappearance of the mucosa, edema of the submucosal layer, and congestion and hemorrhage of the entire intestinal wall were observed. Suppurative peritonitis was observed in the intestinal serosa.

According to the size of the hole caused by previous cholangiojejunostomy in the resected Roux-en-Y limb, the absence of biliary dilatation upon preoperative CT, and the absence of jaundice at admission, stenosis of the cholangiojejunostomy seemed to be absent. She had no postoperative complications and was discharged 12 days after the emergency operation.

## **Discussion**

Acute afferent loop necrosis is a rare sequel of Roux-en-Y reconstruction [1-5]. In our case, the peripheral part of the Roux-en-Y limb, including the cholangiojejunostomy

portion, was twisted just proximal to the cholangiojejunostomy.

Cholangiojejunostomy was completely separated due to necrosis of the Roux-en-Y jejunum. As far as we are aware, no such cases have been reported. Since our case was complicated with complete separation of the cholangiojejunostomy, the clinical features were rather unusual. Although we could not reach a precise diagnosis preoperatively, careful evaluation of imaging studies and knowledge of the possible separation of the cholangiojejunostomy might help with the correct diagnosis.

Usually, afferent loop obstruction is a chronic complication, and its diagnosis is difficult [4, 6-9]. Along with imaging techniques, such as CT and ultrasonography, clinical history has been reported to aid in the preoperative diagnosis of acute afferent loop necrosis [6, 7, 10]. A variety of factors, including adhesion, kinking and angulation of the loop, stenosis of the gastrojejunal anastomosis, and internal herniation, have been reported to contribute to the development of afferent loop obstruction [5]. Ohbatake et al. [3] have described two pediatric cases of acute afferent loop necrosis due to internal hernia after ante-colic Roux-en-Y reconstruction for congenital biliary dilatation. They have pointed out that closure of the space between the afferent loop and transverse mesentery, and appropriate afferent loop length, are important to prevent acute afferent loop obstruction.

Although the mechanism of the torsion of the afferent loop in our case was unclear, we considered that the length of the afferent loop, especially between the jejunal stump and cholangiojejunostomy portion (20 cm), might have been too long. There was no strand around the twisted portion. No other additional possible causes were found in our case. Al-Ghnam et al have reported that there was no afferent loop obstruction or necrosis as a long-term postoperative complication of Roux-en-Y

cholangiojejunostomy [11]. They divided the jejunum at 10–20 cm from the ligament of Treitz and brought the distal end in a retro-colic position as an afferent loop (70 cm in length). Cholangiojejunostomy was placed 10 cm from the stump [11]. Decisions about the appropriate length of the afferent loop are rather difficult. However, the length between the peripheral stump of the Roux-en-Y limb and the cholangiojejunostomy should not be too long, around 10 cm.

Acute afferent loop necrosis is a serious complication with sudden onset and acute course. Complete separation of the cholangiojejunostomy can occur even at 8 months after the operation if Roux-en-Y limb necrosis is present. Although this kind of sequela is rare, we have to keep in mind that separation of cholangiojejunostomy can take place in cases of Roux-en-Y limb necrosis.

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## Figure legends

Figure.1 (a) Plain computed tomography at admission. White arrow head; a localized dilatation of the Roux-en-Y limb, white arrow; ascites. (b) Abdominal finding at the second operation. Two catheters (white arrows) were inserted to anterior segmental branch and posterior segmental branch of the bile duct. (c) Macroscopic finding of the resected Roux-en-Y limb. White arrow; cholangiojejunostomy portion, gray arrow; proximal part of the intestine, black arrow; stump of the necrotic Roux-en-Y limb. (d) H-E staining of the resected afferent loop. White arrow; cholangiojejunostomy portion, gray arrow; proximal normal portion of the Roux-en-Y limb, black arrow; peripheral portion (stump) of the Roux-en-Y limb.

Figure.2 Illustrations of the operative findings. (a) Findings at the second operation. Biliary reconstruction with retro-colic Roux-en-Y cholangiojejunostomy was done at the first operation. Twenty centimeters of peripheral portion of the Roux-en-Y limb was necrotic due to torsion at the cholangiojejunostomy. Cholangiojejunostomy was completely separated (arrows). (b) The necrotic intestine was transected along the dotted arrow line. ★; a new stump of the Roux-en-Y limb. (c) Ante-colic cholangiojejunostomy was performed at the second operation.