OUTCOMES OF RETRO COLIC RETRO PYLORIC ROUX EN Y HEPATICOJEJUNOSTOMY IN BILIARY RECONSTRUCTION

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ABSTRACT

OBJECTIVES

To assess the effectiveness of retro pyloric Roux-En-Y Hepaticojejunostomy in cases of choledochal cysts and bile duct injuries to reduce complications, such as delayed gastric emptying and acute cholangitis.

METHODOLOGY

This retrospective cohort study was conducted in the surgical C unit of Hayatabad Medical Complex, Peshawar (January 2019 - December 2022). This study included 37 patients treated for bile duct injuries and choledochal cysts. All patients had an ASA III or above, aged 5 to 36 years. Amongst the 35 patients, 21 patients underwent surgery for choledochal cysts, while 14 patients were treated for bile duct injuries. Patients with type 1choledochal cysts were admitted through OPD after getting diagnosed by ultrasound abdomen and, in some cases, MRCP.

RESULTS

Out of 36 patients, 23 (63.71%) presented with type I choledochal cysts, while 14 (40%) exhibited bile duct injuries (BDI). Among the 14 BDI cases, 57.14% underwent open cholecystectomy, 42.85% underwent laparoscopic cholecystectomy, and 5.71% received immediate repair during the primary surgery. Conversely, 8.57% of patients with CBD ligation underwent exploration on the 3rd postoperative day upon early detection of the injury. Among the patients diagnosed with BDI after the 7th postoperative day, 25.71% underwent delayed repair at three months. Postoperatively, patients were authorized for fluid consumption within 24-48 hours. Moreover, 4 (11.42%) patients developed a fever of approximately 100°F, managed with intravenous Paracetamol in 2 (5.71%) cases. Patients also presented with subsequent wound infections, which were treated on an outpatient basis through oral antibiotics and wound dressing.

CONCLUSION

The Retropyloric Roux-en-Y hepaticojejunostomy is a modified biliary reconstruction procedure with minimal morbidity and better outcomes than traditional methods. It reduces complications like delayed gastric emptying and acute cholangitis. We recommend its frequent use for biliary reconstruction when appropriate.

KEYWORDS: *Roux en Y hepaticojejunostomy, Hepatobiliary Surgery, Enterobiliary anastomosis, Bile Duct Injuries, Choledochal CYST*

INTRODUCTION

Roux-en-y hepaticojejunostomy (HJ) is a standard procedure for the management of benign as well as malignant hepatobiliary conditions.[1] In this technique, the enterobiliary anastomosis is done in a retrocolic and antegastric manner. Despite being a commonly performed surgery, its association with a wide array of complications is compelling surgeons to evolve newer techniques with better outcomes. These complications include reflux cholangitis, biliary leak, delayed gastric emptying (DGE), and biliary strictures.[2,3,4,5,6,7,8,9,10] Retropyloric Roux en Y hepaticojejunostomy is a conventional procedure modification; the enterobiliary anastomosis is done posterior to the gastric antrum through the lesser sac. This not only makes it secure and decreases the incidence of disruption but it has also been observed to be protected from damage in patients who underwent subsequent abdominal surgeries for other pathologies.[11] DGE is one of the leading causes of postoperative morbidity in patients undergoing conventional ante-gastric HJ, attributable to the pressure caused by the roux loop on the duodenum and antrum.[12] Placing this loop posterior to the gastric antrum in the modified technique has led to a sufficient decrease in its occurrence and better patient satisfaction.[11,12,13] It has also been proven to be the preferred technique in obese patients in whom the

mesentery is usually short with abnormal vasculature.[13] A traditional antegrade anastomosis in such patients puts undue pressure on the new anastomosis, making it prone to leak and disruption. These patients also have a pachyntic pylorus; placing an anastomosis anterior to it not only makes it very difficult for the surgeon but also increases the chances of postoperative reflux cholangitis.[12,13] However, despite the possible benefits and some studies indicating positive outcomes regarding this approach's applicability, surgeons have not extensively implemented it. There is still a lack of substantial clinical evidence comparing this method with the standard technique for this specific group of patients with necessary attributable differences and for various types of hepatobiliary disease. The conclusion drawn from this review is the urgency of the occurrence of further clinical trials aimed to prove the effectiveness of retro pyloric Roux-en-Y hepaticojejunostomy. In this context, we intend to fill this gap by reporting the contents of a detailed, comprehensive, large-scale retrospective study that addresses the outcomes of retrocolic retropyloric Roux-en-Y hepaticojejunostomy in patients with specific bile duct injuries and choledochal cysts.

METHODOLOGY

This retrospective cohort study was conducted in the surgical C unit of Hayatabad Medical Complex, Peshawar, from January 2019 to December 2022. A total of 35 patients who underwent retropyloric rouxen y hepaticojejunostomy for bile duct injuries and choledochal cysts were included in the study. The sample size in this study was not determined through formal calculation, but rather, it was based on the availability of cases meeting the above criteria over the study period. Despite the small sample size, it represents all patients who received this procedure at our center in the study period. Amongst the 35 patients, 21 patients underwent surgery for choledochal cysts, while 14 patients were treated for bile duct injuries. All the patients included in the study had an ASA III or above. Patients with choledochal cysts were admitted through OPD after getting diagnosed by ultrasound of the abdomen and, in some cases, MRCP. Only patients with type I cysts were subject to this repair. The patients varied from the age of 5 to 36 years. Bile duct injuries repaired using the retro pyloric hepaticojejunostomy underwent cholecystectomy in our hospital (05) or were referred from the periphery (09). Amongst these, eight patients had undergone open cholecystectomy, while 06 patients had undergone laparoscopic cholecystectomy. All of these injuries were either tied or transected at the level of the common hepatic duct. Most of them were repaired at a delay of 3 months. However, two patients underwent repair in the primary surgery after detecting the table injury. Three patients in whom the CBD was ligated or transected and detected in the early post-op period were repaired on 3rd post-op day. Patients with complex biliary injuries were excluded from the study. The surgery was performed by a single surgeon skilled in hepatobiliary surgeries to exclude operator bias. In the choledochal cyst, after excising the primary lesion, the roux loop of jejunum was brought to the common hepatic duct through the lesser sac posterior to the transverse colon and gastric antrum. Enterobiliary anastomosis was done using Vicryl 4-0 in a single-layer, interrupted manner. The same procedure was followed in bile duct injury patients after trimming the hepatic duct and suctioning and washing the hepatobiliary bed off the bile fluid. A subhepatic drain was placed in all patients and removed on the 2nd POD. Most of the patients were orally allowed at 24-48 hours. They were followed up on one week, one month, and subsequently, six month of discharge. Statistical analysis was carried out using IBM SPSS 23.0. $P \leq 0.05$ was considered statistically significant.

Figure 1: Window in the Transverse Mesocolon

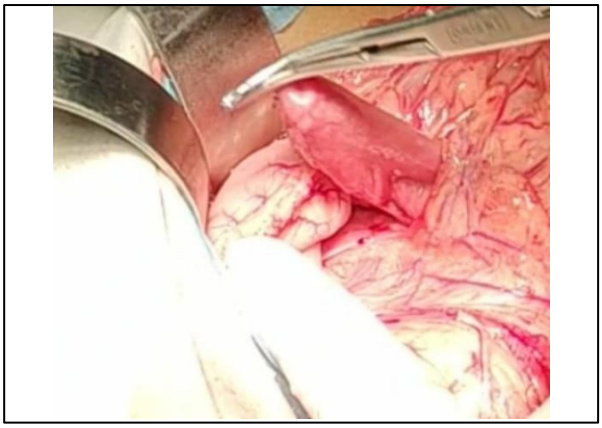

Figure 2: Roux Loop through Transverse Mesocolon Opening

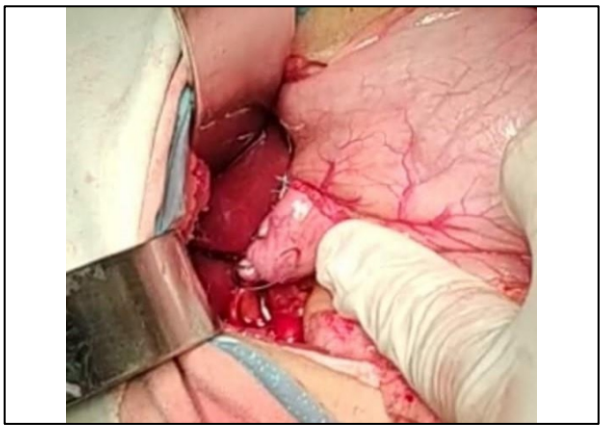

Figure 3: Retropyloric Window

Figured: Ready to be Anastomose with Hepatic Duct

RESULTS

This retrospective study is based on 37 patients who underwent retro pyloric hepaticojejunostomy, including 24 (64.86%) female and 13 (35.13%) male patients. 23 (62.16%) patients had type I choledochal cysts, while 14 (37.83%) patients had bile duct injuries. Amongst the 14 patients with BDI, 08 (57.14%) underwent open cholecystectomy, while 06 (42.85%) patients had undergone laparoscopic cholecystectomy. 02 (14.28%) patients were repaired on the table during the primary surgery, while 3 (21.42%) patients with their CBD ligated were explored on 3rd post-op day after early injury detection. The rest of the 09 (64.28%) patients who were diagnosed with BDI after the 7th post-op day were subject to delayed repair at three months. Postoperatively, patients were allowed for fluid consumption within 24-48 hours. 04 (10.81%) patients had a fever of about 100F, which was treated with I.V. Paracetamol. 02 (5.40%) patients presented with subsequent wound infection, managed on an outpatient basis with oral antibiotics and wound dressing.

Table 1: Demographic of the Study Population

Characteristics	Frequency	%age
Gender		
Female	24	64.86
Male	13	35.13
Etiology		
Type1 choledochal cyst	23	62.16
BDI	14	37.83
BDI (n=14)		
Open cholecystectomy	08	57.14
Lap cholecystectomy	06	42.85
On table repair	02	14.28
Repair on 3rd post-op day	03	21.42

Table 2: Postoperative Complications

Complication	Frequency	%age
Fever	04	10.81
Wound infection	02	5.40
Delayed gastric emptying	01	2.7
Acute cholangitis	01	2.7

Delayed gastric emptying was reported in only 1 (2.70%) patient. 1(2.70%) patient was admitted with acute cholangitis, which was conservatively managed with I.V. antibiotics and analgesics. None of our patients had bile leakage or suffered from chronic cholangitis. Our follow-up time was six months, which is too limited to document any occurrence of anastomotic stricture; however, over the four years of our study, none of our patients have returned with a stricture requiring revision surgery.

DISCUSSION

Retrocolic retropyloric roux en Y hepaticojejunostomy is a newly evolved technique with limited application by surgeons, primarily due to a lack of awareness. In conventional rouxen y hepaticojejunostomy, the proximal jejunal loop is placed in an anti-C shape, facilitating reflux of proximal jejunal contents into the distal jejunum and subsequently the bile duct, making the patient prone to reflux cholangitis. In retrocolic retropyloric hepaticojejunostomy, the jejunum is anastomosed in a straight line to the hepatic duct, decreasing the chances of reflux cholangitis in these patients.[12] In our study, over a follow-up period of 6 months, only one patient (2.85%) reported acute cholangitis, which was treated conservatively. No patients were reported to suffer from chronic cholangitis. This can be compared to an extensive study by Xin Wei et al., who reported that only two patients (3.4%) suffered from acute cholangitis, and one patient (1.7%) had chronic cholangitis in patients undergoing the modified technique.[15] However, the incidence was much higher in the control group, with 14 (7.7%) patients suffering from acute cholangitis and 10 (5.3%) suffering from chronic cholangitis. In another

preliminary study that was also published by Xin Wei et al. in 2012 on only 38 patients, only one patient (2.6%) presented with acute cholangitis as compared to the control group who had an incidence of 8 (7.6%) patients.[16] While constructing the roux loop, transecting the jejunum leads to an interruption in the electric activity of the gut to the extent that it may sometimes lead to reverse peristalsis.[14] In such instances, placing the roux loop anterior to the pylorus, which is already under pressure due to the loaded colon and gastric antrum, contributes to delayed gastric emptying, another grave long-term complication in such patients.[12.] Placing the roux loop posterior to the pylorus relieves the pressure, decreasing the incidence of delayed gastric emptying.[11,12,13] Only one patient (2.85%) in our study has been diagnosed with delayed gastric emptying. It is again very comparable to both the studies performed by Xin Wei in which he recorded one patient (2.6% and 1.7% respect.) to be suffering from delayed gastric emptying as compared to patients undergoing conventional roux en y hepaticojejunostomy, i.e., 12.4% and 10.7% respec.[15,16] Reoperating a patient for any abdominal surgery carries with it the significant risk of bowel perforation and avulsion of any previous repair done during adhenolysis. Placing the bilioenteric anastomosis posterior to the pylorus safeguards it from any iatrogenic injuries during subsequent surgeries.[17,18] One of our patients' who was initially managed in the periphery for bile duct injury, presented to us with a failed primary repair of the CBD and was subject to the retro colic retro pyloric hepaticojejunostomy at our setup. This patient was reopened within 24 hours for a staple line hematoma in the entero enteric anastomosis. Due to recurrent surgeries, the patient later on developed an incisional hernia. On operating the patient for hernia, while adhenolysis was done, it was observed that our biliary enteric anastomosis was lying intact and undisturbed posterior to the pylorus, which would otherwise have been under significant risk of avulsion had it been anterior to the pylorus. Further research can enhance evidential power by conducting prospective, multicenter randomized controlled trials for retrocolic retropyloric Roux-en-Y hepaticojejunostomy vs conventional approaches. Long-term follow-up care is crucial as it helps determine the extent of surgical benefits and the occurrence of late complications.

LIMITATIONS

This study, though practical, has several limitations. The retrospective approach cannot help establishing cause and effect, and regarding the latter, the sample size may not be adequate to reach such conclusions widely. Performed at a single tertiary center, the study's outcomes might have many limitations in terms of external validity. Furthermore, it is impossible to evaluate some late negative consequences, such as biliary strictures or recurrent cholangitis after surgical treatment, due to a lack of long-term follow-up data.

CONCLUSIONS

Retropyloric Roux en Y hepaticojejunostomy is a modification of the conventional hepaticojejunostomy done for various hepatobiliary conditions, having minimal morbidity and better outcomes. DGE and acute cholangitis are some of the most common and impactful complications of traditional methods, and they are significantly lessened if done in the retropyloric plane. We recommend its frequent utilization for biliary reconstruction whenever deemed appropriate based on our outcomes.

CONFLICT OF INTEREST: None

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