

## Causes of Reintervention of Biliary-Digestive Derivation at UMAE HE 71 from 2015 to 2020

Giovanna Osorno-Carbonell<sup>1</sup>, Susana G. Belmares<sup>2</sup>

<sup>1</sup>Digestive and Endocrine Surgery Service, UMAE 71 IMSS, Torreón, Coahuila, Mexico.

<sup>2</sup>General Surgery Service, HGZ 1 IMSS, Tijuana, Baja California, Mexico.

### ABSTRACT

**Objective:** Describe the causes of biliodigestive bypass reoperation in our center.

**Material and methods.** Retrospective, descriptive and observational study.

**Results.** A total of 64 records were reviewed. 53.1% of the patients underwent reintervention after biliodigestive bypass surgery, in some cases on more than one occasion to the same patient, thus making a total of 61 biliodigestive bypass reintervention surgeries. in unity. The most frequent causes for reintervention were stenosis with a frequency of 70.4%, lithiasis 22.9%, anastomotic dehiscence 4.9% and bilioma 1.6%. In patients who had a diagnosis of stenosis in their first reoperation, it was associated with subsequent reinterventions being for the same diagnosis, with a value of  $p = 0.087$ .

**Conclusions.** Any attempt at bile duct repair by inexperienced surgeons or in non-specialized centers should be avoided, in addition to early referral of patients. Avoid instrumentation before bile duct reconstruction due to its possible complications. The surgical technique of hepaticojejunostomy is essential for reducing postoperative complications and better long-term results.

**KEYWORDS:** Biliar Diversions- Hepaticojejunostomy- Biliary duct injuries- complications

### ARTICLE DETAILS

**Published On:**

**18 October 2024**

**Available on:**

<https://ijmscr.org/>

### INTRODUCTION

Biliary diversion (BD) is a procedure used to ensure the continuous flow of bile into the digestive tract to redirect or eliminate the causal problem of its interruption. The main etiology for performing this procedure is bile duct injuries, with cholecystectomy being a primary factor in the genesis of such injuries, making it one of the most commonly performed procedures worldwide.

Factors associated with greater success in this surgical intervention include the degree of bile duct dilation, type of biliary diversion anastomosis, and degree of vascularization, among others. Considering the complications arising from this procedure, it can be noted that up to 49% of anastomotic stenoses occur within the first year following surgery, and 98% by three years, emphasizing the need for prolonged follow-up.

The present study aims to describe the characteristics of patients in our population undergoing biliary diversion and to establish the causes of their reintervention.

### BILIARY DIVERSIONS

Biliary diversions are defined as the surgical establishment of a shunt between a portion of the biliary tree and the digestive tract, particularly with the duodenum or jejunum. (1)

The most common reasons for performing them are non-malignant disease (48%), malignant diseases (37%), iatrogenic injury to the bile duct (IBDI) (10%), congenital biliary anomaly (2.5%), and benign neoplasms (2.3%).

Definitive repair remains the cornerstone of treatment for biliary pathology. However, even in a high-volume biliary surgery center with extensive experience, the incidence of stenosis after repair surgery still reaches 10-20% (2). Evidence has shown that the success of biliary repair surgery is based on the accuracy of the preoperative evaluation of the type of injury and selection of the surgical repair procedure (3).

There are multiple interventions applicable to the management of the biliary system, which have evolved over time.

## **Causes of Reintervention of Biliary-Digestive Derivation at UMAE HE 71 from 2015 to 2020**

### **COMPLICATIONS OF BILIARY DIVERSION**

Surgical management of the biliary system is associated with multiple comorbidities that sometimes require lifelong management, such as bile leaks, sepsis, cholangitis, bleeding, anastomotic stenosis, biliary cirrhosis with portal hypertension, and end-stage liver disease (4).

Kadaba in 2017 reported in a retrospective study of 466 patients undergoing hepatoduodenostomy or choledochoduodenostomy, a perioperative mortality rate at 30 days of 6.5%, bile leak in 3.7%, and anastomotic stenosis (at 12 months) in 3.7%. (5)

### **FACTORS ASSOCIATED WITH COMPLICATIONS OF BILIARY DIVERSIONS**

The associated factors described in the literature can be divided into general factors related to biliary diversion and surgical technique, and specific factors primarily concerning leaks and stenosis.

Zafar SN et al. (2011) noted that there are few studies demonstrating the factors associated with the occurrence of complications; among them, patient age, nutritional status, preoperative serum bilirubin levels, associated chronic liver disease, the nature and extent of the primary disease, and the type of anastomosis performed have been proposed as factors influencing the occurrence of complications related to BDs (7).

A relevant factor concerning the surgical moment to reduce complications associated with stenosis is that biliary-enteric anastomoses should be performed without tension and fundamentally mucosa-to-mucosa (biliary to intestine). The absence of ischemia in the anastomosed bile duct is of utmost importance (8). In 61% of failures in primary hepaticojejunostomy repairs, there is a vascular injury, which is more common the higher the injury (9).

### **MATERIALS AND METHODS**

This was a retrospective, descriptive, and observational study evaluating clinical records of patients who underwent biliary diversion at UMAE HE 71 during the period from 2015 to 2020. SPSS V25.0 software was employed for statistical analysis, using descriptive statistics; qualitative variables were expressed in frequencies and percentages. Normality of distribution was tested using Levene's test, and based on this, numerical variables were expressed as mean  $\pm$  standard deviation or median, mode, and interquartile range. The association between nutritional status and the presence of complications was evaluated using the Chi-square test or Fisher's exact test, determining odds ratios and 95% confidence intervals. A value of  $P < 0.05$  was considered significant.

### **RESULTS**

In the present study, 64 clinical records of patients who underwent biliary diversion in the general surgery service at UMAE HE No 71 from 2015 to 2020 were reviewed.

The majority of cases were female (79.7%, 51) compared to males (20.3%, 13), as shown in Figure 1. The largest age group was patients aged 46-50 years (31.3%), followed by the 36-45 year age group (23.4%).

The diagnosis with the highest proportion of cases in both female and male patients was bile duct injury, with 39 and 7 patients, respectively. Regarding comorbidities, 2 patients had type 2 diabetes mellitus, 4 had systemic arterial hypertension, and 4 had both. 53.1% of patients underwent reintervention after biliary diversion surgery (34/64), with some patients undergoing more than one reintervention, resulting in a total of 61 reintervention surgeries in the unit. The most common causes for reintervention were stenosis (70.4%, 43/61), lithiasis (22.9%, 14/61), anastomotic dehiscence (4.9%, 3/61), and bilioma (1.6%, 1/61). The maximum number of reinterventions in a patient was 7 surgeries due to biliary diversion stenosis. No statistically significant relevance was found between nutritional status, referral time, and previous intervention regarding the incidence of reintervention after diversion.

The mean number of reinterventions due to biliary diversion stenosis was 2 surgeries. The largest proportion of patients who underwent biliary diversion and subsequently required reintervention for stenosis needed between 2 and 5 reinterventions, with an atypical case requiring 7 surgeries. In contrast, patients who did not have biliary diversion stenosis as an initial complication and whose first reintervention was for other causes, such as anastomotic dehiscence, required a lower number of reinterventions, with a mean of 0 compared to patients who had stenosis.

In patients whose first reintervention was due to stenosis, it was associated with subsequent reinterventions being for the same diagnosis; according to the Chi-square test, a value of  $p = 0.087$  was obtained.

### **DISCUSSION**

In this study, it was found that in our setting, bile duct injuries represent the most common indication for biliary diversion, with a total of 46 patients. Regarding referral time and its relation to stenosis of the diversion, our study reports that although the largest proportion of patients (90%) were referred after 6 weeks, no difference was found with those referred earlier, which contrasts with the findings of AbdelRafae (9), who stated that a referral time greater than 3 months increased the risk of diversion stenosis. Hepatojejunostomy was found to be the procedure of choice for performing biliary diversions, which aligns with literature reporting it as the ideal repair for bile duct injury following cholecystectomy, offering the best long-term results (11).

In terms of epidemiological factors, the majority of cases were female (79.7%), consistent with studies published by Stewart, AbdelRafae, Hart, and Tocci (12, 10, 13, 14).

The most common cause for reintervention was stenosis of the hepatojejunostomy following biliary diversion, with a frequency of 70.4%. A single-institution retrospective

## Causes of Reintervention of Biliary-Digestive Derivation at UMAE HE 71 from 2015 to 2020

analysis of 45 patients undergoing reconstruction after bile duct injury reported a bile duct stenosis rate of less than 5% over 4 years (1).

Our hospital, being a referral center for 4 states in the country with extensive experience in managing biliary disorders, observed that in 10.9% of cases, patients had undergone previous interventions at non-specialized centers before their referral. As a result, a significant number of patients requiring complicated reconstructions or multiple previous repair attempts were included, which may underestimate the overall success rate, with 53.1% of patients requiring reintervention surgery.

Comprehensive and accurate evaluation of surgical outcomes or any intervention requires a minimum follow-up of 5 years, but likely longer (6); this parameter was not planned in the study, but it presented as a finding during record review since the majority of reintervention cases were from patients who had their first surgery between 2015 and 2017, now with a follow-up of 5 to 7 years.

### CONCLUSIONS

According to our results, we corroborate that it is essential to avoid any attempts at bile duct repair by inexperienced surgeons or at non-specialized centers, as well as to refer these patients early to prevent reinterventions that favor inflammation and subsequent stenosis of the bile duct.

The sources of bias in our study may include the absence of information regarding details of the anastomosis procedure, the height or length of the anastomotic openings, associated vascular damage, factors that were not assessed but are important in performing any anastomosis; the loss of length of the bile duct.

### ACKNOWLEDGMENTS

To the patients who are part of our Institute for being key in our professional growth.

### FUNDING

“The authors declare that they received no funding for this study.”

### CONFLICT OF INTEREST

“The authors declare no conflicts of interest.”

### REFERENCE

- I. De Santibanes E, Ardiles V. Complex bile duct injuries: management. *HPB Oxford* 2008; 10 (1): 4-12
- II. Yang YL, Zhang C, Zhang HW, Wu P, Ma YF, Lin MJ, et. al. Common bile duct injury by fibrin glue: Report of a rare complication. *World J Gastroenterol.* 2015; 21:2854-2857
- III. Dong J, Feng X, Duan W. Steping into the segment era of biliary surgery. *Chinese Journal of Digestive Surgery.* 2017; 16:341-344.
- IV. Mercado MA et al. Lesión iatrógena de la vía biliar. Experiencia en la reconstrucción en 180 pacientes. *Rev Gastroenterol Mex.* 2002; 67(4):245-249.
- V. Kadaba RS et al. Complications of biliary-enteric anastomoses. *Ann R Coll Surg Engl.* 2017; 99 (3) :210-215.
- VI. Strasberg SM, Hertl M, Soper NJ. An analysis of the problem of biliary injury during laparoscopic cholecystectomy. *J Am Coll Surg.* 1995; 180(1):101-125.
- VII. Flores K, Lope M. Derivaciones biliodigestivas y el manejo de sus complicaciones, realizadas a los pacientes con patologías biliares atendidos en el servicio de Cirugía del Hospital Alemán Nicaragüense de Enero 2013 a Noviembre del 2015. (tesis monográfica, para obtener el grado de especialista en Cirugía General en internet) En la UNIVERSIDAD NACIONAL AUTONOMA DE NICARAGUA 2016 (Citado el 20 de enero del 2023) recuperado a partir de: <https://repositorio.unan.edu.ni/726/1/72211.pdf>.
- VIII. De Santibanes E, Ardiles V. Complex bile duct injuries: management. *HPB Oxford* 2008; 10 (1): 4-12
- IX. Murr MM, Gigot JF, Nagorney DM, Harmsen WS, Ilstrup DM, Farnell MB; Long-term results of biliary reconstruction after laparoscopic bile duct injuries: *Arch Surg,* 1995; 134:604-10
- X. AbdelRafee A, El-Shobari M, Askar W, Sultan A, El Nakeeb A; Long-Term Follow-up of 120 Patients after Hepaticojejunostomy for Treatment of Post-Cholecystectomy Bile Duct Injuries.; *International J Surg,* 2015; 18:205-210
- XI. Sicklick J et al. Surgical management of bile duct injuries sustained during laparoscopic cholecystectomy. *Ann Surg.* 2005; 241 (5): 786-795
- XII. Stewart L. Iatrogenic biliary injuries: identification, classification, and management. *Surg Clin North Am.* 2014; 94(2):297-310
- XIII. Hart RS, Passi RB, Wall WJ. Long-term outcome after repair of major bile duct injury created during laparoscopic cholecystectomy. *HPB* 2000; 2 (3): 325-332.
- XIV. Tocci A, Costa G, Lepre L, et al. The long-term outcome of hepaticojejunostomy in the treatment of benign bile duct strictures. *Ann Surg.* 1996; 224 (2): 162.