International Journal of Medical Science and Clinical Research Studies

ISSN(print): 2767-8326, ISSN(online): 2767-8342

Volume 02 Issue 12 December 2022

Page No: 1572-1582

DOI: https://doi.org/10.47191/ijmscrs/v2-i12-35, Impact Factor: 5.365

Half-Life of Hepaticojejunal Anastomosis of First Time Performed in the Umae 25 in Patients with Bile Tract Lesion

Dr. Adrián Aguilar Izaguirre[1], Dr. Jiménez Caprielova Yuri[1], Dr. José Francisco Rodríguez Salinas[1], Dr. Samuel Rodrigo Gómez Arenas[1], Dr. Yamir Ahmed Nacud Bezies[1], Dra. Grecia Palma Perales[2]

[1]General Surgery Department, Centro Médico Nacional del Noreste IMSS 25 Nuevo León, Mexico

[2]Hospital general de zona 6, San Nicolás de los Garza, Nuevo León

ABSTRACT

Theoretical Framework: Bile duct lesions are an infrequent pathology, occur in 0.2-4% of biliary surgeries and can have an important impact on the postsurgical evolution of the patient with bile duct pathology, in many cases it may represent greater severity than the primary condition reason for the surgical procedure; Hepaticojejunanastomosis is the surgery of choice however studies establish a limited half-life with high probability of reoperation.

Objective: To estimate the half-life of hepatitcoyunoanastomosis first performed in the UMAE 25 of the IMSS in patients with bile duct lesions.

Conclusions: The design of strategies in the repair of the bile duct requires institutional support according to the conditions of patients suffering from bile duct conditions, where the prevention of these conditions is based on an adequate mastery of biliary anatomy by the surgical team, as well as a good surgical technique, with the firm decision to convert to open surgery when laparoscopic surgery is not possible to identify the anatomical structures or failing that, the immediate transfer to a specialized center if required, positively influencing the evolution of the patient, reducing complications and ultimately mortality.

ARTICLE DETAILS

Published On:
23 December 2022

Available on:
https://ijmscr.org/

THEORETICAL FRAMEWORK

The biliary system is a system consisting of bile ducts, gallbladder and associated organs, whose main function is the production, storage, transport and drainage of bile, which is an indispensable component in the absorption and emulsification of fats. [1]

The liver produces about 500-600 ml per day of bile, a substance isoosmotic with respect to plasma which is composed mainly of water and electrolytes, but is also composed of organic compounds: bile salts, phospholipids (lecithin), cholesterol, bilirubin (degradation product of the heme group of hemoglobin, which gives the yellowish-green coloration to bile), and some proteins that regulategastrointestinal function. [2]

Bile salts are the main organic component of bile; The liver uses active transport to secrete bile salts into the canaliculus, which is the cleft present between adjacent hepatocytes. Canalicular transport is the limiting step in bile synthesis. Once secreted, bile salts attract other components of bile (particularly sodium and water) into the canaliculus by osmosis. Bile salts are also biological detergents that allow the body to excrete cholesterol and potentially toxic products (e.g., bilirubin, drug metabolites). The function of bile salts in the duodenum is to solubilize ingested lipids and fat-soluble vitamins and, in this way, facilitate their digestion and absorption. From the liver, bile flows through the intrahepatic collecting system to the right or left hepatic duct and finally enters the duct colédoco. [2]

During fasting about 75% of the secreted bile is directed to the gallbladder for storage, the biliary vesicular absorbs up to 90% of the water present in the bile, which allows its concentration, storage and transport throughthe biliary system or vein. [3]

The bile ductcarries the bile made by the liver to the duodenum. It presents anextrahepatic portion, which extends from the visceral aspect of the liver to its mouth in the descending portion of the duodenum, and another intrahepatic, located in the thickness of this organ from the canaliculi originated in each segment (CS). Classically, two ducts, anterior and posterior, are described on the right side,

which receive bile from the homonymous hepatic sections, and converge to form the right hepatic duct (CHD). The left hepatic duct (CHI) that is longer than the right is formed by the confluence of the canaliculi of segments II, III and IV. Both ducts join at the visceral side of the liver to form the common hepatic duct which is located in front of the portal vein and to the right of the common hepatic artery.1

Regarding the anatomy of the gallbladder it can be mentioned that this is a pear-shaped sac that has a length of approximately 7-10cm and an average capacity of 50-60ml, is located on the visceral face of the liver between the right and square lobe, maintains a piriform shape forward reaching the hepatic edge, presents 3 anatomical areas: Fundus, which corresponds to the wide and round end that occurs at the lower edge of the liver at the end of the ninth costal cartilage, contains most of the smooth muscle of this organ, the main body storage area of bile, contains mostly elastic tissue is in contact with the visceral face of the liver, transverse colon and upper part of the duodenum; and by the last the neck that is the narrow and tapered end that is in a position opposite to the bottom heading to the hepatic portal, this portion has a configuration in S and joins the cystic duct. [4] The cystic duct is considered the excretory duct of the gallbladder, has a length of 2-3 centimeters and about 3mm in diameter, has a sphincter located in the muscular layer of the wall that is called Lutkens' sphincter, contains a set of irregular folds located in the mucosa known as Heister's valves, In its vicinity is the cystic branch of the right hepatic artery, it joins with the common hepatic duct (formed by the right and left hepatic duct) at an acute angle to form the common bile ductor colédoco. [5]

The common bile duct is formed at the free edge of the lesser omentum by the junction of the cystic duct and common hepatic duct; its length ranges from 5-15 cm, depending on the site of attachment of the cystic duct to the common hepatic duct. It descends posterior to the upper portion of the duodenum and is located in a groove on the posterior aspect of the head of the pancreas. On the left side of the descending portion of the duodenum, the common bile duct comes into contact with the main pancreatic duct. The two ducts run obliquely through the wall of this portion of the duodenum, where they join to form the hepatopancreatic ampulla. The distal end of the ampulla empties into the duodenum through the greater duodenal papilla. The circular muscle surrounding the distal end of the common bile duct thickens to form the sphincter of the common bile duct. When this sphincter contracts, bile cannot enter the blister or duodenum; Consequently, bile returns to the gallbladder through the cystic duct, to be concentrated and stored. [4]

The sphincter of Oddi or hepatopancreaticsphincteris a muscular valve of 4-10mm composed of small circular and longitudinal muscle segments and that are mostly in the thickness of the duodenal wall, is located at the distal end of the ampula of Vater, which surrounds the exit of the common bile duct, Its role is to regulate bile flow and pancreatic growth, as wellas to prevent duodenal reflux to the bile duct. [6] The ampula of Vater or greater duodenal papilla is the part of the second portion of the duodenum where the common bile duct empties, consists of several smooth muscle sphincters (sphincter of the pancreatic duct, edochal and hepatopancreatic or oddi col) that regulates the flow of bile and its passage through the ampula, was first described by Abraham Vater in 1720, this ampule opens in the duodenum through a small mucous elevation that is known as Va ter's papilla. [7]

Bile secretion is a response toneurogenic, humoral and chemical mules. Vagal stimulation increases bile secretion, while stimulation of splanchnic nerves results in decreased flow of bile. Chlorineacid, partially digested proteins, and fatty acids in the duodenum stimulate the release of secretin from the duodenum which, in response, increases the production and flow of bile. Bile flows from the liver through the hepatic ducts, the common bile duct, and finally into the duodenum. [8] Bile is decisive for the digestion and absorption of fats; as an important route of elimination of toxins, carcinogens, drugs and their metabolites (xenobiotics). It is also the main route of excretion of endogenous compounds and their metabolic products(endobioticagents), such as cholesterol, bilirubin and hormones. [3]

Bile Duct Injuries

Bile duct lesions (LVB) represent a serious surgical complication after cholecystectomy or duodenal resection due to pancreatic alterations, frequently occurring when the bile duct is confused with the cystic duct; only in the United States more than 700,000 are reported annually and although LVB rates have decreased, being in 0.2 to 0.4% of cases, The need for reconstruction continues to be associated with significant mortality. This reflects the complexity of treatment, as well as the high likelihood that patients will have parallel morbid disorders. [9]

Most LVBs are due to a misinterpretation of anatomy, as well as the presence of anatomical variants. The gallbladder may have abnormal positions or shapes, even be duplicated. In the case of bile ducts, 15 to 20% of patients have anatomical variants to be taken into account: duplication of the extrahepatic biliary system; aberrant bile duct that flows directly into the cystic duct of the gallbladder, low convergence of the cystic duct, or presence of a pre-choledococcian cystic duct located in "shotgun cannon". The most common mistake is to confuse the hepatic duct with the cystic duct, occurring in 74%. Therefore, it is important for the surgeon to keep in mind that no structure should be tied or divided until it has been correctly identified. Another technical error is the "excess tension" that is exerted at the junction of the common bile duct with the cystic duct, producing tears or even partial occlusions of the ducts. [10]

The main form of classification of LVBs are those created by Strasberg and Bismuth, which are classified as follows:

- Type I: lesion of more than 2 cm of the confluence of the hepatic ducts

- Type II: Injury within 2 cm of the confluence of the hepatic ducts
- Type III: Lesion coinciding with confluence of the hepatic ducts
- Type IV: destruction of the confluence, separate right or left hepatic duct.
- Type V: Involvement only of the right sectoral branch or in the common bile duct. [10]

Strasberg proposed a classification for laparoscopic bile duct lesions that can be applied in the management of such lesions:

a) Leakage of the stump from the cystic duct or leakage of a canaliculus into the liver bed.
b) Occlusion of a part of the biliary tree, almost invariably an aberrant right hepatic duct
c) Unligated transection of the right hepatic duct
d) Lateral damage to a major hepatic duct
e) Subdivided by the Bismuth classification E1-E5. [11]

Hepaticojejunal anastomosis

The affections of the hepaticobiliopancreatic system represent a complex pathology associated with a high morbidity and mortality in case of diagnostic delay and inopportune treatment; The surgical establishment of a short circuit between the bile duct and the digestive tract is called biliodigestive diversion, being palliative or curative and constituting one of the therapeutic pillars in the management of biliary lesions. [12]

The disconnection or loss of the confluence of the hepatic ducts is a complex surgical situation, in which the technical demands to restore bilioenteric continuity are increased and which, in many patients, negatively affects the postoperative outcome. In most cases, it is technically possible to create a new confluence by approximating both hepatic ducts; However, in some patients this is not possible, so double hepatic-jejunal anastomosis is necessary. [13]

Hepatic-jejunoanastomosis is considered the technique of choice to treat surgical lesions of the bile duct (resection or section), in particular most authors conclude that Roux-en-Y hepatojejunostomy is the one of choice in almost all pathologies that merit resolution by a shunt; Theobjective of the technique of repair of the surgical lesion of the bile duct is to maintain the permeability and function of the bilioenteric anastomosis over time, since the high rate of failure or dysfunction of the anastomosis in the long term is known. [14]

Lopez et al15 in a study conducted in more than 30 Mexican patients with surgical lesions of the bile duct submitted to hepatic-jejunal anastomosis performed in order to determine the complications associated with this technique found during the first six months of follow-up that 9.68% of cases presented stenosis in the shunt for which they merited reintervention, Likewise, in the 3-year follow-up, stenosis was found in 9.7% of cases, at the end of the 5-year study it was found that 77.42% of cases did not merit reoperation while 22.58% required some type of reoperation (radiological or surgical) establishing that the half-life of this derivation for this population was 5 years.

In a literature review conducted by León et al[16], stenosis of hepatitcojejunoanastomosis was reported in a range of 9-25%; with development of cholangitis in up to 85% of cases, in this study it was established that this stenosis is produced by different factors including intestinal reflux to the bile duct due to loss of the valve mechanism, by the presence of calculus at the site of the anastomosis or by the same surgical technique that leads to stenosis and obstruction.

While most available studies on bile duct injury establish that hepaticojejunoanastomosis is one of the main treatment strategies,17-20 most studies establish that the half-life of this procedure is variable, so most patients require close follow-up with imaging studies and laboratories; although the literature reports a rate of Re stenosis of 9-25% and a variable half-life between 6 -60 months, estimation is required for each population due to many environmental, food, cultural and physiognomic factors that can influence the duration of it.

PROBLEM STATEMENT

MAGNITUDE.- The prevalence or incidence of bile duct lesions are unknown in most centers where cholecystectomies or surgeries are performed for bile duct pathology, it is believed that it may be secondary to the surgeon not identifying the injury in time or repair occurs in the transoperative period without being reported as an adverse event, So far it is unknown the frequency and extent that bile duct lesions occur in the northwest of the country as well as the impact that this problem entails, in addition there are reports that establish that the injury of the bile duct despite surgical repair represents a chronic problem in the patient who suffers it.

TRANSCENDENCE. - The hepaticyunoanastomosis represents the main surgery performed for the repair of bile duct lesions, studies report a success rate of up to 90%, however one of the main limitations is the half-life of this, several studies have established that up to 30% of patients have stenosis of the derivation within a period of time of 6 months to 5 years, and up to 35% will require a reintervention to repair it, however the available evidence is variable so the estimation of the half-life in each population is required due to the cultural, dietary, physiognomic and environmental factors that influence the duration. Beforesuch a practiced and routine procedure it is necessary to know the frequency of presentation of bile duct lesions, the half-life of surgical repair by shunts and the need for reinterventions associated with this type of complications, with this it could be identified factors associated (anatomical varieties, tears, iatrogenic) to bile duct lesions and accompanying morbidities.

VULNERABILITY, - All patients who are undergoing surgical procedures for bile duct pathology are vulnerable to presenting bile duct injury during the transoperative, also during correction by hepaticoyunoanastomosis runs the risk

of presenting stenosis and high probability of reoperation in the course of the following 5 years, to estimate in our population the half-life of this derivation Care protocols can be generated aimed at reporting, identifying and timely treatment of this condition, likewise it could impact the practice of the general surgeon in the recognition and care of these injuries.

RESEARCH QUESTION. - What is the half-life of the first time hapaticojejunanastomosis performed in UMA 25 in patients with bile duct lesions?

JUSTIFICATION

Bile duct lesions is a transoperative clinical condition that can have an important impact on the post-surgical evolution of the patient with bile duct pathology, which in many cases may represent greater severity than the primary condition that is the reason for the surgical procedure (usually cholelithiasis); The available evidence suggests that it is a rare pathology that occurs in 0.2-4% of bile duct surgeries, however, there is little information available regarding the frequency of appearance, possibly because these lesions are considered in many cases iatrogenic and not as part of the normal surgical process.

So far there are no published references where they report the prevalence of biliary lesions in the northwest of the country (whether simple or complex) as well as the results of the short- or medium-term surgeries performed for the relationship of this type of lesions, although hepaticojejunoanastomosis represents the main surgery to correct bile duct lesions The limitation documented in most studies is your time of life, it is reported that about 30% of patients require reoperations due to failure of the same within a period of up to 5 years. It is of utmost importance to know these data since they imply a high expense for health institutions due to the long hospital stay that these patients have in addition to the use of human and material resources.

In the same way and important the knowledge of the prevalence of bile duct injury since refresher courses could be implemented, as well as reinforcement of knowledge to all surgeons to reduce the number of bile duct lesions and early referral to high specialty centers to give a better prognosis to the patient.

OBJECTIVES

General Objective

To estimate the half-life of hepatitcoyunoanastomosis first performed in the UMAE 25 of the IMSS in patients with bile duct lesions.

Specific Objectives

- Identify the sociodemographic and general characteristics of patients with bile duct lesions
- To establish the prevalence of bile duct lesions in biliary tract surgical procedures performed in our institution
- Determine the main types and classification of bile duct lesions
- To establish the prevalence of complications (stenosis, leak, fistula) associated with biliary tract lesion repair surgery (hepatic-jejunoanastomosis)
- To know the incidence of surgical complications in bile duct injury repair surgery.
- To know the functional half-life of hepatic-jejunal anastomosis in patients with bile duct injury
- To establish associations between the general characteristics, the type and degree of bile duct lesion, the presence of complications and the functional half-life of hepatic-jejunal anastomosis in patients with bile duct injury.

HYPOTHESIS

Null hypothesis

Thehalf-life of the hepatitcojejunoanastomosis of the first time performed in the UMAE 25 of the IMSS in patients with lesions of the bile duct is less than 2 years .

Alternate Hypothesis

Thehalf-life of hepatitcoyunoanastomosis first performed in the UMAE 25 of the IMSS in patients with bile duct lesions is greater than 2 years.

MATERIAL AND METHODS

Study design. This is a retrospective analytical observational study.

Place or site of the study. The study will be carried out by the General Surgery service of the UMAE No. 25 of the Mexican Institute of Social Security, cataloged as a third level unit in addition to being a unit of concentration receiving patients from second-level hospitals in four states of northeastern Mexico (Tamaulipas, Coahuila, Nuevo León, San Luis Potosi).

Study population. Study to be carried out in patients who presented bile duct lesion who have undergone hepaticojejunanastomosis by the general surgery service of the High Specialty Medical Unit of the IMSS (UMAE) 25 in the city of Monterrey, Nuevo León, during the period January 2016-January 2021.

Selection criteria

Inclusion criteria:

Patients who meet the following criteria will be considered eligible:

- Patient who presented bile duct lesion and who underwent surgical repair (hepaticojejunoanastomosis) by the surgery service of the UMAE 25 of the IMSS during the study period
- Patients over 18 years of age.
- Patients of any gender or sociodemographic variable (comorbidities, race, among others).

- Patients diagnosed with bile duct injury confirmed by computed tomography, cholangioresonance or cholangriography.
- Patients who have had any type and degree of bile duct injury
- Patients with or without complications during the bile duct injury correction procedure
- Patients followed for the next 5 years after their intervention by the UMAE25 surgery department
- Patients with and without the presence of hepatic stenosis and anejunaanstomosis.

Exclusion criteria:

- Patients undergoing any other type of biliodigestive diversion
- Patients with a history of stenosis undergoing second surgery to correct bile duct injury.
- Patients undergoing hepaticojejunoanastomosis by oncological procedures (Ca of pancreas)
- Patients with bile duct injury under conservative treatment

Removal criteria

- Patients with incomplete records or information impossible to collect
- Patients with loss of post-surgical follow-up
- Patients who had serious complications or died during the surgical procedure
- Patients without transoperative records or by imaging studies of the type and grade of bile duct lesion
- Patients with negative intraoperative findings for bile duct injury
- Patients with simple correction of bile duct lesion (absence of jejunal anastomosis)

Statistical analysis.

For the analysis plan, a database will be made in Microsoft Office Excel data processing program in its 2019 version, once the database is captured, statistical analysis will be performed in the IBM stata statistical program in its MP14 version.

For the verification of the normality of distribution of the variables will be used the statistical test of Kolmogorov-Smirnov, the descriptive data will be expressed in means of central tendency such as median mean or mode in the form of proportions or frequencies and measures of dispersion (standard deviation) according to the type of variables, the nominal variables will be expressed in frequency means and proportions by frequency tables.

The estimation of the incidence of bile duct injury will divide the number of bile duct lesions on the total of cholecystectomies performed during the study time period, likewise the half-life will be estimated by means of the average duration of the hepaticojejunanaestomosis in the procedures performed; for inferential statistics the sample will be divided into two groups (those who present stenosis and those who do not), for the comparison of quantitative variables between the groups will be used t Student or U of Mann Whitney according to variables, for categorical variables of more than 2 groups ANOVA or K. Wallis will be used. , for the categorical variables of 2 groups chi 2. All tests will be conducted with a 95% confidence level and 5% margin of error.

ETHICAL ASPECTS

The procedures of this study adhere to ethical standards, the Regulation of the General Law on Health in Research and will be carried out in full compliance with the following principles of the "Declaration of Helsinki" (and its amendments in Tokyo, Venice, Hong Kong and South Africa)

RESULTS

We obtained 40 records that met the inclusion criteria, to estimate the half-life of the hepaticojejunanastomosis of the first time, in patients with lesions of the bile duct, attended at the Medical Unit of High Specialty 25, of Monterrey, Nuevo León, finding a predominance in the proportion of cases by the female gender with 87.5% (n = 35), while the male gender represented the other 12.5% (n=5), as can be seen in Graph 1.

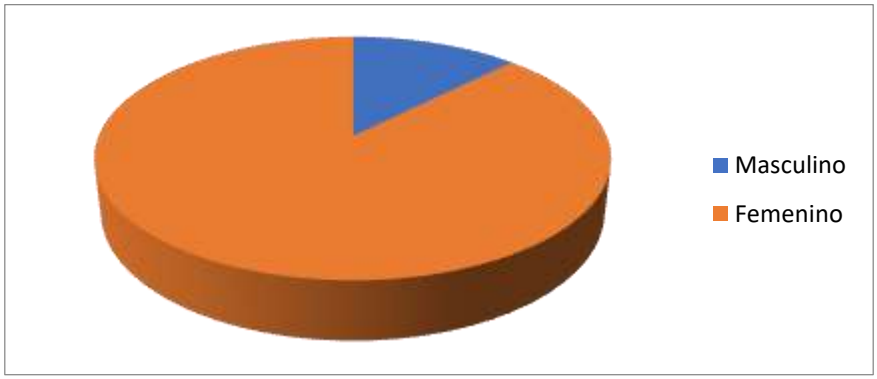


Figure 1 according to gender of cases with hepaticojejunoanastomosis, in the High Specialty Medical Unit 25, of Monterrey, Nuevo León

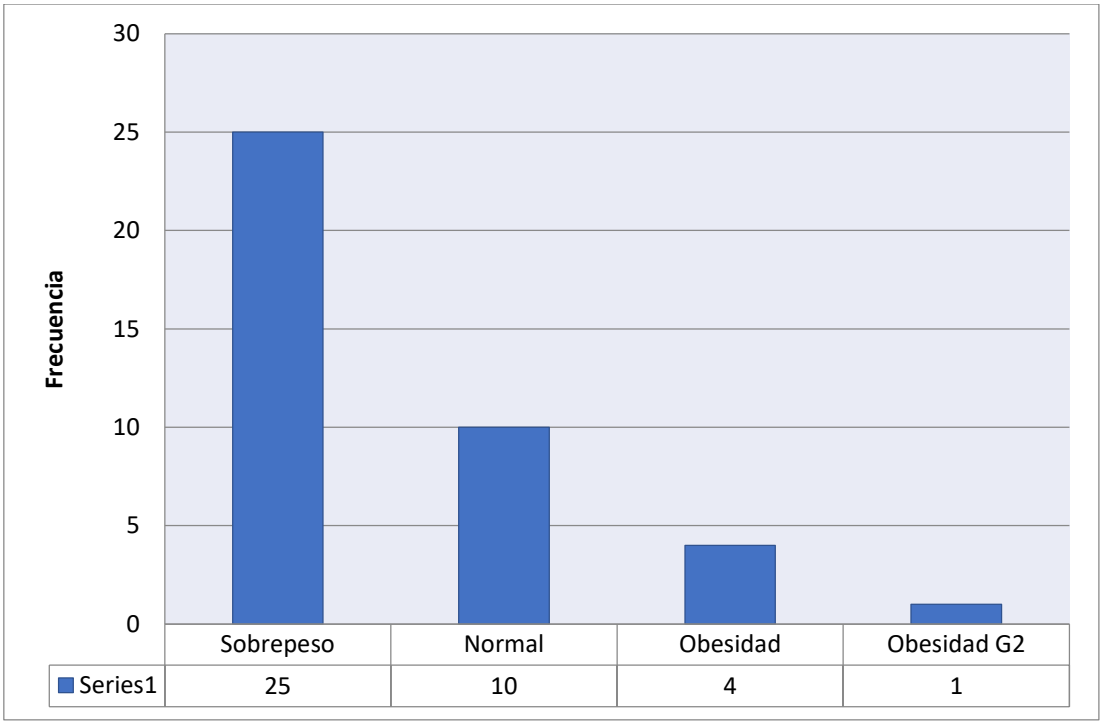
Table 1 shows that with respect to the total number of cases analyzed, the average age in years is 47.65, with a standard deviation of 10.85, a minimum value of 26, a maximum value of 69, with a 95% confidence interval range between 44.17 and 51.12, the weight in average kilograms is 72.3, with a standard deviation of 9.19, a minimum value of 58, a maximum value of 95, with a 95% confidence interval range between 69.35 to 75.24, for what corresponds to the size in meters the average is 1.65, with a standard deviation of 0.06, a minimum value of 1.55, a maximum value of 1.82, with 95% confidence interval range between 1.62 to 1.67 and with regard to BMI the average is 26.51, with a standard deviation of 3, a minimum value of 21.7, a maximum value of 38.1, with 95% confidence interval range between 25.55 to 27.47.

Table 1. Age and somatometry of cases with hepaticojejunoanastomosis, in the High Specialty Medical Unit 25, Monterrey, Nuevo León

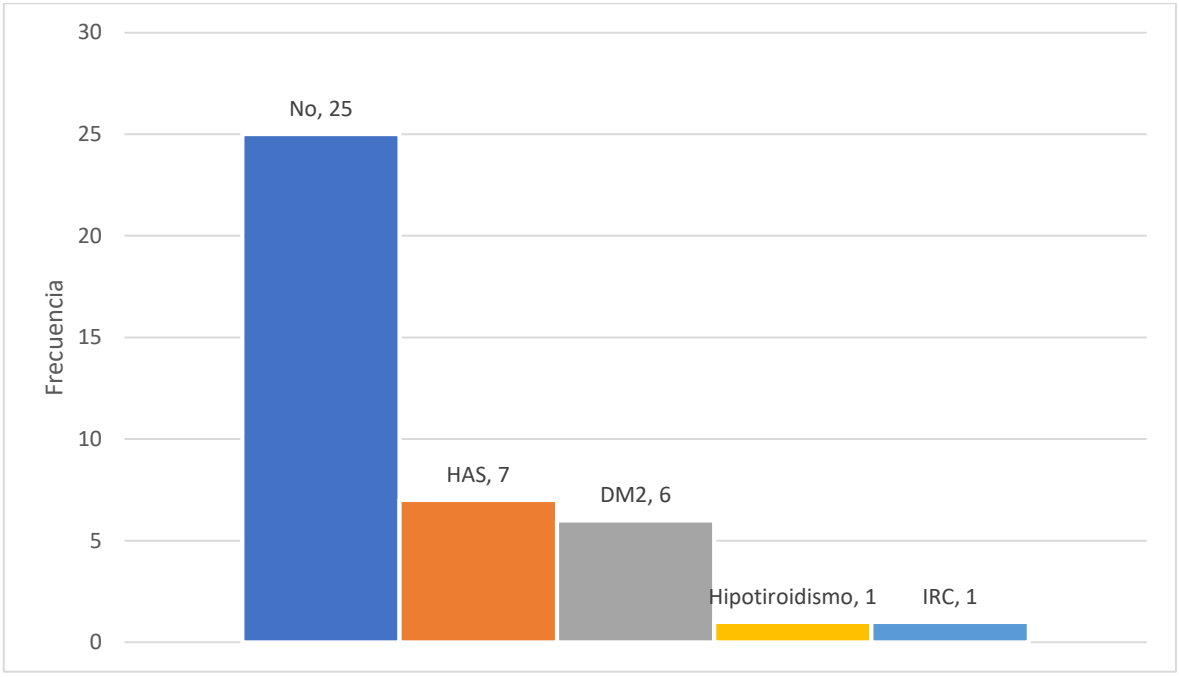
Variable	N	Media	Standard deviation	Minimal	Maximum	IC 95%
Age	40	47.65	10.8546	26	69	44.17 - 51.12
Weight	40	72.3	9.19922	58	95	69.357 - 75.242
Size	40	1.651	0.06578	1.55	1.82	1.6299 - 1.6720
IMC	40	26.51	3.00135	21.7	38.1	25.557 - 27.477

It is observed in the nutritional status according to Body Mass Index that of the total cases studied, the highest frequency is found in Overweight with 62.5% (n = 25), continuing in descending order with Normal weight with 25% (n = 10), Obesity in 10% (n = 4) and Obesity grade 2 with 2.5% (n = 1), as can be seen in Graph 2.

Table 2. Distribution of nutritional status according to BMI in cases of hepaticojejunaanastomosis, in the High Specialty Medical Unit 25, Monterrey, Nuevo León



In the distribution of Comorbidities in the cases studied, it is observed that 62.5% (n=25) did not present any comorbidity, 17.5% (n=7) had a history of systemic arterial hypertension, 15% (n=6) had a history of type 2 diabetes and 2.5% (n=1) had a history of hypothyroidism and chronic kidney disease each respectively.



Graph 2. Distribution of Comorbidities in cases of hepaticojejunaanastomosis, in the High Specialty Medical Unit 25, Monterrey, Nuevo León.

Regarding the type of previous surgery, it is observed that those who presented open surgery was 17.5% (n = 7), while for laparoscopic surgery it was 82.5% (n = 33), the type of biliary lesion classified in degrees according to the Strasberg and Bismuth scale represents for grade E1 35% (n = 14), in grade E2 it is 47.5% (n = 19), in grade E3 it is 15% (n = 6), while for grade E4 it occurs in 2.5% (n = 1), in the respective cases that present the history of stenosis present corresponds to 25% (n = 10) and was absent in 75% (n = 30).

Table 3. Surgical records of hepaticojejunoanastomosis, in the High Specialty Medical Unit 25, Monterrey, Nuevo León.

	N	%
Type of previous surgery		
Open	7	17.5
Laparoscopic	33	82.5
Total	40	100
Type of Injury		
E1	14	35
E2	19	47.5
E3	6	15
E4	1	2.5
Total	40	100
Stenosis		
Present	10	25
Absent	30	75
Total	40	100

Table 4 shows that for the surgical time in minutes presents an average of 81, with a standard deviation of 34.02, a minimum value of 40, a maximum value of 180, with a 95% confidence interval range between 70.11 and 91.88, the estimated surgical bleeding in milliliters presents an average of 58.25, with a standard deviation of 27.53, a minimum value of 20, a maximum value of 150, with a 95% confidence interval range between 49.44 to 67.05, with a half-life measured in months with an average of 51.5, with a standard deviation of 15.45, a minimum value of 12, a maximum value of 60, with a 95% confidence interval range between 46.55 to 56.44.

Table 4. Half-life, time and surgical bleeding in hepaticojejunoanastomosis, in the High Specialty Medical Unit 25, Monterrey, Nuevo León.

Variable	N	Media	Standard deviation	Minimal	Maximum	IC 95%
Surgical time	40	81	34.02865	40	180	70.11711 - 91.88289
Surgical bleeding	40	58.25	27.53902	20	150	49.4426 - 67.0574
Half-life	40	51.5	15.45714	12	60	46.55657 - 56.44343

It is observed that the life measured in months according to stenosis, when the stenosis is absent, it occurs with a frequency of 30 (75%) cases in those cases that have 60 months of half-life, while in cases in which stenosis is present represents 10 cases, of which, 2 (5%) of them, have a half-life of 26 months and 1 (2.5%) case each respectively, in which the half-life was: 12, 16, 20, 24, 30, 32, 34 and 40 months, as can be seen in Table 5.

Table 5. Half-life of the shunt according to stenosis in cases with hepaticojejunoanastomosis, in the High Specialty Medical Unit 25, Monterrey, Nuevo León.

Half-life in months	Stenosis		
	Absent	Present	Total
12	0	1	1
16	0	1	1
20	0	1	1
24	0	1	1
26	0	2	2
30	0	1	1
32	0	1	1
34	0	1	1
40	0	1	1
60	30	0	30
Total	30	10	40

Table 6 shows in cases where stenosis was present a frequency of 30 cases, of which grade E1 corresponds to 12 cases, in grade E 2 there are 12 cases, for grade E3 5 cases are observed and finally in grade E 4 there is 1 case, when there was no stenosis a total of 10 cases are found, of which in grade E1 correspond to 2 cases, in grade E 2 there are 7 cases, for grade E3 1 case is observed and finally in grade E 4 no cases are found.

Table 6. Stenosis of the shunt according to type of lesion in cases of hepatojejunoanastomosis in the High Specialty Medical Unit 25 in Monterrey, Nuevo León

STENOSIS OF THE SHUNT	TYPE OF INJURY				Total
	AND 1	E 2	AND 3	AND 4	
Absent	12	12	5	1	30
Present	2	7	1	0	10
Total	14	19	6	1	40

In the logistic regression model for cases of hepatojejunanastomosis to determine the increase in probability of stenosis, it is found that the variables that present a statistically significant value ($p<0.05$), are: Surgical time (Coefficient: 0.02, 95% CI 0.002 to 0.04, Standard error of 0.01) and the type of previous surgery (Coefficient: 1.82, 95% CI 0.03 to 3.6, Standard error of 0.91), while in the case of comorbidities, they were omitted because they only presented 1 case, in the rest of the variables that did not observe a statistically significant value ($p>0.05$) were: surgical bleeding, type of biliary lesion, SAH, DM2, Age, Gender, Weight, Height, BMI, as shown in Table 7.

Table 7. Logistic Regression Model for cases that presented stenosis in hepatojejunanastomosis attended at the High Specialty Medical Unit 25 in Monterrey, Nuevo León.

Stenosis of the derivation	Coef.	Standard error	P>z	IC 95%
Surgical time	0.0246928	0.0112418	0.028	0.002 - 0.0467
Surgical bleeding	-0.0083895	0.0169631	0.621	-0.0416 – 0.0248
_cons	-2.75126	1.431106	0.055	-5.5561 - 0.0536
Type of previous surgery	1.823129	0.9117582	0.046	0.0361 - 3.6101
Type of biliary injury	-0.0840529	0.5343104	0.875	-1.13 - 0.963
_cons	-3.178254	1.389607	0.022	-5.90 - -0.454
DM2	-0.6931472	1	0.488	-2.6531 - 1.2668
HAS	0.9162908	1.987461	0.645	-2.979 - 4.8116
Hypothyroidism	0	(omitted)		
ERC	0	(omitted)		
_cons	-1.832582	2.459675	0.456	-6.6534 - 2.9882
Age	-0.0161935	0.0357915	0.651	-0.0863 - 0.0539
Gender	1.058087	2.132891	0.62	-3.122 - 5.238
Weight	-0.5444715	0.9132392	0.551	-2.334 - 1.245
Size	57.433	78.37484	0.464	-96.17 - 211.04
IMC	1.370331	2.414248	0.57	-3.361 - 6.102
_cons	-94.20734	125.9602	0.455	-341.08 - 152.67

A Mann-Whitney U test was performed in 40 registered cases to determine the association between the presence of shunt stenosis and half-life, in the group with absent stenosis there are 30 cases, in the group with stenosis present 10 cases are observed, the results show a statistically significant result ($p<0.05$), Based on these results, the presence of stenosis has a significant impact on the half-life of hepatojejunoanastomosis.

Table 8. Mann-Whitney U for Stenosis of the Shunt with Half-Life of Hepatojejunoanastomosis Attended at the High Specialty Medical Unit 25 in Monterrey, Nuevo León

Stenosis of the derivation	Remarks	Rank sum	Expected
Absent	30	765	615
Present	10	55	205
Combined	40	820	820

DISCUSSION

In the study conducted by López and collaborators[15], a half-life of the derivation of 5 years is established, it is a study that was carried out in 30 patients of the Mexican population, who presented surgical lesions of the bile duct, who were subjected to hepatic and jejunaanastomosis, reporting in the same way a proportion of 9.68% of the cases, that at 6 months presented stenosis of the shunt, requiring reintervention, 3 years after performing the procedure 9.7% of cases needed reoperation and at the end of the study after 5 years observed that 77.42% of cases did not require reoperation, while 22.58% required some procedure either radiological or surgical. In the present work there is a concordance regarding the half-life, since a half-life measured in months was observed with an average of 51.5, (95% CI: 46.55 to 56.44), in the same way in the half-life according to stenosis, it occurs with a frequency of 30 (75%) cases in those who have 60 months of half-life, while in cases where stenosis is present

it represents 10 cases, of which 2 (5%) of them have a half-life of 26 months and 1 (2.5%) case, in which the half-life of the derivation was: 12, 16, 20, 24, 30, 32, 34 and 40 months, thus comprising, that an average half-life can be defined to establish specific actions during the evolution of the disease.

Because bile duct lesions require hepatojejunaanastomosis among their main treatment strategies[18-20], by knowing the half-life it is possible to determine the periods, for close follow-up with complementation of imaging studies and laboratories, adapting the cultural, environmental, dietary and physiognomic factors that affect the half-life of the shunt since in the present study, an average age in years is 47.65, 95% CI between 44.17 to 51.12, the weight in average kilograms is 72.3, 95% CI between 69.35 to 75.24 and with regard to BMI the average is 26.51, 95% CI between 25.55 to 27.47.

In the study conducted by Mercado et al. 21, at INCMNSZ, which included 271 patients with a proportion of 21% men and 79% women. BMI ≤ 25: 141 cases (52%); BMI ≥ 25 ≤ 30: 90 cases (33%), and with BMI ≥ 30: 40 cases (15%). The mean age was 39 ± 14, 41 ± 13 and 42 ± 12 years, respectively, the percentage and severity of non-biliary complications was higher in the BMI group ≥ 30, however, none of the three groups presented statistical significance. The variables of age, gender, previous repair and use of stents before surgery were also analyzed. None of these were statistically significant. Bile complications had a higher percentage with increasing BMI, but none is statistically significant. While in the present study a predominance was found in the proportion of cases by the female gender with 87.5% (n = 35), while the male gender represented the other 12.5% (n = 5), the highest frequency is found in Overweight with 62.5% (n = 25), continuing in descending order with Normal weight with 25% (n = 10), Obesity in 10% (n = 4) and obesity grade 2 with 2.5% (n = 1), in the logistic regression model, it is found that the variables that present a statistically significant value ($p<0.05$), are: Surgical time (Coefficient: 0.02, 95% CI 0.002 to 0.04) and the type of previous surgery (Coefficient: 1.82, 95% CI 0.03 to 3.6), in the rest of the variables that did not observe a statistically significant value ($p>0.05$) were: surgical bleeding, type of biliary lesion, SAH, DM2, Age, Gender, Weight, Height, BMI.

CONCLUSION

The requirement of surgical management of the bile duct is one of the most common surgical procedures, so forcefulness is required when performing the procedure and brevity when handling complications, since the repercussions on the postsurgical evolution of cases can increase the probability of complications more than the primary condition as such.

When identifying that there is an association between the presence of shunt stenosis and half-life, it is important to work on actions to reduce the number of complications, so it is necessary to increase information about how to prevent bile duct injuries, with adequate quality control in hospitals, with agreed programs and protocols, that delimit the course of action against these complications.

It is very important to know the half-life periods in hepatojejunoanastomosis, since in this way it is possible to establish an action plan and thus reduce the increase in institutional health costs, reducing in the same way the hospital overstay that these patients present, as well as the risk of developing infections associated with health care, focused on an adequate distribution of human and material resources.

The design of strategies in the repair of the bile duct requires institutional support according to the conditions of patients suffering from bile duct conditions, where the prevention of these conditions is based on an adequate mastery of biliary anatomy by the surgical team, as well as a good surgical technique, with the firm decision to convert to open surgery when laparoscopic surgery is not possible to identify the anatomical structures or failing that, the immediate transfer to a specialized center if required, positively influencing the evolution of the patient, reducing complications and ultimately mortality.

REFERENCES

I. Mitidieri V, Ottone NE. La vía biliar intrahepática. Clasificación anátomo-quirúrgica con base colangiográfica. Int J Morphol. 2015;33(4):1427–1435.
II. Siddiqui A. Generalidades sobre la función biliar. Revisión Manual MSD Junio 2018.
III. García CG. Fisiopatología de la colestasis. Med Interna Mex. 2006; 22(5): 411–421.
IV. Mora MP. Tema 4: Colecistectomía laparoscópica, un enfoque anatomoclínico. Rev Clin Esc Med UCR-HSJD. 2018; 4(1):1–9.
V. Mitidieri V. Anatomia de la Via Biliar. Cirugía Digestiva, Soc Arg Cir Digest 2009; 437 (1): 1-11.
VI. Vida Pérez L. Disfunción del esfínter de Oddi y trastornos biliares funcionales. Rev Andaluza Patol Dig. 2017;40(5):233–242.
VII. Zúñiga V, Moreno V, Domènech BJ. Diagnóstico y tratamiento de los tumores de la papila de Vater. Gastroenterol Hepatol 2009; 32(2):101–108.
VIII. Guía de práctica clínica, diagnóstico y tratamiento de Colecistitis y Colelitiasis, México, Instituto Mexicano del Seguro Social; 2009.
IX. Limaylia H, Vega E. Lesiones Iatrogénicas de vías biliares. Rev Gastroenterol 2017; 37(4): 350-356
X. León F, Andrade D. Estenosis de Anastomosis Hepático-yeyunal TerminoLateral en Y de Roux tratada mediante reconfección y modificación de la técnica de Anastomosis a TerminoTerminal. Rev Concie Dig 2020; 11(3): 284-295.
XI. Ríos N, Guerrero G. Lesiones de la vía biliar más frecuentes caracterizadas por colangiografía percutánea. Experiencia en un año en el servicio de

radiología intervencionista. Ann Radiol Mex 2018; 17(1): 46-52.

XII. Gutiérrez J, Medina P, Ortiz S, Lozano H. Lesiones de la vía biliar: Prevalencia en pacientes con colecistectomía laparoscópica en un hospital de especialidades. Cir Gen Mex 2018; 33(1); 38-42.

XIII. Galiano J, Henández Y. La hepaticoyeyunostomía en el tratamiento de las afecciones hepatobiliopancreáticas. Rev Cir 2016; 55(2): 32-41.

XIV. Pereira F, Venales Y, Salazar F. Detalles técnicos de la doble anastomosishepático-yeyuno en Y de Roux, con base en la descripción de un caso. Rev Colomb Cir 2019; 34: 179-184.

XV. López D, García A, Díaz T, Zamora D, Nachón F. Derivación bilioentérica en un centro académico de referencia estatal en México. Cir General 2020; 37(3):82-90

XVI. León F, Andrade D. Estenosis de Anastomosis Hepático-yeyunal TerminoLateral en Y de Roux tratada mediante reconfección y modificación de la técnica de Anastomosis a TerminoTerminal. Rev Concie Dig 2020; 11(3): 284-295.

XVII. Itonaga M, Hatamaru K, Kitano M. EUS-guided hepaticogastrostomy. Dig Endosc 2018; 30(4): 548.

XVIII. Kawakami H, Kubota Y. Endoscopic ultrasonography-guided antegrade stenting combined with hepaticogastrostomy/ hepaticojejunostomy using ultraslim instruments. Endoscopy 2017; 49(1): 88-89

XIX. Uchida D, Kato H, Okada H. Re-intervention with endoscopic ultrasound-guided hepaticogastrostomy for unresectable hilar biliary drainage using a multipath occlusion balloon. Endoscopy 2018; 50(4): 450-452.

XX. Ogura T, Masuda D, Takeuchi T, Fukunishi S. Simplified reintervention method of EUS-guided hepaticogastrostomy stent obstruction. Gastrointest Endosc 2016; 83(4): 831.