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Subtotal Cholecystectomy and Endoscopic Retrograde Cholangiopancreatography: A Colossal Synergy

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ABSTRACT

Introduction: acute cholecystitis disease is defined as inflammation of the gallbladder and is more common in women. Objective: to report the experience of endoscopic retrograde cholangiopancreatography in patients with biliary pathology with partial cholecystectomies. Method: retrospective, longitudinal, descriptive and observational study with descriptive statistical analysis in patients with endoscopic retrograde cholangiopancreatography who underwent surgery by partial cholecystectomy Results: 110 patients with endoscopic retrograde

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cholangiopancreatography with cholecystectomy were identified, which are 72.8% of the 151 studies performed. Of these group 95 women who are 86.36% and 15 men who represent 13.63% with a male-female ratio of 6:1. The average age was 46 years with a range of 18 to 75 years. Adjusted morbidity was concluded at 60% and there was no mortality. Discussion: subtotal cholecystectomy is the removal of as much of the gallbladder as possible, intentionally leaving a portion of it in situ, making it a viable alternative for complex cases of acute or chronic gallbladder inflammation and subclassifying it into fenestrant and restorative. Conclusions: partial cholecystectomy, whether laparoscopic or conventional, is justified in a difficult cholecystectomy, in an emergency surgery and in the absence of the basic and correct supplies/resources, both to perform an obligatory trans operative cholangiography or even an endoscopic retrograde cholangiopancreatography.

Keywords: Acute cholecystitis, Gall bladder, Subtotal cholecystectomy, Fenestrant, Reconstitute, Cholecystectomy, Endoscopic retrograde cholangiopancreatography.

INTRODUCTION

A gallstone in Egypt is dated to 1,085 BC, which was found in the mummy of Amun. But it was not until the nineteenth century, when the doctor John Stough Bobbs on June 15, 1867, was the first to perform an elective operation on the gallbladder to treat gallstones, on a patient in his own office. [1, 2] Acute cholecystitis disease is defined as inflammation of the gallbladder. The pathophysiological mechanism of acute cholecystitis is the obstruction of the cystic duct, which can be due to or without stones. [3, 4] Statistically, biliary pathology is estimated to occupy the first place of surgical diagnoses in Mexico. However, it is only an impression of the authors of this manuscript in question of their day-to-day experience, since in the national health system in Mexico there is no reliable statistical database to support it. [5, 6] Gallstone disease is more common in women than in men. Gallstones affect 10-15% of adults in developed countries, where the most severe form of gallstone disease can develop in 20% of symptomatic people and affects 10-20% of untreated people, where they suffer recurrent symptoms with biliary colic in 70%, or bile duct obstruction in 24% or even pancreatitis in 6%. [7, 8] In the United States, it is estimated that 10% to 20% of the adult population has gallstones, and the prevalence is projected to increase. More than 1.2 million cholecystectomies are performed annually. [9] However, the true incidence of acute cholecystitis is unknown; some epidemiological data have been retrieved from the United Kingdom, during the period April 2003 to March 2005, with 25,743 patients admitted to the emergency room with acute gallbladder disease and only 3,791 undergoing emergency cholecystectomies during first admission. [10]

The various risk factors for gallstone disease that have been documented are overweight/obesity, dietary choices, dyslipidemia, insulin resistance, and hispanic ethnicity, among others. [11] Medical literature reports acute cholecystitis as a cause of acute abdomen of up to 11% as a second cause, but it should be clarified that it is only in an emergency setting, being the second cause of surgical intervention; on the contrary, the actual incidence of chronic cholecystitis, acute, choledocholithiasis, biliary colic, and non-lithiasis is unknown. [12] Cholecystitis, which is one of the most common digestive diseases presenting as a complication of cholelithiasis and affecting 10% of the world's population, and acute non-lithiasis cholecystitis have been identified as accounting for 2 to 15% of all cases of acute cholecystitis. [13, 14] Other factors that cause cholestasis, such as opioid therapy, positive pressure

ventilation, and total parenteral nutrition, have also been considered contributing factors, causing ischemia-reperfusion injury, along with the involvement of proinflammatory eicosanoid mediators as the core of this process. [14]

In addition, the gallbladder is one of the organs with the most alterations in its anatomical morphology, which is why it is sometimes a surgical challenge both in its diagnosis and in its treatment. Patients have been published even with a left gallbladder without a true inverse situs; [15] this is explained by abnormal embryonic development that can lead to vesicular duplication and alterations in the morphology of these structures with an incidence of approximately 1:4000 worldwide, which presents a significant risk of iatrogenic injury during surgical procedures, posing a significant challenge to the surgeon's experience and expertise. [16] There are even cases of absence of this gallbladder, in the so-called atresia's with congenital malformations, where they are cases of difficult diagnosis, and intraoperative biliary exploration continues to be essential for timely diagnosis. [17] The existence of a double gallbladder has been reported in the literature, which confirms the anatomical variants that are so diverse or numerous that exist in this organ, that it is sometimes underestimated and its diagnostic complexity leads to the coexistence of more postoperative studies and even new surgical reinterventions, not to mention the complications that increase morbidity. White trans operative cholangiography is imperative justified. [18] We must not forget the so-called "caterpillar hump", also known as Moynihan's hump, which is a right hepatic artery with a tortuous course within Calot's triangle, which carries a significant risk of accidental injury and ligation during cholecystectomy and causes incoercible intraoperative bleeding with an incidence of 3.81 to 15%. With two or up to five cystic arteries. [19] Similarly, triple gallbladder has been reported to be a rare congenital anatomical anomaly due to incomplete regression of rudimentary bile ducts and is often undetected, only accidentally. [20]

OBJECTIVE

To report the experience of endoscopic retrograde cholangiopancreatography (ERC) performed on patients with biliary pathology with partial cholecystectomies, at the "Dr. Rubén Leñero" General Hospital of the Ministry of Health of Mexico City.

MATERIAL AND METHOD

It is a retrospective, longitudinal, observational and descriptive study with the analysis of descriptive statistics of patients who underwent ERC due to biliary pathology in whom they underwent surgery with partial cholecystectomy, from March 2021 to March 2025, at the "Dr. Rubén Leñero" General Hospital of the Ministry of Health of Mexico City. The variables of sex, age, types of cholecystectomies, types of surgical approach, variants of partial cholecystectomies, days of hospital stay, number of surgeries, surgical time, number and frequency of ERC, complications of surgery and complications of ERC, morbidity, and mortality were identified.

RESULTS

A total of 151 patients who underwent **ERC** were identified, of which 110 have a history of having undergone surgery by cholecystectomy and represent 72.8% of all ERCs. Of this group, 95 women were 86.36% and 15 men who only represent 13.63% with a male-female ratio of 6:1. The mean age was 46 years, with a range of 18 to 75 years and a bimodal presentation of 42 and 57 years.

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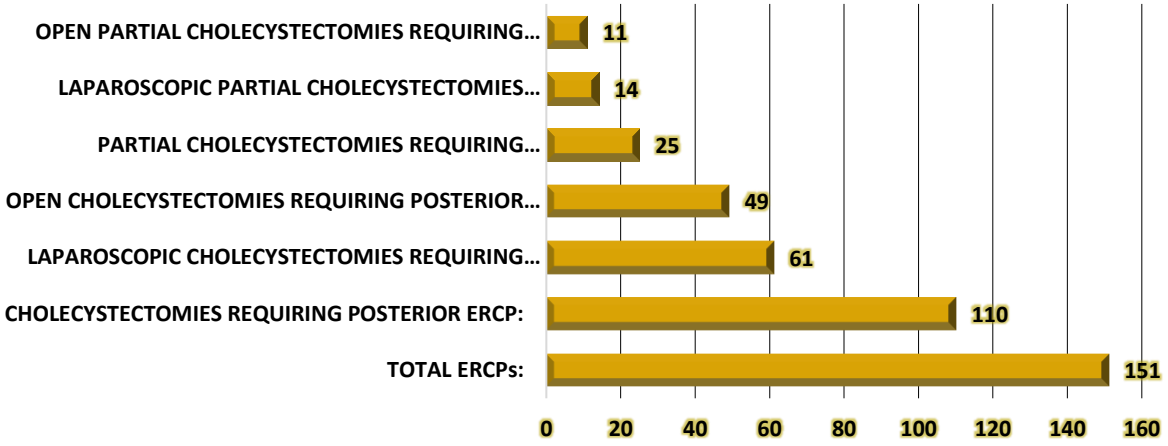
Data was collected from patients who underwent ERC after cholecystectomy, reaching 110 patients, of which 61 were laparoscopic approaches, representing 55.45%, and the remaining 44.54%, which are 49 cases, cholecystectomy was performed with a conventional approach. However, only 25 cases were counted in individuals with partial cholecystectomies, representing 23% of these 14 patients were laparoscopic cholecystectomies and 11 were conventional. No cholecystostomy was performed. See table and graph 1.

Table 1: Total Number of ERCs in Subtotal Cholecystectomy at the "Dr. Rubén Leñero" General Hospital from 2021 to 2025.

Total ERC:	**151**
Cholecystectomies Requiring Subsequent ERC:	110
Laparoscopic Cholecystectomies Requiring Posterior ERC:	61
Conventional Cholecystectomies Requiring Subsequent ERC:	49
Partial Cholecystectomies Requiring Posterior ERC:	25
Laparoscopic Partial Cholecystectomies Requiring Posterior ERC:	14
Conventional Partial Cholecystectomies Requiring Subsequent ERC:	11



Graph 1: Total Number of ERCs in Subtotal Cholecystectomy at the "Dr. Rubén Leñero" General Hospital from 2021 to 2025.

In most of the patients who underwent subtotal cholecystectomies, they were emergency surgeries with a percentage that reaches up to 96%, in summary 24 patients and where the technique in its entirety of 100% developed was the so-called "reconstituted"; in addition, the three indications of ERC that by incidence were: firstly, biliary leakage through the drainage, which are 60% or 15 patients (which many doctors mistakenly call "biliary fistula"), the second place for choledocholithiasis 8 cases (32%) (which others erroneously call "residual choledocholithiasis" when trans operative cholangiography is not performed and there are relative and/or absolute indications for bile duct exploration falling into a surgical/therapeutic omission) and in third place for persistent jaundice in 2 patients (8%). View images 1, 2 y 3.

8 cases of uncomplicated gallbladder “rendezvous” have been documented, in addition, two patients have been referred to other hospitals to perform spyglass, these cases were not included in this partial cholecystectomy study. At the same time, 3 patients were reoperated

for bili peritoneum but were surgically operated on by cholecystectomy in other hospitals, and for the same reason they are not included in the study.

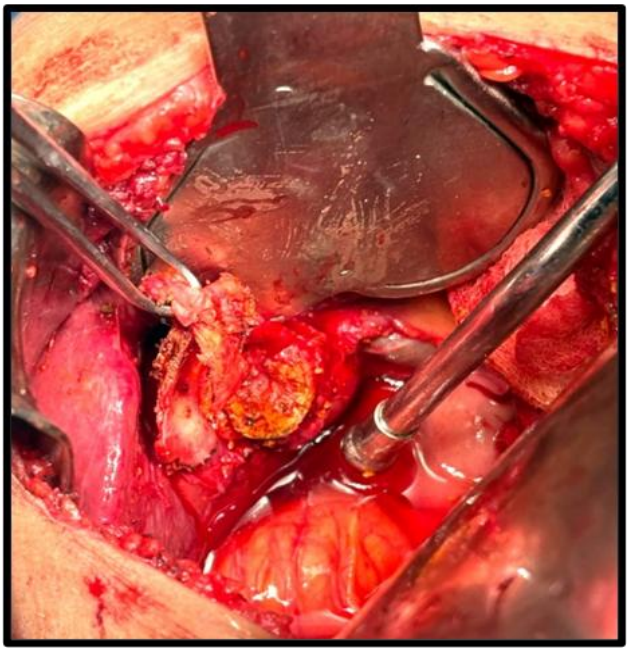


Image 1: Exposure of Gallbladder Mucosa with Few Liths, Conventional Partial Cholecystectomy

Image 2: Vesicular Remnant After Reconstitutive Partial Cholecystectomy

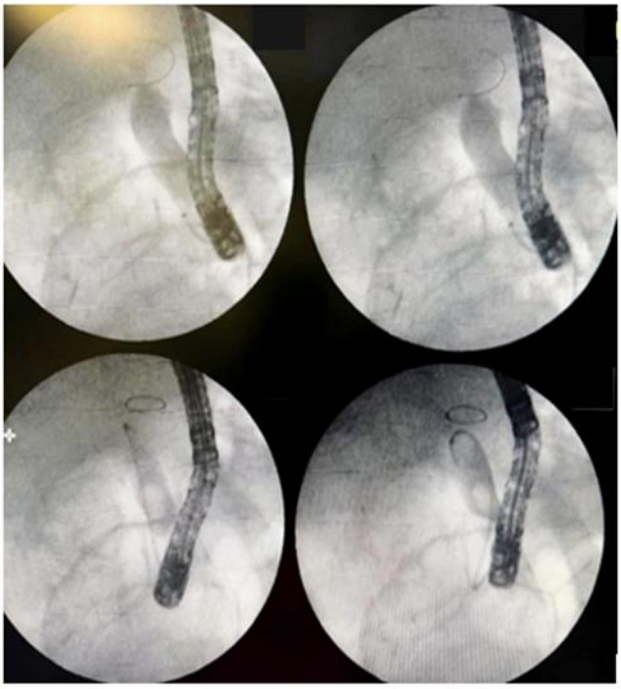


Image 3: ERC of a Patient With Residual Choledocholithiasis in a Partial Cholecystectom

The use of plastic stents or partially covered SEMS and sphincterotomy is carried out in 88% of patients and their subsequent removal with a new ERC, there was no reported migration or any

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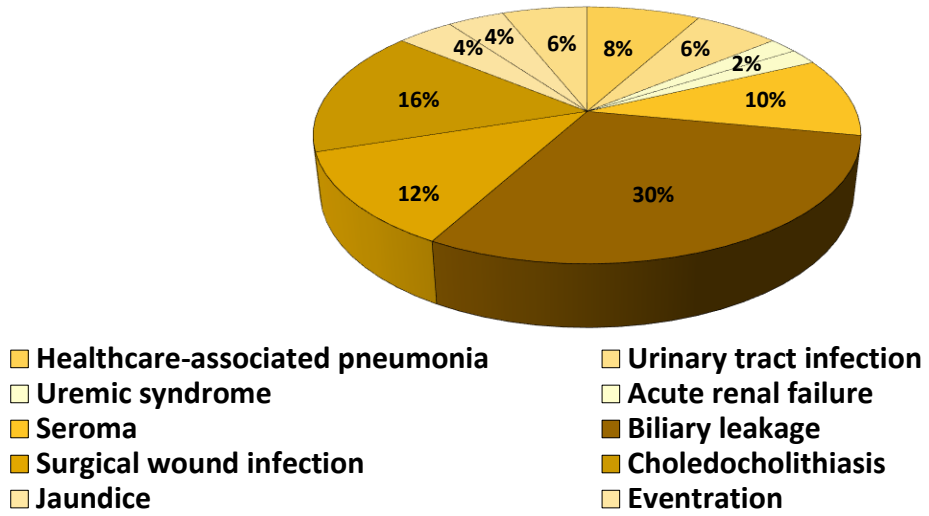
complication in its removal with a variable time of 3, 4 or up to 6 months due to external factors. The days of in-hospital stay were averaged in 6 days with a range of 3 to 11 days; three patients were candidates for management in intensive care for pneumonia associated with health care with an average stay of 4 days and range of 2 to 5 days. Follow-up was reported in the outpatient clinic for a period of 6 months. Morbidity was combined from both surgery and ERC procedures occurring in the same patient. See table and graphic 2.

TABLE 2

Morbidity of patients undergoing surgery by subtotal cholecystectomy and ERCP at the "dr. Ruben leñero" hospital From 2021 to 2025	**NUMBER/%**
Healthcare-associated pneumonia	4 /16
Urinary tract infection	3 /12
Uremic syndrome	1 /04
Acute renal failure	1 /04
Seroma	5 /20
Biliary leakage	15 /60
Surgical wound infection	6 /24
Choledocholithiasis	8 /32
Jaundice	2/08
Eventration	2/08
Elevation of pancreatic enzymes by ERCP	3/12



Graphic 2: Morbidity of Patients Undergoing Surgery by Subtotal Cholecystectomy and ERC at the "Dr. Ruben Leñero" Hospital from 2021 to 2025.

The adjusted morbidity is concluded to be 60% as a superior indicator, this expresses that the adjustment is made when the same patient may have more than two comorbidities. Biliary leakage, as seen in table and graph 2, is the one that occupies the first place, the second place is choledocholithiasis not resolved in the surgical intervention, in third place the infection of the surgical wound and seroma; the rest of the variables are specified in the previous table. The variety of morbidity increases too much because they are patients who come from the emergency department with intermittent fasting, jaundice, fluid and electrolyte imbalance, dehydration, etc.

The surgical time of laparoscopic cholecystectomies was tabulated in an average of 42 minutes, with ranges of 31 to 110 minutes, while conventional cholecystectomy averaged 68 minutes with ranges of 37 to 162 minutes. Regarding the ERC procedure, the average time was 35 minutes, with ranges of 18 to 46 minutes and together with laparoscopic cholecystectomy it increased to 110 minutes. No complications, mortality or failed studies were tabulated, they were rescheduled on 3 occasions due to the lack of supplies to perform them; the same happened in the removal of the endoprosthesis, with an elective rescheduling of the ERC due to the lack of supplies.

No patient was reported to be readmitted after 30 days due to any complication, and at the time of this manuscript no jaundice, residual choledocholithiasis or new acute cholecystitis of the gallbladder remnant has been documented in postoperative patients with subtotal cholecystectomy, which requires hospitalization or surgical reintervention. No mortality was reported, neither from surgery nor from ERC.

DISCUSSION

The biliary pathology is so varied and complex that in most cases it is presented as chronic lithiasis cholecystitis, with or without an acute presentation; much less frequently a non-lithiasis cholecystitis, which is otherwise acute on a single occasion. 10% of lithiasis cholecystitis will be present with choledocholithiasis. Gallbladder disease is the leading non-obstetric cause of hospitalization during pregnancy, with high rates of recurrence and readmission. These are just a few examples of common groups or of greater incidence, however, there are a few clinical presentations of patients that present with other complications, mixed presentations and anatomical malformations, which deserve mention and separate study in a specific way in the future. [21, 22]

Regarding the diagnosis of acute cholecystitis, the anamnesis and physical examination are essential, where pain was observed on palpation in the epigastric region and the right hypochondrium with Murphy's sign present is pathognomonic, with a clinical conclusion, which is confirmed with laboratory and cabinet studies. [23, 24] Ultrasound is the study that has a high sensitivity and a specificity greater than 90% of cases, for diagnosis, on the other hand computed tomography is not the method of choice to evaluate this pathology, however, the greatest utility of this is the study of the complications of acute cholecystitis, such as emphysematous cholecystitis. hemorrhagic forms, perforation, intra-abdominal collections, tumors, among others. [25] Computed tomography is crucial in the diagnosis and management of patients older than 75 years with acute abdomen, given the difficulty of clinical-biological diagnosis, the frequency of complicated forms, and the morbidity induced by late diagnosis. [26] Enhanced computed tomography showed thickening of the gallbladder wall, sub serosal edema, and enlargement of the gallbladder with no stones inside. [24] The gallbladder scan is a diagnostic standard in biliary dyskinesia, or hypokinesia, characterized by a reduced gallbladder ejection fraction, whereas biliary hyperkinesia involves an abnormally high ejection fraction, reflecting excessive contractility and remains poorly understood, but pathological. [27]

The treatment of acute cholecystitis, which is one of the most common diagnoses in operating rooms, there are several modalities. Many factors influence treatment strategies, such as the patient's age and frailty. Due to the increasing proportion of older patients, one study was

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published in 446 patients treated with antibiotics alone, 17% underwent percutaneous cholecystectomy and 8% underwent laparoscopic cholecystectomy. Mortality at one year was 28.1%. The highest mortality rate was 41.6% in the cholecystectomy group. [28] Endoscopic echo-guided gallbladder drainage is increasingly used for distal malignant biliary obstruction, and in cases of acute cholecystitis in frail or non-surgical patients with concomitant choledocholithiasis, ERC, using a gallbladder "rendezvous," is usually necessary.[29] Apart from the above, cholecystectomy is the treatment of choice in acute cholecystitis with a traditional, laparoscopic or robotic surgical approach. The surgical approach par excellence is laparoscopic cholecystectomy, which is performed at a very high percentage up to 94.0% of cases, with a conversion rate to traditional surgery of 1.4%.[30]

High-risk patients usually require percutaneous gallbladder drainage, with an interval cholecystectomy, where the drainage-surgery time was compared: 1≤ 9 days, 10-17 days, 18-32 days, ≥ 32 days; concluding that 18-32 days later offers the most balanced surgical profile. [31] International guidelines state that emergency cholecystectomy should be performed within 72 hours, but this is not actually the case, as only 20% of Irish patients with acute cholecystitis undergo surgery during their initial admission. This compares to 32.2%, 48.9%, 60.4% and 59% in Sweden, England, Scotland and Ontario (Canada), respectively. [32] Performing a cholecystectomy within seven days of hospital admission is safe, and optimal reduction in morbidity is seen when the procedure is performed within 72 hours of admission. The most tangible obstacles are access to emergency operating rooms, biliary duct imaging, and operative cholangiography. [33]

Decompensated liver disease increases the risk of morbidity and mortality from cholecystectomy, and many practitioners prefer nonsurgical methods, such as stenting into the cystic duct for ERC prevents readmissions and greater decompensation of liver disease compared to other treatment modalities. [34]

In 2018, the scale (TGDS18) was introduced to assess the difficulty of laparoscopic cholecystectomy based on the Tokyo guidelines; the technical difficulty in traditional or laparoscopic and even robotic cholecystectomy, which has been strangely revitalized in the last decade, has become a current issue. [35]

Subtotal cholecystectomy is used as a salvage technique in cases of difficult cholecystectomy where it is not possible to identify anatomical structures. The 2020 World Journal of Emergency Surgery guideline for acute lithiasic cholecystitis recommends performing a subtotal cholecystectomy in situations where it is difficult to identify the necessary anatomical structures or if there is a high risk of iatrogenic injury. [36, 37]

"The technique of partial resection of the gallbladder leaving the liver wall in situ was well known in the third and fourth decades of the twentieth century. In 1931, Estes emphasized the term "partial cholecystectomy." In 1947, Morse and Barb introduced the term "subtotal cholecystectomy." Madding and Farrow popularized it in the years 1955-1959." [38, 39] Subtotal cholecystectomy is defined as removing as much of the gallbladder as possible but intentionally leaving in *situ* the portion of the gallbladder (usually the posterior wall attached to the hepatic bed and/or part of the infundibulum or neck), thus avoiding dangerous dissection in the hepatocytic triangle and thus preventing injury to the bile duct. [40] This surgical

technique is a viable alternative for complex cases of acute or chronic gallbladder inflammation. However, despite its advantages, patients undergoing still face the risk of developing symptomatic gallstones in the remaining gallbladder. In such cases, a resection of the remaining gallbladder is required, which presents some technical challenges. [41] In addition, there are other postoperative complications such as biliary leakage from the edge of the remnant or stump of the cystic duct, or the presence of residual stones in the bile duct or newly formed in the remnant, and were performing ERC for diagnosis and treatment at the same time is a real advantage. [42] In 2016, Steven Strasberg and collaborators published in a literature review article, the introduction of new denominations, discarding the term partial, and subtotal cholecystectomies subdivided them into "fenestrant" and "restorative". The so-called "fenestrant" does not occlude the gallbladder, but it can suture the cystic duct internally. It has a higher incidence of postoperative "biliary fistula" (or actual biliary leakage) but does not appear to be associated with recurrent cholecystolithiasis, as well as "reconstituted" cholecystolithiasis, which involves closing the lower end of the gallbladder, which reduces the incidence of postoperative "fistulas" (biliary leakage), but creates a remnant gallbladder, which may lead to recurrence of symptomatic cholecystolithiasis. [43]

Two meta-analyses were reviewed where the two modalities were compared, in one of them reconstitution was associated with a lower incidence of biliary leakage. We also observed higher rates of postoperative ERC with the "fenestrant" technique. However, there was no difference between the two techniques with respect to rates of cholecystectomy completion, reoperation, readmission and stones retained in the common bile duct. [44, 45] The results are analyzed in another study that long-term over 5 years comparing the two subtypes of subtotal cholecystectomy " fenestrant" and "reconstituted":

1. Bile duct injury rates (0.9% vs. 1.0%; P > 0.99).
2. Biliary leakage (10.6% vs. 9.5%; P > 0.99).
3. Readmission at 30 days (7.6% vs. 8.0%; P > 0.99).

The results did not differ between the "fenestrant" and the "reconstituted" subtotal cholecystectomy. In fenestrant subtotal cholecystectomy, the postoperative biliary leak rate quadrupled upon cystic duct closure (6.0% vs. 24.1%; P = 0.012). There are no notable differences in postoperative outcomes or quality of life between subtotal cholecystectomy subtypes, and the technique should be considered to depend on intraoperative conditions. [46] On the other hand, 21% of patients required a postoperative ERC and 50% were discharged with a drain. Bile leakage was found to be more prevalent in the fenestrated laparoscopic subtotal cholecystectomy group (38% vs. 0%, P = 0.003). The case series suggested more severe recurrent biliary disease in patients undergoing reconstituted laparoscopic subtotal cholecystectomy. [47] On the other hand, in another study the two techniques of subtotal cholecystectomies were compared, it was concluded that reoperation rates were higher in open or reconstituted "reconstructive" subtotal cholecystectomies, bile leakage was common in laparoscopic and open "fenestrant" subtotal cholecystectomies, with an increase in the placement of intraoperative drains and the need for postoperative ERC. [48]

A comparative review is carried out in the published medical literature of 10 different authors, which are characterized in retrospective, observation, descriptive studies from 2015 to 2024, where different variables are evaluated from conventional laparoscopic cholecystectomy, subtotal cholecystectomy with the two techniques "fenestrated" and "reconstituted"; with a

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range of number of patients ranging from 65 to 7,089 cases, with a follow-up of 30 days until the age of 6. ERC support was required in up to 75% of patients with a dependence and variability of diagnoses, but the most frequent indication found was biliary leakage, which predominated with the "fenestrated" subtotal cholecystectomy technique up to 65%, despite the different laparoscopic approach compared to the conventional one. Intra-abdominal collections (bili peritoneum/residual abscess) were reported in three studies. See table 3.

Table 3: Comparative Studies on the Incidence of Postoperative ERC and Related Outcomes after Subtotal Cholecystectomy (SC) and Subtypes: Fenestrated (F)/Reconstituted(R) Vs. Total (C).

Study (Author, Year)	Cohorte(s)	No. Patients	Monitoring	ERC incidence (%)	Primary ERC Indications (Post-CS)	Biliary Leak Rate (%)
Freedle et al., 2017	SC vs C	65	20 months	30.8%	Biliary leakage 65%, Choledocholithiasis 15%), Stenosis 10%, Pancreatitis 5%	Not determined
Shaw et al., 2022	SC vs C	97	Not determined	73.60%	Biliary leak (main)	19.6%
van Dijk et al., 2018	SC-F vs SC-R	191 (102 F, 73 R)	6 years	Not determined	Biliary leakage (more in F), Recurrent biliary events (more in R)	18%
Nzenwa et al., 2021	SC (F vs R)	3.645	Variable	Not determined	Biliary leakage. Collections. Residual lithiasis.	13.90%
Pearce et al., 2023	C(laparoscopic)	2,166 (C) / 1,125 (SC)	22 months	8%	Biliary leakage. Collections. Choledocholithiasis.	18%
Davis et al., 2022	CS vs C	87	30 days	34.50%	Biliary leak. Intra-abdominal abscess.	21.8%
Ausania et al., 2024	CS vs C	626 (in 10 studies)	Variable	8.6%	Biliary leakage. Residual litiasis.	6.4%
Loh et al., 2024	SC vs C (ransom)	489 (317 SC, 172 SC)	Not determined	41%	Biliary leakage (mainly in fenestrant types).	Not determined
Henneman et al., 2015	CS	625	Variable	Not determined	Biliary leakage. Collections. Residual lithiasis.	18.0%
Qu et al., 2023	CS vs C	7.089	30 days	1.7%	Not detailed	Not determined

ERC has been recommended for the management of difficult stones of the common bile duct. In this study, the success rates of elimination of residual lithiasis and the complications or morbidity with which the patients were present were evaluated; in the single-stage group, surgery with removal of gallstones from the bile duct had a rate of residual stones that was halved, and the overall complication rate was four times lower compared to the two-stage group, and the incidence of cholangitis was 3.5 times lower than after cholecystectomy with ERC posterior. The single-stage group experienced a significantly shorter postoperative bowel and defecation time, as well as a shorter hospital stay. [49] Bile leaks can arise because of

cholecystectomy, liver surgery, liver transplant or, less commonly, trauma. The answer is ERC as the primary approach to the management of these often-complicated cases, performing sphincterotomy, naso-biliary drainage, and stenting, which seek to relieve pressure within the bile duct, facilitating depressurization and promoting leak healing. [50]

Choledocholithiasis is currently managed by a two-stage approach, which includes ERC followed by laparoscopic cholecystectomy, this method entails significant morbidity and presents logistical difficulties. Single-stage laparoscopic cholecystectomy and trans cystic bile duct exploration with the spyglass system (anterior cholangioscope): which allows direct visualization of stones, electrohydraulic lithotripsy, and successful ductal cleaning without the need for choledochotomy or papillary trauma, so spyglass-assisted trans cystic exploration with offers important advantages over ERC. [51] Endoscopic biliary stenting is a widely adopted technique for the management of bile duct lesions after cholecystectomy, one of which is duodenal perforation due to stent migration that carries a significant risk of morbidity and mortality. [52] Pediatric choledocholithiasis is a rare but increasingly recognized disease that is managed with a "first endoscopy" or "first surgery" approach that includes laparoscopic cholecystectomy and intraoperative cholangiography, followed by laparoscopic exploration of the common bile duct when indicated. Recent studies have highlighted the potential advantages of this approach. [53] However, current evidence shows that laparoscopic exploration of the common bile duct in a single stage is more efficient and cost-effective than a 2-stage strategy with ERC followed or preceded by cholecystectomy. Common bile duct approaches can be trans cystic or choledochotomy. [54] In the latter, several studies have evaluated the safety between primary closure and T-tube drains, demonstrating the superiority of primary closure. [55, 56] ERC is an invasive endoscopic procedure that is mainly used to treat hepatopancreatobiliary diseases, out of a total of 66,993 ERC procedures that were performed urgently, especially in patients with suppurative cholangitis, biliary tract lesions, were 37,743 (56.4%), the rest was elective and it was reported that the indications were bile duct stone (78.7%), pancreatic tumor (3.9%), papillary tumor (3.3%), cholangiocarcinoma (2.6%), sphincter of Oddi dysfunction (2.4%), biliary leakage after cholecystectomy (2%). A resolution of the pathology or success was reported, much higher than 90%. [57]

Specifically, the use of ERC in acute cholecystitis is carried out by performing the endoscopic placement of trans papillary vesicular stents, with high rates of technical and clinical success, reporting up to 95.2% in endoscopic trans papillary vesicular drainage, as well as placing an endoscopic 5 Fr naso-biliary vesicular drainage tube, reporting a resolution of 100% of patients. [58, 59] The success rate is reported to range from 72.8% to 100%, and recurrence of acute cholecystitis begins within one month, a second event of stenting, lavage, aspiration, and removal of vesicular stones, ensuring non-recurrence of cholecystitis with a follow-up at 3 months. [60] Another application of ERC is the indication of bile leakage of the stump of the cystic duct after cholecystectomy, which is considered by some authors to be an important postoperative complication. Stenting has become the treatment of choice due to its minimal invasion and high success rates. [61] In addition, patients with acute cholangitis in older age pose unique challenges due to comorbidities and frailty, requiring timely intervention by performing emergency ERC without sedation in patients older than 80 years, offering effective biliary decompression with an acceptable safety profile. [62] At present, there are no doubts about the validity, benefit, confidence, and appropriateness of ERC in patients with biliary pathology.

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Authors' Observations

- The diagnosis of acute/chronic cholecystitis is clinically suspected and confirmed by ultrasound.
    1. It is considered that there is no transcendence or difference in the term partial cholecystectomy with subtotal cholecystectomy, in fact they must be a synonym.
- In a laparoscopic or conventional cholecystectomy, whether interval, emergency or scheduled, it is imperative/mandatory to perform a trans cystic cholangiography for two reasons
    1. Verify bile duct integrity and anatomical orientation
    2. The study rules out the presence of choledocholithiasis or not.
- In a subtotal cholecystectomy, only the "restorative" variant is indicated, the "fenestrated" technique has no scientific or logical reason to exist. By leaving a hollow organ open directly to the abdominal cavity its function is to be a store and concentrator of bile; it's just an opinion.
- There are pathologies previously described decades ago, due to the consequences of performing a subtotal cholecystectomy, such as cystic duct remnant syndrome, sinkhole syndrome and post cholecystectomy syndrome. The stigmatization of the variants described in 2016 of partial cholecystectomy is not new.
- In subtotal cholecystectomy, as much of the gallbladder as possible should be resected by planning a closure of the remnant of the gallbladder tissue, removing all the stones and surgically washing the remaining walls, always seeking closure in two planes with polypropylene suture. And a strategically placed external drainage saratoga type at the site of the vesicular remnant and a penrose-type one in the pelvic hollow.
- The authors of this manuscript never recommend and have done a subtotal "fenestrated" cholecystectomy, for the only logical reason of not leaving an open hollow organ (vesicular remnant) that without any pressure that competes with the sphincteric complex of Odiee's system with a continuous pressure from the terminal bile duct to the duodenum, (creating an iatrogenic perforation, with a high risk of bili peritoneum and a posteriori biliary fistula after 9 days and it is mandatory to carry out ERC if it is essential or vital, and assuming that there is no choledocholithiasis.
- With the above statement and analyzing what Steven Strasberg describes, the subclassification of subtotal cholecystectomy into "fenestrated" and "restorative" is of no diagnostic/therapeutic value as there is no real advantage; fenestrated technique is only increasing the risk of complication and useless. The reconstitute technique had already been published by Estes 85 years earlier.
- When a subtotal cholecystectomy is performed for a gallbladder cholecystitis with perforation, pyocholecyst, hydrocholecyst, Mirizzi syndrome; in all these scenarios the walls of the gallbladder are ischemic, necrotic and infected, with a severe inflammatory process and with a very stunted blood circulation, therefore the closure of the remnant will be compromised and the biliary leak will be imminent that if there is no choledocholithiasis the closure will resolve spontaneously in less than 7 days, clear when there is a strategically placed drain; however, excessive use or over indication of performing ERC, such as in placing a stent, verifies patency, extracts residual vesicular stones and a new ERC is reprogrammed in a third time for stent removal. Its risk-cost benefit would then have to be assessed.

- Surgical exploration of the bile duct is no longer an option in the modern era for many recently graduated surgeons, due to fear, ignorance or even the belief of saving time/effort/cost-benefit. However, to date it is imperative to know, perform perfectly and always have this surgical option in the deck of options due to its efficiency, effectiveness, forcefulness/resolution.
- The cost-benefit in these two scenarios has not been documented with scientific evidence:
    1. Failure to perform trans operative cholangiography to ERC.
    2. In not performing cholecystectomy surgery and bile duct exploration to a cholecystectomy and then an ERC.
- It is imperative to have a choledoscope (35 years on the market) and/or spyglass (18 years on the market) in any hospital where a cholecystectomy is performed compared to the use of ERC, since many managers, administrators and even some surgeons consider performing ERC as a substitute with "better results".
- Surgery in biliary pathology in public hospitals in Mexico, outside of the laparoscopic approach, is technologically delayed for more than a century.

CONCLUSIONS

Subtotal cholecystectomy, whether laparoscopic or conventional, is a viable option, in a difficult cholecystectomy and in emergency surgery; that without supplies/resources to perform an obligatory trans operative cholangiography or the lack of being able to perform ERC. ERC is an efficient and effective resource already well demonstrated for the treatment of patients with biliary pathology, however. Its usefulness should not be exceeded. Choledocholithiasis is a surgical pathology, and its first-choice treatment is bile duct exploration surgery, however, the colossal alternative is ERC with less risk, excellent resolution and high forcefulness. The complex thing is the dogmas to carry them out, the lack of supplies and adequate infrastructure. Subtotal cholecystectomy should be performed with the "reconstituted" technique, with adequate/strategic drainage and after trans operative cholangiography, never the "fenestrated" technique. Cholecystectomy and aggregate biliary pathology are complex, as well as the most frequent in incidence, so it must be managed by administrative decision makers, to be able to have continuous retraining for surgeons in the optimization of surgical techniques, acquisition of supplies/resources and then to be able to provide the best surgical quality care to patients in Mexico.

Conflict of Interest

The authors stated that they had no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

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