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Role of Intraoperative Cholangiography in Selective Laparoscopic Cholecystectomy

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1. Abstract

1.1. Background: Laparoscopic cholecystectomy (LC) is a procedure that most commonly performed during general surgery. The effectiveness of intraoperative cholangiography and its contribution to minimizing postop complications remains uncertain.

1.2. Objective: The objective of the study is to assess the role of intraoperative cholangiography in selective laparoscopic cholecystectomy.

1.3. Materials and Methods: This was a discreptive study and data was collected retrospectively. During study 58 patients of all age groups with both genders were included. The patients admitted as acute cholecystitis, biliary pancreatitis, and patients with obstructive jaundice were included in the study.Data was entered and analyzed through computer software SPSS version 25.0.

1.4. Results: Among 58 patients included in the study, 65.5% were females and mean age was 41.31+11.722 years. The mean operative time was 58.64+40.436 minutes and mean hospital stay was 4.71+0.622 days. Among these patients, 1.7% had CBD injury, patient was converted to open surgery. Fourteen patients (20.7%) patients were found to have CBD calculi and underwent ERCP.

1.5. Conclusion: Study concluded that intraoperative cholangiography plays a significant role in selective laparoscopic cholecystectomy. The main advantage of IOC was that it diagnosed 20.7% cases who required ERCP at the same time.

2. Introduction

Laparoscopic cholecystectomy is a procedure that most commonly performed worldwide [1,2]. This surgical approach was popularized in 1985 when Dr. Erich Miuhe first utilized it for the removal of gallstones [3]. In addition to the benefits of a notably quicker recovery and improved cosmetic outcomes, the laparoscopic technique carries an elevated risk of several complications, including bleeding from the gallbladder bed or the cystic artery, as well as biliary complications such as spilled gallstones, biliary leaks, and common bile duct injuries. The intraoperative complication rate was reported to be between 8.3% and 43% in various series [4,5]. Retained CBD (common bile duct) stones and BDIs (bile duct injuries) are uncommon but severe complications, closely related to postop morbidity as well as mortality [6,7].

The intraoperative cholangiography (IOC) technique, initially reported by Mirizzi, entails the endoscopic cannulation of cystic duct for the visualization of bile duct [8-10]. It facilitates in detection of any bile duct stones, preexisting anatomic anomalies and iatrogenic injuries that might have occurred. In the past, IOC was primarily employed in open surgical procedures to assist in identifying common bile duct stones, but its regular utilization had been a topic of debate long before the advent of laparoscopic cholecystectomy. Nonetheless, when performed during laparoscopic cholecystectomy, the IOC offers the added advantage of serving as a guide for surgical dissection [11].

The use of IOC during laparoscopic cholecystectomy is well established [12]. Studies have reported a prevalence rate of 10 to 18 percent for concomitant CBD stones among individuals undergoing LC. Failing to address this issue promptly can lead to poten-

tial future health complications including pain, infections, biliary pancreatitis and jaundice. If the CBD stones are detected during intraoperative cholangiography in the course of cholecystectomy, failing to take immediate intraoperative actions or plan for postoperative measures can result in an enhanced probability of adverse outcomes. The incidence of iatrogenic BDIs has been increased with LC. However, performing IOC can lead to the detection of a greater number of biliary injuries during surgery. Timely identification and intervention for these injuries can effectively prevent the development of partial injuries into entire CBD transections [13].

Arguments opposing its usage include the enhanced intraoperative time demands, elevated false positive rates necessitating avoidable additional procedures such as ERCP (endoscopic retrograde cholangiopancreatography), a failure incidence of 3 to 17 percent and elevated costs coupled with utilization of resources. Moreover, there are concerns regarding the potential risks associated with ionizing radiation exposure for both patients and personnel in the operation theater [14]. So far, the need for IOC during LC remains controversial, although, regarded as a safe procedure with a low risk of complications, the role of selective IOC usage remain an area of debate.

3. Objectives

The objective of the study is to assess the role of intraoperative cholangiography in selective laparoscopic cholecystectomy.

4. Materials and Methods

This was a descriptive study and data was collected retrospectively. The study was carried out at Sheikh Khalifa Medical City Ajman. During study 58 patients of all age groups with both genders were included. The patients admitted as acute cholecystitis, biliary pancreatitis, and patients with obstructive jaundice were included in the study.The data of patients who underwent laparoscopic cholecystectomy with intra operative cholangiogram between January 2019 to December 2022 was analyzed. Data regarding age, gender, marital status, operative time, hospital stay and outcome in terms of missed CBD calculi, and futher need of ERCP was evaluated. The role of intraoperative cholangiography was evaluated among patients during laparoscopic cholecystectomy.

Data was entered and analyzed through computer software SPSS version 25.0. Frequencies and percentages were calculated and data was presented in tables. Confidentially of data was ensured that data will not be utilized except for the academic purpose.

5. Results

Among 58 patients included in the study, 20 (34.5%) were males and 38 (65.5%) were females. The mean age was 41.31+11.722 years. Fifty-five (94.8%) patients were married and only 3 (5.2%) were unmarried. Elective surgeries were performed among 20 (34.5%) patients while 38 (65.5%) patients underwent emergency surgeries.

(Table 1) depicts that among 58 patients, 19 (32.7%) had operative time <30 minutes, 16 (27.6%) had 31-60 minutes, 13 (22.4%) had 61-90 minutes and 10 (17.3%) patients had above 90 minutes while the mean operative time was 58.64+40.436 minutes. (Table 2) highlights that out of 58 patients, 20 (34.5%) had hospital stay 3-4 days and 38 (65.5%) had 5-6 days while the mean hospital stay was 4.71+0.622 days. (Table 3) demonstrates the outcome of intra operative cholangiogram. CBD stone was detected in 14 patients who underwent ERCP, and stone removal. One patient, 1 (1.7%) had CBD injury, was converted to open surgery, and CBd was repaired.

Table 1: Opertive Time

	Frequency	Percentage
<30 minutes	19	32.7
31-60 minutes	16	27.6
61-90 minutes	13	22.4
>90 minutes	10	17.3
Total	58	100
Mean+SD	58.64+40.436	

Table 2: Hospital Stay

	Frequency	Percentage
3-4 days	20	34.5
5-6 days	38	65.5
Total days	58	100
Mean+SD	4.71+0.622	

Table 3: Outcomes (n = 58)

	Yes
CBD stone detection	14 (24.2%)
ERCP and stone removal	14 (24.2%)

6. Discussion

The present study was carried out to assess the role of intraoperative cholangiography in selective laparoscopic cholecystectomy. Study revealed that among 58 patients, 34.5% were males and 65.5% were females. The findings of a similar study undertaken by Omar and Khalil (2015) are comparable with our study results who reported that 26.4% patients were males while 73.6% were females.[15] But a study conducted by Lai and teammates (2016) indicated that both males and females' patients were almost in equal number (50.3% vs. 49.7%) [13].

Age is a leading factor that plays a significant role in timely recovery of patients. It was found during study that mean age of the patients was 41.31+11.722 years. The findings of our study exhibited better scenario than the study carried out by Lai and teammates (2016) who asserted that mean age of patients was 58.65+16.12 years [13]. Akingboye and comrades (2014) also confirmed in their study that patients mean age was 51+17.5 years [2]. However, a study done by Kumar and fellows (2014) highlighted that

patients' average age was 43.7 years [16]. In our study elective surgeries were performed among 34.5% patients while a study done by Photti and companions (2017) reported that most of the cases were elective (83.0%) [12].

During study operative time was also assessed, study disclosed that among patients the operative time was 58.64+40.436 minutes. A most recent study performed by Esposito and coworkers (2023) also offered comparable results that mean operative time was 60 minutes [1]. The findings of our study further revealed that among patients the mean hospital stay was 4.71+0.622 days. But a study carried out by Lai and teammates (2016) reported better outcomes that mean hospital stay among patients was 3.05+3.21 days [13]. It was very encouraging to know that in our study the incidence of CBD injury was only 1.7% (one patients) showing the better efficacy of intraoperative cholangiography. Similar results were also reported by a study conducted by Esposito and coworkers (2023) who stated that only one patient was suffered from CBD injury [1]. But another study carried out by Farda and associates (2015) showed difference scenario, they confirmed that three patients experienced CBD injury [5]. However, the results of a study performed by Photti and companions (2017) are better than our study results who elucidated that no CBD injury was reported among patients [12]. It is significant to mention here that the incidence of spilled gallstone in our study was 3.4% while a study done by Farda and associates (2015) confirmed that prevalence of spilled stone was 16.4% [5] The results of our study highlighted that 1.7% patient experienced biliary leak while two studies reported comparable but better situation than our study results. One study carried out by Lai and teammates (2016) reported that prevalence of biliary leak was 0.5% [13] while other study performed by Farda and associates (2015) confirmed that biliary leak incidence was 0.9% [5].

The results of our study demonstrated an increased prevalence regarding obstructed jaundice (13.8%) and pancreatitis (13.8%). But a study conducted by Omar and Khalil (2015) exhibited better results than our study and confirmed that incidence of pancreatitis was only 3.8% [15]. When the rate of conversion to open surgery was assessed among patients, better results were observed that only 1.7% patient experienced conversion to open surgery. However, a study done by Photti and companions (2017) highlighted that the rate of conversion to open surgery was only 0.4% [12]. Another study performed by Farda and associates (2015) indicated that the rate of conversion to open surgery was 0.7% [5]. In a study, Esposito and coworkers (2023) elucidated that conversion to open surgery was noticed among three patients [1]. Study further showed the significant advantage of intraoperative cholangiography and found that during laparoscopic cholecystectomy, 20.7% cases were detected who required ERCP at the same time. The findings of another study conducted by Shneashen and collaborators (2019) also highlighted the significance of intraoperative cholangiography during laparoscopic cholecystectomy and confirmed that 13.0% cases were detected who required ERCP [10]. However, a study carried out by Lai and teammates (2016) elucidated that only 2.3% cases were detected who required ERCP.

7. Conclusion

Study concluded that intraoperative cholangiography plays a significant role in selective laparoscopic cholecystectomy. The main advantage of IOC was that it diagnosed 20.7% cases who required ERCP at the same time.

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