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Comparative Analysis of Laparoscopic and Open Surgery for Gallbladder Disease

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ABSTRACT

Background: Laparoscopic cholecystectomy is a procedure frequently performed worldwide by general surgeons. In a significant number of cases, it is performed on elderly patients with cholecystitis.

Objective: This study was focused on assessing and comparing outcomes related to laparoscopic and open Surgery for patients with gallbladder disease.

Patients and methods: A cross-sectional study were conducted for patients who underwent cholecystectomy, which included 155 patients whose ages ranged from <35 years to 50 years of age in different hospitals in Iraq for a period between July 14, 2022, to August 26, 2023. The clinical data of the patients were determined, and they were divided into two groups, where group A included 80 patients and group B included 75 patients. This study was conducted between both surgeries, which are laparoscopic cholecystectomy and open cholecystectomy, by recording the rate of complications, assessing the degree of pain, and evaluating the quality of life of patients after surgery.

Results: In comparison between the two surgeries, the intraoperative data recorded that the duration of laparoscopic cholecystectomy surgery was (56.14 ± 11.88) minutes and the duration of open cholecystectomy surgery was (84.36 ± 15.78), the rate of patients who had blood loss was 18 in group A and 29 patients in group A. B, the duration of hospital stay was 3.2 ± 0.3 days and 5.8 ± 0.7 days, and the death rate in group A was 0 cases while group B got 2 cases. Regarding the results after the two kinds of operations, our study recorded the rate of postoperative complications, which shows that there were 15 patients who had postoperative complications in group A, while in group B, 25 patients were included, and the most common complications were wound infection and bleeding.

Conclusion: The current study indicates that laparoscopic cholecystectomy surpasses open cholecystectomy in the management of gallbladder disease because it presents less postoperative pain and a more accepted and preferred aesthetic result by patients.

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KEYWORDS: Cholecystitis; Laparoscopic cholecystectomy; Open cholecystectomy, post-operative complications; quality of life.

INTRODUCTION

Acute cholecystitis is an inflammatory process characterized by distension of the gallbladder, thickening of the walls, exudations, and the presence of pericholecystic fluid [1]. In most cases, it is associated with cholelithiasis, but there are other factors that seem to contribute to its pathogenesis, including wall ischemia, decreased motility, direct chemical damage, infection, and connective tissue abnormalities [2]. It is estimated that in the USA, there are 25 million people with cholelithiasis, and about 20% of them will eventually develop symptoms and complications during their lifetime. [3]

Currently, laparoscopic cholecystectomy (LCC) is the main treatment for acute cholecystitis. Compared to open cholecystectomy (ACC), LCC is associated with a lower morbidity, but in complicated cases, the recommendation is conversion to open cholecystectomy when it cannot be performed laparoscopically [4]. In different studies, an attempt has been made to identify those patients who will represent greater technical complexity and who, consequently, would have a greater risk of conversion. [5]

On the contrary, some studies found the incidence of gallbladder lesions in laparoscopic surgery is low; it provides better evolution in patients whenever the diagnosis and repair of the lesion is performed in the trans-operative; the treatment can be laparoscopic or by conventional route according to the experience of the acting surgeon and the appropriate instruments existing in health centers [6]. Patients are diagnosed by means of abdominal ultrasound because it is the most widely available imaging study in most low- to middle-income countries and has a good diagnostic efficiency [7]. Computed tomography is as effective as ultrasound in demonstrating the dilated bile duct in patients with obstructive jaundice. [8]

Computed tomography is much more accurate than ultrasound in determining the level and cause of obstruction; it is invaluable in the detection and demonstration of choledocyanin stones [9]. The most frequent injury to the bile ducts during laparoscopic surgery is the so-called classic injury; it occurs when a portion of the common bile duct is resected with the gallbladder. [10]

The main disadvantages of laparoscopic surgery, in contrast to open surgery, are the loss of direct vision, the need for hand-eye coordination, and the lack of tactile feedback [11]. Improper placement of the trocars is an added risk [12]. The biggest advantage of open gallbladder surgery is its better spatial perception and haptic sensation, which could improve the surgeon's confidence about how to proceed during cholecystectomy [13].

Previous risk prediction models have tried to address this problem, but for decades, different diagnostic criteria have been used to differentiate CA from symptomatic cholelithiasis, which prevents the replicability of the findings in relation to the determined CA. [14]

Patients and methods

We conducted a cross-sectional study of patients with gallbladder diseases for the purpose of evaluating and analyzing the results before, during, and after the surgical operation performed to treat patients with gallbladder diseases in different hospitals in Iraq for a period between July 14, 2022, to August 26, 2023. Clinical and demographic data were collected for the samples, which included 155 patients aged <35 years to 50 years. Demographic data included age, gender, body mass index, comorbidities, and economic level,

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Our study recruited 155 patients and divided them into two groups, where group A included 80 patients and group B included 75 patients. The indicators or symptoms associated with patients were identified and distributed among both groups. Also, these results included the average severity of cholecystitis in patients, which was defined as mild, moderate, and severe.

Regarding intraoperative results, our study compared both groups while undergoing surgery. Clinical data included operation time, use of drainage system, estimated blood loss, the rate of patients who lost blood during surgery, and the rate of cases who remained in the hospital for more than six days, use of prophylactic, length of stay in hospital, and number of deaths.

For further results, our study determined the postoperative complication rate that patients in both groups experienced. Moreover, we evaluated the average pain scores of patients after surgery by VAS scale in the first six days after surgery. In addition, our study evaluated patients' postoperative quality of life with the GIQLI scale, and the scales included symptoms, physical function, emotional state, psychological state, and social activities.

Results

Table 1: Clinical and preoperative patient characteristics in this study.

Preoperative Characteristics	Number of patients	Percentage [%]
Age		
< 35	34	21.94%
35 – 44	54	34.84%
45 – 50	67	43.23%
Sex		
Males	46	29.68%
Females	109	70.32%
BMI [kg/m2]		
< 29.5	27	17.42%
29.5 – 32.9	85	54.84%
> 32.9	43	27.74%
Comorbidity		
Diabetes mellitus	38	24.52%
Hypertension	33	21.29%
Coronary diseases	25	16.13%
Respiratory diseases	19	12.26%
Obesity	40	25.81%

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Income Status		
Low [200 – 400] $	41	26.45%
Middle [401 – 600] $	50	32.26%
High [601 – 800] $	64	41.29%

Table 2: Determine the frequency and percentage of patients who underwent surgery.

Groups	Number of patients	Percentage [%]
Group A [Laparoscopic surgery]	80	51.61%
Group B [Open Surgery]	75	48.39%

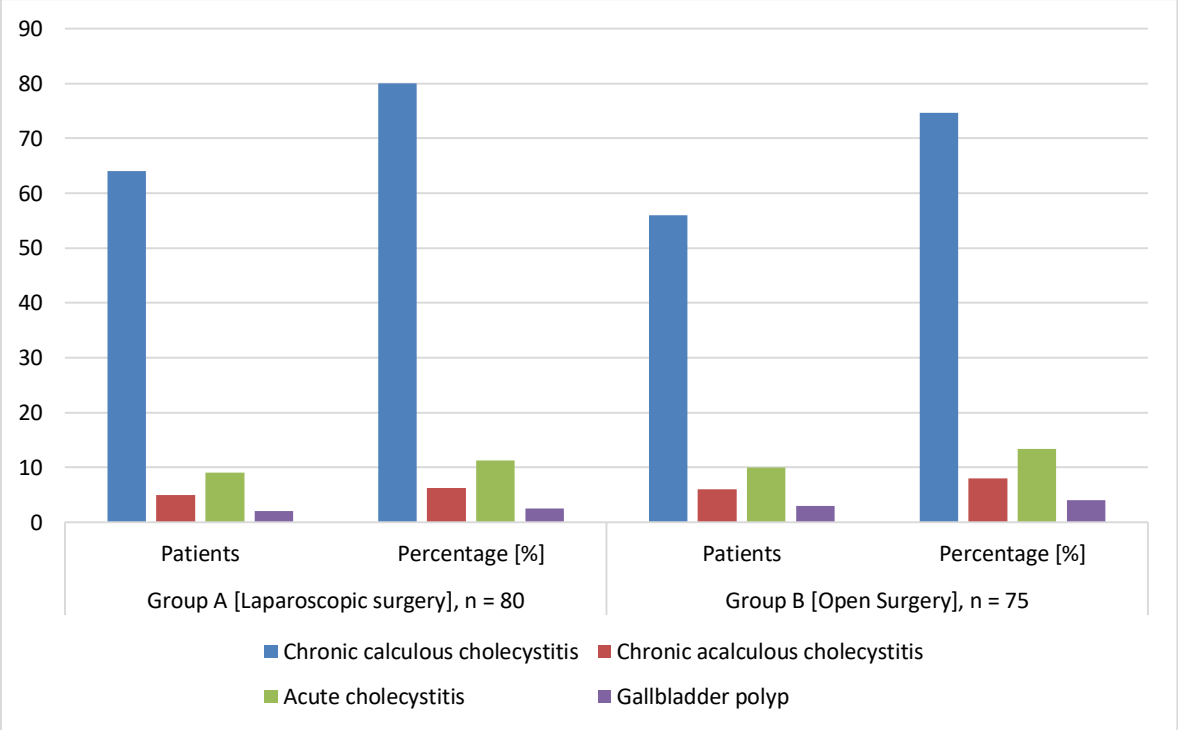

Figure 1: Determine common indications of surgery in both groups.

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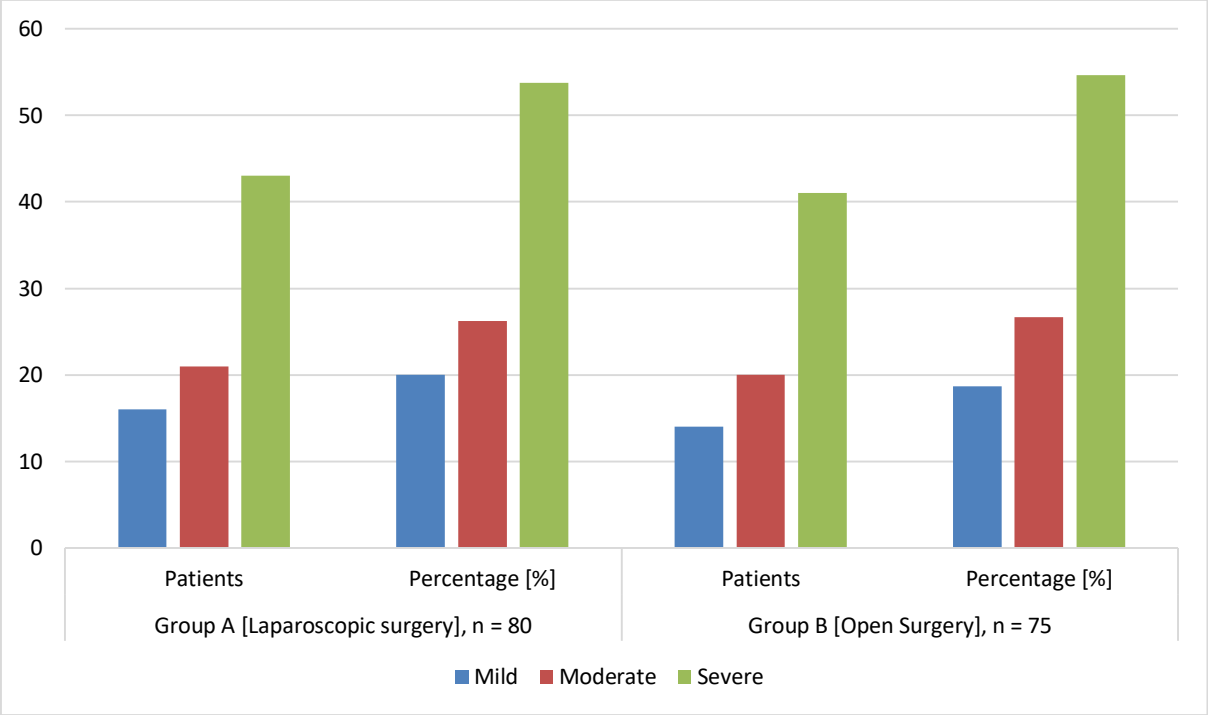

Figure 2: Severity of cholecystitis.

Table 3: Intraoperative outcomes of patients.

Characteristics	Group A [Laparoscopic surgery], n = 80	Group B [Open Surgery], n = 75	P – value
Operative time [min]	56.14 ± 11.88	84.36 ± 15.78	< 0.0001
Use of drainage system, N [%]	31 [20%]	56 [36.13%]	< 0.0001
Estimated blood loss (mL)	119.76 ± 14.20	171.56 ± 16.51	< 0.0001
Blood loss, N [%]	18 [11.61%]	29 [18.71%]	0.0027
Stayed > 6 in hospital, days (%)	6 [3.87%]	12 [7.74%]	0.0858
Use of prophylactic antibiotics, N [%]	132 [85.16%]	148 [95.48%]	0.0528
Length of stay in hospital [days]	3.2 ± 0.3	5.8 ± 0.7	< 0.0001

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Death	0 [0%]	2 [2.67%]	0.0063

Table 4: Post-operative complications.

Complications	Group A, n = 80	Group B, n = 75	P – value
Bleeding	4 [5%]	6 [8%]	0.034
Bile leak	2 [2.5%]	2 [2.5%]	0.05
Wound infection	6 [7.5%]	10 [12.5%]	0.0014
Morrison's pouch	2 [2.5%]	4 [5.0]	0.022
Port site hernia	1 [1.25%]	3 [3.75%]	0.0253
Total	15 [18.75%]	25 [33.33%]	< 0.001

Table 5: Assessment of pain of patients by VAS scale.

VAS pain time [days]	Group A [Laparoscopic surgery], n = 80	Group B [Open Surgery], n = 75	P – value
First day	5.20 ± 1.21	7.85 ± 1.53	0.0024
Second day	3.61 ± 1.13	5.84 ± 0.34	0.000282
Fourth day	2.43 ± 0.65	3.66 ± 0.88	0.0045
Sixth day	1.103 ± 0.44	2.65 ± 0.63	0.0045

Table 6: Assessment of post-operative quality-life of patients by GIQLI scale.

GIQLI scale	Group A [Laparoscopic surgery], n = 80	Group B [Open Surgery], n = 75	P – value

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Symptom	74.68 ± 6.2	62.11 ± 4.35	< 0.001
Physical function	22.84 ± 2.5	20.62 ± 1.8	0.258
Emotional status	19.67 ± 1.5	16.51 ± 1.4	0.271
Psychological status	17.53 ± 2.21	14.37 ± 2.4	0.357
Social activities	14.32 ± 1.6	12.20 ± 1.03	0.624

Discussion

Clinical data showed a high incidence of gallbladder diseases and that the patients were between the ages of 45 and 50, with a rate of 67 patients. Our results found that males were 102 patients more likely than females, which included 53 patients with a high body mass index (BMI) with a rate between (29.5 and 32.9), which included 85 patients. Patients, our results found that comorbidities were related to patients, and the most influential diseases were obesity with 40 patients, diabetes with 38 patients, and hypertension with 33 patients.

This surgery, which was used to remove the gallbladder, was recorded as Group A, which included patients who underwent laparoscopic surgery and included 80 patients. Group B included patients who underwent open surgery with 75 patients. Our results identified the common indications for surgery in both groups, and the most dangerous indicator for patients was chronic calculous cholecystitis, with 64 patients in group A and 56 patients in group B, with the majority of patients suffering from severe cholecystitis with a rate of 84 patients, moderate with 41 patients, and mild with 30.

Our study determined surgical data for patients, such that the duration of surgery for laparoscopic cholecystectomy was (56.14 ± 11.88) minutes, and the duration of surgery for open cholecystectomy was (84.36 ± 15.78) minutes. The drainage system was 31 patients in group A and 56 patients in group B, and the average Estimated blood loss was (119.76 ± 14.20) ml in group A and (171.56 ± 16.51) in group B. The rate of patients with blood loss was 18 in group A and 29 patients in group B, and the duration of hospital stay was 3.2 ± 0.3 days. And 5.8 ± 0.7 days and the death rate in group A was 0 cases while group B got 2 cases.

Regarding the postoperative results, our study recorded the rate of postoperative complications, which shows that there were 15 patients who suffered from postoperative complications in group A, while in group B, 25 patients were included, and the most common complications were wound infection and bleeding, with changes and differences between the two groups, as On the fourth day it was 2.43 ± 0.65 and on the sixth day it was 1.103 ± 0.44 in group A, while in group B it was found on the fourth day of 3.66 ± 0.88 and on the sixth day it was 2.65 ± 0.63.

Previous studies unanimously agreed on the effectiveness of laparoscopic cholecystectomy due to its many positive characteristics, safety, and quality of the technique, and high patient satisfaction with the laparoscopic procedure due to its advantages: shorter length of stay in the hospital, faster recovery, and shorter duration of surgery, which is attributed to a decrease in the rate of complications and the rate of pain of patients [15,16]. Another study showed that the improvement in patient outcomes positively affects patients' quality

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of life in the long term, which makes most patients significantly prefer laparoscopic cholecystectomy over open cholecystectomy. [17]

Conclusion:

This study has proven that the laparoscopic cholecystectomy procedure is safer and more effective compared to the traditional open surgery procedure, as this laparoscopic surgery offers a lower rate of blood loss, a shorter duration of hospital stays, a shorter duration of surgery, a faster recovery rate, and a lower postoperative pain rate. Our study reported a lower complication rate in laparoscopic cholecystectomy with 15 patients compared to open surgery with 25 patients.

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