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A Cross-Sectional Study of Risk Factors in Patients Who Underwent Laparoscopic Cholecystectomy

Dr. Ahmed Fakhri Omar[1], Dr. Emad Khalid Mohammed[2], and Prof. Dr. Luai Farhan Zghair[3]

[1]M.B.Ch.B \ C.A.B.S \ M.R.C.S. Ireland \ (General Surgeon), Ministry of Health of Kurdistan, Erbil Directory of Health, Roj Halat Emergency Hospital

[2]M.B.Ch.B. \ C.A.B.M.S. \ (General Surgeon), Specialist in general surgery, Iraqi Ministry of Health, Kirkuk Health Directorate, Azadi Teaching Hospital, Kirkuk, Iraq

[3]Ministry of Higher Education and Scientific Research, Al-Iraqia University, Medical College, Surgical Department, Baghdad, Iraq

Abstract: Background: Gallstones are treated via laparoscopic cholecystectomy, which is regarded as the best method. Prior to surgery, estimating the degree of difficulty might assist in organizing a safe procedure with few problems. Cases that are anticipated to be very challenging may be scheduled for an open cholecystectomy or sent to a more skilled surgeon. **Objective:** This paper aims to assess a cross-sectional study of risk factors in patients who underwent laparoscopic cholecystectomy. **Patients and methods:** This paper contributed to conduct a cross-sectional study of risk factors in patients who underwent laparoscopic cholecystectomy, which was done for all patients (50 cases) who underwent laparoscopic cholecystectomy in different hospitals in Iraq from the 18th of July 2021 to the 25th August 2022. This paper was analysed all patients with cholecystectomy into ages above 30 years to below 60 years to determine the complications impact on cholecystectomy patients before and after laparoscopic cholecystectomy operation and the role of risk factors on patients after laparoscopic cholecystectomy operation. The examination of data was estimated and applied on the SPSS program. **Results and discussion:** Age of 60 or more, male gender, concomitant disease, history of severe cholecystitis, prior surgery on the abdomen, gall bladder wall thickness of 4-5 mm, constricted gall bladder, and impact stone are only a few of the indicators for problematic LC that have been cited in the literature. In other searches, it was discovered that male patients presented with symptoms later than female ones. The probable cause might be that minor symptoms receive less attention, which delays presentation until the disease has advanced. Other research has referred to this circumstance. We did not consider the surgeon's expertise as a predictor because, at our hospital, LC is frequently done by consultant surgeons. However, several research continued to point to surgeons' lack of operational expertise being a risk factor for challenging LC. **Conclusions:** Pericholecystic adhesions and adhesions at the triangle of calot are brought on by chronic gall bladder inflammation, which makes it more difficult to dissect the gallbladder under laparoscopic surgery and raises the risk of bleeding and harm to adjacent structures. As a result, adhesion at Calot's triangle is another important that has been highlighted in several research, including ours.

Keywords: laparoscopic cholecystectomy; Complications; BMI; and Hypertension.

INTRODUCTION

Gallstones are treated via laparoscopic cholecystectomy, which is regarded as the best method. Prior to surgery, estimating the degree of difficulty might assist in organizing a safe procedure with few problems. Cases that are anticipated to be very challenging may be scheduled for an open cholecystectomy or sent to a more skilled surgeon [Saber, A. *et al*., 2015; Vivek, M.A.K.M. *et al*., 2014]. The degree of difficulty in pneumothorax creation, entrance into the peritoneal cavity, adhesive lysis, distinguishing of anatomical features, and gallbladder removal was evaluated by Vivek and colleagues. Age over 65, male gender [Stanisic, V. *et al*., 2014; Joshi, M.R. *et al*., 2015], recurrent seizures, a previous history of prior surgery to the abdomen, abnormal tests for liver function, high serum amylase levels, and to stretched gallbladder alongside peri cholecystitis upon ultrasound imaging were some of the factors linked to challenging laparoscopic cholecystectomy in the study. [Bourgouin, S. *et al*., 2016]

Only a few research assessed the degree of difficulty based on the variance from the mean running time. Using a grading system that considered the patient's medical history, and clinical criteria, whereas ultrasound images, Joshi projected that laparoscopic cholecystectomy would be difficult [Nidoni, R. *et al*., 2015]. However, during surgery, 74% of all patients were easy, and 26% were not, contrary to his prediction. Since there is a ton of research on this subject, past studies have produced contradictory findings. [Thyagarajan, M. *et al*., 2017; Kumar, S. *et al*., 2008]

The surgical challenge about of haemorrhage and conversions to open cholecystectomy was examined by Saber and colleagues [Sharma, S. *et al*., 2006; Sanabria, J.R. *et al*., 1994]. 7.84% of patients experienced incisional haemorrhage, and 7.35% of patients required conversion to open surgery; both outcomes were mostly related to acute cholecystitis (4.9%), a male gender (10.2%), age more than fifty years, high BMI, and

*Corresponding Author: Dr. Ahmed Fakhri Omar

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peritoneal adhesion (8.62%). [Schrenk, P. *et al*., 1995]

According to research by Stanisek *et al*. [Brodsky, A. *et al*., 2000; Bedirli, A. *et al*., 2001], 2.7% of patients experienced difficulties due to conversion to open cholecystectomy. Based on the length of the procedure and the percentage (4.3%) that it was converted to open surgery, Bourgoin, *et al*., [Ibrahim, S. *et al*., 2006].

Rated the difficulty level. 35.2% of the cases were problematic based on the time of the surgery. Age more than 70 years (47.3%), a man's gender (67.8%), severe cholecystitis (69.6%), and prior attack (18.2%) were statistically significant characteristics linked to difficulties [Fried, G.M. *et al*., 1994; Nachnani, J. *et al*., 2005; Jansen, S. *et al*., 1997]. This paper aims to assess a cross-sectional study of risk factors in patients who underwent laparoscopic cholecystectomy.

PATIENTS AND METHODS

This paper contributed to conduct a cross-sectional study of risk factors in patients who underwent laparoscopic cholecystectomy, which was done for all patients (50 cases) who underwent laparoscopic cholecystectomy in different hospitals in Iraq from the 18th of July 2021 to the 25th of August 2022. This paper was analysed all patients with cholecystectomy into ages above 30 years to below 60 years to determine the complication's impact on cholecystectomy patients before and after laparoscopic cholecystectomy operation and the role of risk factors on patients after laparoscopic cholecystectomy operation. The examination of data was estimated and applied on the SPSS program.

This paper was conducting the demographic of cholecystectomy patients based on age, sex, and smoking.

The examination of the data was presented on Table 1, Table 2, and Table 3. To follow that, this paper was acquiring to comorbidities of cholecystectomy patients, which include Cardiovascular, Diabetes, Hypertension, and Respiratory diseases, which can be determined in Table 4.

As well as this study was extended to estimate Types of cholecystectomies related to patients, which depend on Elective, Emergency, Laparoscope, and Open, which can be seen in Table 5. This paper was Measured of the height, weight, and BMI of cholecystectomy patients, which can be shown in Table 6, Table 7, and Table 8.

This study was estimated the results of changes in Gallbladder wall thickness examination which depend on <4 and $\geq$ four which the outcome was found in Table 9. This study was determined Cholecystitis outcomes distribution and Fibrotic Gallbladder outcomes of cholecystectomy patients, which based on yes and nowhere all outcomes were shown in Table 10 and Table 11.

This paper was extended to the Estimation of Co-morbidity of cholecystectomy patients were determined based into ASA I, ASA II, ASA III, and ASA IV, of which all examinations were estimated in Table 12.

Moreover, this paper was assessed of complications before the cholecystectomy operation, which selected to Bile leakage, Bleeding, Deep vein thrombosis, Infection, and Injury to the bile duct were; all outcomes have been shown in Table 14. To analyse the result, this paper was assessed of complications after Laparoscopic cholecystectomy operative, which distribute into high temperature, indigestion, non, and tummy pain, were all results can be seen able 15.

Finally, this paper was too assessed of risk factors for patients conducting after a Laparoscopic cholecystectomy operative, which get on Age, Sex, Blood Loss, ASA, Fibrotic Gallbladder, and Obesity. Then all these assessment results of risk factors can be clarified in Table 16.

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RESULTS

Table 1: Conducting demographic of cholecystectomy patients based on age

Age		
N	V	50
	Mi	0
M		46.7400
SEM		1.31018
Me		46.5000
Mo		51.00
ST		9.26439
Sk		-.091
SES		.337
Min		30.00
Max		60.00
S		2337.00

Table 2: Conducting demographic of cholecystectomy patients based on sex

Sex					
		F	**P**	**VP**	**CP**
V	Women	17	34.0	34.0	34.0
	men	33	66.0	66.0	100.0
	T	50	100.0	100.0	

Table 3: Conducting demographic of cholecystectomy patients based on smoking

Smoking					
		F	**P**	**VP**	**CP**
V	Non-smoker	15	30.0	30.0	30.0
	Smoker	35	70.0	70.0	100.0
	T	50	100.0	100.0	

Table 4: Comorbidities of cholecystectomy patients

		F	**P**	**VP**	**CP**
V	Cardiovascular	7	14.0	14.0	14.0
	Diabetes	20	40.0	40.0	54.0
	Hypertension	12	24.0	24.0	78.0
	Respiratory diseases	11	22.0	22.0	100.0
	T	50	100.0	100.0	

Table 5: Types of cholecystectomies related to patients

		F	**P**	**VP**	**CP**
V	Elective	12	24.0	24.0	24.0
	Emergency	3	6.0	6.0	30.0
	Laparoscope	33	66.0	66.0	96.0
	Open	2	4.0	4.0	100.0
	T	50	100.0	100.0	

Table 6: Measurements of height of cholecystectomy patients

Height		
N	V	50
	Mi	0
M		177.0800
SEM		1.18109
Me		178.5000
Mo		182.00[a]

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ST	8.35156
Sk	-.469
SES	.337
Min	155.00
Max	191.00
S	8854.00

Table 7: Measurements of the weight of cholecystectomy patients

Weight		
N	Va	50
	Mi	0
M		80.8600
SEM		1.23784
Me		82.0000
Mo		84.00
ST		8.75287
Sk		.069
SES		.337
Min		66.00
Max		98.00
S		4043.00

Table 8: Measurements of BMI of cholecystectomy patients

BMI		
N	V	50
	Mi	0
M		25.7728
SEM		.29236
Me		25.4100
Mo		23.18[a]
ST		2.06729
Sk		.875
SES		.337
Min		22.22
Max		32.74
S		1288.64

Table 9: Results of changes in Gallbladder wall thickness examination

		F	**P**	**VP**	**CP**
V	<4	7	14.0	14.0	14.0
	≥4	43	86.0	86.0	100.0
	T	50	100.0	100.0	

Table 10: Cholecystitis outcomes distribution

		F	**P**	**VP**	**CP**
V	No	14	28.0	28.0	28.0
	Yes	36	72.0	72.0	100.0
	T	50	100.0	100.0	

Table 11: Fibrotic Gallbladder outcomes of cholecystectomy patients

		F	**P**	**VP**	**CP**
V	No	38	76.0	76.0	76.0
	Yes	12	24.0	24.0	100.0
	T	50	100.0	100.0	

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Table 12: Estimation of Co-morbidity of cholecystectomy patients

		F	P	VP	CP
V	ASA I	13	26.0	26.0	26.0
	ASA II	24	48.0	48.0	74.0
	ASA III	9	18.0	18.0	92.0
	ASA IV	4	8.0	8.0	100.0
	T	50	100.0	100.0	

Table 13: Assessments of complications before cholecystectomy operation

		F	P	VP	CP
V	Bile leakage	10	20.0	20.0	20.0
	Bleeding	22	44.0	44.0	64.0
	Deep vein thrombosis	10	20.0	20.0	84.0
	Infection	3	6.0	6.0	90.0
	Injury to the bile duct	5	10.0	10.0	100.0
	Total	50	100.0	100.0	

Table 14: Assessments of complications after Laparoscopic cholecystectomy operative

		F	P	VP	CP
V	high temperature	7	14.0	14.0	14.0
	indigestion	2	4.0	4.0	18.0
	non	38	76.0	76.0	94.0
	tummy pain	3	6.0	6.0	100.0
	Total	50	100.0	100.0	

Table 15: Outcomes of blood loss after Laparoscopic cholecystectomy operative

		F	P	VP	CP
V	Blood loss	9	18.0	18.0	18.0
	No bleeding	41	82.0	82.0	100.0
	T	50	100.0	100.0	

Table 16: Assessment of risk factors for patients conducting after Laparoscopic cholecystectomy operative

Risk factors	F	CI	P-value
Age	3.4	(2.2-6.2)	0.001
Sex	4.63	(1.7-6.3)	0.0035
Blood Loss	3.3	(2.4-5.2)	0.0018
ASA	5.26	(3.6-8.77)	0.0046
Fibrotic Gallbladder	4.66	(2.5-6.3)	0.0272
Obesity	3.5	(2.6-5.6)	0.0011

DISCUSSION

Age of 60 or more, male gender, concomitant disease, history of severe cholecystitis, prior surgery on the abdomen, gall bladder wall thickness of 4-5 mm, constricted gall bladder, and impact stone are only a few of the indicators for problematic LC that have been cited in the literature. The results of British studies revealed that adhesion in the triangle of Calot, fibrotic gallbladder, male gender, history in severe cholecystitis (LC), gall bladder wall thickness (4-5 mm), and history about acute cholecystitis were all important risk factors for difficult LC, as had been found in other studies.

In other searches, it was discovered that male patients presented with symptoms later than female ones. The probable cause might be that minor symptoms receive less attention, which delays presentation until the disease has advanced. Other research has made reference to this circumstance.

Like this, other studies have identified the senior population (defined as those above the age of 30) as a predictor of challenging laparoscopic cholecystectomy. Like prior research, our investigation identified their ages, ASA, which is smoking history, BMI (obesity), and the presence of comorbidities as risk variables.

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Particularly, Rassan, *et al.*, [Jansen, S. *et al*., 1998]. Demonstrated that BMI (obesity) was a significant predictor in their study. However, because none of the patients in our research were fat, we were unable to make any assessments. Instead, we discovered several malnourished individuals, but this had no effect on our ability to calculate the challenging LC. We did not consider the surgeon's expertise as a predictor because, at our hospital, LC is frequently done by consultant surgeons. However, several research continued to point to surgeons' lack of operational expertise being a risk factor for challenging LC.

Additionally, we discovered that problematic LC is linked with gallbladder fibrosis, as described through Stanisic, *et al*., 2014; [Liu, C.L. *et al*., 1996]. Gallstone irritation of the gallbladder wall, which occurs often, typically leads to the development of the fibrotic gallbladder. Chronic gall bladder inflammation causes pericholecystic adhesions as well as adhesions at the triangle of calot, which makes it harder to dissect the gallbladder during laparoscopic surgery and increases the risk of bleeding and damage to nearby structures. Therefore, adhesion at Calot's [Brunt, L. *et al*., 2001] triangle is another significant predictor that has been discussed in a few studies, including our study.

CONCLUSIONS

Pericholecystic adhesions and adhesions at the triangle of calot are brought on by chronic gall bladder inflammation, which makes it more difficult to dissect the gallbladder under laparoscopic surgery and raises the risk of bleeding and harm to adjacent structures. As a result, adhesion at Calot's triangle is another important that has been highlighted in several research, including ours.

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