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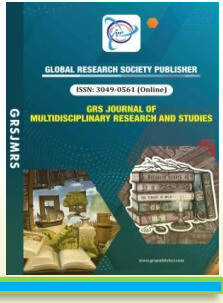

Comparison the results of acute laparoscopic cholecystectomy versus elective laparoscopic Cholecystectomy and emergency open cholecystectomy: a retrospective study

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Abstract: Background and aim: Laparoscopic cholecystectomy is the preferred treatment for gallstones. The aim of this study is to evaluate the role of Laparoscopic cholecystectomy in patients with acute cholecystitis and comparison with open cholecystectomy and elective laparoscopic cholecystectomy in regard with side effects, the rate of converting to the open procedure, duration of hospitalization and duration of surgery.

Materials and Methods: A retrospective cross-sectional study was done on 235 patients, including 94 patients with a diagnosis of acute cholecystitis in an emergency by using one of two methods: open surgery (48 cases) or laparoscopic cholecystectomy for acute cases (46 cases). The third group including 141 patients with symptomatic stones was undergoing elective laparoscopic cholecystectomy. All patients had a confirmed diagnosis through ultrasound.

Results &Findings: The mean length of hospitalization was 5.3 and 2 days in open surgery, acute laparoscopy and elective laparoscopy, respectively. The mean time of surgery was 58/8 ± 29/3, 53/2 ± 3/2 and 18.8 ± 39.9 minutes, in open surgery, acute laparoscopy and elective laparoscopy, respectively. Main complications in patients with open surgery -5 cases- was (10.4%), in patients with acute laparoscopy, 2 cases (5.1%) and in patients with elective laparoscopy -5 cases, was (3.6%).

Conclusion: This study showed that laparoscopic acute cholecystectomy compared with open cholecystectomy is along with by reducing the length of hospital stay, postoperative hospital stay and main complications and should be considered as the first choice before make decision for doing open cholecystectomy.

Keywords: *Open Cholecystectomy, Acute Cholecystitis, Laparoscopic Cholecystectomy*.

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Introduction

Laparoscopic cholecystectomy is known as an elective treatment for gallstones. The benefits of open cholecystectomy in a prospective study has shown that early cholecystectomy in comparison with the late laparoscopy in patients with acute cholecystitis has lower complications and lower length of hospitalization [1, 2] in the past, laparoscopic cholecystectomy for acute cholecystitis was reported with higher side effects due to the anatomical problems caused by acute inflammation, edema and adhesion. In addition, Laparoscopic cholecystectomy have technical problems for surgeons and risks to patients that this complications causes prohibition for doing laparoscopy in these patients. [3-7] However, improved skills and the creation of better techniques for surgery, laparoscopic surgery complications has declined, today laparoscopic cholecystectomy for acute cholecystitis has become a successful procedure, harmless and cost –effect option for patients [8-10] on the other hand Several studies have reported that laparoscopy for acute cholecystitis was along with acceptable side effects, although the conversion rate to open surgery is high. [11-16] we believe that in acute cholecystitis laparoscopic, acute cholecystectomy should compare with open cholecystectomy, and then the complications and the rate of open surgery with elective laparoscopic cholecystectomy be measured. Due to the lack of tendency of some surgeons in developing countries to do emergency Laparoscopic Cholecystectomy thanks to fear of complications, this study aimed to investigate the role of laparoscopic cholecystectomy in patients with acute cholecystitis and its comparison with open cholecystectomy and elective laparoscopic cholecystectomy was performed in cases of complications, the conversion rate to the open procedure, duration of hospitalization, duration of surgery.

Materials and Methods

Cross-sectional study on 235 patients were undergoing cholecystectomy was performed during the years 2012 to 2015 in Bouali hospital, Amiralmomenin hospital (Javadieh) and Sina Hospital. 94 patients with a diagnosis of acute cholecystitis was admitted in an emergency unit and diagnosis was including pain, tenderness of upper abdominal quadrant, fever, or an increase in white blood cells (WBC) and sonographic findings . The patients

were treated by using one of two surgical methods open surgery or laparoscopic acute cholecystectomy and surgical intervention was performed within 72 hours after admission and less than 7 days of onset of symptoms, and the third group of 141 patients with symptomatic gallbladder stones were admitted and were under laparoscopic cholecystectomy.Patients with the following conditions were excluded the study , namely bilirubin greater than 3.5mg / dl or alkaline phosphatase more than 250 international units per liter, stones in the bile ducts, common or bile pancreatitis, not tendency to participate in the study, older than 90 years and symptoms over a week in patients with acute cholecystitis. Patients with acute cholecystitis received anti-inflammatory, intravenous fluids, IV Cefazolin antibiotic 1 g every 6 hours. The third group of patients with symptomatic gallbladder stones which have undergone elective laparoscopic cholecystectomy received prophylactic cefazolin. 4 trocars was used in laparoscopic techniques for acute and elective laparoscopic groups.The CO2 gas through veress needle with an incision below the umbilicus enteredto the peritoneal cavity then ports was entered. In acute cholecystitis due to edema and inflammation in most patients, the gallbladder is aspirated. Tissue dissection was done by cutery and cystic artery was ligated by Titanium clips. To remove the gallbladder, epigastric incision was slightly larger in most cases. Closed drains in sub-hepatic was used in the majority of patients with acute cholecystitis and if necessary were used for some patients with gallstones (elective). Demographic data of cases, history, heart disease, lung disease, kidney disease, and diabetes) laboratory results and clinical findings during surgery, the reasons for conversion to open surgery, injury to the common bile duct, damage to organs, bleeding, operation time surgery(since entering the abdomen until the last stitch during suturing)post –op complications, surgical infections, urinary complications, pulmonary, duration of hospitalization(night hospital stay was calculated)and length of stay after surgery were collected and all patients were followed for up to six weeks. These three groups were compared through using statistical analysis software SPSS & t-test and ANOVA and Chi-Square tests.

Results

The study included 235 patients with cholecystectomy 203 women (86.4%) and 32 men (13.6%) is done, the average age of the patients (51.7 ± 16.4) years (18-90 years). there was no significant difference between open surgery and acute Laparoscopic cholecystectomy in terms of age, gender, temperature, white blood cell count and ultra-sonographic findings.The rate of Laparoscopic to open surgery was in 7 patients (15.7%) out of 46 patients in the acute laparoscopy and it was in 5 patients (3.6%) out of 141 patients in the elective laparoscopic elective hence this difference was statistically significant (P = 0/005). In the acute laparoscopy four women (10.5%) out of 38 women and three men 37.5%) out of 8 males were converted to the open surgery either in elective laparoscopy, three women (2.4%) out of 126 women and 2 men (13.3%) outof the 15 men. Of 141 patients who had elective laparoscopy two people had cancer, one of cases had suspected injured duodenum, 1 bleeding and 1 had cystic duct atresia. While in 46 cases with acute laparoscopy 2 patients had cancer, 2 injured duodenum and three others had suspected dissection. The median length of hospital stay 5,3 and 2 days respectively in open surgery, acute laparoscopy and elective laparoscopy that this difference was statistically significant (P<0.05). (Results after excluding patients who converted from laparoscopic to open surgery were shown in Table 1). 11 patients (28.2%) in the acute laparoscopy and 63 patients (46.3%) in elective laparoscopic surgery were discharged less than 10 hours after surgery, but in the open surgery no patients were discharged during this period.

Table 1: The results of treatment in each of the study groups

variable		ELC	ALC	OC	P-value
		No. (%) (N= 136)	No. (%) (N= 39)	No. (%) (N= 46)	
SEX	**Female**	123	34	39	**0.242**
	Male	13	5	9	
Mean age (rang)		47.9 (18-90)	54.6 (21-84)	57.9 (27-85)	**0.001**
Hospital stay (day)		1.99 ± 1.3	3.39± 3.14	5.39± 2.9	**0.005**
Operation time (min)		38.26 ± 16.1	49.85± 18.1	53.2± 3.2	**0.005**
Comorbidities (ASA class III& IV)		39± 28.6	9 (23%)	13 (275)	**0.78**
Drain usage		15 (11%)	33 (84.6)	30 (63.5)	**0/005**
Death		0	0	1	**NS**

The mean duration of hospitalization and surgery in the acute laparoscopic surgery group was 1.6 days. The existence of comorbidity diseases in the three groups were not significantly different (Table 2), but the duration of hospital stay in patients with co morbidity was 6, 4.7 and 2.5 days respectively in open, acute laparoscopic and elective laparoscopic. The mean operative time was 53.2 ± 3.2, 58.9 ± 29.3, 39.9 ± 18.8 minutes respectively in open, acute laparoscopic and elective laparoscopic. Duration of surgery in the elective laparoscopy and acute laparoscopy there was significant difference statistically (P = 0/005), but in acute laparoscopic and open surgery groups was not statistically significant difference (mean time of surgery after excluding patients who were converted from laparoscopy to open surgery, see table 1).

Table 2: Frequency distribution of comorbidities in three groups being studied

	ELC	ALC	OC
Heart disease	32 (23.5)	4 (10.2)	8 (16.6)
Diabetes	4 (2.9)	2 (5.1)	3 (6.2)
Chronic renal failure	2 (1.5)	1 (2.5)	-
COPD	1 (7)	2 (5.1)	2 (4.1)
TOTAL	39 (28.6%)	9 (23%)	13 (27%)

Intraoperative and postoperative complications are listed in Table 3. Complications that required readmission or prolonged hospital stay were (major complications) 5 cases out of 48 patients with open surgery 10.4%), in patients with acute laparoscopy were 2 cases out () of 39 patients. One case of peritonitis following elective laparoscopy due to inadequate cleaning of the abdomen after rupturing of gallbladder was observed on the tenth day after surgery; the patient was hospitalized and treated with antibiotics. In patients who were converted from acute laparoscopy to open surgery, two cases had hematoma and colon laceration where injured during open surgery.

Table 3: Intraoperative and postoperative complications (after excluding patients who were converted from laparoscopic to open surgery)

	VARIABLES	ELC	ALC	OC
Intraoperative complications				
	Bleeding	-	1	1
	Liver damage	-	-	1
	Cystic artery rupture	-	2	2
	Rupture of the gallbladder	13	8	6
	Colon rupture	-	-	1
Postoperative complications				
	Wound infection	-	-	3
	Umbilical trocar site infection	3	2	-
	Epigastric trocar site infection	2	4	-
	bile Accumulation	1	-	1
	Hematoma	1	1	1
	delayed Peritonitis	1	-	-
	Aspiration pneumonia	1	-	-
	Umbilical trocar site pain	2	1	-
	Epigastric trocar site pain	7	4	-
	Shoulder pain	15	5	-
	The surgical site pain	-	-	8

Discussion and conclusion

The study showed that laparoscopy in the majority of patients with acute cholecystitis can be performed successfully with low morbidity. An increase in mortality and major complications there was not in acute laparoscopic cholecystectomy compared with elective cholecystectomy and open cholecystectomy. Shikata et al reported that between laparoscopic and open surgery in patients with acute cholecystitis there is no difference in terms of morbidity [17] that this is consistent with our study. Length of Hospital stay and length of stay after surgery in patient with acute laparoscopic cholecystectomy is lower than that of open cholecystectomy in patients with acute cholecystitis. But this time was more compared with patients who underwent elective laparoscopic cholecystectomy. Madani reported that the average duration of all hospitalizations in acute laparoscopy was 6.4 days and after excluding patients who had the disease been reduced to 3.5 days. [18] In another study Elder and his colleagues reported that post-operative hospital stay was 3 days in patient with acute laparoscopy. [5] Also Gharaibeh et al.[19] has reported mean post-

operative hospital stay 1.9 days and 1.33 days, respectively, in patients with acute laparoscopy and elective laparoscopy. In this study, 63 patients underwent elective laparoscopy and 11 (28.3%) patients with acute laparoscopic surgery were discharged on the same day and Laparoscopic Cholecystectomy for patients with acute cholecystitis was associated with less pain and less postoperative hospital stay. Also in this study, the mean duration of hospitalization in acute laparoscopic cholecystitis Laparoscopic and performing laparoscopic Cholecystectomy was 1.6 day (38/08 hours), respectively. Edema, inflammation and congestion were the major problems in the acute laparoscopy. Busic et al.[20] suggested that Laparoscopic Cholecystectomy should be performed within 72 hours after onset of symptoms. Performing Early Laparoscopic Cholecystectomy after the onset of inflammation may reduce complications, length of hospital stay and the amount of conversion to open surgery. [5, 8] The mean operative time after the omission of conversion to open surgery, duration of surgery reduce to the 38.2 and 49.8 respectively in acute and elective laparoscopy. In this study, duration of surgery in acute laparoscopic cholecystitis and open surgery groups had no statistical difference. Eldar et al.[5] time reported 60 minutes duration of laparoscopic surgery for acute laparoscopy. Although the duration of laparoscopic surgery in acute laparoscopy still remains higher than the open procedure. [21] In this study, the mean duration of acute laparoscopic surgery and open surgery showed no statistical difference. The conversion rate of laparoscopic to open surgery were reported in 5 patients (3.6%) out of 141 patients in elective laparoscopic and in 7 patients (15.2%) out of 46 patients in acute laparoscopy (P <0/005). Wang et al., reported the conversion to open surgery 3.6% in acute laparoscopy. [22] Several studies reported the conversion rate of laparoscopy to open surgery method from 6% to 35%. [14, 21, 23-25] Pessaux et al.[24] demonstrated that the rate of conversion to open surgery in acute cholecystitis (38.6%) is higher than in elective laparoscopic (9.6%). Arnarson et al.[13] reported the rate of conversion to open 1/3% and 12.2% respectively in acute and elective laparoscopic. The most common cause of acute laparoscopy to open surgery is due to complicated dissection of Calot's triangle. The researchers also been described in other studies. [9, 16, 26] the conversion rate of laparoscopy to open surgery method was higher in men than in women and this is similar to previous studies. [19, 27] In our opinion, due to intraoperative findings, early surgery reduces conversion rate to the open surgery method and in case of fibrotic adhesion it is converted to an open procedure to reduce complications. In case of ruptured gallbladder, sufficientcleaning, prophylactic antibiotic is recommended to reduce peritonitis. The rate of major complications was higher in patients with open surgery, but did not find an obvious difference between acute and elective laparoscopic procedures. Kiviluoto et al.[9] reported that compilation rate of acute cholecystectomy is lower than that of open cholecystectomy. Zacks[28] also showed that mortality rate in open surgery is 5 times higher than the laparoscopy procedure. Previous studies and results in this field show that laparoscopy for acute cholecystectomy is a safe and risk less method. The previous studies also achieved similar results. [18-20] In general, in patients with acute cholecystitis performing laparoscopy compared to open surgery reduces the length of hospital stay, postoperative hospital stay and the complications. Acute laparoscopy compared with elective laparoscopic does not increase the main complications. Laparoscopy is a safe and healthy option for patients with acute cholecystitis.

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