

Unplanned readmission and outpatient workup 90-days after cholecystectomy in adults

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Abstract

Aim: The majority of patients with persistent postoperative pain are caused by a change in the indications and timing of cholecystectomy due to a lack of evidence and different views among surgeons. We purposed to identify the relation of preoperative patients' characteristics and postoperative readmission after laparoscopic cholecystectomy

Material and Methods: Between June 2015 and June 2018, 710 consecutive patients who were admitted for laparoscopic cholecystectomy were included in the study. Based on database the following factors were analysed: gender, age, American Society of Anesthesiologists classification, body mass index, Visual Analog Scale (VAS)-scale prior to operation (intensity of abdominal pain, scored on a visual score of 0–10), duration of symptoms and existence of abdominal pain.

Results: There were 472 men (66.5%) and 238 women (33.5%). The median age was 51.0 (range 18-79) years. Indications for laparoscopic cholecystectomy were as follows: choleystolithiasis 452 (63.7%), acute cholecystitis 140 (19.8%), chronic cholecystitis 105 (14.7%) and sludge 13 (1.8%). The following preoperative incidence of dispeptic and colonic symptoms were as: abdominal pain n=137 (19.3%), nausea n=119 (16.8%), vomiting n=86 (12.1%), heartburn n=79 (11.1%), early satiety 80 (11.3%), bloating n=151 (21.3%), food intolerance n=62 (8.7%), constipation n=73 (10.3%), diarrhea 60 (8.5%), back pain n=307 (43.2%). Readmission was present in 108 (15.2%) of the 710 patients due to added examination for persistent abdominal pain after laparoscopic cholecystectomy. The cause of readmission were gallstone related (n=16, 2.2%), surgery related (n=7, 1.0%), other diagnosis (n=30, 12.0%), nonspecific abdominal pain (n=55, 7.7%) respectively. Number of readmission were as follows: 1 (n=59, 54.6%), 2 (n=39, 36.1%), 3 (n=10, 9.3%).

Conclusions: The main causes of readmission were associated with gastrointestinal symptoms other than gallstone or surgery related. Before accepting patients for cholecystectomy, doctors should discover and help realistic expectations.

Keywords: Laparoscopic Cholecystectomy; Readmission; Acute Cholecystitis; Cholecystolithiasis.

INTRODUCTION

Laparoscopic cholecystectomy (LC) is the gold standart in uncomplicated symptomatic cholecystolithiasis, especially for relieving abdominal pain symptoms (1). Despite the lack of definitive data every year around 40000-60000 cholecystectomy it is carried out in Turkey (2). In spite of high cholecystectomies in the world, this approach seems to be ineffective up to 50% of patients (3). Prospective researches and a systematic review demonstrated that less than 40% of patients have abdominal pain after operation (4-6).

The majority of patients with persistent postoperative pain are caused by a change in the indications and timing of cholecystectomy due to a lack of evidence and different views among surgeons (7-9). This condition may lead to unwarranted cholecystectomies, complications and

health costs.

The persistent pain after cholecystectomy may be bring about by operative complications or remaining gallbladder stones, but may also show poor diagnostic research and recommends an alternate (and perhaps less clear) investigation of symptoms (10).

An internationally approved good current guideline policy can minimize implementation change by using the best available evidence.

Establishing clinically appropriate and useful guidelines can be a long and challenging process that includes all advices that need to be supported by high quality evidence.

Several researches concentrated on better patient selection for LC and intended to lower abdominal pain after surgery. But, there is little literature on the main burden of permanent postoperative pain after LC for the health

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system in general (10). Associations between preoperative characteristics and post operative readmission and outcomes can help determine the rate of patients who will really utility from operation.

We purposed to determine the relationship between preoperative pain and patient characteristics and postoperative readmission in patients who required additional abdominal examination after laparoscopic cholecystectomy

MATERIAL and METHODS

Between June 2015 and June 2018, 710 consecutive patients who were admitted for laparoscopic cholecystectomy were included in the study. All patients were included in an elective surgery list after they were evaluated by the surgical teams, or they were operated urgently after admission to the hospital for acute gallstone-related emergencies. The trial included patients between the age of 18 and 95. Cholelithiasis was described as abdominal pain related with gallbladder stones supported by ultrasound imaging.

Patients with a history of complicated symptomatic cholelithiasis (cholangitis, pancreatitis in biliary origin, choledocholithiasis needing endoscopic retrograde cholangiopancreatography) were excluded from the study. Other exclusion criteria were pregnancy, cirrhosis, cancer therapy, or any discomfort that could predispose the patient to unreliable reactions.

Medical ethics committees of Cukurova University Medical Faculty approved the study.

Preoperative patients' characteristics

Data were obtained from hospital file system. Based on database the below factors were analysed: gender, American Society of Anesthesiologists classification, body mass index, Visual Analog Scale (VAS)-score prior to surgery (intensity of abdominal pain, scored on a visual score of 0–10), duration of symptoms and existence of abdominal pain (11). Besides transition to open cholecystectomy, pathological diagnosis of gallbladder, type of pain (episodic or non-episodic), number of preoperative acute cholecystitis attacks, psychotrop drug usage and postoperative VAS were assessed.

The following preoperative factors were registered: abdominal pain, nausea, vomiting, heartburn, early satiety, bloating, food intolerance, constipation, diarrhea, back pain.

Readmissions and outpatient examinations

Planless readmissions and outpatient assessments were documented 90-days after discharge in each patient. The admissions period was described from the day of discharge from the clinic.

Readmission was explained as assesment in the emergency clinic or the outpatient center applying to the ward and hospital admissions interventions. The

outpatient examination was described as polyclinic assesment in the emergency department, which was not accepted for examination or ward.

Statistical analysis

Statistical analysis was performed using SPSS software (Version 23.0, SPSS Inc., Chicago, IL, USA). All numerical data are expressed as median values (Minimum-Maximum). For each continuous variable, normality was checked by Kolmogorov Smirnov and Shapiro-Wilk tests and by histograms. Comparisons between groups were applied using Mann Whitney U test were used for the data not normally distributed. Pre-post measures data were analysing Paired T test. Logistitis regresion was performed predictic values. Values of $p < 0.05$ were considered statistically.

RESULTS

There were 472 men (66.5%) and 238 women (33.5%). The median age was 51.0 (range 18-79) years. Table 1 shows the patients characteristics. Indications for laparoscopic cholecystectomy were as follows: choleystolithiasis 452 (63.7%), acute cholecystitis 140 (19.8%), chronic cholecystitis 105 (14.7%) and sludge 13 (1.8%).

The following preoperative incidence of dispeptic and colonic symptoms were as: abdominal pain $n=137$ (19.3%), nausea $n=119$ (16.8%), vomiting $n=86$ (12.1%), heartburn $n=79$ (11.1%), early satiety 80 (11.3%), bloating $n=151$ (21.3%), food intolerance $n=62$ (8.7%), constipation $n=73$ (10.3%), diarrhea 60 (8.5%), back pain $n=307$ (43.2%).

The operation was performed laparoscopic in all patients except for 6 patients. The number of patients with less than 1 year symptom was 270 (38.5%) and the number of patients with symptoms more than 1 year was 440 (61.5%). 9 patients were using psychotropic drugs. Number of preoperative acute cholecystitis attacks were 0 ($n=570$, 80.3%), 1 ($n=13$, 1.8%), 2 ($n=86$, 12.1%), 3 ($n=32$, 4.5%), 4 ($n=7$, 1.0%), 5 ($n=2$, 0.3%) respectively. While preoperative median VAS was 4.00 (2-9), postoperative median VAS was 2.00 (1-4). Readmission was present in 108 (15.2%) of the 710 patients due to added care for insistent abdominal pain after laparoscopic cholecystectomy. Reported diagnosis for readmission were shown in Table 2.

The cause of readmission were gallstone related ($n=16$, 2.2%), surgery related ($n=7$, 1.0%), other diagnosis ($n=30$, 12.0%), nonspecific abdominal pain ($n=55$, 7.7%) respectively. Number of readmission were as follows: 1 ($n=59$, 54.6%), 2 ($n=39$, 36.1%), 3 ($n=10$, 9.3%).

When we compared readmission according to the patients characteristics there were association with age, gender, BMI, conversion to open cholecystectomy, ASA and postoperative VAS as presented in Table 3 and 4.

However, we observed that the number of preoperative VAS scoring and number of acute cholecystitis episodes increased as readmission was statistically lower ($p=0.0001$).

Table 1. Patient characteristics responders (n=710)

	n	%
Gender		
Male	472	66.5
Female	238	33.5
Age, median, y	51.0 (18-79)	
BMI, median, kg/m ²	32.0 (23-39)	
ASA		
I	19	2.7
II	461	64.9
III	215	30.3
IV	15	2.1
Conversion to open cholecystectomy	6	0.8
Histopathology		
Cholecystolithiasis	452	63.7
Acute cholecystitis	140	19.8
Chronic cholecystitis	105	14.7
Sludge	13	1.8
Preoperative Findings	1	
Abdominal Pain	137	19.3
Nausea	119	16.8
Vomiting	86	12.1
Heartburn	79	11.1
Early Satiety	80	11.3
Bloating	151	21.3
Food Intolerance	62	8.7
Constipation	73	10.3
Diarrhea	60	8.5
Back Pain	307	43.2
Duration of Symptoms		
<1 year	270	38.5
>1 year	440	61.5
Type of Pain		
Episodic	392	55.2
Non-episodic	318	44.8
Psychotrop Drug Usage	9	1.3
Number of Preoperative Acute Cholecystitis Attacks		8
0	570	80.3
1	13	1.8
2	86	12.1
3	32	4.5
4	7	1.0
5	2	0.3
Preoperative VAS, median	4.00 (2-9)	
Postoperative VAS, median Readmission	2.00 (1-4)	
Absent	602	84.8
Present	108	15.2

Table 2. Reported Diagnosis for readmission (n=108)

	n	%
Gallstone related		
Cholelithiasis	10	1.4
Pancreatitis	6	0.8
Surgery related		
Intra-abdominal abscess	2	0.3
Bile duct injury	5	0.7
Other diagnosis		
Hernias	4	0.6
Gastritis/Reflux	14	2.0
Infections(not surgery related)	3	0.4
Irritable bowel syndrome	7	1.0
Diverticulosis/Diverticulitis	2	0.3
Nonspecific abdominal pain	55	7.7
Number of readmission		
1	59	54.6
2	39	36.1
3	10	9.3

Table 3. Comparison of readmission according to the patients characteristics I

	Age	BMI	ASA	Preoperative VAS	Postoperative VAS	Number of acute cholecystitis attacks
Readmission Absent	49.9±8.7	32.2±2.2	2.32	4.0 (3-9)	2.0 (1-4)	1.0 (0-5)
Readmission Present	51.6±10.8	31.7±2.8	2.0 (1-4)	3.0 (2-8)	2.0 (1-3)	0.0 (0-1)
p	0.071	0.053	0.263*	0.0001*	0.052	0.0001*

p:Student T test; *Mann Whitney U testi

Table 4. Comparison of readmission according to the patients' characteristics II

	Readmission absent (n=602)		Readmission present (n=108)		p
	n	%	n	%	
Gender					
Female	404	67.1	68	63.0	0.439
Male	198	32.9	40	37.0	
Conversion to open cholecystectomy					
No	598	99.3	106	98.1	0.228
Yes	4	0.7	2	1.9	
Preoperative findings					
Abdominal pain	98	16.3	39	36.1	0.0001
Nausea	86	14.3	33	30.6	0.0001
Vomiting	54	9.0	32	29.6	0.0001
Heartburn	68	11.3	11	10.2	0.868
Early satiety	69	11.5	11	10.2	0.869
Bloating	69	11.5	82	75.9	0.0001
Food intolerance	52	8.6	10	9.3	0.853
Constipation	71	11.8	2	1.9	0.001
Diarrhea	56	9.3	4	3.7	0.059
Back pain	248	41.2	59	54.6	0.011
Duration of symptoms <1 year	199	33.1	71	65.7	0.0001
Type of pain episodic	359	59.6	33	30.6	0.0001
Psychotropic drug usage	6	1.0	3	2.8	0.144
Histopathology					
Cholecystolithiasis	372	61.8	80	74.1	0.017
Acute cholecystitis	131	21.8	9	8.3	0.001
Chronic cholecystitis	86	14.3	19	17.6	0.378
Sludge	13	2.2	0	0.0	0.236

p:Fisher Exc. test

Comparing preoperative abdominal pain, dyspeptic and colonic symptoms according to the readmission; we found that the readmission rate was significantly higher in patients with abdominal pain, nausea, vomiting, bloating, back pain and duration of symptoms 1 year. However, readmission was lower in patients who had constipation and episodic type of pain. Psychotropic drug usage did not affect the readmission rate ($p=0.144$).

When we compared the histopathology of the gallbladder with the readmission, we found that the patients who had cholecystitis had more readmission.

However, there was no significant difference in patients who had chronic cholecystitis and sludge. Interestingly in patients who had acute cholecystitis the readmission was significantly lower (Table 4).

Logistic regression analysis was performed in order to find the independent risk factors affecting readmission with $p < 0.10$ variables in univariate analysis results. Abdominal pain, vomiting, bloating, back pain, duration of symptoms less than 1 year, histopathology report of cholelithiasis and preoperative VAS were detected that significantly affecting readmission (Table 5).

Table 5. Multivariate Logistic Regression Analysis

	B	S.E.	Wald	df	p	Odds Ratio	95% C.I. for Odds Ratio	
							Lower	Upper
Abdominal pain	3.64	712	26.19	1	0.0001	38.26	9.48	154.48
Vomiting	1.82	653	7.78	1	0.005	6.18	1.72	22.25
Bloating	3.47	384	81.50	1	0.0001	32.00	15.08	67.91
Back pain	1.55	396	15.40	1	0.0001	4.73	2.18	10.27
Duration of symptoms <1 year	0.89	349	6.61	1	0.010	2.46	1.24	4.87
Histopathology report Cholelithiasis	0.97	477	4.16	1	0.041	2.64	1.04	6.73
Preoperative VAS	-1.51	244	38.49	1	0.0001	0.22	0.14	0.36
Constant	-197	970	0.041	1	0.839	0.82		

Logistic regression analysis was performed in order to find the independent risk factors affecting Readmission with $p < 0.10$ variables in Univariate analysis results. Backward: LR was chosen as the method

DISCUSSION

A recent systematic review showed that in 59-100% of patients reported by the patient, there was complete relief after cholecystectomy and was between 3 and 61 weeks postoperatively. (5). The literature is consistent with our data and shows that cholecystectomy is successful in 82-93% and overall improvement in abdominal symptoms (90%) (12-17). This study indicates that 15.2% of patients with readmission and outpatient examination after LC required extra care for their discomforts. The primary causes of readmission and outpatient examinations were gastrointestinal symptoms, nonspecific abdominal pain, gallstone related and surgery related.

Age, gender, BMI score, ASA score and postoperative VAS were not associated with readmission after LC during long term follow up. But Wennmacker SZ. et al. found that young patients and those with high postoperative pain scores were more presumably to require extra care during long-period follow-up (10). In another study, it was determined that abdominal pain persistence after 5 years of cholecystectomy is not fundamentally specific, and is mostly detected in young women with complicated gallbladder disease (13). Using different outcome measurement tools reported by the patient among studies or variations in indication for cholecystectomy may identify these different outcomes (18). Unlike this work Lamberts MP et al. detected that existence of ASA II was related with abdominal pain following cholecystectomy.

Because ASA classification does not have an impact on the patient's surgical success scores, the relation of ASA II classification with abdominal pain may be associated with concomitant morbidity. (12).

Patients with high preoperative VAS scores had lower readmission. The reason for this may be that cholecystectomy was performed because the symptoms of high preoperative pain were due to gallbladder symptoms.

We could not find a significant relationship between readmission and postoperative VAS score. But Wennmacker SZ. et al. revealed that patients with lower postoperative pain-scales are less presumably to request added health care (10).

As the number of acute cholecystitis attacks increased, we found that the readmission was lower. The best explanation for this is that postoperative readmission was lower because the patient's symptoms are more likely due to the gallbladder disease.

Patients with higher preoperative pain scores and acute cholecystitis attacks are less presumably to seek extra care during their follow up.

Preceding cohort researches showed that biliary pain (in particular \leq per month), duration of symptoms \leq year before operation and pain- excited wakening are associated with the nonexistence of abdominal pain (4,19-20). However this work stated that in case of duration of symptoms less

than 1 year the readmission was significantly higher. Our study revealed that patients with episodic type of pain had lower readmission. But Sarah Wennmacker et al. could not set up relations with episodic kind of pain (6).

Distention, dyspepsia, belching, constipation or lower abdominal pain were associated with continued pain after cholecystectomy (19,21-22). In our study, we found that patients with preoperative nonspecific abdominal pain, nausea, vomiting, bloating, constipation, back pain symptoms had higher readmission. These patients may suffer from a accompanying functional gastrointestinal disease.

When we compared the histopathological findings with readmission, no significant correlation was found in patients with chronic cholecystitis and sludge, but less in patients with acute cholecystitis and more in patients with cholelithiasis. Symptoms in patients with acute cholecystitis is more attributable to the gallbladder but in case of cholelithiasis symptoms should more precisely evaluated for cholecystectomy.

Since only 20% of patients with gallbladder stones become symptomatic throughout their lives, the existence of gallbladder stones on ultrasound in patients with upper abdominal complaints does not require the diagnosis of symptomatic gallbladder stone disease. Since there are no strict rules (23), the indications for LC show a wide variation between and among countries which lead to misdiagnosis, over-treatment and application diversity (24-27).

The present study had the below limitations. Firstly, we cannot exclude the possibility that readmission may have happened to another clinic. However, the vast majority of patients had the population we served, so they were admitted to our institution if necessary. We are confident that the number of lost readmission was insignificant. Second, the study was retrospective in nature. A larger population, multicentric, prospective, studies are needed.

CONCLUSION

This study showed that a significant number (15.2%) of the patients received readmission or outpatient treatment after cholecystectomy. The main causes of readmission were associated with gastrointestinal symptoms other than gallstone or surgery related.

Considering the high incidence of cholecystectomy, attempts should be made to reduce these rates. Before accepting patients for cholecystectomy, doctors should create and discover realistic expectations.

Competing interests: The authors declare that they have no competing interest.

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