Original Article

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Prevalence of Hiatal Hernia and Related Risk Factors to Laparoscopic Cholecystectomy Using the Hasson Technique

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ABSTRACT

BACKGROUND AND OBJECTIVE: One of the complications of laparoscopic cholecystectomy is trocar incision hernia (TSIH: Trocar Site Incisional Hernia), which occurs almost exclusively in the navel area and could cause significant problems. The aim of this study was to evaluate the prevalence of hiatal hernia in laparoscopic cholecystectomy and identify the associated risk factors.

METHODS: This cross sectional study was done on patients who underwent laparoscopic cholecystectomy during one year in different hospitals of Babol. Information including age, gender, BMI, diagnosis prior to surgery, duration of hospitalization, duration of surgery, the thickness of the lining of the gallbladder, surgical site infection and umbilical hernia during 12 months follow-up for patients were confirmed and examined.

FINDINGS: Among 270 studied patients, there were 236 women (87.4%) and 34 men (12.59 %). Eleven patients (4.07%) during the 12-month follow-up; they had a hiatal hernia surgical site infection in the navel area (223.82-4.33: CI-95%, OR: 31.14) and BMI (60.18-1.72 CI-95%; OR: 10.21) were associated with increased incidence of inguinal hernias. There was no relationship between other variables and umbilical hernia.

CONCLUSION: According to the results of this study obesity and surgical site infections have been linked with an increased incidence of inguinal hernias.

KEY WORDS: *Cholecystectomy*, *Laparoscopic Hernia*, *Inguinal Hernia Shear*.

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Introduction

When the first laparoscopic cholecystectomy was performed in 1985, gradually evolved over the decades and led to changes and developments in the treatment of gallbladder disease [1]. Laparoscopic surgery has now replaced with traditional surgery and known as the gold standard in the treatment of symptomatic gallbladder stones (2, 3). This change stems from the belief that laparoscopy lead to fewer complications such as smaller incision, less pain and shorter recovery time after surgery (2, 4).

Surgery methods with the minimally invasive procedure has many benefits for patients, healthcare systems and moreover for society (4). But the existence of any new approach will be accompanied always by creating new complications and Trocar Site Incisional Hernia is probably the most common complication of laparoscopic surgery (5). Cord central location in the abdomen and its high capability to hide surgical scars led to become very convenient location for inserting the trocar laparoscopy. Since the umbilicus is located in the largest abdominal girth which is the weakest point, the possibility of new complications including umbilical hernia will go up (6). A number of factors are involved in the development of hiatal hernia after laparoscopic cholecystectomy, which can be divided into two groups associated with the patient's risk factors and risk factors related to surgical technique (5,7,8). Risk factors associated with the disease include obesity, older than 60 years and wound infection and surgical technique associated risk factors include the diameter of trocar, surgical procedure, extensive manipulation and time of surgery (1, 2, 5, 9-11).

Although inguinal hernia can lead to significant problems for the patient, but in many cases not recognized (9). Since there is a risk of strangulation and entrapment in umbilical hernia, timely detection by clinical exam is very important (1, 12). But without the medium- and long-term follow-up will often ignored and will not be detected (13).

In studies conducted in 1991 until 2010, the incidence of Trocar Site Incisional Hernia after laparoscopic cholecystectomy in a wide range of 18 percent to 4.5 percent have been reported. In these studies, umbilical hernia associated with age, gender, duration of surgery, duration of hospitalization, BMI and wound infection were studied. The majority of the studies stated that obesity and surgical site infection are the main risk factor in the occurrence of hernia trocar incision and no relationship was found between other variables and hernia (1, 5). However, a number of studies linked age and duration of hernia surgery with trocar site incisional hernia (1, 7). The aim of this study was to evaluate the prevalence of hiatal hernia after Laparoscopic cholecystectomy using Hasson technique as well as identify possible risk factors involved in the development of this complication.

Methods

This analytical study was done on all patients with biliary colic, acute cholecystitis and chronic cholecystitis, from April 93 to April 94 underwent laparoscopic cholecystectomy in selected hospitals in Babol. Follow up of these steps completely was explained for patients and all patients ensured to non-disclosure their personal information. If there is a history of hiatal hernia, abnormal findings during surgery (such as cancer), conversion to open surgery, poor compliance to follow up after surgery and death were excluded. Demographic data including age, gender and BMI along with the diagnosis were recorded before surgery.

After surgery, duration of surgery, gallbladder wall thickness, duration of hospitalization and the presence or absence of infection on surgical area were recorded. according to previous studies, because the risk of TSIH in obese people as well as older age is higher, patients were divided into two group with BMI less than and equal to 30 kg/m2 and more than 30kg/m2 as well as the age group below and equal to 55 and more than 55 years (10).

All surgery was performed by a surgeon and a surgical procedure (Hasson method). In this procedure, a small incision at the umbilicus level was performed horizontally or vertically opening the fascia the surgeon enters the peritoneal space under a direct vision and enter the 10-mm trocar. Then a laparoscope is entered into the abdomen and CO2 gas at a pressure of 15-13 mmHg is sent into the belly space. Then a 10 mm trocar is placed in epigastric area. Two 5-mm trocars are entered in the right upper abdominal area. After the surgery, fascia and skin are sutured with

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nylon 1 and 0-3 nylon, respectively (14 and 4). All patients were physically examined between 3, 6 and 12 months after surgery to determine the umbilical hernia or any other disorder. Umbilical hernias are diagnosed only by clinical examination (11).

The obtained data for analysis were entered into database. A group of qualitative variables were analyzed using Chi-square test and continuous variables were analyzed by Student's T-Test. The Univariate logistic regression analysis and Multivariate logistic regression analysis of age, BMI, diagnosis, duration of surgery, gallbladder wall thickness and wound infection (umbilical) were done to predict the risk factors of hiatal hernia. Adjusted odds ratio with CI 95% was reported for each variable and $p<0.05$ was considered significant.

Results

291 patients including 256 women and 35 men were enrolled from April 93 to April 94. A total of 21 patients (4 patients because of a history of hiatal hernia, 2 cases had abnormal findings during surgery (malignancy), 10 cases of conversion to open surgery, 4 cases of poor compliance for follow-up and 1 deaths during follow-up) were excluded . From remaining 270 patients, 236 cases were women (87.4%) and 34 cases were men (12.59%) (table 1). Age range of the patients was between 14 and 81 with an average age of 42.38. BMI range of patients was 16 to 47 kg/m2 with an average of 26.76 kg/m2. The BMI of 58 patients (21.48%) was above 30. There were 25 cases of acute cholecystitis (9.25%), 194 chronic cholecystitis (71.85%) and 51 cases of biliary colic (18.88%). Mean duration of hospitalization was 25.86±8.19 hours and the mean duration of surgery was 33.67±10.02 minutes. According to the pathology report, average thickness of the gallbladder was 3.35±1.005 mm. 11 patients underwent surgical site infection (umbilicus) after surgery.

During 12- months follow up, 11 (4.07%) patients had hiatal hernia. According to results of univariate logistic regression, BMI and umbilicus infection had been statistically associated with incidence of umbilical hernias after laparoscopic cholecystectomy. No relationship was found between other variables such as age, diagnosis, duration of surgery and gallbladder wall thickness with the incidence of umbilical hernia. Based on multivariate logistic regression analysis, BMI (1.72-60.18 -CI: 95%, OR: 10.21) and umbilical infection (4.33-223.82- CI-95%, OR: 31.14) had statistically significant relationship with incidence of umbilical Hernia after laparoscopic cholecystectomy (table 2).

Table 1. Profile of patients with and without umbilical hernia

Variable		All patients N=270 N(%)	Without Umbilical Hernia N=259 N(%)	With Umbilical Hernia N=11 N(%)	P-value
Gender	Woman	236(87.4)	225(86.9)	11(100)	0.19
	Man	34(12.59)	34(13.1)	0(0)	0.55
Age(year)	≤55	214(79.25)	206(79.53)	8(72.72)	0.58
	>55	56(20.74)	53(19.62)	3(27.27)	
BMI (kg/m^2)	≤30	212(78.5)	210(81.1)	2(18.2)	<0.001
	>30	58(21.48)	49(18.9)	9(81.8)	
Diagnosis	Acute cholecystitis	25(9.25)	24(9.3)	1(9.1)	0.69
	chronic cholecystitis	194(71.85)	185(71.4)	9(81.8)	
	Biliary colic	51(18.88)	50(19.3)	1(9.1)	
Duration of hospitalization (hours)		25.86±8.19	2596±8.35	24±0	0.44
Surgical time (min)		33.67±10.02	33.71±10.18	32.72±5.17	0.75
The thickness of the gallbladder (mm)		3.35±1.005	3.36±1.01	3.18±0.75	0.55
Umbilical infection		11(4.07)	5(1.9)	6(54.5)	<0.001

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Table 2. Variables associated with the development of umbilical hernias in patients during 12 months follow-up

Variable		OR (CI-95%)		P-value	
		Univariate	Multivariate	Univariate	Multivariate
Age	≤55	Reference	Reference		0.26
	>55	1.45(0.37-5.68)	2.72(0.46-16.07)	0.58	
BMI	≤30	Reference	Reference		0.01
	>30	19.28(4.23-62.09)	10.21(1.72-60.18)	<0.001	
Disease	Acute cholecystitis	Reference	Reference		
	chronic cholecystitis	1.16(0.14-9.62)	3.18(0.18-54.91)	0.88	0.42
	Biliary colic	0.48(0.02-8)	1.83(0.04-78.90)	0.6	0.75
Surgical time		0.98(0.92-1.05)	0.98(0.89-1.08)	0.74	0.72
The thickness of the gallbladder		0.81(0.4-1.62)	0.93(0.3-2.8)	0.55	0.9
Umbilical infection		60.96(13.87-267.93)	31.14(4.33-223.82)	<0.001	0.001

Discussion

The prevalence of hiatal hernia in this study was 4.07%, which is similar to the prevalence reported by other studies (1,2,5,10,14). Since most patients with umbilical hernia are asymptomatic and diagnosis is based on clinical examination, it is necessary to be carefully examined. In a study done by Comajuncosas et al., prevalence of trocar incision hernia was reported 25/9% which was significantly higher than the amounts reported by other studies (9).

In this study, in addition to clinical examination, ultrasound was used for diagnostics. We do not recommend the use of ultrasound for the diagnosis of umbilical hernia, because it is possible to report any defects in the fascia leading to a higher and false report of umbilical hernia. In previous studies, a number of risk factors were associated with the incidence of trocar site incisional hernia. In our study, no correlation was found between gender and the incidence of umbilical hernia which is in line with other studies (2,7,9,10,15).

However, in a study conducted by Uslu and colleagues age was introduced as a risk factor in the development of the trocar site incisional hernia (7), in our study no relationship was found between age and incidence of umbilical hernia which is in agreement with some other studies (9, 2). Based on the results of this study, the incidence of umbilical hernia after Laparoscopic cholecystectomy in obese patients is higher than other patients. In many other studies, the obesity was considered as a risk factor in the development of the trocar site incisional hernia that our study strongly confirms this. Based on the results of Tiong and colleagues, no significant difference in the duration of hospitalization, complications after surgery and laparoscopic surgery conversion to open surgery in obese patients was observed. It should be noted that in this study follow-up period was only 8 weeks, hence there is no information about the rate of long-term complications such as umbilical hernia (3). Based on a large number of studies, the incidence of surgical site infection is one of the major risk factors for trocar site incisional hernia after laparoscopic cholecystectomy (8,9,11,18-20). According to obtained results in this study, patients with laparoscopic cholecystectomy after infection are facing with an increased incidence of umbilical hernia. These findings clearly indicate that surgical site infection after laparoscopic cholecystectomy has played a pivotal role in the incidence of umbilical hernias.

A number of studies investigated the effect of antibiotic prophylaxis on reducing surgical site infection after laparoscopic cholecystectomy. In a study by Choudhary et al., The use of antibiotic prophylaxis resulted in no statistically significant difference in the overall incidence of superficial infections, major infections and reduction of duration of hospitalization (21).

In another study was carried out by al-Qahtani et al., concluded that eliminating the use of antibiotic prophylaxis before laparoscopic Cholecystectomy increases the incidence of surgical site infection, but

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this difference was not considered statistically significant (22). According to the results of this study, umbilical hernia is an uncommon condition in laparoscopic gallbladder surgical using Hasson technique. In addition, BMI and umbilicus infection are two significant risk factors for incidence of this complication.

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