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Original Research Article

Prospective Observational Assessment of the Factors Associated with Conversion of Laparoscopic Cholecystectomy to Open Cholecystectomy

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Abstract

Aim: To determine factors of conversion of laparoscopic to open cholecystectomy in tertiary care center.

Material & Methods: This is a prospective observational study conducted on 120 admitted patients in Department of Surgery, Shri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India, over a period of one year. All patients exhibited symptomatic gallbladder disease and scheduled for laparoscopic cholecystectomy.

Results: Out of 120 participants, 66 were males and 54 were females. Max no. of patients (N=82) between 30 to 60 years. A total of 11 conversions were obtained. Gender wise distribution showed increased incidence of conversion in male 62% patients compare to female 38% patients. Patients having age group of 30-60 years had more conversion rate 74%. the most common reason for conversion was intraoperative adhesions which was found in 9 patients. CBD injury and bleeding from cystic artery was found in 2 patients each.

Conclusion: Laparoscopic cholecystectomy is a safe and minimally invasive technique, with only low conversion rate and the commonest cause of conversion in this study was the presence of dense adhesions at Calot's triangle.

Keywords: Cholelithiasis, Cholecystectomy, Adhesions, Conversion, Calot's triangle

Introduction

About 20 million people in the United States of America (15% of the population) have gallstones [1]. Ultrasound studies in Europe showed a prevalence of 9-21% and an incidence of 0.63/100 persons/year [2]. Laparoscopic cholecystectomy (LC) is considered as a gold-standard treatment for cholelithiasis all around the world. Hu et al. reported the conversion rate from laparoscopic cholecystectomy to open cholecystectomy (OC) to be 1-15% [3].

Laparoscopic cholecystectomy (LC) represents the "gold-standard" for the treatment of symptomatic gallstones disease, being the most common intra-abdominal operation performed in Western nations [4].

A conversion rate 5% to 10% has been reported on a nationwide basis [5]. Depending on specific circumstances, a conversion can be characterized as either elective, which is defined as the surgeon's decision to resort a laparotomy (because of obscure anatomy or lack of progress of the laparoscopic procedure) before being forced to do so as a result of a major intraoperative complication or as enforced, when an intraoperative emergency such as uncontrollable bleeding or bile duct injury, occurs [6]

The most recognizable causes for conversion are: obscure biliary anatomy, presence of dense pericholecystic adhesions, intraoperative bleeding, and failure of the progression and suspicion of choledocholithiasis [7-8].

Conversion of laparoscopic to open surgery should not be regarded as a complication but as an attempt to prevent complications. [8] Factors usually responsible for conversion from laparoscopic cholecystectomy to open cholecystectomy are: Pericholecystic adhesions, Intra-operative bleeding, common bile duct injury, visceral injury, instrumentation failure, empyema of gall bladder, spillage of gall stones, impacted large stone, liver bed injury, unclear biliary anatomy, surgeon's knowledge, laparoscopic fellowship training, operative experience and skill in laparoscopic surgery plays an important role. Identification of these risk factors before the procedure can prevent possible conversion to open cholecystectomy and this would be beneficial for both surgeon and patient. [8]

Thus, we aim to determine factors of conversion of laparoscopic to open cholecystectomy in tertiary care center.

Material & Methods:

This is a prospective observational study conducted on 120 admitted patients in Department of Surgery, Shri Krishna Medical College and Hospital, Muzaffarpur, Bihar, India, over a period of one year. All patients exhibited symptomatic gallbladder disease and scheduled for laparoscopic cholecystectomy. Study was conducted after taking ethical clearance approval and informed consent from each patient.

Inclusion criteria:

Patients of both genders aged 18 years and above with gall bladder disease and patients willing to participate in our study and ready to give written and inform consent for converting laparoscopic to open cholecystectomy were included in the study.

Exclusion criteria:

Patients with clinical features of obstructive jaundice, palpable gall bladder lump, pregnant females, perforated gall bladder and carcinoma of gall bladder or any other malignancy were excluded from study. Patients who refused to give written and informed consent. Cholecystectomy vs. those patients with converted to open cholecystectomy.

In all patients a detailed clinical history, previous treatment record was obtained and a thorough clinical examination was performed. Preoperative investigations including CBC, BT/CT, RBS, LFT, RFT, S. amylase, S. lipase, urine routine, HIV, HBsAg, HCV, ECG, chest x-ray (PA view) was performed. In all cases, an abdominal ultrasound was performed. In some cases, magnetic resonance cholangiopancreatography (MRCP) and endoscopic retrograde cholangiopancreatography (ERCP) were also performed. The consultant surgeon performed the laparoscopic cholecystectomies. The operative findings and reason for conversion were recorded and carefully analyzed. All cholecystectomy gall bladder specimens were sent for histopathological examination.

Descriptive analysis will be done using descriptive tools like-1) mean and 2) standard deviation.

Results:

Out of 120 participants, 66 were males and 54 were females. Max no. of patients (N=82) between 30 to 60 years, (N=33) patients were above 60 years of age and (N=5) patients were under 30 years of age. [Table 1]

Table 1: Gender wise distribution of cases.

Gender	N
Male	66
Female	54
Age (years)	
<30	5
30-60	82
>60	33
Total	120

A total of 11 conversions were obtained. Gender wise distribution showed increased incidence of conversion in male 62% patients compare to female 38% patients. Patients having age group of 30-60 years had more conversion rate 74%. [Table 2]

Table 2: Distribution according to conversion (N=11)

Gender	%
Male	62
Female	38
Age (years)	
<30	6
30-60	74
>60	20
Total	120

Out of the total 120 patients, duration of surgery was less than 57 minutes in 11% patients, between 60 minutes to 90 minutes in 51.3% patients and more than 90 minutes in 37.7% patients. Only 1 patient which were converted to open surgery had longer duration time for surgery and increased post-operative stay. [Table 3]

Table 3: Duration of surgery and post-operative stay in laparoscopic and open converted cases.

Duration	Total (N=120)	Open Conversion (N=11)	Laparoscopic (N=109)	P value
	Mean±SD			
Surgery (min)	91.63 ± 33.81	126.82 ± 29.02	87.91 ± 35.42	0.0736
Post-operative	1.96 ± 1.50	6.39 ± 1.21	1.66 ± 0.72	<0.001stay (days)

Out of total 11 patients who underwent conversion, the most common reason for conversion was intraoperative adhesions which was found in 9 patients. CBD injury and bleeding from cystic artery was found in 2 patients each. Only one patient each had bowel injury and unclear anatomy and spillage of gallstones. [Table 4]

Table 4: Causes of conversion

Variables	Open Conversion (N=11)	Laparoscopic (N=109)	P value
	N	N	
Adhesion	9	71	0.382
CBD injury	1	0	<0.001
Bowel injury	1	0	0.220
Cystic artery bleeding	2	0	0.439
Unclear anatomy	1	1	0.271
Spillage of gallstones	1	2	0.592

Discussion:

There is no obvious explanation as to why a higher age may lead to a higher conversion rate; however, the same result has also been shown for laparoscopic hysterectomy [9]. Also, the higher conversion rate in men is hard to explain. An explanation might be that men are more likely to delay seeking help [10-11], and thereby present themselves with a more severe disease when they are operated. Another study [12] revealed that men have a higher risk of getting acute cholecystitis.

Acute cholecystitis is a severe inflammation accompanied by increased vascularity and dense adhesions that interfere with good visualization, whereas the thick-walled gallbladder is often shrunken and contracted. Therefore, the cystic duct becomes shortened and the gallbladder adherents to the CBD, making its grasp for retraction difficult and its dissection from the CBD unsafe [13]. Cholecystitis may progress to emphysematous, gangrenous, emphysematous and perforated cholecystitis. Reports from national registries [14-15] disclosed that whenever any of the above happened, the conversion rate was increased by 3-fold, compared to the simple acute cholecystitis cases.

One of the factors found to affect the conversion rate, was the timing for cholecystectomy in acute cholecystitis cases. A Cochrane review [16], outlined the benefits of LC within 7 days from the onset of symptoms, others [17] addressed that the conversion rate was significantly lower in patients who underwent LC within 96 hours from the onset of symptoms, while others [18-19], advocated LC within the "golden 72 hours" of symptoms duration. Despite the obvious benefits, the feasibility of performing LC within 72 hours is often questioned due to a multitude of factors such as the possible attempts by patients to self-medicate with which may result in the late recognition of the condition, and that in a substantial group of patients with significant co-morbidities is required time for adequate pre-operative assessment and optimization [20].

No age is said to be immune to gallbladder disease, however they were more common in the fourth, fifth and sixth decades of life as 72% of the cases belonged to these decades. [21] In our study minimum age of patient undergoing laparoscopic cholecystectomy was 19 years and the maximum age was 76 years.

A study conducted by Delal et al found in their study, the mean duration of operation in converted cases was 128 min and for successful laparoscopic cholecystectomy it was 48.3 minutes. [22] Similarly, Santhanalakshmi et al found that the average duration of surgery in their study was 75 minutes, the mean duration of surgery in converted cases was 101.2 minutes and successful laparoscopic surgery it was 79.4 minutes. [23,24]

Conclusion:

Laparoscopic cholecystectomy is a safe and minimally invasive technique, with only low conversion rate and the commonest cause of conversion in this

study was the presence of dense adhesions at Calot's triangle.

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