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Difficulties that Lead to Conversion in Laparoscopic Cholecystectomy

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Abstract:

Background: *Cholelithiasis is one of the most common surgical problems throughout the world. Earlier, the prevailing treatment of symptomatic Cholelithiasis was an open cholecystectomy which is almost replaced by laparoscopic cholecystectomy. Although occasionaly switch to open cholecystectomy may require during the procedure which is known as conversion in laparoscopic cholecystectomy. Many factors contribute to the conversion which is not a sign of surgeon's failure rather is a sign of surgeon's good surgical judgment. Our objectives are to find out the factors which are associated with conversion and thus reduce conversion rate, preoperative preparation and counseling the patient for conversion in laparoscopic cholecystectomy.*

Methods: *This was a hospital based retrospective study, carried out in department of hepatobiliary & pancreatic surgery department, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from January 2008 to December 2009. A total no of 50 cases were included in our study which were converted to open cholecystectomy. Cases were collected from the hospital medical records which were retrieved and analyzed.*

Result: *A total no of 768 laparoscopic cholecystectomies were attempted during the study period. Out of which 50 cases were converted to open cholecystectomy. Thus the conversion rate was 6.5%. Among these the reasons for conversion in both genders were dense adhesion in 22 (2.86%), aberrant anatomy in 10 (1.3%), empyema gall bladder in 4 (0.52%), per operative findings of choledocholithiasis in 3 (0.39%), suspicion of common bile duct injury in 3 (0.39%), others causes of conversion included uncontrolled bleeding 3 (0.39%), thick fibrosed gall bladder 2 (0.26%), accidental bowel injury 2 (0.26%), Type-I choledochal cyst 1 (0.13%) cases.*

Conclusion: *various factors are related to conversion in laparoscopic cholecystectomy. But due to improvement of learning curve, good quality operative equipment, now a day's laparoscopic cholecystectomy is safe method of treatment for gall stone diseases with very low conversion rate.*

Key words: *Laparoscopic cholecystectomy, Cholelithiasis, Conversion.*

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Introduction:

The introduction of laparoscopic cholecystectomy has been a major breakthrough in minimal access surgery and an important milestone in the history of surgery which has largely replaced open cholecystectomy. Laparoscopic cholecystectomy was first accomplished in June 1987 by a French gynecologist named Philipes Mouret in Lyons.[1] Better cosmetic result, short hospital stay, early recovery with return to physical activity and work; all have contributed to the popularity of this technique, establishing it as the gold standard for the treatment of Cholelithiasis.[2]

In some cases conversion to open cholecystectomy is required for the safety of patient; A conversion rate of 1.5 to 19% has been reported in different published series.[3] The reasons of conversion and rate of conversion is variable which was shown by different author published in various Journals. Like Peters has identified the following reasons for conversion of laparoscopic to open cholecystectomy like dense adhesions, severe inflammation, obscure anatomy and complications like bleeding, duodenal injury, cystic duct

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avulsion.[4] Strasberg has introduced the critical view of safety rules during dissection in calot's triangle in laparoscopic cholecystectomy to reduce the risk of CBD injury.[5]

Laparoscopic cholecystectomy can be safely performed in patients with acute cholecystitis; however, the rate of conversion remains higher when compared with patient having chronic cholecystitis.[6] Chahin and others was showed conversion rates for acute cholecystitis range from 12% to 37.5%.However, conversion rate for acute gangrenous cholecystitis has been reported up to 40%.[7] Study of Shamim M. Shows, the conversion rate for acute cholecystitis was 24.4% versus 5.1% for chronic cholecystitis.[8] Chahin was also found conversion rate for acute cholecystitis was 22% versus 5.5% was for chronic cholecystitis. Failure to identify the calot's triangle is the main risk factor associated with conversion.[9] Ibrahim and Bingener also found; the most common reason for conversion was disturbed anatomy at calot's triangle which was observed in 44% and 50% of patient respectively. [10]

Adhesions are the common reason for conversion of laparoscopic cholecystectomy. Accidental injuries to bile duct and bowel are significant risks of laparoscopic surgery and sometimes require conversion to open surgery.[11]Haemorrhage from Gall bladder during laparoscopic cholecystectomy is one of recognized reasons for conversion to open cholecystectomy.[12] Shea reported following conversion rates: dense adhesion 290 (20.7%), bleeding 112(8%),acute cholecystitis 96(6.9%), bile duct injury 41(2.9%),cystic artery injury 25(1.8%), and bowel injury (0.9%) and empyema 10(0.7%) . A low conversion rate for per operative complications such as bleeding and injury to the biliary tree and bowel reflects over all laparoscopic policy and increasing experiences. Careful Gall bladder retraction, dissection limited to Gall bladder-cystic duct junction, and use of the open technique to establishment of pneumoperitoneum, sequential clipping and lifting of umbilical ligament for abdominal access, all contribute to the reduction in per operative complications.[13]

Gabriel R. had shown the most frequent cause of conversion was perforation of gall bladder with spillage of its content in the peritoneal cavity in 32.8% and 27.9% had dense adhesions causing difficult anatomy. They also shown surgeries performed by surgeon in learning phage of laparoscopic cholecystectomy were more prone to be converted to open surgeries.[14]

So following review of different series of study we can concludes the difficulties that lead to conversion are multi factorial, out of them pre-operative factors are biliary colic within last two to four months, multiple gall bladder calculi with acute cholecystitis. Intra operative factors like gall bladder perforation with spillage of its content, dense adhesions, difficult anatomy, empyema of gall bladder, common bile duct as well as cystic artery injury.

Materials and Methods:

This two years retrospective analytic study was carried out in Bangabandhu Sheikh Mujib Medical University (BSMMU) and Dhaka medical college hospital (DMCH), Dhaka from January 2008 to December 2009. Total no of 768 laparoscopic cholecystectomies were attempted during the study period when 50 cases were converted to open cholecystectomy. Out of them 35 patients received from BSMMU, and 15 patients from DMCH, Dhaka. In our study we include all patient admitted for laparoscopic cholecystectomy in all age group and both sexes. We exclude all patients with acute attack of severe abdominal pain, patient with coagulopathy, altered liver function test, incomplete operation note where causes of conversion were not mentioned properly. The aim of this study is to find out common and exact reason for conversion, to find out preoperative suspicions for subsequent conversion and to reduce the frequency of conversion in laparoscopic cholecystectomy. After admission all the patients were clinically evaluated for assess their condition by history and necessary haematological, biochemical, radiological as well as other special investigations. After proper selection of cases laparoscopic cholecystectomy had tried but conversion into open cholecystectomy were needed due to various reasons. The causes of conversion, complications & pre-operative suspicion for subsequent conversion were try to evaluated from hospital medical history sheet which were collected from hospital record office and endorsed in a data form. Research instrument include a self-constructed data form consisting of history, clinical examination findings, relevant investigations & operation note. All data were endorsed and analyzed by statistical package for the social sciences (SPSS) 17 version.

Results:

Laparoscopic cholecystectomy was attempted in 768 patients during the time period of January 2008 to

December 2009 total period of 02 years at hepatobiliary and pancreatic surgery department of Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh. Out of them 50 cases were converted to open cholecystectomy. Thus the conversion rate was 6.5%. Out of these 50 patients, male were 38 (76%) and female were 12 (24%). So male: female ratio was 19: 6. The age of the patients varied from 16 to 65 years. Largest numbers of patient required conversion were the age group of between 41-50 years which were 18(36%). The next common age group was 31-40 years of age which included 15 (30%) of total selected cases. Other common age group was 51-60 years 10 (20%) and 21-30 years 5 (10%). Only 1 (2%) patients were in the age group of 11-20 years and 1 (2%) were 61-70 years (Table-I)

Table-I

Age and sex distribution of patients (n-50)

Age (years)	No of male	No of female	Total	Percentage
11-20	1	0	1	2
21-30	4	1	5	10
31-40	11	4	15	30
41-50	13	5	18	36
51-60	8	2	10	20
61-70	1	0	1	2
Total	38	12	50	100

Table I shows mean age of the study was 41.5 years and ranges from 11 to 70 years. Most patients under gone conversion were 18 patients (36%) between the ages of 41 to 50 years of age.

Table-II

Distributions of patients according to symptoms (n-50)

Clinical features	No. of patients	Percentage
1. Pain in right hypochondrium	49	98
2. Flatulent dyspepsia	38	76
3. Radiation of pain to the back	35	70
4. History of fatty food intolerance	28	56
5. Positive Murphy's sign	3	6

Table II shows most patient presented with pain in right hypochondrium 49 (98%) then flatulent dyspepsia 38 (76%).

Table-III

Distributions of patient according to Ultrasonographic and per operative findings (n-50):

Ultrasonographic/ peroperative findings	No. of patients	Percentage
Cholelithiasis with thickened & contracted gall bladder	35	70
Cholelithiasis with normal looking gall bladder	7	14
Cholelithiasis with slightly distended gall bladder	5	10
Features of chronic cholecystitis without any stones	2	4
Cholelithiasis with slightly dilated common bile duct	1	2
Total	50	100

In Table III sonographic and per operative finding shows most conversion occurs in this study was Cholelithiasis with thickened and contracted gall bladder 35 (70%).

Table-IV

Distributions of patients as per causes of conversion in laparoscopic cholecystectomy (n-768):

Causes of conversion	No of patients	Percentage	Male	Female
Dense pericholecystic adhesion	22	2.86	17	5
Obscure anatomy of gall bladder	10	1.13	7	3
Empyema gall bladder	4	0.52	3	1
Per-operative diagnosis of choledocholithiasis	3	0.39	2	1
Suspicion of CBD injury	3	0.39	3	0
Uncontrolled bleeding	3	0.39	2	1
Thick fibrosed gall bladder	2	0.26	2	0
Accidental bowel injury	2	0.26	2	0
Choledochal cyst- Type-I	1	0.13	0	1
Total	50	6.51	38	12

Table IV shows dense pericholecystic adhesion was the most common causes of conversion 22 (2.86%), next common obscure anatomy of gall bladder 10 (1.3%). We found accidental bowel injury 2 (0.26%) patient who require conversion.

Table-V

Distributions of patients according to post-operative complications of laparoscopic cholecystectomy (n-50)

Complication	No. of patients	Percentage
Port infection	3	6
Bile duct lesion	2	4
Mild peritonitis	1	2
Pneumonia	1	2
Paralytic ileus	1	2
Incisional hernia	1	2
Bowel perforation	1	2
Total	10	20

Few post-operatives complication found which includes port infection 3 (6%), bile duct lesion / stricture 2(4%), 1 (2 %) patient has occurred serious post-operative complications like bowel perforation.

Table-VI

Distributions of patients as per preoperative suspicion for conversion (n-50)

Suspected cases	No of patients	Percentage
Thick contracted gall bladder	7	14
Acute cholecystitis	2	4
Dilated common bile duct	1	2
Advanced age	1	2
Total	11	22

Discussion:

Open cholecystectomy has been the gold standard of treatment for gall stone management for more than hundreds years, which is very safe, effective and is being performed with insignificant mortality but laparoscopic cholecystectomy has largely replaced open cholecystectomy because of patients satisfaction, shorter hospital stay, early of recovery, earlier return to work and cosmetic consideration.

Now-a-days laparoscopic technique is widely used for cholecystectomy but conversion to open cholecystectomy may still be necessary. Many factors contribute to the conversion like dense pericholecystic adhesion, atypical anatomic situation, excessive bleeding from cystic artery, empyema of gall bladder, per operative common bile duct injury, thick fibrosed gall bladder, accidental bowel injury and technical failure etc. 50 cases of conversion in laparoscopic cholecystectomy were studied from Bangabandhu Sheikh Mujib Medical University, Dhaka .The age of the patients varied from 16 to 65 years and the highest incidence was in between 41-50 years of age group . Among them 38 patients were male and 12 patients were female (Table-I).

The usual presentation was pain in the right hypochondrium 49 (98%) cases, flatulent dyspepsia 38 (76%) cases, characteristic radiation of pain towards back or right lower chest or right shoulder was experienced in 35 (70%) cases. 28 (56%) patients had history of fatty food intolerance. Only 3 (6%) patients had recent history of acute attack with positive Murphy's sign (Table-II). In 35 (70%) cases gall bladder was thickened and contracted. In 7 (14%) cases ultrasonography revealed cholelithiasis along with normal looking gall bladder and in 5 (10%) cases gall bladder was slightly distended. 1 (2%) patients had slightly dilated common bile duct. In 2 (4%) cases there was evidence of chronic inflammation with no evidence of stone within the gall bladder (Table-III).

In this study the commonest cause of conversion in laparoscopic cholecystectomy was dense pericholecystic adhesion 22 (2.86%). This result is comparable with other studies where pericholecystic adhesion is the commonest cause of conversion.[15] In 10 (1.3%) patients aberrant anatomy of gall bladder lead to conversion which is the second most common cause of conversion is this study. This result is also consistent with other studies where aberrant anatomy of gall bladder is the second most common cause of conversion.[16] Next common cause of conversion is empyema of gall bladder was 4(0.52%) which is also comparable with a study where empyema gall bladder was the 3rd common cause of conversion in laparoscopic cholecystectomy.[17] Other less common causes of conversion in laparoscopic cholecystectomy includes- per operative diagnosis of choledocholithiasis (0.39%); suspicion of common bile duct injury 3 (0.39%), uncontrolled bleeding 3 (0.39%); thick fibrosed gall bladder 2 (0.26%), accidental bowel

injury 2 (0.26%) and Type-I choledochal cyst 1 (0.13%) which was also supported by other study.[18](Table-IV)

Among these 50 cases post-operative complications were found in 10(20%) patients. Common complications were port infection and bile duct lesion. Mild peritonitis, pneumonia, paralytic ileus and umbilical incisional hernia were other complications. In this study one gut injuries required conversion (Table-V). The result of pre-operative suspicion for conversion in this study is comparable to a study where acute cholecystitis and thickening of gall bladder are the two most common causes.[19] one study shows acute cholecystitis (29.4%), difficulties with the anatomy in Calot's triangle (17.1%), and adhesions (14.3%) have been the main reasons for conversion beside difficulties in establishing pneumoperitoneum (3.7%).[20] Although recently the overall conversion rate has come down but the reasons of conversion are more or less same and the commonest reason is dense pericholecystic adhesion and the next common cause is aberrant anatomy of gall bladder. The results of this study are comparable to those of another study.[21]

Conclusion:

Difficulties that lead to conversion in laparoscopic cholecystectomy are multi factorial. Other than patient's factor; lack of adequate equipment's, the efficiency and the experience of the surgeon regarding the procedure may influences the rate of conversion also. The rate shown in this study may be variable in respect of time and place of the study. But in a well-equipped hospital with appropriate preoperative evaluation of patients, early diagnosis of the common causes of conversion and modification of the skillfulness and experience of surgeon may reduce the rate of conversion day by day.

Conflict of interest:

We have no conflict of interest to declare

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