

ORIGINAL ARTICLE

ASSESMENT OF RISK FACTORS DIAGNOSTIC APPROACH AND MANAGEMENT IN CASES UNDERGOING DIFFICULT CHOLECYSTECTOMIES

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ABSTRACT: BACKGROUND: Laparoscopic cholecystectomy is the standard of care for the treatment of symptomatic gallbladder disease and one of the most common procedures being performed by the general surgeons all over the world. With more and more endeavors being made in the field of laparoscopy, more and more complicated cases which were relatively contraindicated a few years ago, are now being tackled laparoscopically. AIM: Aims of this study is assessment of risk factors, diagnostic approach and management of cases undergoing difficult cholecystectomies on basis of clinical, USG, preoperative, intra operative findings, duration of surgery, rate of conversion, post op complications and duration of stay in hospital. MATERIAL & METHODS: Prospective study done from June 2012 to Nov. 2014, 192 cases undergoing laproscopic cholecystectomy included in study at tertiary care hospital. RESULT: Cholecystitis or pancreatitis and thickened GB wall, PREOP ERCP are found to be significantly associated with increased risk of conversion. Obesity (BMI≥30 kg/m²) was significantly associated with difficulty in access to the peritoneal cavity. Various factors. CONCLUSION: clinical factors like male sex, previous acute cholecystitis or pancreatitis and ultrasonographic finding of gall bladder wall thickness ≥4 mm can help to predict difficult laparoscopic cholecystectomy and likelihood of conversion of laparoscopic cholecystectomy to open cholecystectomy. KEYWORDS: Difficult, cholecystectomy, risk factor, management.

INTRODUCTION: Laparoscopic cholecystectomy is the standard of care for the treatment of symptomatic gallbladder disease and one of the most common procedures being performed by the general surgeons all over the world.1

With more and more endeavors being made in the field of laparoscopy, more and more complicated cases which were relatively contraindicated a few years ago, are now being tackled laparoscopically.

Laparoscopic cholecystectomy decreases postoperative pain, allows earlier oral intake, shortens hospital stay, enhances earlier return to normal activity, and improves cosmetics over open cholecystectomy.2,3

However, approximately 2% to 15% of patients require conversion to open surgery for various reasons.2,3 Identifying preoperative variables predicting conversion to open surgery improves patient counseling, planning of convalescence, and postoperative expectations. In addition, the surgeon can appropriately predict operative times while maintaining a lower threshold for conversion when intraoperative difficulties are encountered. These predictive factors for conversion also improve patient safety, minimizes the intraoperative complications.
AIMS AND OBJECTIVES: 1. To study the preoperative Ultrasonographic, Clinical parameters that can predict difficult laparoscopic cholecystectomy. 2. To determine the per operative findings suggestive of difficult laparoscopic cholecystectomy. 3. To establish management approach in term of operative time, conversion rates, per operative and post-operative complications, duration of hospital stay.

MATERIAL AND METHODS:
Study Setting: A Tertiary Care Hospital and Institute draining a large rural population of central India
Study Duration: July 2012 to November 2014.
Study Design: A Hospital based Non Randomized Prospective Study.
   All patients undergoing laparoscopic cholecystectomy were included in the study.

Exclusion Criteria:
1. Patients unfit for general anesthesia and surgery.
2. Patients refusing to undergo surgery.

Criteria for prediction of difficult laparoscopic Cholecystectomy:

| CLINICAL                                      | USG BASED                                      | PER-OPERATIVE                                      |
|-----------------------------------------------|-----------------------------------------------|----------------------------------------------------|
| Stocky Male patients                          | Thickened GB wall ≥4mm                        | Difficulty in Access                                |
| Multiparous female with flabby abdomen        | Polyph/mass lesion                            | Difficulty in GB dissection                         |
| Pregnancy                                      | Edematous GB                                  | Bleeding                                           |
| Liver Cirrhosis                                | Emphysematus GB                               | Abnormal Anatomy                                    |
| Present or previous Acute cholecystitis or pancreatitis | Contracted non-functioning GB | GB perforation                                    |
|                                               | Perforated GB                                 | Viscus perforation                                 |
|                                               | Impacted GB stone                             | Intracorporeal suturing                            |
|                                               | Empyema GB                                    |                                                    |

TREATMENT:
Surgical:
(a) Laparoscopic cholecystectomy.
(b) Laparoscopic cholecystectomy converted to open cholecystectomy.
(c) Open cholecystectomy.

Reasons Continuous variables (Age, Duration of surgery) were presented as Mean± SD. Continuous variables were compared by performing unpaired t-test. Categorical variables were compared by chi-square statistics. For small numbers, fisher exact test was applied wherever applicable.
RESULT:

| NO. OF PATIENTS | MALE | FEMALE |
|-----------------|------|--------|
| EASY            | 130  | 90     |
| DIFFICULT       | 62   | 26     |
| TOTAL           | 192  | 116    |

TABLE NO. 1

| AGE IN YEARS | TOTAL | DIFFICULT (n=62) |
|--------------|-------|------------------|
| 11-20        | 7     | 4 (6.45%)        |
| 21-30        | 09    | 08 (12.90%)      |
| 31-40        | 51    | 16 (25.80%)      |
| 41-50        | 61    | 15 (24.19%)      |
| 51-60        | 40    | 12 (19.35%)      |
| 61-70        | 23    | 06 (9.67%)       |
| 71-80        | 01    | 01 (1.61%)       |
| TOTAL        | 192   | 62 (100%)        |

TABLE NO. 2: AGE DISTRIBUTION OF THE PATIENTS

| PRESENTATION                                           | NO. OF CASES | PERCENTAGE |
|--------------------------------------------------------|--------------|------------|
| Chronic Calculus Cholecystitis                         | 13           | 20.96      |
| Chronic Calculus Cholecystitis With Choledocholithiasis With Pre-Operative ERCP Guided Clearance Done | 14           | 22.58      |
| Acute Cholecystitis                                    | 5            | 8.06       |
| Sickle Cell Disease/Thalessemia                        | 12           | 19.35      |
| Empyema Gallbladder                                    | 8            | 12.9       |
| Gallbladder Polyp                                      | 1            | 01.61      |
| Cholelithiasis With Pancreatitis                       | 5            | 8.06       |

TABLE NO. 3: DIFFERENT PRESENTATION OF DIFFICULT CASES

| DISEASE                                      | TOTAL | DIFFICULT CASES | P-VALUE |
|----------------------------------------------|-------|-----------------|---------|
|                                              | NUMBER | %               | NUMBER | %            |         |
| Pure Gall Bladder Disease                    | 158    | 82.29           | 37     | 23.41        | -        |
| Gall Stone With CBD Pathology                | 15     | 7.81            | 14     | 93.33        | <0.001 (HS) |
| Gall Stone With Pancreatic Pathology         | 5      | 2.6             | 5      | 100          | <0.001 (HS) |
### TABLE NO. 4: RELATION BETWEEN BILIO-PANCREATIC AND SYSTEMIC DISEASES WITH DIFFICULT CHOLECYSTECTOMY

| Preoperative Risk Factor | Number | Access | P-Value |
|--------------------------|--------|--------|---------|
| BMI                      |        |        |         |
| Obese                    | 46     | 11     | 35      | <0.001, (HS) |
| Nonobese                 | 146    | 1      | 145     | 0.652, (NS)  |
| Previous Abdominal Surgery |      |        |         |
| Present                  | 24     | 1      | 23      |         |
| None                     | 168    | 11     | 157     |         |

### TABLE NO. 5: ACCESS TO THE PERITONEAL CAVITY ACCORDING TO PRESENCE AND ABSENCE OF PRE-OPERATIVE RISK FACTORS

| Preoperative Risk Factor | Number | GB Bed Dissection | p-value |
|--------------------------|--------|-------------------|---------|
| Local Signs Of Cholecystitis |        | Difficult N=44     | Easy N=153 |         |
| Present                  | 32     | 19                | 13      | 0.001, (S) |
| Absent                   | 160    | 25                | 135     |         |
| No. Of Stones            |        |                   |         |         |
| Single                   | 38     | 6                 | 32      | 0.208, (NS) |
| Multiple                 | 149    | 38                | 111     |         |
| GB Wall Thickness        |        |                   |         |         |
| ≥4                       | 32     | 15                | 17      | <0.001, (HS) |
| <4                       | 160    | 29                | 131     |         |
| Liver                    |        |                   |         |         |
| Normal                   | 139    | 33                | 106     | <0.6, (NS) |
| Fatty                    | 53     | 11                | 42      |         |
| Preop ERCP               |        |                   |         |         |
| Done                     | 17     | 7                 | 10      | <0.001 (HS) |
| Not Done                 | 175    | 37                | 138     |         |

### TABLE NO. 6: GB BED DISSECTION ACCORDING TO PRESENCE AND ABSENCE OF PREOPERATIVE RISK FACTOR

| Preoperative Risk Factor | Number | Adhesion | p-value |
|--------------------------|--------|----------|---------|
| Local Signs Of Cholecystitis |        | Present N=30 | Absent N=150 |         |
| Present                  | 32     | 12       | 20      | 0.001, (HS) |
| Absent                   | 160    | 21       | 139     |         |
| Pre Op ERCP              |        |          |         |         |
| Done                     | 18     | 7        | 11      | 0.01, (S) |
| Not Done                 | 174    | 26       | 14      |         |
### TABLE NO. 7: DENSE ADHESIONS ACCORDING TO PRESENCE OR ABSENCE OF PREOPERATIVE RISK FACTORS

| Dense Adhesions At Calots | Difficulty | Number | Percent |
|---------------------------|------------|--------|---------|
| Cholecystoduodenal Fistula | Difficulty | Number | Percent |
| Anatomical Variation | Difficulty | Number | Percent |
| None | Difficulty | Number | Percent |
| Present | Difficulty | Number | Percent |
| Absent | Difficulty | Number | Percent |

### TABLE NO. 8: OPERATIVE DIFFICULTIES

| Pre Operative Risk Factor | Difficulty | Number | Percent |
|---------------------------|------------|--------|---------|
| Present | Difficulty | Number | Percent |
| Absent | Difficulty | Number | Percent |

### TABLE NO. 9: BLEEDING DURING SURGERY ACCORDING TO PRESENCE AND ABSENCE OF PREOPERATIVE RISK FACTOR

| Pre Operative Risk Factor | Difficulty | Number | Percent |
|---------------------------|------------|--------|---------|
| Present | Difficulty | Number | Percent |
| Absent | Difficulty | Number | Percent |
**TABLE NO. 10: DURATION OF SURGERY IN THE PRESENCE AND ABSENCE OF PRE-OPERATIVE RISK FACTORS**

| PRE OPERATIVE RISK FACTOR | NUMBER | DURATION OF SURGERY | P-VALUE |
|---------------------------|--------|---------------------|---------|
| Local Signs Of Cholecystitis | | | |
| Present | 32 | 76.09 ±22.71 | <0.0001, (HS) |
|Absent | 160 | 59.42 ±27.25 | |
| No. Of Stones | | | |
| Single | 38 | 56.26 ±16.92 | 0.124, NS |
|Multiple | 149 | 63.97 ±29.47 | |
| GB Wall Thickness | | | |
| ≥4 | 32 | 84.34 ±43.23 | 0.0001, (HS) |
|<4 | 160 | 57.78 ±20.18 | |
| Liver | | | |
| Fatty | 53 | 58.91 ±25.31 | 0.30, NS |
|Normal | 139 | 63.46 ±27.34 | |
| PREOP ERCP | | | |
| DONE ND | 18/174 | 81 ±19.63/60 ±27.19 | 0.002 (S) |
| H/O ACUTE CHOLECYSTITS | | | |
| Present | 8/184 | 84.38 ±4.95/61.24 ±27.38 | 0.018 (S) |

**TABLE NO. 11: INTRAOPERATIVE COMPLICATIONS**

| COMPLICATION | NUMBER | PERCENT |
|--------------|--------|---------|
| Bleeding     | 12     | 46.15   |
| GB Perforation | 08     | 30.76   |
| Duodenal Perforation | 01     | 03.84   |
| Stone Spillage | 05     | 19.23   |

**TABLE NO. 12: POST OPERATIVE COMPLICATIONS**

| REASON FOR CONVERSION | NUMBER | PERCENT |
|-----------------------|--------|---------|
| Difficult GB Dissection | 10     | 58.82   |
| Intra Operative Bleeding | 04     | 23.52   |
### Table No. 13: Conversion to Open

| Risk Factor                        | No. | Conversion to Open | P-Value   |
|------------------------------------|-----|--------------------|-----------|
|                                    |     | Completed | Converted |           |
| Gender                             |     |           |           |           |
| Male                               | 76  | 64        | 12        | 0.006, (HS) |
| Female                             | 116 | 111       | 5         |           |
| BMI                                |     |           |           |           |
| Obese                              | 46  | 40        | 6         | 0.251, (NS) |
| Non Obese                          | 146 | 135       | 11        |           |
| Lower Abdominal Surgery            |     |           |           |           |
| Present                            | 24  | 23        | 1         | 0.387, (NS) |
| None                               | 168 | 152       | 16        |           |
| GB Wall Thickness                  |     |           |           |           |
| Thick                              | 32  | 22        | 10        | <0.001, (HS) |
| Normal                             | 160 | 153       | 7         |           |
| History of Acute Cholecystitis / Pancreatitis |     |           |           |           |
| Present                            | 08  | 5         | 3         | 0.01, (S) |
| Absent                             | 184 | 169       | 15        |           |
| PREOP ERCP                         |     |           |           |           |
| DONE                               | 18  | 4         | 14        | 0.036(S) |
| ND                                 | 174 | 13        | 161       |           |

### Table No. 14: Conversion to Open According to Presence and Absence of Pre Operative Risk Factor

| Number of Days | Difficult | Easy |
|----------------|-----------|------|
|                | No.       | Percent | No. | Percent |
| 2-4            | 15        | 24.19   | 105 | 80.76 |
| 5-7            | 35        | 56.45   | 25  | 19.23 |
| 8-10           | 12        | 19.35   | 00  | 00    |
| Total          | 62        | 100     | 130 | 100   |

### Table No. 15: Post Operative Hospital Stay

| Risk Factor                  | Number | Percent |
|------------------------------|--------|---------|
| Difficult Cholecystectomy    | 17     | 26.56   |
| Overall                      | 17     | 8.85    |

### Table No. 16: Conversion Rate
DISCUSSION: Total 192 patients underwent laparoscopic cholecystectomy during this period and 62 cases which were considered as difficult were studied in detail.

The observations were as follows:

1. Sex: In present study, 76 patients were males and 116 patients were females. (Table no 1). The male: female ratio in this study is 1: 1.53.

2. Age: The age group (Table no 2) in this study ranged from 14 years to 71 years. Mean age incidence in the present study was 45.77 years whereas mean age in difficult group was 43.52 years. Palanivelu C et al (2007)\(^4\) in their study over 9864 patients found that the mean age of patients was 40.4 yrs.

3. Relation between Biliopancreatic diseases and systemic diseases with difficult laparoscopic cholecystectomy:

   In this study, (Table no.4) 14 out of 15 patients having CBD pathology in whom Preoperative ERCP was done, had difficulty in laparoscopic cholecystectomy which was statistically significant (p<0.001), 5 out 5 patients with pancreatitis had difficult laparoscopic cholecystectomy which is statistically significant (p<0.001) and 8 out of 14 patients with systemic disease had difficult laparoscopic cholecystectomy which is also statistically significant (p<0.03).

   Akoglu M et.al (2010) in their study, performed preoperative ERCP was done in 32.5% patients and according to their study preoperative ERCP appeared to be related to scleroatrophy gall bladder and that that scleroatrophy gallbladders present more difficulties for laparoscopic cholecystectomy and are associated with a higher conversion rate.

   Costantini R et.al. (2011).\(^5\) The execution of ERCP before surgery proved to be significantly associated with the risk of conversion (p<0.01) and hence the difficulty of procedure.

4. In this study, two variables were analyzed in relation to difficulty in access which were obesity and history of previous abdominal surgery. (Table no.5)

   In this study it was found that obese patients had significantly higher difficulty in access as compared to non-obese patients. (p<0.001).

   Similar finding has been noted in many other studies.

   Jagadish Nachnani et.al. (2005)\(^6\) in his study concluded that difficulty in access was encountered significantly more often in obese patients (p<0.05) and patients with past history of upper abdominal surgery. (p<0.01).

5. In our study, Difficulty in GB dissection was studied in relation to 4 variables that were presence or absence of local signs of cholecystitis, number of stones, GB wall thickness and status of liver, preoperative ERCP. (Table no.6).

   Out of these, cases with local signs of cholecystitis, GB wall thickness 4 mm or more and those in which preoperative ERCP was done had significantly higher difficulty in GB dissection (p<0.001), (p<0.001) and (p<0.001) respectively.
Jagadish Nachnani et al. (2005)⁶ in his study concluded that dissection of GB bed was more difficult in patients with past history of acute cholecystitis/pancreatitis (p<0.01) and in those with GB wall thickness exceeding 3mm (p<0.05).

6. In our study, presence of dense adhesions during surgery was correlated with various variables (Table No. 7) out of which history of local sign of cholecystitis was significantly associated with presence of dense adhesions (p<0.001). Preoperative ERCP, past history of acute cholecystitis or acute pancreatitis and GB wall thickness 4mm or more were also positively associated with presence of dense adhesions intra operatively, (p<0.003, p<0.012 and p<0.021 respectively).

Jagadish Nachnani et al. (2005)⁶ in his study commented that past history of abdominal surgery, past history of acute cholecystitis/pancreatitis and thickened GB wall were associated with difficulty in defining the anatomy.

7. Significant intra operative bleeding was correlated with various variables (Table No. 9) out of which there was significant correlation observed between thickened GB wall and bleeding (p<0.001) and presence of acute cholecystitis/pancreatitis and bleeding (p<0.025).

Jagadish Nachnani et al. (2005)⁶ concluded that bleeding occurred more commonly in patients with having GB wall thickened (p<0.01) and those with history of acute cholecystitis/pancreatitis (p<0.01).

Abdel Baki et al. (2006)⁷ in their study demonstrated that patients with thickened GB wall had high incidence of bleeding resulting in significant increase in duration of surgery.

8. Operative time (Table no. 10) mean operative time required for laparoscopic cholecystectomy is 62.2min; while mean time required for difficult cases is 90.56 minutes whereas mean operating time for converted procedures is 121.58 min which is significantly higher as compared to non-converted cases.

9. In our study, in presence of local signs of cholecystitis and thickened GB wall ≥4mm, pre op ercp, duration of surgery was significantly higher. (p<0.001).

Abdel Baki et al. (2006)⁷ in their study commented that patients with local signs of cholecystitis, single impacted stones, thickened GB wall and liver fibrosis had significantly higher operative time (p<0.05).

10. The present study, (Table No. 13) the reasons for conversion were as follows – dense adhesions (10 cases), bleeding (4 cases), GB perforation (2 cases), and Duodenal perforation (1 case).

Duca S et al (2003)⁸ in their study over 9542 patients found following results - The rate of conversion was 1.9%. The causes of conversion were - CBD injury was the cause of conversion in 11 cases, right hepatic duct injury in 2 cases, bleeding in 9 cases, pericholecystitis in 124 cases, perforated GB in 2 cases, adhesions of previous laparotomy in 6 cases and instrument failure in 5 cases.
Jagadish Nachnani et al. (2005) in their study found that 12 patients (11.4%) required conversion because of the following reasons: inability to delineate anatomy (66.7%), bleeding (25%), suspected CBD injury (8.3%).

The common reasons for conversions are dense adhesions, bleeding which hamper surgeons visibility other factors like viscus injury, aberrant anatomy, instrument failure also play role.

11. In our study, (Table No.14) a gallbladder wall thickness of 4mm or more was significantly associated with difficult surgical preparation leading to conversion and with the histopathologic report of chronic or acute inflammation (p value <0.001).

Avinash Supe et al (2005) inferred that preoperative predictive factors significantly associated with conversion to OC are: obesity, patient gender, past history of acute cholecystitis or acute pancreatitis, past history of upper abdominal surgery, and GB wall thickness >3 mm.

N.A. Kama et al (2001), B J Ammori et al (2001) found following factors as significant predictors of conversion male sex, past history of upper abdominal surgery, thickened GB wall(>4mm), age>60 years, clinical diagnosis of acute cholecystitis or previous attacks of acute cholecystitis.

12. In present series we found significant association with male sex and conversion to open cholecystectomy (p value 0.006). Table No.14

The c Avinash Supe et al (2005) found significant association between male sex, obesity, past history of acute cholecystitis or acute pancreatitis, past history of upper abdominal surgery, and GB wall thickness >3 mm.

Common reasons for conversion in males were adhesions, moderate bleeding.

13. In study conducted by Raad S. Al-Saffar et al.(2010), it was seen that conversion rate declined as the number of cases progressed and concluded that LC is preferred method even in the difficult cases and as the number of surgery increases, the learning curve of surgeons increases and the difficult cases become less difficult.

Similar results are drawn from our study as well.

In present series of 192 patients; 192 patients had undergone laparoscopic cholecystectomy, 17 (8.85%) cases required conversion to open cholecystectomy (Table no. 16).

| Sr. No. | Series                                      | Rate of conversion |
|-------|--------------------------------------------|-------------------|
| 1     | Avinash Supe et al (2005)                  | 11.4%             |
| 2     | Sajid Randhawa(2014)                       | 11 %              |
| 3     | Kumar A et al (1996)                       | 14.3%             |
| 4     | Samir shrestha et al (2014)                | 11.14 %           |
| 5     | Pradeepanand Vaidya et al (2015)           | 7%                |
| 6     | S K Sahu et al (2007)                      | 6%                |
| 7     | Shamiyeh A et al (2007)                    | 5.4%              |
| 8     | Present series                             | 8.85%             |
Rate of conversion in various studies is 2 to 15%.

| Study Name of Author | Year | Place     | No. of Cases | Conversion Rate         |
|----------------------|------|-----------|--------------|-------------------------|
| Fletcher et al       | 1992 | AUSTRALIA | 186          | 3% (11% in different cases) |
| Perissat J.          | 1993 | FRANCE    | 6110         | 3% (8% in different cases) |
| Lee FT et al         | 1994 | USA       | 587          | 6%                      |
| Sanabria et al¹⁸     | 1994 | CANADA    | 628          | 5% (10% in different cases) |
| Margret et al        | 1995 | UK        | 443          | 10%                     |
| Vecchio et al        | 1998 | USA       | 114005       | 2.2%                    |
| Thompson et al       | 2003 | ITALY     | 1360         | 1.8%                    |
| Kologlu et al        | 2004 | TURKEY    | 1000         | 3.2% (4.8% in different cases) |
| Gauraya et al        | 2004 | SAUDI ARABIA | 549    | 2.9%                    |
| Nachnani et al⁶      | 2005 | INDIA     | 105          | 11.4%                   |
| Kuldip et al         | 2005 | INDIA     | 6147         | 0.36% (1.66% in different cases) |
| Tarcoveanu           | 2005 | ROMANIA   | 6985         | 3.2%                    |
| Lim et al            | 2006 | SINGAPORE | 149          | 11.5%                   |
| Burr et al           | 2006 | LAHORE    | 300          | 4%                      |
| Ishizaki et al       | 2006 | JAPAN     | 1179         | 5.3% (10.6% in different cases) |
| Bakos et al          | 2008 | SLOVAKIA  | 1535         | 5.7%                    |
| Waseem et al         | 2008 | PAKISTAN  | 216          | 4%                      |
| Rosita et al         | 2009 | IRAN      | 793          | 9%                      |

Table taken from Raad S. Al-Saffar et. al. (2010)¹⁰ for comparison.

Conversion rate (8.85%) is comparable with other studies whereas conversion rate in difficult cases (26.58%) is slightly higher in our study which is considerable on the basis of fact that this is an institutional study.

**CONCLUSION:** Mean age of difficult laparoscopic cholecystectomy was highest in the age group of 31-40 years, showing incidence of 23.5%. The mean age incidence undergoing difficult laparoscopic cholecystectomy in present study was 43.6 years. Chronic calculus cholecystitis is the commonest mode of presentation in this study. In clinical factors, male gender, previous acute cholecystitis or pancreatitis and thickened GB wall are found to be significantly associated with increased risk of conversion. Preoperative ultrasonographic finding of gall bladder wall thickness ≥4mm is significantly associated with increased risk conversion.
Preoperative ERCP significantly increases the number of difficult cases and increases the risk of conversion to open & can help to predict difficult laparoscopic cholecystectomy. Obesity (BMI ≥ 30 kg/m²) was significantly associated with difficulty in access to the peritoneal cavity. Various factors like thickened GB wall, presence of local signs of cholecystitis and preoperative ERCP were significantly associated with difficulty in GB dissection and dense adhesions causing difficulty in performing laparoscopic cholecystectomy.

In present series, mean operative time required for difficult laparoscopic cholecystectomy is 89.92 min; while mean time required for converted procedures is 121.58 min which is highly significant as compared to operative time for non-converted cases which is 68.75 minutes. Significant bleeding occurred more often in patients with past history of acute cholecystitis or pancreatitis and those patients having gall bladder wall thickness ≥ 4m. The common reasons for conversion in present study were as follows-dense adhesions (57.9%), bleeding (21.1%), GB perforation (10.5%) and intra operative viscus perforation (10.5%). As more and more number of cases were performed laparoscopically, conversion rate was significantly reduced. The conversion rate of laparoscopic cholecystectomy to open cholecystectomy is 9.64% overall and 29.69 % in difficult cases which is slightly higher in our study and can be explained on the basis of less experience in difficult cases, early phase of learning curve and lack of technological advances.

Patients with a high predicted risk of conversion could be operated on either by or under the supervision of a more experienced surgeon. Also, a high predicted risk of conversion may allow the surgeon to take an early decision to convert to OC when difficulty is encountered during dissection; this may significantly shorten the duration of surgery and decrease the associated morbidity.

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