

A Clinical Study to Determine Predictive Factors for Difficult Laparoscopic Cholecystectomy

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Abstract

Background: Cholelithiasis is the most common biliary pathology, with a prevalence of 10 to 15%. It is symptomatic in approximately 1 to 2% of patients. In 1992, National Institute of Health (NIH) consensus development stated that laparoscopic cholecystectomy "Provides a Safe and Effective treatment for most patients with symptomatic gallstones". In about 5 to 10% of laparoscopic cholecystectomy, conversion to open cholecystectomy may be needed for safe removal of gallbladder.

Objectives: To determine the predictive factors for difficult laparoscopic cholecystectomy, To study the clinical presentation of cholelithiasis, To study the surgical mode of management, To study the complications of laparoscopic cholecystectomy.

Material And Methods: The material for the present study comprised of 50 cases admitted to Mahatma Gandhi Memorial Hospital, Warangal from April 2018 to December 2019 for a period of 21 months. The cases confirmed by Ultrasonography were evaluated with following risk factors: age >50 years, male sex, BMI 25.1 to 27.5 and >27.5, previous surgery, prior hospitalization, palpable gall bladder, gall bladder wall thickening, impacted stone, pericholecystic collection. Each risk factor was given a score. The total score upto 5 predicted easy, 6 to 10 difficult and more than 10 very difficult. **RESULTS:** The highest age incidence of cholelithiasis was in the 4th decade, and was more common in females. Pain abdomen was the most common symptom. Ultrasonography detected gallbladder stones in all patients, wall thickening in 19 and pericholecystic collection in 8. BMI >27.5 (P<0.001), history of prior hospitalization (P<0.0008), palpable gallbladder (p<0.0364), impacted stone (P<0.0103) and pericholecystic collection (P<0.0471) were significant predictors of difficult laparoscopic cholecystectomy.

Conclusion: The proposed scoring system had a positive prediction value for easy prediction of 94.7% and for difficult prediction of 100%. The conversion rate from laparoscopic cholecystectomy to open cholecystectomy was 10%.

Key words: Laparoscopic Cholecystectomy, Predictive factors, Scoring System

INTRODUCTION

Cholelithiasis is the most common biliary pathology. Gallstones are present in 10 to 15% of the general population and asymptomatic in the majority (>80%).

The prevalence of gallstone varies widely in different parts of the world. In India it is estimated to be around 4%. An epidemiological study restricted to rail road workers showed that north Indians have 7 times higher occurrence of gallstones as compared to south Indians.^[1] It is estimated that at least 20 million people in the United States have

gallstones and that approximately 1 million new cases of cholelithiasis develop each year. Changing incidence in India is mainly attributed to westernization and availability of investigation that is ultrasound in both rural and urban areas and due to change in socioeconomic structure.

Approximately 1-2% of asymptomatic patients will develop symptoms requiring cholecystectomy per year, making cholecystectomy one of the most common operation performed by general surgeons.

Cholelithiasis is rare in the first two decades. Incidence gradually increases after 21 years and reaches its peak in 5th and 6th decade. Women are more affected than men in the ratio of 4:1.

In 1992, The National Institute of Health (NIH) consensus development conference stated that laparoscopic cholecystectomy "provides a safe and effective treatment for most patients with symptomatic gallstones."^[1] Since the

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introduction of laparoscopic cholecystectomy, the number of cholecystectomy performed in the United States has increased from 5 lakh per year to 7 lakh per year.^[2]

The advantages of laparoscopic cholecystectomy over open cholecystectomy are earlier return to bowel functions, less postoperative pain, informed cosmesis, shorter length of hospital stay, earlier return to full activity, and decreased overall cost. Laparoscopic cholecystectomy is associated with better preservation of immune function and a reduction of the inflammatory response compared with open surgery. The rate of postoperative infections seems to be lower.^[3]

Laparoscopic cholecystectomy has become the gold standard in the treatment of cholelithiasis and is replacing open cholecystectomy. The rate of conversion from laparoscopic cholecystectomy to open cholecystectomy is 5 to 10%. Hence it is necessary to study the predictive factors for difficult laparoscopic cholecystectomy. Therefore this study was undertaken.

Objectives of the Study

- To determine the predictive factors for difficult laparoscopic cholecystectomy.
- To study the clinical presentation of cholelithiasis.
- To study the surgical mode of management.
- To study the complications of laparoscopic cholecystectomy.

METHODOLOGY

The materials for the present study on “A CLINICAL STUDY TO DETERMINE PREDICTIVE FACTORS FOR DIFFICULT LAPAROSCOPIC CHOLECYSTECTOMY” comprises of 50 cases admitted to Mahatma Gandhi Memorial Hospital, Warangal from April 2018 to December 2019 for a period of 21 months. The method for the study included screening of patients who presented with upper abdominal pain, or vomiting or dyspepsia or jaundice. Such patients were studied in detail clinically and investigated as per the proforma detailed below. Ultrasound abdomen was done in all patients. Routine haematological and biochemical investigations were done. Investigations like OCG, ERCP, PTC could not be done routinely due to lack of facilities. LFT and PT-INR were done in all patients.

The patients confirmed by USG examination were evaluated with following factors: age, sex, h/o previous hospitalization, BMI wt (kg)/ht (mt²), abdominal scar- supraumbilical or infraumbilical, palpable gall bladder, sonographic findings- wall thickness, Pericholecystic collection, impacted stone.

All the patients were received symptomatic treatment and vitamin K for 3 days preoperatively.

Following evaluation the patient will be subjected to laparoscopic cholecystectomy and time taken, biliary/stone spillage, injury to duct/artery or conversion were noted.

All the patients were operated by single laproscopic surgeon. Post operatively cases were followed up for any complication. Drain was removed between 2nd and 5th post OP day depending on the drainage, and S/R was done 8th post OP day. All cases were followed up for any recurrent symptoms.

Inclusion Criteria

The patients aged between 16 and 60 yrs presenting with symptoms and signs of Cholelithiasis/Cholecystitis and diagnosed by USG examination in surgical ward of K R hospital, Mysore.

Exclusion Criteria

Patients below 15 years of age. Patients with CBD calculus, raised ALP, dilated CBD, where CBD exploration was needed. Patients with features of obstructive jaundice. Patients refusing surgery. Patients not willing for laparoscopic cholecystectomy.

RESULTS

This study included 50 cases that were studied prospectively over a period of 21 months, April 2018 to December 2019

Age Distribution

In the present series the youngest patient was 19 yrs of age and the oldest was 60 yrs of age. Majority of the patients in the present series were in the age group of 31-40 yrs of age.

Sex Distribution

Out of 50 patients 35 were females and 15 were male patients. The male: female ratio is 1:2.3.

SEX	BATTACHARY'S SERIES	%	HANIF SERIES	%	PRESENT SERIES	%
MALE	26	28.6%	90	36%	15	30%
FEMALE	65	71.4%	160	64%	35	70%

Presenting signs

Tenderness in right hypochondrium was present in 40(80%) patients, Guarding and rigidity in 2 patients and a mass was palpable in 11 patients.

Correlation with blood group

Of the 50 patients 23 had of blood group ‘O’, 15 had of blood group ‘B’, 10 had of blood group ‘A’ and 2 had blood goup ‘AB’.

Ultra sonography

All the 50 patients had stones in gallbladder, 19 patients had wall thickening and 8 had pericholecystic collection. 33 patients had multiple calculi, 9 had solitary calculi and 8 had solitary impacted calculi.

Post operative complications

Only 2 patients had infection of the epigastric port site which required about 2 to 3 dressing.

Histopathological examination

49 cases were reported as chronic cholecystitis, while one was reported as acute cholecystitis. No case of malignancy of the GB was detected [Table 1].

DISCUSSION

Age Distribution

Majority of the patients in the present series were in the age group of 31-40 yrs of age, whereas in Herman's series and Hanif series the majority of them were in the age group of 51- 60 yrs and 41-50 yrs respectively.

Sex Distribution

In the present series, out of 50 patients 35 were females and 15 were male patients. The male: female ratio is 1:2.3. Battachary's series showed 71.4 % of the patients were females and 28.6% were males. Similar sex distribution was seen in Hanif series.

PRESENTING SYMPTOMS

Pain

Pain was the predominant symptom seen in all 50 patients. All the 50 patients presented with chronic recurring pain. In 82% (41) of patients, pain was in the right hypochondrium. Of the 41 patients, 72% (36) patients had colicky type of pain, 28% (14) patients had gripping type of pain and 18% (9) patients had dull aching type of pain. In 18% (9) patients, pain was in epigastrium predominantly. Radiation of pain to back was seen in 28%.

Pain was the most common symptom in both Ganey's series and Alok sharma series.

Vomiting

Vomiting was present in 38% (19) of the patients with pain. Vomiting was spontaneous and occurred mostly during the attack of pain.

Jaundice

Jaundice was present in 1 patient, which was obstructive in nature. The patients underwent ERCP with CBD stenting.

It was followed by cholecystectomy after 6 weeks.

Dyspepsia

Dyspepsia was present in 22% (11) of the patients. On endoscopy 3 of them had duodenal ulceration. These patients were treated with anti H-Pylori regimen.

Fever

Fever was present in 12% (6) of the patients which was of moderate degree and was associated with chills.

Past History

Of the 50 patients, 11 had undergone tubectomy, 2 had undergone LSCS, 1 had undergone appendicectomy, and 1 had undergone hysterectomy. 1 patient presented with obstructive jaundice due to CBD calculus, and he underwent ERCP with CBD stenting. 2 patients had attack of acute cholecystitis which required hospitalization and were managed conservatively. One patient had acute pancreatitis and was treated conservatively with hospitalization.

Personal History

Only 2 patients in the present series were purely vegetarian in their diet, while the remaining had mixed dietary habits. 9 of the 15 male patients consumed alcohol regularly. None of the female patients consumed alcohol.

Family History

None of the patients in the present series had a family history of cholelithiasis.

General Physical Examination

General survey revealed that 29 (58%) patients had BMI < 25, 9 (18%) had

BMI in the range of 25-27.5, and 12 (24%) had BMI > 27.5.

4 patients were hypertensive and 2 were diabetic. 1 patient had bronchial asthma. 1 patient was a known case of hypothyroidism and was on thyroid hormone supplementation.

On inspection, scar due to previous surgery was seen in 16(32%) of the patients. Out of this 2 had supraumbilical scar and 14 had infraumbilical scar.

Presenting Signs

Tenderness in right hypochondrium was present in 40(80%) patients. This is more when compared to Hadfield's series.^[4]

Guarding and rigidity was present in 2(4%) patients in contrast to 18.7% seen in Hadfield's series. Murphy's sign was present in 11(22%) patients.^[4]

Mass was palpable in 5(10%) patients while in Hadfield's series mass was palpable in 7% of the patients.

INVESTIGATION

Routine biochemical and hematological investigations like Hb%, Urine examination, Blood grouping, B.urea, S.ceanine, RBS and LFT were done in all cases.

Hb% of patients ranged from 10 to 13 gm%. FBS and PPBS were done for diabetic patients. B.urea and S.creatinine were within normal limits.

One patient had deranged LFT with raised SGOT and SGPT levels. PT-INR was done in all cases and was within the range of 1 to 1.2.

Majority of patients in present series belonged to Blood group 'O' constituting about 46%. 30% and 20% had blood group 'B' and 'A' respectively. Only 4% had blood group 'AB'. While in North American Series majority were of blood group 'A' constituting of about 36.5%, followed by blood group 'O' ie 30%, blood group 'B' 13.5% and blood group 'AB' ie 13.5%.

Ultrasonography

Ultrasound was done as a routine investigation in all the patients. The sonologic criteria used to diagnose gall stones were acoustic shadowing of the opacities in the gall bladder and change in the position of the opacity with the change in patient position.

All the 50 patients had stones in gallbladder, 19 patients had wall thickening and 8 had pericholecystic collection.

33 patients had multiple calculi, 9 had solitary calculi and 8 had solitary impacted calculi.

In Alok Sharma series 98.3% had stones in GB and 5.2% had GB wall thickening. Of the 98.3%, 73.7% had multiple stones, 26.3% had solitary stones and 5.2% had bile duct stones.

Post-operative Treatment

In all cases, post-operative treatment included

- Nasogastric aspiration till the patient recovered from the postoperative ileus evidenced from appearance of bowel sounds and passage of flatus.
- I-V fluids continued till oral liquid diet was started, ie following removal of Ryle's tube.
- Broad spectrum antibiotic for 5 days
- Analgesics as and when required
- Drainage tube was removed between 1st and 5th post OP day.

TABLE 1: Showing the age wise distribution of cholelithiasis.

AGE IN YRS	HERMAN'S SERIES	%	HANIF SERIES	%	PRESENT SERIES	%
0-10 yrs	0	0%	0	0	0	0
11-20 yrs	25	1.60%	1	0.4%	1	2%
21-30 yrs	92	5.90%	8	3.2%	12	24%
31-40 yrs	226	14.60%	58	23.2%	15	30%
41-50 yrs	325	21%	150	60%	13	26%
51-60 yrs	473	30.60%	33	13.2%	9	18%
>61 yrs	352	23.57%	0	0	0	0

Post-operative Complication

Only 2 patients had infection of the epigastric port site which required about 2 to 3 dressing. It healed by secondary intention. In both the cases there was bile spillage. In Saxena *et al*, the postoperative infection rate was 6.3%.

Histopathological Examination

49 cases were reported as chronic cholecystitis, while one was reported as acute cholecystitis. No case of malignancy of the GB was detected, which was similar to series by Battachary, Raza *et al*.

Follow Up

All patients were followed up for a period of 1 month and no significant complication was noted.

CONCLUSIONS

- The highest incidence of gallstone in present series is in the age group of 30 to 40 years, which is closely followed by 21-30 years and 41-50 years. Where as in Herman's series and Hanif series highest incidence were in the age group of 51-60y and 41-50 y respectively.
- The sex ratio (Female: Male) is 1: 2.3. this clearly shows female preponderance which is same all over the world. Endogenous estrogen and progesterin are attributed to this phenomenon.
- The incidence of gall stones was found to be more in patients with blood group O, which differs greatly with The North American Series where the incidence was found to be more in patients with blood group A.
- Pain was the predominant symptom seen in all (100%) the patients. Vomiting was present in 38% of the patients with pain. Dyspepsia was present in 22% of the patients and fever in 12% of them.
- The symptomatology matched well with that of Ganey's series.
- Tenderness in the right hypochondrium was present in 80% of the patients, while guarding and mass were present in 4 and 10% respectively.
- Ultrasound is the most accurate and sensitive investigation for diagnosis of cholelithiasis.

- Of the 50 patients, all had stones in the gall bladder, 19 patients had wall thickening and 8 had pericholecystic collection.
- The incidence of CBD stones is 4%. 1 patient had obstructive jaundice for which he had undergone ERCP previously while another patient was detected to have CBD stone pre-operatively.
- In the present study, Prior Hospitalization, BMI > 27.5, Palpable Gall Bladder, Thick GB Wall, Impacted Stone and Peri-Cholecystic Collection were significant predictors of difficult laparoscopic cholecystectomy.
- As per the R^[5] study, Prior Hospitalization, BMI > 27.5, Palpable GB, Thick GB Wall were significant predictors of difficult laparoscopic cholecystectomy.
- The positive predictive value for easy prediction was 94.7% and for difficult prediction was 100%.
- The conversion rate from laparoscopic cholecystectomy to open cholecystectomy was 10% which was in accordance with that of the study by Kama *et al.*^[6]
- The incidence of port site infections was 4% and in both cases there was biliary spillage.
- The incidence of complications due to bile stone spillage is 2.3% as per the study by T Santhosh Kumar *et al.*^[7]
- Histopathological examination revealed chronic cholecystitis in 98% of cases and acute cholecystitis in 2%.

SUMMARY

Cholelithiasis is the most common biliary pathology. Gall stones are present in 10 to 15% of the general population and asymptomatic in the majority of them, of about >80%. Approximately 1-2% of asymptomatic patients will develop symptoms requiring cholecystectomy every year, making it one of the most common operations performed.

In 1992, The National Institute of Health (NIH) consensus development Conference stated that laparoscopic

cholecystectomy “Provides a safe and effective treatment for most patients with symptomatic gallstones”.

In about 5 to 10% of the cases of laparoscopic cholecystectomy, conversion to open cholecystectomy may be needed for safe removal of gallbladder.

Therefore it is necessary to analyse the risk factors that predict difficult laparoscopic cholecystectomy.

The following risk factors were considered- age>50 years, male sex, H/O prior hospitalization for acute cholecystitis/ biliary pancreatitis, BMI 25-27.5 and >27.5, abdominal scar, palpable GB, wall thickening, impacted stone, and pericholecystic collection. Out of this BMI >27.5, H/O prior hospitalization for acute cholecystitis/acute pancreatitis, palpable GB, wall thickening, impacted stone, and pericholecystic collection were significant predictors of difficult laparoscopic cholecystectomy, as per present study.

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