

“A Prospective Cohort Study of 100 Consecutive Cases of Cholelithiasis Undergoing Laparoscopic Cholecystectomy In A Tertiary Care Ruralhospital.”

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Abstract : At times patient who has undergone Laparoscopic or Open Cholecystectomy may present with various Post-op Complications.

Aims and Objective – To study the clinical, pathological and radiological parameters in patients presenting with acute and chronic cholecystitis with cholelithiasis and correlate them.

Material and Methods - The present study was conducted during the two years on patients of gall bladder disease admitted for laparoscopic cholecystectomy throughout patient department / Emergency in Netaji SubhashChandra Bose Subharti Medical college in whom laparoscopic cholecystectomy was attempted and performed. Some of them had to be converted to open cholecystectomy. Finally, 100 patients were included in the study (n=100) out of which 92 patients ended up with Laproscopic Surgery for Cholecystectomy and 8 patients got converted to Open Cholecystectomy.

Results - Most of the patients who got converted from Laproscopic Cholecystectomy to Open Cholecystectomy belonged to Age Group 36-45 Years, female gender, showed raised CBC and LFT, had a distended GB with pericholecystic fluid, Impacted stone was also seen in a few. Patients having Multiple Stones, Empyema GB, Mucocoele GB showed higher incidence of Conversion.

Keywords: Laproscopic Cholecystectomy, Open Cholecystectomy, Conversion, Age group.

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I. Introduction

A **gallstones** are formed within the gallbladder out of bile components. The term **cholelithiasis** may refer to the presence of gallstones or to the diseases caused by gallstones. Some people with gallstones may never have symptoms.^[5] When a gallstone blocks the bile duct, a crampy pain in the right upper part of the abdomen, known as biliary colic (gallbladder attack) can result.^[6]

However, in smaller regional hospitals, presence of fewer experienced surgeons makes achievement of definitive successful treatment difficult. Therefore, protection of bile ducts and vascular structures from injury becomes a major priority during LC.^[1]

Acquiring information regarding potential risk factors causing difficulties in different phases of LC prior to execution of the same is highly important for ensuring patient safety as well as for critical analysis of the competency of the surgical team performing the LC.^[1,2] Identification of these risk factors prior to operation is specifically important for non-referential LC centers as well as hospitals where OC is rarely performed for protection of bile ducts and vascular structures from intraoperative injuries.¹ Besides, accurate identification of these risk factors also facilitate more significant and precise preoperative counselling, improved scheduling and efficiency of operating room as well as classification of risks posing technical challenges.^[2]

Identification of risks also aid in suitable assignment of resident assistance which in turn improves patient safety by reducing time required for conversion.^[2] Furthermore, risk identification helps determine patients indicated for planned OC.^[3] In scenarios where only few experienced surgeons are available, the surgeon about to perform a difficult operation should be aware of his competencies and operate only in presence of an experienced surgeon.^[1]

The present study aims to predict the difficulties of laparoscopic cholecystectomy and the possibility of converting this to open cholecystectomy using various haematological, clinical, and radiological

II. Material And Methods

The present study was conducted during the two years on patients of gall bladder disease admitted for laparoscopic cholecystectomy throughout patient department/Emergency in Netaji Subhash Chandra Bose Subharti medical college in whom laparoscopic cholecystectomy was attempted and performed. Some of them had to be converted to open cholecystectomy.

Inclusion Criteria - Patient of Acute and chronic calculus cholecystitis.

Exclusion Criteria – Nil.

Pre-operative Workup - The patient will be worked up thoroughly and subjected to:

- Detailed history and clinical examination.
- Routine hematological investigation: Complete blood count along with coagulation parameters.
- Biochemical investigation: Renal Function Test, Serum Amylase, Serum Lipase, Random Blood Sugar.
- Viral markers: Hepatitis B virus, Hepatitis C virus, Human immuno deficiency virus 1&2
- Liver function test: Serum Bilirubin, Serum glutamic pyruvic transaminase, Serum glutamic oxaloacetic acid, Serum Alkaline phosphatase
- Abdominal USG Features
 - GB distended / contracted
 - GB Wall thickness
 - USG Murphy's sign
 - Pericholecystic fluid
 - Stone:
 - single or multiple
 - Size of largest stone
 - Impacted stone at Hartmann's pouch
- ECG
- Pre-anaesthetic check-up.

Pre-operative Scanning - The patients were worked up thoroughly and subjected to - detailed history and clinical examination, routine hematological investigation :Hb, PT, APTT, INR, TLC, DLC; Biochemical investigation: RFT, S. Amylase, S. Lipase, RBS; Liver function test: Serum Bilirubin, SGOT, SGPT, Serum Alkaline phosphatase; Viral marker :HCV, HBsAG , HIV; Abdominal Ultrasonography (USG) for GB distention, GB Wall thickness, USG Murphy's sign, Pericholecystic fluid, CBD status, Stone: single or multiple, Size of largest stone, Impacted stone at Hartmann's pouch; ECG, Pre-anesthetic check-up.

Pre-operative Preparation - Case of Acute and chronic cholecystitis with cholelithiasis will be included in the study. Viral marker for HBsAG and HCV will be tested prior to surgery and informed consent for HIV testing will be taken prior to HIV test. Informed consent for surgery will be obtained. On pre-operative night tablet alprazolam 0.25mg and bisacodyl (dulcolax) will be given. The patient was kept fasting after mid night. On next morning injecfoperazone 1gm i.v.as prophylactic antibiotic measure was given. Pre-medication half hour before operation and patient being asked to void urine immediately before being shifted in OT.

Instruments Required - Standard set of Laparoscopic Instruments with suture materials, whenever required along with HIV operating kit for operating team in marker positive patients.

Intra-operative Analysis - During the procedure careful note was made of -

- Anaesthesia time
- Universal precaution was followed in all viral marker positive patient.
- Operative time: Duration of surgery (in minutes).
- Gall bladder bed dissection
- Rupture of gall bladder with spillage of stone/ bile
- Difficulty or any other intra-operative problems or complications
- Other findings if any.

Post-operative Analysis -

- Gall bladder Mucosa after operation
- Number of Stone/Type/physical)/Site Stone
- Post-operative clinical course of patients
- Time oral intake allowed
- Post-operative problems such as nausea, vomiting etc
- Antibiotic coverage with painkiller and Proton pump inhibitor will be given.
- How many hours after surgery for mobilization of patient.
- Any post-operative complications such as bile leak, jaundice etc.

Follow up – Patient was called on follow up on weekly basis for next two weeks and surgical site will be assessed. The data collected was tabulated and the same will be subjected to suitable statistical analysis as per Performa attached.

III. Result

The study was performed with a total of 100 patients. Out of these patients 92 patients had Laproscopic Cholecystectomy while 8 Patients were converted to Open Cholecystectomy. The various factors associated with the Conversion rate have been analysed below.

Most of the patients were in the age group is of 36-45 (44%) out of which 38 were females and males were 6 in number. The conversion rate to open cholecystectomy was seen in 4 patients.

In age group 26-35 years there were 2 patients who were converted to open cholecystectomy and in age group 46-55 and >55 years there was 1 patient in which conversion to open cholecystectomy was done.

AGE	LAPROSCOPIC CHOLECYSTECTOMY		CONVERTED TO OPEN CHOLECYSTECTOMY		TOTAL	
	NO.	%	NO.	%	NO.	%
15-25	4	100%	Nil	Nil	4	4%
26-35	10	83.33%	2	16.66%	12	12%
36-45	40	90.90%	4	9.10%	44	44%
46-55	24	96%	1	4%	25	25%
>55	14	93.33%	1	6.66%	15	15%

There was unequal distribution gender wise with females (87%) of which 6.90% were converted to open cholecystectomy and males (13%) only of which 15.40% were converted to open cholecystectomy.

There were two groups, Group A which had patients with acute cholecystitis who presented with fever, vomiting and pain abdomen and the other Group B which had patients with chronic cholecystitis and the conversion rate to open cholecystectomy was comparable between the two groups. The study showed that there was (7.0%) patients with Fever of which (57.20%) showed conversion to open cholecystectomy, (9.0%) patients presented with Vomiting with (33.33%) conversion rate to open cholecystectomy, (48.0%) presented with Flatulence of which 8 patients were converted to open cholecystectomy and 89.0% patients presented with Abdominal pain in which 9% showed conversion to open cholecystectomy.

SEX	LAPROSCOPIC CHOLECYSTECTOMY		CONVERTED TO OPEN CHOLECYSTECTOMY		TOTAL	
	NO.	%	NO.	%	NO.	%
MALE	11	84.60%	2	15.40%	13	13%
FEMALE	81	93.10%	6	6.90%	87	87%

Similarly, in Group A it was found that there were 22% patients with positive Murphey’s sign and (78%) in Group B with no Murphey’s sign of which 2 patients were converted to open cholecystectomy. 21% patients with presence of Tenderness in right hypochondrium of which 4 patients were converted to open cholecystectomy and (79%) patients showed no tenderness.

On investigating the patients, the study depicted that there were 11% patients with abnormal LFT of which 6 patients were converted to open cholecystectomy and 89 patients with normal LFT and 2 patient showed the conversion to open cholecystectomy. There were 7% with abnormal TLC/DLC of which 4 patient were converted to open cholecystectomy and there were 93(93%) patients with normal counts and the conversion rate the same that is 4 patients.

PRESENTING COMPLAINTS	LAPROSCOPIC CHOLECYSTECTOMY		CONVERTED TO OPEN CHOLECYSTECTOMY		TOTAL	
	No.	%	No.	%	No.	%

Fever	3	42.80%	4	57.20%	7	7%
Vomiting	6	66.66%	3	33.33%	9	9%
Flatulence	40	83.33%	8	16.66%	48	48%
Pain Abdomen	81	91%	8	9%	89	89%

The Radiological findings showed that 20% patients had contracted gall bladder in which 2 patient showed conversion to open cholecystectomy and 8% patients with distended gall bladder in which 75% showed conversion to open cholecystectomy, rest 72% had normal gallbladder .

The gall bladder wall thickness of 68% patients was <3mm which showed that 1 patient was converted to open cholecystectomy and 32% had GB wall thickness more than 3mm of which 7 patient showed the conversion to open cholecystectomy. Pericholecystic fluid was present in 13% cases.

In 72% patients the GB calculi size was found to be <1cm and in 28% patients the stone size was of >1cm, both showed 4% conversion to open cholecystectomy. 57% patients had multiple stone on USG whereas 43% patient had single stone on USG. 15% patients had impacted stone with 4 patients converted to open cholecystectomy. There were (43%) patients with Single gallbladder stone and 3% were converted to open cholecystectomy and 57 (57%) with Multiple gall bladder stones and there were 5 patients were converted to open cholecystectomy.

RADIOLOGICAL FINDINGS		LAPROSCOPIC CHOLECYSTECTOMY		CONVERTED TO OPEN CHOLECYSTECTOMY		TOTAL	
		No.	%	No.	%	No.	%
GB Distension	Contracted	18	90%	2	10%	20	20%
	Distended	2	25%	6	75%	8	8%
	Normal	72	100%	Nil	-	72	72%
GB Wall thickness	<3mm	67	97.80%	1	2.20%	68	68%
	>3mm	25	78.10%	7	21.90%	32	32%
Pericholecystic Fluid	Present	7	53.80%	6	46.20%	13	13%
	Absent	85	97.70%	2	2.30%	87	87%
Stone	<1cm	68	94.40%	4	5.60%	72	72%
	>1cm	24	85.70%	4	14.30%	28	28%
Impacted Stone	Present	11	73.33%	4	86.66%	15	15%
	Absent	81	95.30%	4	4.70%	85	85%

The intra-op findings showed that the difficulty in access to the peritoneal cavity occurred in 10 patients and 7 patients showed conversion to open cholecystectomy. Difficulty occurred in lifting the abdominal wall, creating the pneumo-peritoneum.

No CBD/hepatic duct injury occurred in the present study. But conversion rate was found in 5% of patients due to suspicion of CBD injury.

In this study no bowel injury occurred during trocar placement, separation of adhesions due to inadvertent thermal touching of cautery.

Rupture of gall bladder occurred in 20 patients, there was spillage of bile occurred in all cases and 2% patient showed conversion to open cholecystectomy. Suction irrigation was done in all cases.

Placement of drain occurred in all 100 cases.

In present study the conversion rate was 8% with 0 mortality rate.

The study showed that there were 9 (9%) subjects which showed presence of Mucocele in which 7 patients showed conversion to open cholecystectomy and 91% did not had mucocele of which 1 patient had conversion to open cholecystectomy. In 92% of patients Calot’s Triangle was visualized, of which none was converted to open cholecystectomy and 8% where Calot’s Triangle was not Visualized and 8 patients were converted to open cholecystectomy. There were 9 (9%) subjects with presence of Empyema with 6 patients showed conversion rate to open cholecystectomy and in 91 (91%) with absence of Empyema showed 2 patients open cholecystectomy. In the study there were 82% patients with Easy Gall Bladder Extraction of which none of the patient showed conversion to open cholecystectomy and 10% patients with Difficult Gall Bladder Extraction showed 8 patients with conversion rate to open cholecystectomy. Minimal intra-op bleeding was seen in 85% patients while moderate amount of bleeding was seen in 15% patients and 8 patients showed conversion to open cholecystectomy.

INTRA-OP FINDINGS		LAPROSCOPIC CHOLECYSTECTOMY		CONVERTED TO OPEN CHOLECYSTECTOMY		TOTAL	
		No.	%	No.	%	No.	%
Difficult access to Peritoneal cavity	Present	3	30%	7	70%	10	10%
	Absent	89		1		90	90%
Rupture of GB-spillage of	Present	14	70%	6	30%	20	20%

bile	Absent	78	97.50%	2	2.50%	80	80%
Extension of incision	Present	2	20%	8	80%	10	10%
	Absent	90	100%	NIL	-	90%	90%
Injury to Omentum	Present	NIL	-	8	100%	8	8%
	Absent	92	92%	NIL	-	92	92%

Post-op complications were that there were 29 patients with pain abdomen, 4 patients had fever, 1 patient had retention of urine, none had Leakage of bile, 3 patients had Wound Infection, collection in bladder area was seen in none, none had Jaundice and 4 patients had Nausea/Vomiting.

Histological Profile revealed that 98% cases had Chronic cholecystitis and 2% cases had Acute cholecystitis.

None had evidence of carcinoma gall bladder.

IV. Discussion

Several factors have been found to be associated with a difficult case, but no reliable criteria are available yet to identify patients with a difficult laparoscopic cholecystectomy from pre-operative variables. This prospective study was conducted in the Department of General Surgery of subharti medical college. 100 patients who satisfying the selection and exclusion criteria underwent laparoscopic cholecystectomy and pre-operative factors that predict the difficult laparoscopic cholecystectomy were analyzed. Also, such prediction may allow a surgeon to be better prepared, to take extra precautions to reduce intra-operative complications, and to convert from Laparoscopic Cholecystectomy to Open Cholecystectomy at an earlier stage.

Age: In the present study the mean age of patients who underwent Laparoscopic Cholecystectomy was 45 years showing that Cholelithiasis is more common in the age group of 30-35.

Series and year	Mean age
Present Study	45 years
Nachnani and supe et al(2005) ^[42]	40 years
Gurkanyetkin et al(2009) ^[55]	75.02 ± 4.0 years
Baki Nabil AA et al(2006) ^[46]	42.5 ± 11.7 years

The influence of age on the conversion rate remains controversial.

Gurkanyetkin et al (2009) ^[55] reported that in patients aged 80 or older the rate of acute cholecystitis, conversion to open surgery and post-operative complications were significantly higher than in other group (p>0.05) due to failure to adequately visualize the biliary tract anatomy due to intense fibrosis around the gallbladder and calot’s triangle.

Gupta G et al (2015) ^[66], **Baki Nabil AA et al (2006)** ^[46], **Nachnani and supe et al (2005)** ^[14] have observed no correlation between the two. The present study shows that age >65 years had no impact on conversion rate and operative time due to small sample size and most of the patients 89% are under < 65 years age group. So our findings were near about consistent with other previous studies.

Sex: In present study majority of patients were female (87%) and male were only 13% showing that females have more prevalence of Gall stone disease than males.

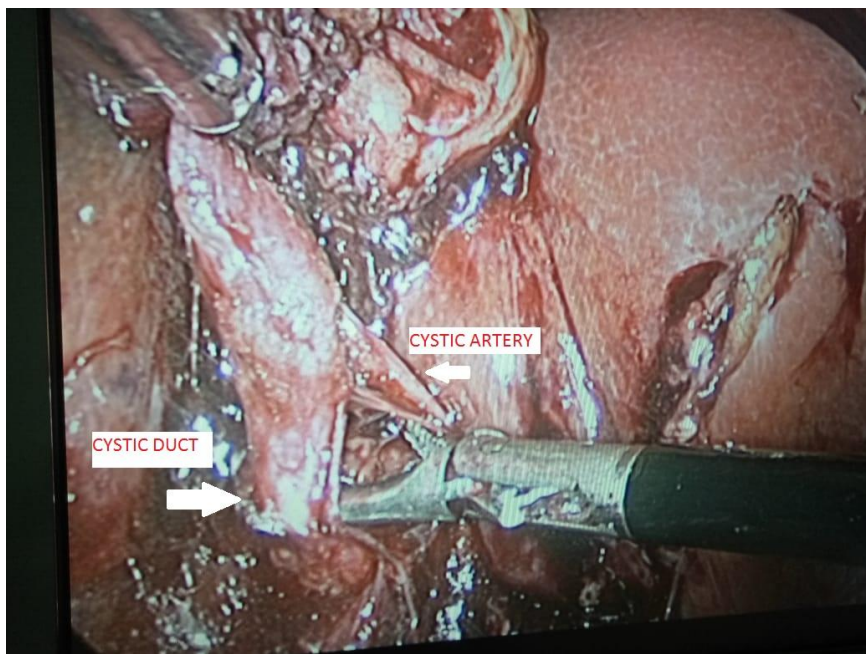
Series and year	Female: male
Prashant S Dhake et al(2014) ^[64]	78:27
Nabil A.Abdelbaki(2006) ^[46]	90:10
Gupta G et al(2015) ^[66]	4:1
PRESENT STUDY	87:13

In present study male gender is associated with difficult dissection of gall bladder due to adhesions obscuring the anatomy, longer duration of surgery and higher rate of conversion to open cholecystectomy.

Gupta G et al(2015) ^[66] reports have identified the male gender as a risk factor for conversion, probably because male patients have more intense inflammation or fibrosis resulting in more difficult dissection both in the calot’s triangle and through the plane between the gallbladder and liver.

Prashant S Dhake et al (2014) ^[64], **Baki Nabil AA et al (2006)** ^[46] have found no significant correlation between two.

So our findings were near about consistent with other previous studies.



CALOT'S TRIANGLE SHOWING CYSTIC DUCT AND CYSTIC ARTERY

Presenting sign/symptoms and blood investigations:-

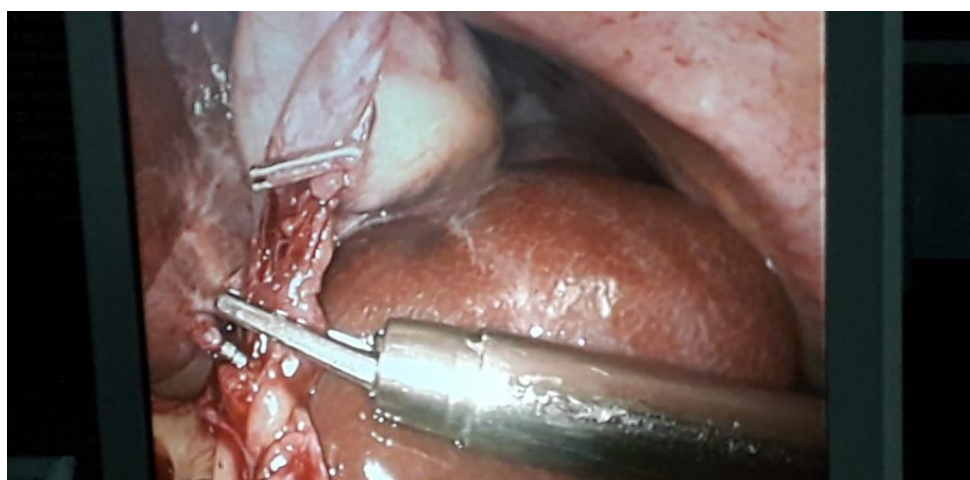
In our series patients presenting with upper abdominal pain(89.0%) with fever(27.0%), positive murphy's sign(22%), increased WBC count(26%) and derranged LFT(11%) are associated with difficult laparoscopic cholecystectomy and need for conversion. This might be due to the firmly adhesions that made dissection difficult and lack of plane of cleavage between gallbladder and liver bed.

Nachnani and supe (2005)^[42] analysed and correlate the relation between prior attacks of acute cholecystitis and acute pancreatitis with difficulty in laparoscopic dissection due to dense adhesion and fibrotic gallbladder.

C. Simopoulos et al(2005)^[49] in there study found that the conversion rate increased to 10 fold in patients with acute inflammation of gallbladder when associated with fever, increased WBC count and deranged LFT.

Andrew J. Shapiro et al(1999)^[73] predict that male patients with rising temperature and LDH level while on intravenous antibiotics require conversion at increased frequency.

So our findings were consistant with other previous studies in literature.



CYSTIC DUCT CLIPPED AND CUT

Ultrasonographical Findings:

In our study thickened wall of the gallbladder>3mm, size of the stone> 10mm, pericholecystic fluid, contracted gallbladder and impacted stone measured pre-operatively by ultrasound associated with bleeding, difficult dissection, difficult extraction of gallbladder with more operative time and conversion rate.

Gupta G et al (2015)^[66] proved significantly association between gallbladder wall thickness, gallbladder stone size, impacted stone with difficult laparoscopic cholecystectomy and conversion,

Nachnani and supe (2005) ^[42] reported significant relation between difficult in gallbladder dissection, extraction of stone with gallbladder wall thickness and stone size>10mm and not with number of stones.

Nabil A.Abdelbaki (2006) ^[46] **statically** proved significance between solitary large stone, gallbladder wall thickness >3mm with prolonged operative time due to difficulty during grasping of gallbladder and gallbladder dissection.

M. Tayab et al (2005) ^[44]. Presents the multivariate model of risk factors independently associated with conversion. Patients with ultrasonographic signs of inflammation (gall bladder wall thickness > 3 mm, oedematous wall, pericholecystic fluid, and ultrasonographic Murphy's sign) were 8.5 times more likely to be converted to Open Cholecystectomy compared to the patients who underwent successful Laparoscopic Cholecystectomy.

Sharma SK et al (2007) ^[50] analysed that thickened wall of the gallbladder>3mm, size of the stone>10mm, and impacted stone measured pre-operatively by ultrasound associated with difficult laparoscopic cholecystectomy. So our findings were consistent with other previous studies in literature.

Intra-Operative findings

Intra-op bleeding

Bleeding is present in all cases in our study along with cases with moderate bleeding which is another cause for difficulty and conversion.

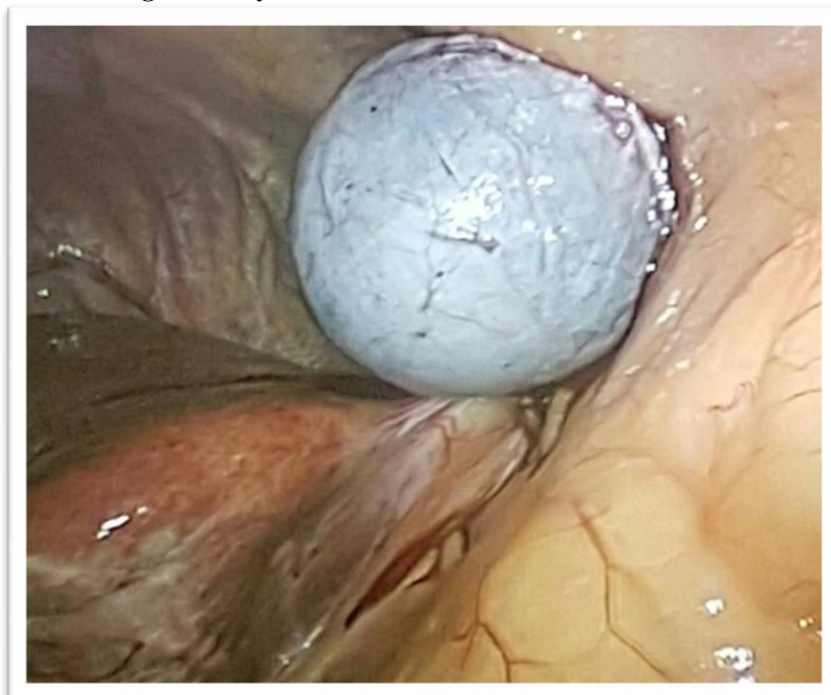
Moderate bleed was present in 66% of patients and mild bleeding was present in (54%)of patients.

N O Machado et al (2012)^[59]Laparoscopic Cholecystectomy with and without cirrhosis, revealed higher conversion rate, longer operative time, higher bleeding complications, and overall increased morbidity in patients with cirrhosis.

Iqbal et al (2008) ^[51]Out of 340 patients 32 (9.4%) required conversion to open procedure. Factors responsible for these conversion were dense adhesions in 8(2.4%), empyema gall bladder in 4(1.2%), contracted gall bladder in 3(0.9%), hemorrhage in 3(0.9%), and CBD injury and carcinoma gall bladder in 2(0.6%) each.

Kapoor M, Yasir M et al (2013)^[62] Intraoperative and postoperative complications, hospital stay, mortality and time taken to return to normal activity on 300 patients. Complication noted are conversion to open cholecystectomy(3%), CBD and bowel injury(2.6%), stone spillage(2%), Postoperative bile leak(2.3%)/colonic fistula(0.3%)/biliary fistula(0.3%)/haemorrhage(0.3%).

Single Large Calculi Showing Difficulty in Gall Bladder Extraction



Conversion:

Conversion rate was 5 % in this study.

Series and year	Conversion rate
Gupta G et al (2015) ^[66]	6%
Anand A et al (2007) ^[47]	11.93%
Nabil A.Abdelbaki(2006) ^[46]	7.5%
Nachnani and supe(2005) ^[42]	11.4%
C. Simopoulos et al(2005) ^[41]	5.2%
Present study	5%

In present study conversion rate is comparable with most of other series reported. Dense adhesion with obscured anatomy is the most common cause of conversion. Bleeding that was not controlled by pressure and electro-coagulation Laparoscopic cholecystectomy lead to conversion in one case. Conversion to open cholecystectomy is significantly associated with male gender, previous surgery, obesity, contracted gall bladder, gall bladder wall thickness > 3 mm and pericholecystic fluid on USG. Conversion to open cholecystectomy is not a failure of technique, but is a sign of sound judgment in the interest of safety of the patient ^[29]. In present study conversion rate is low due to experience of surgeon towards laparoscopic surgery was good enough with selection of right cases.



GB WITH MULTIPLE CALCULI

Hospital stay and Follow up

Patient with gall bladder rupture, spillage of bile, spillage of stone, extension of incision had longer stay due to delayed healing and port site infection.

Mohammad Taveb et al (2008)^[52] Thirty patients, including 21 females (median age: 42 years) underwent LC during the study period There was no incidence of bile duct injury, but two patients (6.7%) required conversion to open procedure Mean hospital stay was 3 ± 2.7 days.

A R Shaikh et al (2009)^[56] Of 250 patients undergoing laparoscopic cholecystectomy, 20 (12.5%) were cirrhotic. Thirty percent were hepatitis B positive, and 70% were hepatitis C positive. Preoperative diagnosis of cirrhosis was possible in 80% of cases, and 20% were diagnosed during surgery. Morbidity rate was 15% and mortality rate was 0%. Two patients developed postoperative ascites, and mean hospital stay was 2.8±0.1 days. In present study 12% patients had their stay for >3days due to other co morbidities and were in our follow-up.

Histopathological findings

In this study (80%) had chronic cholecystitis,(20%) patient had acute cholecystitis, 12(86%) and (9%) had empyema out of total 100.

M R Cox (1993) ^[24] Patients presenting with symptomatic cholelithiasis from October 1990 until June 1992 were evaluated at laparoscopy with intention of proceeding to a laparoscopic cholecystectomy. The gross appearance of the gallbladder was categorized as acute inflammation, chronic inflammation, or no inflammation. Ninety-eight (23.4%) of 418 patients had acute inflammation of the gallbladder: 55 were

edematous, 10 were gangrenous, 15 had a mucocele, and 18 had an empyema. The authors assessed outcome in these patients. The frequency of conversion to an open operation was 33.7% for acute inflammation, 21.7% for chronic inflammation ($p < 0.05$), and 4% for no inflammation ($p < 0.001$). The conversion rate was highest for empyema (83.3%) and gangrenous cholecystitis (50%), while the conversion rate for edematous cholecystitis was 21.8% and for acute inflammation with a mucocele it was 7%.

R. THAMIL SELVI et al (2017)^[69] Histopathological study showed 85.8 % of these patients suffering from chronic cholecystitis, 2.5% with acute cholecystitis, 2.5% polyp, 1.2% granulomatous cholecystitis, 1.2% empyema, 5.1% eosinophilic cholecystitis and 1.2% carcinoma.

V. Conclusion

Thus we conclude that gallstones are still a major cause of undergoing surgery worldwide. Gallstones can be classified according to their composition into cholesterol, mixed, or pigment gallstones. Symptomatic cases usually present with right upper quadrant pain that is associated with fatty meals and more common at night.

Biliary colic and the presence of stones on imaging confirm the diagnosis of chronic cholecystitis. Complications of gallstones can include choledocholithiasis, gallstone ileus, and acute gallstone pancreatitis.

Normally, treatment is only indicated for symptomatic patients, unless other risk factors for disease progression are present. The general management and treatment of gallstones have not changed much recently. However, the methods and techniques have improved dramatically. Laparoscopic cholecystectomy is considered today as one of the most important interventions in treating gallstones.

Our study has shown that elevated total white blood cell count and levels of alkaline phosphatase age, past history of previous surgery, acute cholecystitis to be some of the major risk factors for conversion of Laparoscopic cholecystectomy to open cholecystectomy.

Other risk factors were tenderness in Right Hypochondrium, palpable gall bladder, edema in gall bladder, thickness >3 mm and pericholecystic fluid.

A thorough review of clinical, radiological, and biochemical profile of the patient before surgery can help the surgeon to either perform a safe LC or convert into open cholecystectomy. There should be no hesitation to convert to open in unclear anatomy and dense adhesions. "Time to convert is before a complication occurs and not after it". Conversion to open reflects sound surgical judgment.

Pre-operative prediction of a difficult cholecystectomy and the risk of conversion are of great help both to the patient who can plan his work and the surgeon who can also schedule his time and team accordingly.

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