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A Comparative Study of Acute Verses Chronic Cholecystitis Operated Laperoscopically

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Abstract: ***Objective:****A prospective randomized study was undertaken to compare effects of laparoscopic surgery for acute versus chronic cholecystitis.* ***Method:****During a period of 2.5 years 60 patients of which 30 having acute and another 30 having chronic cholecystitis were operated by laparoscopic cholecystectomy and results were noted.* ***Results:****Intraoperative adhesions(43.33%) were significantly more with callot's triangle and inferior surface of liver in acute cholecystitis.Mean operative time also significantly higher for acute cholecystitis(97 min) compared to 87.83min for chronic one.Also conversion rate was significantly higher in acute (13.33%) compared to chronic(6.66%) group.* ***Conclusion:*** *Previously it was concept of treating patients of acute cholecystitis conservatively, which is changing now a days.There is an increasing trend toward shortening the hospital stay of patients undergoing laparoscopic cholecystectomy. This does not appear to have had a deleterious effect on outcome. Thus we can conclude that laparoscopic cholecystectomy is feasible, safe and rewarding procedure for management of acute cholecystitis in experienced hands, though significantly longer operating time without increase in any morbidity or mortality.*

Keywords: Cholecystitis, Laparoscopiccholecystectomy, Singleport, Bileleak, Biliary colic

1. Introduction

In the 21st century, the laparoscopic era, laparoscopic cholecystectomy has become gold standard for the management of cholecystitis. Although recent studies [1,2], have reported that laparoscopic cholecystectomy is a safe and effective treatment for acute cholecystitis, the optimal timing for the procedure remains unknown. In the pre laparoscopic era, prospective randomized studies [3] demonstrated that early open cholecystectomy within 7 days of the onset of symptoms was superior to delayed interval surgery because of a shorter total hospital stay and reoperation period. Koo and Thirlby suggested that there was a role for delayed interval elective laparoscopic cholecystectomy, particularly for patients who had symptoms for more than 72 hours[4]. It becomes prudent to look for the efficacy and feasibility of laparoscopic cholecystectomy as a preferred approach for acute cholecystitis when presented within 72hrs of onset of symptoms.

Acute cholecystitis as a major complication of gallstones is diagnosed in 10% to 35% of patients admitted for cholecystectomy [5,6]. The acutely inflamed gall bladder makes the surgery difficult by virtue of its edematousgall bladder wall, associated adhesions and friable surfaces. In chronic cholecystits dense vascular adhesions, fibrotic gall bladder create difficulty in laparoscopic cholecystectomy. Thus it is necessary to enlighten the factors that adversely affect the outcome of laparoscopic cholecystectomy and their degree of association with associated complications.

2. Literature Survey

2.1 Laparoscopic Cholecystectomy

The pneumoperitoneum is created with carbon dioxide gas, either with an open technique or by closed needle technique. Once an adequate pneumoperitoneum is established, a 10-mm trocar is inserted through the supraumbilical incision. The laparoscope with the attached video camera is passed through the umbilical port and the abdomen inspected. Three additional ports are placed under direct vision. A 10-mm port is placed in the epigastrium, a 5-mm port in the middle of the clavicular line, and a 5-mm port in the right flank, in line with the gallbladder fundus.

Most of the dissection is carried out through the epigastric port using a dissector, hook, or scissors. The dissection starts at the junction of the gallbladder and the cystic duct. A helpful anatomic landmark is the cystic artery lymph node. This is continued until the gallbladder neck and the proximal cystic duct are clearly identified. A hemoclip is placed on the proximal cystic duct. The cystic artery is then clipped and divided. Finally, the gallbladder is dissected out of the gallbladder fossa, using either a hook or scissors with electrocautery. If the gallbladder is acutely inflamed or gangrenous, or if the gallbladder is perforated, it is placed in a retrieval bag before it is removed from the abdomen. If the gallbladder was severely inflamed, gangrenous, or if any bile or blood is expected to accumulate, a closed suction drain can be placed through one of the 5-mm ports and left underneath the right liver lobe close to the gallbladder fossa. Skin closed with sutures. Strile dressing kept.

3. Brief Overview of Laparoscopic Cholecystectomy

3.1 Introduction

Laparoscopic cholecystectomy has clearly become the choice over open cholecystectomy in the treatment of hepatobiliary disease since the introduction of laparoscopic cholecystectomy by Mouret in 1987[9]. In the era of laparoscopic surgery, laparoscopic cholecystectomy has become gold standard for management of acute as well as chronic cholecystitis[20,21]. This approach has decreased post operative hospital stay, pain and early ambulation.

Laparoscopic cholecystectomy is done on day care basis now a days.

3.2 Equipments and their Positioning

Ideally, the paient is placed on a fluoroscopic table with the table turned around backward for easy, calm access to the midabdomen by the C-arm. Two monitors are placed at the 10 o'clock and 2 o'clock position with respect to the patient's head. Generally, the surgeon stands to the patient's left, and the first assistant stands to the patient's right. If a dedicated camera operator is used, that person stands at the surgeon's left.

3.3 Patient Positioning

Supine position

3.3.1 Pneumoperitoneum:

1)Veress needle Method:
The pneumoperitoneum is obtained by sliding a specialized needle (a Veress needle) through the umbilicus. Confirm its position by allowing saline to run through the needle from a plungerless syringe, and then attaching the needle to tubing from the carbon dioxide insufflator. Initially, the flow rate of carbon dioxide is kept below 2 L/min to ensure that proper placement has occurred before a large volume of gas is insufflated. Confirmation of the intra-abdominal position of the needle can be obtained by observing for uniform abdominal distention, tympany, and the ability to vary the intra-abdominal pressure by raising and lowering the abdominal wall. Initial pressures greater than 10 mm Hg nearly always reflect preperitoneal placement of the needle. Once the surgeon is comfortable that the needle is in the abdomen, the flow rate can be increased until an intra-abdominal pressure of 15 mm Hg is achieved.

2) Open Method
Open (Hasson) laparoscopy technique, whereby the abdominal cavity is entered under direct vision. A scalpel, S-retractors, a clamp, and scissors are required for this technique. Once the peritoneal cavity is entered, the initial trocar is inserted and its position is secured with two stay sutures.

Problem Definitions:

- Study the outcome of laparoscopic cholecystectomy in acute and chronic cholecystitis.
- To assess the feasibility of laparoscopic cholecystectomy in acute cholecystitis when operated with in 72 hrs of onset of symptoms.
- Compare the complication rate in laparoscopic management of acute cholecystitis and chronic cholecystitis.
- To look for associations of acute and chronic cholecystitis predicting their outcome.
- Compare the difficulties arising during laparoscopic cholecystectomy for patients with acute and chronic cholecystitis.

4. Materials and Methods

The prospective study involved analysis of 60 cases of laparoscopic cholecystectomy done for acute as well as chronic cholecystitis of which 30 were diagnosed to be acute cholecystitis and 30 with chronic cholecystitis. All the patients received treatment in our institute during the period of 2 years and 4 months from July 2010 to September 2012. In each case a detailed history, clinical examination, investigations and follow up was recorded as per the proforma.

4.1 Inclusion crieteria for Acutecholecystitis:

a. Symptoms of acute cholecystitis less than 72 hrs of onset
- Pain in abdomen
- Fever
- Vomiting
- No previous attacks of billiary colicky pain
- Blood investigations showing leucocytosis
- Radiological investigations (Ultrasonography)

b. Gall bladder wall thickness > 4mm
c. Peri gall bladder fluid collection
d. Inclusion crieteria for chronic cholecystitis:
- Symptoms of chronic cholecystits of variable duration.
- Radiological investigations (Ultra sonography)
  i. Multiple gall bladder calculi
  ii. Normal gall bladder wall thickness
    - No peri gall bladder fluid collection

e. Exclusion crieteria:
- Patients with gall bladder perforation were excluded.
- Patients with systemic complications like peritonitis, septicaemia, MODS were excluded.
- Patients less than 12 years and more than 70 years were excluded.
- Patients not giving concent for laparoscopic surgery and patients not fit for general anaesthesia were excluded
- Patients who were pregnant were excluded.
- HIV, HbSAg, HCV positive patients were excluded.

4.2 Management Criteria

All patients were operated for laparoscopic cholecystectomy. Patients with acute cholecystitis were operated within 72 hours of symptoms in routine basis after adequate pre operative work up.

5. Observations and Results

The following observations were made on the comperative study of Acute verses chronic cholecystitis operated laparoscopically at our institute. We included 60 patients in the study. Acute cholecystits group contained 30 patients and chronic cholecystits group contained 30 patients.

1) Age:

Age group	*Acute*	*Chronic*
18-30	4	8
30-50	20	15
50-70	6	7
Mean Age	40.96	41.66

Youngest patient in the study was 19 years old and oldest was 68 years. Mean value of age is 40.96 in acute group, 42.43 in chronic group. Maximum numbers of patients were in 30-50 years group in each method.

2) Sex

Sex	*Acute*	*Chronic*
Male	9	4
Female	21	26

3) Clinical Presentation

Presentation	*Acute*		*Chronic*	
	No	Percentage	No	Percentage
RHC pain	30	100	30	100
Fever	25	83.33	3	10
Nausea/ vomiting	30	100	25	83.33

4) Associated Conditions

Asso conditions	*Acute*	*Chronic*
history of OC pills intake	5	8
H/O biliary colick/ cholecystitis	5	22
prolonged hospitalization	0	0
h/o jaundice	1	5
h/o of liver pathology	0	1
h/o kidney pathology	1	0
hemolytic conditions	1	2

6) Investigations

		Acute	*Chronic*
Mean Hb		11.73	11.82
Mean WBC count		12996	7386
Mean GB wall thickness		6.1mm	Normal
PeriGB collection		14	0
Calculi	Multiple	22	26
	Single	8	4

7) No of ports required

Single incision cholecystectomy was done in 2 patients of chronic group. 3 port cholecystectomy was done in 14 (46.66%) of acute group and 10 (33.33%) of chronic group while 4 ports were required in 16 (53.33%) of acute group and 18 (60%) of chronic group.

8) Intraoperative Findings

Intera operative findings	*Acute*	*Chronic*
Adhesions in Callot's triangle	13	11
Adhesions with inf surface of liver	13	8
Duration bet port placement and clipping cystic duct and artery	63.33min	54.66min
Duration bet clipping cystic duct and artery and GB removal	33.66 min	34.16 min
Mean operating time	97 min	87.83 min

9) Difficulties in Surgery

Difficulties in Surgery	*Acute*	*Chronic*
Omental adhesions	18	15
Mucocele/ pyocele	7	0
Non visualisation of callot's triangle anatomy	4	2
Partially intraparechymal GB	1	1
large GB	7	0

1) Postoperative Course:

Post operative course	*Acute*	*Chronic*
Duration of antibiotics	5.5	5.6
Duration of Analgesia	3.53	3.53
Hospital Stay	5.8	6.03
Requirment of Drain	17	11

10) Complications

	Acute	*Chronic*
Conversion to open	4	2
SSI	O	O
Bile leak	2	1
Bleeding	0	0
Recurrent cholangitis	0	0
abscess formation	1	0

6. Discussion

Laparoscopic cholecytectomy has become the gold standard procedure for cholecystitis in this laparoscopic era. With earlier trends in surgical management of cholecystits, immediate surgical management of acute cholecystits was on back foot. However with increasing experience in field of laparoscopy, successful treatment of patients with acute cholecystitis was reported [22]. In fact, urgent LC is now considered the optimal treatment of patients with AC [23].

In our institute, we did prospective study of outcome of patients undergoing laparoscopic cholecystectomy whose diagnosis was confirmed by laboratory and radiological means to be acute and chronic cholecystitis. Comparison was done by findings on laparoscopic evaluation, intraoperative difficulties, complications and subsequent outcome. Before the advent of laparoscopic cholecystectomy, the usual treatment of patients with acute cholecystitis was an early (within 3 or 4 days of admission) open cholecystectomy. This practice evolved from studies that documented a benefit, in terms of the total length of inpatient stay, for early cholecystectomy versus initial nonoperative treatment and interval cholecystectomy at a subsequent admission [3,24]. Hence, our aim has been to perform laparoscopic cholecystectomy early (within 72 hours) during the acute admission.
The demographic profile of the patients was identical indicating adequate randomisation. Male patients were associated with acute cholecystitis than chronic one [25]. Most common presentation was pain in right hypochondrium in all patients belonging to both groups. More common association of fever with acute group was pointing towards the acute symptoms in the acute group. Common association of past history of biliary colick and cholecystitis was present in chronic group indicating the chronicity of the inflammatory process.

We compared present study with studies of Chung-Mau Lo and M R Cox et al. Sample size in our study 60 was comparable in studies of Chung Mau et al (52 in 1996 [26] and 86 in 1998 [27]) but was significantly smaller in case of M R Cox et al[28] where sample size was 218.

6.1 Intraoperative findings:

	Present study		*Chung-Mau Lo et al 1996*		*Chung-Mau Lo et al 1998*		*M R Cox et al*	
	Acute	*Chronic*	*Acute*	*Chronic*	*Acute*	*Chronic*	*Acute*	*Chronic*
No of patients	30	30	27	25	45	41	98	120
Severe adhesions	18 (60%)	15 (50%)	7 (25.9%)	11 (44%)	14 (31.1%)	22 (53.6%)	-	-
Tensely distended Gallbladder	7 (23.3 %)	0	24 (88.8%)	3 (12%)	41 (91%)	20 (48.7%)	33 (33.6%)	0
Use of closed suction Drainage	17 (56.6 %)	11 (36.6 %)	23 (85.1%)	8 (32%)	39 (86.6)	18 (43.9%)	-	-
total operative time	97	87.33	137.2	98	135	105	105	100
Conversion rate	4 (13.3 %)	2 (6.6%)	2 (7.4%)	5 (20%)	5 (11.1%)	9 (21.9%)	33 (33.6%)	25 (20.8%)

6.2 Complications

	Present study		*Chung-Mau Lo et al 1996*		*Chung-Mau Lo et al 1998*		*M R Cox et al*	
	Acute	*Chronic*	*Acute*	*Chronic*	*Acute*	*Chronic*	*Acute*	*Chronic*
Wound infection	0	0	3 (11%)	1 (4%)	3 (6.6%)	2 (4.8%)	2 (2%)	3 (2.5%)
Subh-epatic collection	1 (3.3%)	0	1 (3.7%)	0	0	2 (4.8%)	-	-
Bile leak	2 (6.6%)	1 (3.3%)	0	0	0	2 (4.8%)	3 (3.06%)	4 (3.33%)
Bile duct injury	0	0	0	0	0	1 (2.4%)	1 (1.02%)	0
Bleeding	0	0	-	-	0	1 (2.4%)	-	-

6.3 Post operative course

	Present study		*Chung-Mau Lo et alm1996*		*Chung-Mau Lo et al 1998*		*M R Cox et al*	
	Acute	*Chronic*	*Acute*	*Chronic*	*Acute*	*Chronic*		
Doses of analgesics	3.53	3.53	2.4	3.4	1	2	2	2
Total hospital stay (days)	5.8	6.03	6.7	15.1	6	11	-	-

7. Conclusion and Summary

The present study of 60 patients was conducted in our institute during June 2010 to September 2012. Thirty patients included in acute group while 30 patients were included in chronic group. All patients underwent laparoscopic cholecystectomy. Patients with acute cholecystitis were operated within 72 hrs of onset of symptoms by laparoscopic cholecystectomy. Conclusions of the present study are as follows:

1) Commonest age group of presentation in both groups , acute and chronic was 30 to 50 yrs. While mean age was 40.96 yrs in acute group and 41.33yrs in chronic group.
2) Females predominated in both the groups. While male presented more commonly with acute cholecystitis (69%).
3) Right hypochondriac pain was the uniforrn feature in both groups. Fever and nausea and vomiting was significantly more in acute cholecystitis as compared to chronic cholecystitis, which are marker of acute inflammation.
4) Mean Body mass index was significantly lower, 26.81 for Acutecholecystitis than 28.232 for chronic cholecystitis.
5) Past history of jaundice, biliary colic or cholecystitis was significant association of chronic cholecystitis. While the other associated conditions such as OC pill intake, prolonged hospitalisation, haemolytic conditions, liver or kidney pathology was not significantly associated with either of the groups.
6) Mean haemoglobin was comparable in both groups but leucocytosis had significant assocoiation with acute cholecystitis. Mean TLC was 12996/cucm for acute group as compared to 7386/cucm for chronic group. Gall bladder wall thickness(100%) and Peri gall bladder fluid collection (46.66%) was significantly associated with acute cholecystitis.
7) Port placement had no significant association with either of the group. Single incision laparoscopic cholecystectomy was feasible in 2 patients of chronic group.
8) Intra operatively adhesions (43.33%) were significantly more with calot's triangle and inferior surface of liver in acute cholecystitis. Mean operating time was significantly higher for acute cholecystitis viz. 97 min for acute group and 87.83 min for chronic group.
9) Difficulties during procedure such as omental adhesions(60%) , large edematous gall bladder(23.33%), mucocele and empyema (23.33%) were more commonly associated with acute cholecystitiswhere as association of partial intraparenchymal gall bladder and frozen colot's triangle were not significant.
10) In the post operative course, duration of antibiotics required, duration of analgesics given and hospital stay was comparable in both the groups and the difference was not significant.
11) However requirement of closed drain was significantly less in the patients with chronic cholecystitis (36.6%) as compared to acute group in which 56.6% patients required drainage.
12) The rate of conversion to open was 13.33% in acute group while in chronic group it was only 6.66%. This difference was not significant. Other complications such as bile leak and abscess formation had no significant association with any of the groups.
13) Laparoscopic cholecystectomy for acute cholecystitis though having more intra operative difficulties is possible with simple techniques such as percutaneous GB decompression, precise dissection and meticulous technique adhering to the view of safety.
14) With the advance of technology and instrumentation, complications associated with laparoscopic cholecystectomy have been reduced to minimal though morbidity associated with drain placement is acceptable.

Thus we can conclude that laparoscopic cholecystectomy is feasible, safe and rewarding procedure for management of acute cholecystitis in experienced hands, though

significantly longer operating time without increase in any morbidity or mortality.

Previously it was concept of treating patients of acute cholecystitis conservatively, which is changing now a days.There is an increasing trend toward shortening the hospital stay of patients undergoing laparoscopic cholecystectomy. This does not appear to have had a deleterious effect on outcome[33].Always put a scope inside and see the abdomen so that we can give a cosmetic scar to the patients. Most of the patients can be operated laparoscopically, it carries no more difference wheather the patient has acute or chronic cholecystitis. Post operative complications having very less mortality.

8. Future Scope

Surgeons and researchers at Columbia's new **Center for Scarless Surgery** are devoted to the advancement of procedures done through natural orifices of the body such as the mouth or the anus. In a step beyond laparoscopic surgery, these kinds of procedures, known as Natural Orifice Translumenal Endoscopic Surgery, or NOTES, offer patients the advantages of no external scars whatsoever, and even less pain and a faster recovery than with laparoscopic surgery (See *Healthpoints*, Summer 2007 issue).

So far, a team including **Marc Bessler, MD**, *Director of Laparoscopic Surgery*, **Peter Stevens, MD**, *Director of Endoscopy*, and **Dennis Fowler, MD**, *Director of the Minimal Access Surgery Center*, has performed two gallbladder removal operations through the vaginal wall (transvaginal cholecystectomy, or TVC). In these groundbreaking operations, they passed a narrow surgical instrument into the vagina, through a tiny incision in the vaginal wall, and into the abdominal cavity, where they removed each patient's gallbladder. Although they inserted a second instrument through a tiny incision in the belly button in order to provide imaging during these initial procedures, Dr. Fowler believes they will be able to soon eliminate this second scope.

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