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A CLINICAL STUDY ON EARLY SURGICAL INTERVENTION IN ACUTE CASES OF CHOLECYSTITIS IN A TERTIARY CARE CENTRE OF SOUTHERN ODISHA.

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ABSTRACT

BACKGROUND:

Cholecystectomy is the accepted treatment for acute cholecystitis. The previous traditional management of acute cholecystitis was initial conservative management with intravenous fluids and antibiotics followed by elective cholecystectomy after an interval of 6 weeks. This policy was advocated because of mainly three reasons i.e. (1) difficulty in diagnosis, (2) the risk associated with the condition specially in the elderly patients, (3) the mortality associated with conservative management is very low. This was however before the advent of Ultrasonography. But now-a-days with accuracy in the diagnosis by ultrasonography and with proper selection of cases the traditional method stands challenged. So, some surgeons prefer early surgery within 48-72 hrs of onset of symptoms. The main advantage claimed is the early relief pain and shorter hospital stay and thus more cost effective.

AIM AND OBJECTIVE:

This study was conducted to evaluate the treatment of acute cholecystitis by early surgical intervention randomly either by laparoscopic or open cholecystectomy and compare the study with traditional methods of treatment and outcomes.

PATIENTS AND METHODS:

Fifty ultrasound proven patients with cholecystitis were included in this study. There were 42 females and 8 males. These patients were undergone early cholecystectomy (either laparoscopy or open within 24-48 hrs after onset of pain) and compare it on various parameters against traditional methods.

RESULTS:

The early cholecystectomy is safe and feasible for acute cholecystitis with the additional benefit of shorter hospital stay, shorter operating time, less postoperative pain and complications.

CONCLUSION:

Early surgery if performed by a team of experienced surgeons has an advantage of early removal diseased gall bladder and shorter hospital stay with significant operative or perioperative complications and post

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operative mortality. Patients can return work early and it is cost effective. So early cholecystectomy should be performed for patients with acute cholecystitis.

INTRODUCTION:

The gall bladder, a part of hepatobiliary system. It is a store house and concentrator of bile in it's enroute from liver to small gut. It is not an essential organ and only surgical removal of the gall bladder guarantees that the patient will not suffer from gallstone disease and complications thereof.[1]

Acute cholecystitis is the sudden onset of inflammation of gall bladder wall, resulting in steady upper abdominal pain which may recur from time to time.[2]

Acute cholecystitis is the most common complication of cholelithiasis, conversely >95% of patients with acute cholecystitis have cholelithiasis. When a stone becomes impacted in the cystic duct and persistently obstructs it, acute inflammation results. Bile stasis triggers release of inflammatory enzymes (e.g., phospholipase-A, which converts lecithin to lysolecithin, which then may mediate inflammation). The damage mucosa secrets more fluid into the gall bladder lumen. The resulting distention further releases inflammatory mediators (e.g., prostaglandins). Worsening mucosal damage and causing ischemia, all of which perpetuate inflammation. Bacterial infection supervenes. The vicious cycle when unchecked leads to necrosis and perforation. If acute inflammation resolves the gall bladder become fibrotic and contracted doesn't concentrate bile or empty normally- features of chronic cholecystitis.[3]

In 5% cases inflammation occurs without stone (acalculous cholecystitis). The mechanism probably involves inflammatory mediators released because of ischemia, infection or bile stasis. Sometimes an infecting organism can be identified (e.g., salmonella species or cytomegalo species in immune deficient patients). It is seen particularly in patients recovering from major surgery (e.g., coronary artery bypass), trauma, burns, sepsis and prolonged total parenteral nutrition.[3,4]

Initially acute cholecystitis is an inflammatory process with a thickened and reddish wall with subserosalhaemorrhage. The mucosa may show hyperaemia and patchy areas of necrosis. In most severe cases this process can lead ischemia and necrosis of the gall bladder wall (5-10%). Acute gangrenous cholecystitis results in formation of abscess or empyema within gall bladder. When gas forming organisms are part of secondary bacterial infections gas may be seen in the gall bladder lumen and in the wall of gall bladder on imaging resulting in emphysematous cholecystitis.[5]

Gallstones are concretions that form in the gall bladder. Their development is insidious and they may remain as asymptomatic for decades. Migration of gall stone may lead to occlusion of the biliary and pancreatic ducts causing pain (Biliary colic) and producing acute complications such as acute cholecystitis, ascending cholangitis or acute pancreatitis.[6]

Acute cholecystitis tends to occur in all age groups, but the complications are high in elderly and in persons with other co morbid condition where the operative risk is remarkably high. The incidence of complications and associated morbidity mortality are high in acalculous type compared to calculous cholecystitis.[7,8]

The conventional method of management of acute cholecystitis is conservative treatment using intravenous fluids, antibiotics and analgesics followed 6-10 weeks after surgical intervention, which may be open or laparoscopic cholecystectomy.[9]

Cholecystectomy is definite treatment for patients with acute cholecystitis. Early cholecystectomy performed within 2 to 3 days of presentation is preferred over delayed cholecystectomy that is performed 6 to 10

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weeks after initial medical therapy. About 20% of patients fail medical therapy and require surgery during the initial admission. Laparoscopic cholecystectomy is the preferred approach to patients with acute cholecystitis. The conversion rate to an open approach is higher (4-35%) in setting of acute cholecystitis.[5]

Acute cholecystitis may progress to empyema of the gall bladder, emphysematous cholecystitis or perforation of the gall bladder despite antibiotic therapy. In each case emergency cholecystectomy is indicated. In most cases Cholecystectomy can be performed and is the best treatment of complicated acute cholecystitis. Occasionally the inflammatory process obscures the structures in the triangle of calot, precluding safe dissection and ligation of cystic duct. In these patients' partial cholecystectomy, cauterization of the remaining gall bladder mucosa and drainage avoid injury to the CBD.[5,10]

In a meta-analysis of laparoscopic cholecystectomy in acute cholecystitis, it was observed that with advent newer skills of technology, safe anaesthesia and expertise, more and more surgeons, now-a-days are opting for early cholecystectomy (usually laparoscopic cholecystectomy) within 48-72 hours of an attack of acute cholecystitis.[11]

AIM AND OBJECTIVE OF THE STUDY:

1. Role of early surgery in acute cholecystitis.

2. To evaluate early surgery. The study includes performance of Surgical procedures, Operative Time, Blood Loss, Hospital Stay, morbidity, Mortality, Economic benefits and Patients acceptance.

MATERIALS:

Inclusion criteria:

Patients admitted to M.K.C.G Medical College and hospital in the department of General Surgery with pain abdomen with clinical diagnosis acute cholecystitis irrespective of age, sex with valid informed consent will be considered eligible.

Exclusion criteria:

- Moribund patients
- Pregnant lactating women
- Non-compliance
- Patients with terminal disease
- Previous history of abdominal surgery
- Spreading Peritonitis

METHODS:

All cases satisfying the inclusion criteria and exclusion criteria wereselectedforthestudy.Then they were subjected to following investigations:

Preliminary investigation:

- Hb%, DC, TLC, urine (routine, microscopic, bile salts, bile pigments)
- FBS, Blood urea, Serum creatinine, bleeding time, clotting time
- Straight X-Ray abdomen in erect posture
- X-Ray Chest PA view in erect posture

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- E.C.G

Special Investigation:

- Liver function test: Serum bilirubin total, direct and indirect, Serum Alkaline phosphatase, SGOT, SGPT, Serum protein

- Ultrasonography of abdomen and pelvis-
  - ✔ Gall bladder wall thickening,
  - ✔ Stone with posterior acoustic shadow,
  - ✔ Sonographic Murphy's sign,
  - ✔ Pericholecystic fluid collection

After thorough investigation and preparation with due consent from patient and his /her attendants, cases were subjected randomly to either open or laparoscopic cholecystectomy. All specimens were subjected to histopathological examination with special request for serial section on those mucosal or wall abnormality. On the basis of histopathological reports, the cases were considered as gangrenous, acute or chronic cholecystitis while looking for incidental finding of carcinoma.

Patients were discharged on being afebrile, ambulant, pain free and tolerant to adequate oral intake. On discharge patients were requested to note the date on which they considered themselves fully recovered and also to note the date of joining their services if they were job holders or when then resumed their routine household works if they were non-job holders. Patients were reviewed after two weeks.

DATA ANALYSIS AND RESULTS:

All the data from the present study were tabulated, compiled, analysed, discussed and conclusion was drawn with respect to the aims and objectives of the study. Finally, the results of the study were compared with all other existing international reports.

50 patients of acute cholecystitis were taken up for study in this series. Patients admitted to surgical indoors with clinical diagnosis of acute cholecystitis from September 2007 to September 2009 were taken up.

Four of them had associated risk factor for surgery and they needed adequate preoperative preparation before surgery could be undertaken. This includes one patient with anaemia, one patient with DM and one patient with hypotension. Twenty-Five patients undergone laparoscopic cholecystectomy and 25 undergone open cholecystectomy.

Age and Sex Incidence:

The age of male patients in this group ranged 30 -65 yrs. (mean 47.5 yrs.). The age of female patients in this group ranges from 25-62 yrs. (mean 43.5 yrs.). The study group comprised 42 females and 8 males with female to male ratio of 5.3:1 and the females constituted 84% of the study.

Table-1
AGE & SEX DISTRIBUTION

Age in year	Male	Female	Total (n=50)
<30	0	1	1
30-39	1	3	4

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40-49	2	18	20
50-59	4	18	22
60-69	1	2	3
Total	8	42	50

Duration of Symptoms:

The duration of symptoms at the time of admission ranged between 1 to 5 days. Duration of symptoms in laparoscopic group was less than 4 days

Table-2
DURATION OF SYMPTOMS:

Duration of symptoms (Days)	**Laparoscopy**	**Open Surgery**	**Total**	**Percentage**
0-1	4	4	8	16.0
2-3	18	6	24	48.0
3-4	3	11	14	28.0
5	0	4	4	8.0
Total	**25**	**25**	**50**	**100.0**

CLINICAL SYMPTOMS & SIGNS IN ACUTE CHOLECYSTITIS:

Fifty patients had clinical features of pain in upper abdomen, fever (>37.5 °C), leucocytosis (> 11,000/mm^3), tenderness, guarding in the right hypochondrium and ultrasound evidence of cholecystitis. Seven patients (14%) had elevated serum bilirubin levels; six patients (12%) had elevated serum alkaline phosphatase on laboratory examination.

Table- 3
FEVER:

Oral temperature (°C)	**Lap surgery**	**Open surgery**	**Total**
37.5-38	4	4	8
38.1-38.5	9	9	18
38.6-39	7	2	9
39.1-39.5	3	6	9
39.6-40	2	4	6
Total	**25**	**25**	**50**

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Table-4
TOTAL WBC COUNT:

TWBC Count/cumm	Lap surgery	Open surgery	Total
11000-12000	4	2	6
12001-13000	3	4	7
13001-14000	6	8	14
14001-15000	7	10	17
>15001	5	1	6
Total	**25**	**25**	**50**

Fifty patients had leucocyte count more than 11,000 counts /cumm

Table-5
SERUM TRANSAMINASE:

Serum Transaminase U/L	Lap surgery	Open surgery	Total
<35	20	12	32
36-50	1	2	3
51-100	2	2	4
101-150	2	7	9
>150	0	2	2
Total	**25**	**25**	**50**

18 patients had elevated Serum Transaminase >35 IU /L

Table-6
SERUM BILIRUBIN:

Serum Bilirubin(mg/dl)	Lap surgery	Open surgery	Total
<0.9	23	20	43
1.0-2	0	0	0
2.1-2.5	2	1	3
2.6-3.0	0	2	2
>3	0	2	2
Total	**25**	**25**	**50**

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7 out of 50 patients had jaundice i.e., Serum bilirubin > 2 mg/dl

Table-7
SERUM ALKALINE-PHOSPHATASE (SGPT):

Serum Alkaline phosphatase(U/L)	**Lap surgery**	**Open surgery**	**Total**
<35	23	20	43
36-100	1	0	1
101-150	1	1	2
151-250	0	2	2
>250	0	2	2
Total	**25**	**25**	**50**

Six patients (12%) had elevated serum alkaline phosphatase on laboratory examination >100 U/L.

Table- 8
SUMMARY OF CLINICAL SIGNS IN ACUTE CHOLECYSTITIS:

Signs	**Lap surgery**	**Open surgery**
Fever (>37.5 °C)	25	25
Leucocytosis	25	25
Murphy's sign	25	25
Total serum bilirubin (>2 mg/dl)	2	5
Serum alkaline phosphatase (> 100 u/l)	1	5
Serum transaminase (>35 IU/L)	5	13
USG evidence of acute cholecystitis	25	25

Length of Incision:

The average length of right subcostal incision in the early surgery group average 8.5 cm ranging from 7.0 to 11 cm. The incision was extended whenever there was difficulty during surgery and in obese person.

Table-9
LENGTH OF INCISION OF OPEN SURGERY:
(n=25)

Length of the incision (cm.)	**No. of Cases**	**Percentage**
7 - m	9	18
8.1 - 9.0	11	22

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9.1 - 10.0	2	4
10.1 - 11.0	3	6
Total	**25**	**50**

Duration of Surgery:

The duration of surgery in lap surgery ranged from 60-70 min and open surgery ranged from 60-80 min.

Table-10
Duration of Surgery:

Time in Min.	**Lap surgery**		**Open surgery**	
	No. of Cases	**Percentage**	**No. of Cases**	**Percentage**
60-70 Min.	25	50	5	10
70-80 Min.	0	0	20	40
Total	**25**	**50**	**25**	**50**

Operative finding and procedure:

Of the 25 patients in the laparoscopic cholecystectomy group there were 2 patients with concealed gall bladder perforation and in two patients gall bladder was gangrenous, 3 patients had empyema of gall bladder. In open cholecystectomy group 3 patients had dense pericholecystic adhesion. One patient had stone in CBD which was explored through the bile duct. 4 patients had empyema with stone impacted in neck.

Table-11
OPERATIVE FINDING DURING CHOLECYSTECTOMY:

Pathology	**Lap surgery**		**Open surgery**	
	No.	**%**	**No.**	**%**
Acute cholecystitis alone	18	36	18	36
Concealed gall bladder perforation	2	4	2	4
Gangrenous gall bladder	2	4	0	0
Empyema	3	6	4	8
Associated with CBD stone	0	0	1	2
Total	**25**	**50**	**25**	**50**

Table-12
APPROXIMATE AMOUNT OF BLOOD LOSS OF OPEN SURGERY:

Approx. amount of blood loss (Ml)	**No. of Cases**	**Percentage**
251 - 350	13	26
351 - 450	10	20

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451 - 550	2	4
Total	**25**	**50**

Post operative period:

In laparoscopic cholecystectomy group the post operative recovery was uneventful in all patients. The average duration of I.V. fluids was 1 day ranging from 1 to 2 days and drains were removed on 48 to 72 hours. In the open cholecystectomy group post operative recovery was uneventful. The average duration of I.V. fluids was 2.2 days ranging from 2 to 3 days and drains were removed on 72-96 hours.

Table-13
HISTOPATHOLOGICAL ANALYSIS:

H/P Finding	**Lap surgery**		**Open surgery**	
	No.	**%**	**No.**	**%**
Acute cholecystitis	23	46	22	44
Gangrenous cholecystitis	2	4	0	0
Acute on chronic cholecystitis	0	0	3	6
Total	**25**	**50**	**25**	**50**

Table-14
DURATION I.V FLUIDS:

Duration of I.V fluids	**Lap surgery**		**Open surgery**	
	No.	**%**	**No.**	**%**
0-1	25	50	0	0
2-3	0	0	25	50
Total	**25**	**50**	**25**	**50**

Hospital stays:

In open cholecystectomy the hospital stay ranged from 7 days to 15 days with a mean of 9.1 days. In laparoscopic cholecystectomy the hospital stay ranged from 2 to 5 days with a mean of 3.2 days.

Table-15
LENGTH OF HOSPITALIZATION:

Hospital stays in days	**Lap surgery**		**Open surgery**	
	No.	**%**	**No.**	**%**
1-5	25	50	0	0
6-10	0	0	17	34
11-15	0	0	8	16
Total	**25**	**50**	**25**	**50**

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DISCUSSION:

Acute cholecystitis is the most common complication of cholelithiasis, conversely >95% of patients with acute cholecystitis have cholelithiasis. When a stone becomes impacted in the cystic duct and persistently obstructs it, acute inflammation results. Factors that may initiate the inflammatory process include the formation of inflammatory mediators (e.g. lysolecithin and prostaglandins); an increase in intraluminal pressure in association with compromise of the blood supply; and chemical irritation by bile acids.

The main presenting features were pain in the right hypochondrium (100%) cases, leucocytosis (100%) cases. Ultrasound of abdomen was done in all cases where the diagnosis was suspected. Ultrasound revealed the features of acute cholecystitis in all cases. The clinical diagnosis of acute cholecystitis is far from simple and the rate of diagnostic error is high by **Halaz et al (1975)**[12]. In our study the diagnosis was more than 98% accurate both clinically and ultrasonographically, was confirmed at operation and histopathology.

It is accepted that the incidence of acute cholecystitis is more in females than males and in our study the ratio between female to male is 5.3:1. This is in accordance to the previous study by **Lahtinen et al (1978)**[13]and **Mc Arthur et al (1975)**[14]where the ratio was 3:2 and 5:1 respectively.

Early surgery has been criticized it is said to be more difficult, more time consuming and more intraoperative blood loss by **Burnett, Mecker, Jersy (1972)**[15]. However, many surgeons prefer to operate at early stage because the operative time is significantly shorter in early cholecystectomy.

Operative difficulty was observed in 3 cases due to dense adhesions and difficulty in identifying Calots triangle. However, there was no injury to duodenum, cystic artery and bile duct.

In this study no complication was observed in laparoscopic cholecystectomy. The incidence of complication in open surgery group was 12%. The results differ from the previous study by **Van Der Lindel at al., (1970)**[16]where complication was more in early surgery group.

In this study no mortality was observed due to proper selection of cases.

Significant difference was found in the total hospital stay between laparoscopic and open cholecystectomy. It was 9.1 days in the open cholecystectomy and 3.2 in laparoscopic cholecystectomy. Also, patients in the laparoscopic group returned to normal activity. This result is similar to the reports in other series by **Linden et al (1970)**[16]and **Norrby et al (1983)**[17].

The shorter hospital stay in the early surgery is a factor which is to be given importance. While considering the economic aspect of treatment by **Van der Linden et al (1970)**[16]studied the cost effectiveness of early or delayed surgery in acute cholecystitis and found that conservative treatment was 65% more expensive than early surgery. This also supported by **Jarvinen et al (1980)**, **S. Norrby et al (1983)**[18,17].

Comparison of results obtained from different series in the early cholecystectomy for acute cholecystitis

Authors	Total no of patients	Operative time(minute)	No of complications	Hospital stays (days)
Vander Linden et al 1970	70 (140)	75	10 (14%)	10.1
Mc Arthur et al 1975	15 (32)	Not available	4(26%)	13.1
Lathinen J et al 1978	50 (132)	70.3	14(28%)	12.1

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Jarvinen het al 1980	83 (165)	93.0	11(13.8%)	10.7
Norrby S et al 1983	101 (192)	Not available	15 (14.8%)	9.1
Present series 2009	25 (50)	75	3 (12%)	9.1

CONCLUSION:

This study was conducted to evaluate the treatment of acute cholecystitis by early surgical intervention randomly either by laparoscopic or open cholecystectomy. Fifty ultrasound proven patients with cholecystitis were included in this study. There were 42 females and 8 males. The exclusion criteria were previous history of upper abdominal surgery, pregnancy, presence of spreading peritonitis; elderly patients age more than 70 years.

The early cholecystectomy is safe and feasible for acute cholecystitis with the additional benefit of shorter hospital. Apart from shorter operating time as compared to open and delayed cholecystectomy.

With careful patient selection, optimal post operative pain control and early resumption of diet with better management of post operative nausea and vomiting laparoscopic cholecystectomy was feasible and safe.

In this study no mortality was observed due to proper selection of cases. Morbidity was observed in few cases of open cholecystectomy, no major complication like bile duct injury was seen in this series.

To conclude early surgery if performed by a team of experienced surgeons has an advantage of early removal diseased gall bladder and shorter hospital stay with significant operative or perioperative complications and post operative mortality. Patients can return work early and it is cost effective. So early cholecystectomy should be performed for patients with acute cholecystitis.

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