

Effectiveness of Various Treatment Options in the Management of Gallbladder Stones and Related Acute Conditions

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ABSTRACT

Objective: The purpose of this study was to compare and to assess the differences in the clinical outcomes of surgical versus laparoscopic cholecystectomy, endoscopic procedures (ERCP), percutaneous cholecystectomy, percutaneous aspiration (PA) and medical measures in the management of gallstone and related acute conditions.

Study Design: A comparative and retrospective study

Place and Duration of Study: This study was conducted at the Department of General Surgery Khalifa Gul Nawaz Teaching Hospital Bannu between August 2019 and June 2020.

Materials and Methods: A total of 269 patients were included in the study, with the age ranged from 30 to 85 (mean 57.5) years. Data were collected from the charts and computer record of the prospective patients, admitted from Jan 2013 to Dec 2015. Statistical analyses were used to calculate the risks of in hospital mortality and morbidity, to detect the statistical differences among the treatment types, age groups, length of hospital stay and the readmission frequency among the different treatment types.

Results: Open surgery is a gold standard, effective, definitive and safe treatment modality in the management of gallstones and related acute conditions. Laparoscopic surgery (lap chole) is, although a gold standard and a vogue with surgeons but it is not applicable and successful in all cases of gallstones and related conditions, for which open surgery comes as a definite treatment option. The age of the patients affects the mortality and the duration of hospital stay after every type of treatment for gallstones and related acute conditions. Percutaneous cholecystectomy or percutaneous aspiration (PA) was associated with highest risk of death and length of hospital stay. ERCP (endoscopic retrograde cholangio-pancreatography) was related to a shortest hospital stay. There were more deaths in the medically treated patients. There were more readmissions in the delayed types of procedures. The risks of death and the probability of readmissions were not affected by the gender of the patients.

Conclusion: Surgery is a gold standard, effective, definite and safe in the management of gallstones related acute conditions. Laparoscopic cholecystectomy is mainly used in young fit patients, usually for simple cases of gallstones/cholecystitis. The success rate of the procedure increases with the experience of the surgeon. Surgically unfit and high risk patients are treated conservatively with medicines or through ERCP, percutaneous cholecystostomy or PA. These techniques have limitations. They are temporizing and palliative procedures, with a high recurrence rate of symptoms.

Key Words: Acute cholecystitis (AC), Endoscopic Retrograde Cholangiopancreatography (ERCP), Percutaneous aspiration (PA)

Citation of article: Khan GS, Ghafoor A, Mehmood A, Rafi Ullah. Effectiveness of Various Treatment Options in the Management of Gallbladder Stones and Related Acute Conditions. Med Forum 2021;32(4):67-71.

INTRODUCTION

Reportedly the prevalence of gallstone is 6-8% for men and 10-12% for women in the population^[1,2]. The incidence of gallstone increases with age, that by the age of 65, 12% of men and 25% women have gallstones

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Received: October, 2020

Accepted: December, 2020

Printed: April, 2021

increasing to 20% and 30% respectively at the age of 90^[2,3].

Some 60-65% of patients with gallstones are without symptoms^[1,2,4,5] and the risk of developing symptoms or complications is almost 1-4% per year^[4,5]. Some of the most frequent complications of gallstone disease are biliary colic, acute cholecystitis, CBD (common bile duct) stones, mucocele, empyema or emphysema of gallbladder and gangrene of gallbladder with perforation, biliary pancreatitis and cholangitis and the cholecystoenteric fistula and the gallstone ileus are the less common.

Biliary colic: starts when the gallbladder contracts against a stone which is temporarily blocking the cystic duct^[1]. The patient notices a sharp intermittent pain in the right upper quadrant or epigastrium, with nausea

and vomiting. The pain usually starts after the ingestion of fatty meal and may last for several hours^[1,4].

Acute cholecystitis: starts due to blockade of cystic duct by a gallstone and the patient is complaining of pain in the right upper quadrant, nausea, vomiting, anorexia and fever. Leucocytosis is frequent^[1,6]. Raised liver function tests are associated with worse outcomes^[7]. Kimura et al, in a large review of the literature report the mortality rate of acute cholecystitis from 0-10% and complications rate of 7-26%^[1,8]. Although the mortality rate of acute cholecystitis is usually low (0.2-0.3%)^[9] but this figure is 7-10 times high in old age due to comorbidities⁹. Gallbladder perforation occurs in 8-10% cases of acute cholecystitis with an increased rate of mortality^[1,10].

Common bile duct stones: (choledocholithiasis) are present in almost 10% cases of cholelithiasis and 5-18% cases of elective cholecystectomies^[1,11]. The related signs are jaundice, clay colour stool and dark urine^[1]. Patients with CBD stone can present with fever, jaundice and pain RHC. Acute cholangitis is a surgical emergency needs early biliary drainage.

40-60% cases of biliary pancreatitis are due to gallstones¹² and the patients present with epigastric pain, nausea and vomiting. Severe pancreatitis occurs in almost 10-15% of patients with gallstone disease^[12,13].

MATERIALS AND METHODS

A total 269 patients including 69 (26%) males and 200 (74%) females, aged 30-85 (mean age 57.5) years, were included in this study. The cases of gallstones were admitted through the OPDs and the cases of acute cholecystitis mostly through emergency. Patients were diagnosed on the basis of history, physical examination, laboratory tests, ultrasound and CT scan abdomen.

Variables included were the patient demographics, hospital diagnosis, white cell count, biochemical parameters, ASA (American society of anaesthesiologist) score, various types of treatment given, length of hospital stay and morbidity and mortality.

Statistical analysis was performed with the statistical package for social sciences version 20.0. Multiple logistic regression was used to calculate the risks of in hospital mortality and to detect statistical differences and their significance among the treatment groups, age groups and between male and female patients. Univariate ordinary linear regression was used to compare the length of hospital stay and readmission frequency among the different age groups. A P value of less than 0.05 was considered significant.

Gallstones /Acute cholecystitis (AC): For these 185 (69%) patients, 135 (73%) female and 50 (27%) male were included in the study. Patients were mostly

admitted through OPDs; however the cases of acute cholecystitis were mostly admitted through emergency. The cases of acute cholecystitis were kept NBM (nothing by mouth), put on I/v antibiotics, I/v fluids, analgesics and antacids. Cases of acute cholecystitis fit for surgery and especially those cases not responding to the conservative treatment and the cases of gallstones underwent surgery, either laparoscopic or open cholecystectomy. The cases of AC responding favorably to the conservative treatment or cases unwilling or unfit for surgery were continued on the medical treatment. On discharge, they were advised to come back for definitive treatment 4-6 weeks after.

RESULTS

We saw from the results of the study that the incidence and prevalence of gallstones and related acute conditions are increasing with the age. Usually cases were selected with ASA score of 3 or lower for surgery in the elderly patients. Delayed, misdiagnosed and improperly treated cases of calculous cholecystitis presented with complications e.g. cholecystoenteric fistula or gallstone ileus.

Cholecystectomy and CBD exploration are the principal procedures commonly performed. Early cholecystectomy (the operation performed with in 48hrs of admission) decreases hospital stay, readmission rate and other biliary complications¹⁵.

Several reports have documented the fact that surgical correction of cholelithiasis and choledocholithiasis to prevent recurrent pancreatitis can be safely accomplished as soon as the clinical evidence of acute pancreatitis has subsided¹⁶.

In this study endoscopic treatment was found to be an important predictor of recurrent biliary symptoms during follow up ($p=0.05$) and age was the only independent predictor of mortality and morbidity ($p=0.007$). In this study percutaneous cholecystostomy or PA was associated with the highest risk of death and hospital stay while Lap chole with lowest mortality and ERCP with the shortest length of stay. The patient sex did not affect the rate of death after any type of treatment but some studies has shown that women with cholecystitis had lower mortality and shorter hospital stay¹⁷.

A weak but positive correlation was found between age and leucocytosis ($p=0.049$), with the leucocyte count increasing with age. There were more deaths and readmission in the medically treated patients. In the present study, the difference between treatments of patients <60 yrs and >60yrs was statistically significant ($p=0.030$).

Lap chole was performed more frequently in the young age (<60yrs) group with preserved and good cardiopulmonary status.

Table No.1: Age groups wise treatment for the cases of acute cholecystitis/gallstones

Age group	Acute cholecystitis plus elective cases of gallstones	Treatment		
		Lap chole	Open chole Plus converted Cases	Medical Treatment
30 – 40	35	15	8 + 2 = 10	10
41 – 50	65	32	15 + 3 = 18	15
51 – 60	50	22	13 + 5 = 18	10
61 – 70	20	6, 2(p chole or PA)	6 + 3 = 9	3
71 – 80	10	2, 2 (PA or p chole)	6 + 2 = 8	0
81 – 85	5	0, 2(PA or p chole)	3 + 0 = 3	0
Mean age 57.5	185 (68%)	77 (42%)	66 (35.6%)	38 (20.5%)

From the table 1, it is cleared that most of the cases whether acute or elective were treated with lap cholecystectomies especially in the young age group (<60yrs), although some cases in the old age group were also resorted to lap chole. It is also seen that the rate of conversion to open cholecystectomy was more in the old age groups. Also the ratio of patients treated conservatively decreased towards the old age groups indicating the severity of gallstone diseases. Hospital

stay was 5-6days. There were 2 expiries in the medically treated patients and 1 in the lap choles.

Follow up: 5 out of 36 medically treated patients had readmissions with acute episodes with in the first 3-4 wks time and they had early lap choles in 3 cases and 2 open cholecystictomes. Only 25 patients came back for elective surgeries at different dates. They underwent either lap choles or open cholecyseictomes, with some cases of lap chole converted to open cholecystectomy

Table No.2: Age wise various treatment modalities

Age group	Acute cholecystitis with CBD stones plus gallstones with CBD stones	Treatment		
		Lap chole plus ERCP	Open chole plus CBD exploration plus converted cases	Medical
		0	3 + 0 = 3	2
41 – 50	10	2	6 + 0 = 6	2
51 – 60	15	4	7 + 2 = 9	2
61 – 70	13	5	6 + 2 = 8	0
71 – 80	10	3	5 + 2 = 7	0
81 – 85	5	2	2 + 1 = 3	0
Mean age 57.5yrs	58 (21.6%)	16 (27.5%)	36 (62%)	6 (10.3%)

In this study, a total of 58(21.6%) patients with 14(24.21%) males and 44(75.8%) females were included. some cases of acute cholecystitis were jaundiced and running fever with elevated liver function tests (with acute cholangitis). All the cases were kept NBM, put on I/v fluids, I/v antibiotics, antipyretics and antacids.

Those patients who responded early and well were continued on medical treatment and on discharge were advised to come back for definitive treatment 4-6 wks after. Those cases which were ill and toxic underwent either early ERCP, sphincterotomy and CBD clearance followed by lap chole or open cholecystectomy and CBD exploration. The elective cases were put on OT list for lap chole plus ERCP or open cholecystectomy plus CBD exploration. There were a few cases of Lap chole or ERCP which failed and were converted to open cholecystectomy plus CBD exploration.

From the table 2 it is clear that most of the cases in the young age groups (<60yrs) were treated with open cholecystectomy, IOC and CBD exploration. In the old age groups (>60yrs), the CBD stones were cleared in most of the cases through ERCP, sphincterotomy and

CBD clearance followed by either Lap chole or open cholecystectomy. Hospital stay was 7-11days. 1 case of ERCP expired during the procedure.

Follow up: 2 out of the 6 medically treated cases had readmissions with acute episodes and they were resorted to early lap choles followed by ERCP. 3 out of the 4 cases followed for definitive treatment at different dates. They had either Lap choles followed by ERCP or open cholecystectomy with choledocholithotomy.

Table No.3: Cases of acute biliary pancreatitis

Age group	Cases of gallstones and or CBD stones	Acute pancreatitis	
		Mild Cases	severe cases
30 – 40	3	2	1
41 – 50	5	4	1
51 – 60	8	6	2
61 – 70	5	3	2
71 – 80	3	2	1
81 – 85	2	0	2
Mean age 57.5yrs	26 (9.7%)	17 (65.4%)	9 (34.6%)

In this part of study some 26 (9.7%) patients with 5(19.3%) male & 21(80.7%) female with acute biliary pancreatitis were included. All the cases were kept NBM, put on I/V antibiotics, I/V fluids, analgesic & antacid. Mild cases of acute pancreatitis responded favorably and they remained in hospital for 4-7 days. On discharge they were advised to come back for definitive treatment as early as possible.

3 cases of acute necrotizing or hemorrhagic pancreatitis were excluded from the study. 2 cases of severe acute pancreatitis expired during the course of disease. 4 cases of the severe variety being on medical treatment were resorted to early ERCP plus sphincterotomy and CPD clearance. Hospital stay was 9-14 days. On discharge they were advised to come for eradication surgery 8-12wks.

Follow up: 12 out of 17 conservative patients followed for definitive treatment, 8 had ERCP followed by lap chole and 4 had open chole with CPD exploration. Out of 4 patients of severe variety 2 had open chole and the other 2 had lap chole.

DISCUSSION

From this study, it became cleared that laparoscopic and endoscopic procedures are not always successful. In our setup (Pakistan), the patients of gallstones usually present to the surgeons after repeated attacks of cholecystitis and they are not suitable to be handled laparoscopically. Even when they are started with laparoscopy, the conversion rate is high, either because of difficult dissection in the calot's triangle or injury to the CBD or blood vessels. Also patient's selection for laparoscopic procedures is quite important. Elderly and diabetic patients, patients in cardiopulmonary compromised state and patients having abdominal operation are not suitable for laparoscopic cholecystectomy. The merits of laparoscopic cholecystectomy are, the minimum trauma of access, the less post-operative pain, early mobilization and early recovery to normal work.

Laparoscopic choledocholithotomy is possible in specialized centers by surgeons with advanced laparoscopic experience and skill, advanced laparoscopic techniques and equipment.

The ERCP failed in some cases of CBD stones clearance due to the failure to cannulate the ampulla of Vater or due to the large size of CPD stone to retrieve.

In a retrospective group of 362 patients Neoptolemos et al^[14] found immediate morbidity 8% versus 19% and mortality 4% versus 8% in the surgical and endoscopic groups respectively, but the endoscopic group had a large proportion of high risk patients. These workers also noticed that preoperative endoscopic intervention increases the surgical mortality and morbidity. Endoscopic therapy shortens hospital stay but this advantage is antagonized by the

substantially high rate of the recurrence of biliary symptoms, some of which demand readmission.

In a high risk elderly patients, surgery is suitable to endoscopic intervention with the gallbladder left in situ as a definitive treatment for gallstones and related conditions.

CONCLUSION

Surgery is a gold standard, effective, definitive and safe treatment modality for the management of gallstones and related acute conditions. Laparoscopic cholecystectomy is also a gold standard for simple cases of gallstones in young patients and in some old patients with preserved cardiopulmonary states. Open surgery is practiced frequently in complicated gallstones and related acute cases in both young and old ages under general or epidural anesthesia. Careful pre-operative patient assessment and selection for a definite treatment and post-operative care are necessary for a successful treatment.

ERCP is a gold standard for retrieval of CBD stones in old age. Endoscopic procedures (ERCP), percutaneous cholecystectomy or percutaneous aspiration and medical treatment are used in surgically unfit, high risk, old infirm and diabetic patients to ameliorate and palliate the symptom of gallstones and related acute conditions. These temporizing procedures are in no way definite with high rate of recurrence of symptoms. Also these procedures are not always successful. When they fail or when the acute state of the disease has been over, open surgery comes as an effective and definitive treatment modality.

Author's Contribution:

Concept & Design of Study:	Gul Sher Khan
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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