



## PROSPECTIVE GALLSTONE STUDY OF EXTRAPHEPATIC BILIARY LITHIASIS- EVALUATION AND MANAGEMENT AT ACHARYA VINOBA BHAVE RURAL HOSPITAL

Dr. Raju Shinde\*, Dr. Vivek Sharan Sinha<sup>1</sup> and Dr Gaurav Amle

\*Professor & Head of Department of Surgery, AVBRH, DMIMS, Sawangi(M), Wardha.

<sup>1</sup>Post Graduate Department of Surgery, AVBRH, DMIMS, Sawangi(M), Wardha.

**\*Corresponding Author: Dr. Raju Shinde**

Professor & Head of Department of Surgery, AVBRH, DMIMS, Sawangi(M), Wardha.

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### ABSTRACT

In today's modern world Extrahepatic Biliary Lithiasis especially Gallstone disease continue to be the major problem in world population especially in western countries. From last few decade there has been a increase in incidence Extrahepatic Biliary Lithiasis in Asian population also. Prevalance is particularly high among middle aged, obese and women. Most patients of gallstones are asymptomatic, and only a few suffer from recurrent bouts of abdominal discomfort. To study for risk factor, investigation protocol, treatment modalities and outcome in a rural setup, a prospective study is undertaken in Acharya Vinoba Bhave Rural hospital of Sawangi (Meghe), Wardha. **Aim:-**To study Extrahepatic Biliary Lithiasis and its Management **Objectives:-**1-To study predisposing factors of biliary lithiasis in rural based population of AVBRH. 2-Different investigations for evaluation of biliary lithiasis. **Material and methods-**A prospective randomized study includes 40 cases of extrahepatic biliary lithiasis which were treated in our hospital in Department of Surgery of AVBRH Wardha. **Conclusions:-** A total of 40 patients of Extrahepatic biliary lithiasis were included in our study. Out of 40 cases 30 (75%) patients were of cholelithiasis, 8 (20%) patients were of CBD stones and 2 (5%) patients were of gallstone pancreatitis. In our study females were more commonly affected than male patients in Cholelithiasis. Laparoscopic cholecystectomy was found to be costlier as compared to open cholecystectomy. Thus our study shows that Extrahepatic Biliary Lithiasis can be managed by both open as well as laparoscopic and endoscopic procedures effectively.

**KEYWORDS:** Stones, Biliary, Gallstones, Extrahepaic.

### INTRODUCTION

In today's modern world Extrahepatic Biliary Lithiasis especially Gallstone disease continue to be the major problem in world population especially in western countries. From last few decade there has been a increase in incidence Extrahepatic Biliary Lithiasis in Asian population also. Prevalance is particularly high among middle aged, obese and women. Most patients of gallstones are asymptomatic, and only a few suffer from recurrent bouts of abdominal discomfort. Occasionally complications such as acute cholecystitis, pancreatitis or choledocholithiasis may ensue. The primary physician needs to know when treatment is necessary and how to help patients choose among elective surgery, medical therapy and expectant management.

Extrahepatic Biliary Apparatus is having various anomalies and also major vessels around it which make operative treatment difficult and prone for complications.

Various investigations are available for evaluation of conditions including Ultrasonography, CT scan, ERCP and MRCP.

Newer treatment modalities like Laparoscopic Cholecystectomy, Laparoscopic exploration of Common Bile Duct are expertise sophisticated treatment but none of which is free of complications.

To study for risk factor, investigation protocol, treatment modalities and outcome in a rural setup, a prospective study is undertaken in Acharya Vinoba Bhave Rural hospital of Sawangi (Meghe) Wardha.

### MATERIAL AND METHODS

A prospective randomized study includes 40 cases of extrahepatic biliary lithiasis which were treated in our hospital in Department of Surgery of AVBRH Sawangi (Meghe), Wardha.

Patients were initially seen in Out-patient Department and were admitted to the hospital. A detailed history comprising of presenting symptoms, signs, investigation and management was carefully recorded according to proforma.

After careful clinical and laboratory evaluation, correlating physical findings and investigations, a final diagnosis was made. Later patients were categorised in three groups, those with gall bladder stones, those with CBD stones and those with gallstone pancreatitis. The patients with cholelithiasis were treated surgically by either open and laproscopic method. Patients with cholelithiasis with CBD stones were treated either with open surgery or Endoscopic Retrograde Cholangiopancreatography (ERCP). Patient with gallstone pancreatitis were treated conservatively for there acute attack and were advised for definitive treatment. All the patient underwent planned elective surgery.

Pre-operative preparation: Anemic patients were given blood transfusion. Those with jaundice were given intravenous fluid, multivitamins, vitamin k and those with cholangitis received broad spectrum antibiotics. In all routine and planned cases preoperative antibiotic was given.

**Anaesthesia:** All the patients were operated under general anaesthesia.

**Operative technique:** The abdomen was painted and draped. In patients with cholelithiasis open cholecystectomy was done by subcoastalkocher's incision. In our present study 8 patients underwent open cholecystectomy.

**Table No 1: Sex Incidence**

| Sex    | No. of patients | Percentage |
|--------|-----------------|------------|
| Female | 26              | 65         |
| Male   | 14              | 35         |
| Total  | 40              | 100        |

The male female ratio was 1:1.8.

**Table No. 2: Age Incidence**

| Age in years  | Numbers           | Percentage |
|---------------|-------------------|------------|
| 11-20         | 01                | 2.5        |
| 21-30         | 06                | 15         |
| 31-40         | 07                | 17.5       |
| 41-50         | 10                | 25         |
| 51-60         | 10                | 25         |
| 61-70         | 03                | 7.5        |
| 71-80         | 02                | 5          |
| 81-90         | 00                | 00         |
| 91-100        | 01                | 2.5        |
| Total         | 40                | 100        |
| Mean $\pm$ SD | 48.30 $\pm$ 17.20 |            |
| Range         | 16-100 years      |            |

In the present study 15 cases underwent laparoscopic cholecystectomy under general anaesthesia. Post-Operative care: Post-Operatively the patient was maintained on intravenous fluids, antibiotics and analgesics for 5 days in open cholecystectomy. Patients of laparoscopic cholecystectomy were 3 doses of antibiotics.

All the uncomplicated cholecystectomy patients were discharged on seventh to tenth day. Those with CBD exploration were discharged on tenth to twelfth day. Those with laparoscopic surgery were discharged on fifth to sixth day.

All the patients were given discharged and were asked to followup on out patient basis after 14-15 days.

**Follow-up:** Patients were followed at regular intervals after 14-15 days after discharge. At the time of follow-up enquiry regarding relief of symptoms and recurrence if any was asked. Detailed examination was done, noting if there were any postoperative complications.

For patient who did not come for followup telephonic questionnaire was made to them asking about there present condition, relief of symptoms and any complications. Most of them replied promptly. On basis of various finding observed during above study, data was collected and inferences drawn.

## RESULTS

40 cases of extrahepatic biliary lithiasis which were treated in our hospital in Department of Surgery of AVBRH Sawangi (Meghe), Wardha All the cases were studied prospectively and statistical data was obtained.

Table No 3: Weight of the Patients

| Weight in kgs | No. of cases      | Percentage |
|---------------|-------------------|------------|
| 20-30         | 00                | 00         |
| 31-40         | 00                | 00         |
| 41-50         | 18                | 45         |
| 51-60         | 09                | 22.5       |
| 61-70         | 05                | 12.5       |
| Above 70      | 08                | 20         |
| Total         | 40                | 100        |
| Mean $\pm$ SD | 55.82 $\pm$ 11.48 |            |
| Range         | 42-78             |            |

Table No 4: Diet

| Type of diet | No. of patients | Percentage |
|--------------|-----------------|------------|
| Vegetarian   | 28              | 70         |
| Mixed        | 12              | 30         |
| Total        | 40              | 100        |

Table No.5: Parity

| Parity      | Number | Percentage |
|-------------|--------|------------|
| Nulliparous | 0      | 00         |
| 1 issue     | 0      | 00         |
| 2 issue     | 12     | 46         |
| 3 issue     | 06     | 23         |
| 4 or more   | 08     | 31         |
| Total       | 26     | 100        |

Table No. 6: Use of Oral contraceptives

|                       |    |      |
|-----------------------|----|------|
| Female taking OCP     | 09 | 34.7 |
| Female not taking OCP | 17 | 65.3 |
| Total                 | 26 | 100  |

Table No. 7: Presentation of symptoms and sign

| Symptoms        | Number | Percentage |
|-----------------|--------|------------|
| Pain in abdomen | 40     | 100        |
| Dyspepsia       | 27     | 67.5       |
| Nausea          | 14     | 35         |
| Vomiting        | 10     | 25         |
| Fever           | 10     | 25         |
| Jaundice        | 08     | 20         |

Table No. 8: Site of pain in abdomen

| Sr. No | Site of pain                | No. of cases | Percentage |
|--------|-----------------------------|--------------|------------|
| 1      | Rt. Hy pochondri um         | 23           | 57.5       |
| 2      | Rt.hypocondrium+epigastrium | 10           | 25         |
| 3      | Epigastrium                 | 05           | 12.5       |
| 5      | Generalised                 | 02           | 5          |
| 4      | Upper abdomen               | 00           | 00         |
|        | Total                       | 40           | 100        |

Table No 9. No represents the patients showing raised value of respective investigations.

| Liver function test | Patients of cholelithiasis | Patients of CBD stone | Patients of biliary pancreatitis |
|---------------------|----------------------------|-----------------------|----------------------------------|
| Serum bilirubin     | 0(0%)                      | 8(20%)                | 0(0%)                            |
| Se. alkaline phosp  | 0(0%)                      | 6(15%)                | 0(0%)                            |
| SGOT                | 0(0%)                      | 6(15%)                | 2(5%)                            |
| SGPT                | 0(0%)                      | 6(15%)                | 2(5%)                            |

**Table No. 10: Sensitivity to extrahepatic biliary lithiasis**

| Investigation | No. of Patients | Sensitivity |
|---------------|-----------------|-------------|
| USG           | 40              | 100%        |
| CT Scan       | 10              | 100%        |

**Table No. 11: Treatment modalities**

| Type of treatment    | No. of cases | Percentage |
|----------------------|--------------|------------|
| Conservative         | 08           | 20         |
| Open surgery         | 08           | 20         |
| Open CBD Exploration | 03           | 7.5        |
| Laparoscopic surgery | 15           | 37.5       |
| ERCP                 | 06           | 15         |
| Total                | 40           | 100        |

**Table No. 12: Type of Surgery**

| Type of surgery                        | No. of patients | Percentage |
|----------------------------------------|-----------------|------------|
| Open cholecystectomy                   | 08              | 20         |
| Laparoscopic cholecystectomy           | 15              | 37.5       |
| Open cholecystectomy + CBD exploration | 03              | 7.5        |

## DISCUSSION

A prospective randomized study of extrahepatic biliary lithiasis which included the cases of gall bladder stones, CBD stones and gallstone pancreatitis was carried out on 40 patients.

### Predisposing factors

**1) Sex distribution:** In our study females were more commonly affected with gallstones (65%) than male (35%) with male: female ratio of 1:1.8.<sup>[1,2]</sup>

This study correlates with study of M. vetrhus et al where ratio is 1:4.2 and Anamika G et al where ratio is 1:15.1.<sup>[3]</sup>

There are geographic and ethnic differences in the prevalence of gallstones, with high values in Europe and North America and low values in Asia. In all populations, gallstones are approximately two times more common in woman than in men.

CBD stones predominance is seen in male according to study by Saravith V et al where male female ratio is 1.3:1.

In our study CBD stones were having equal sex ratio where out of 8 patients 4 were male and 4 were female where male and female ratio is 1:1.

Biliary pancreatitis was seen in 2 patients out of which 1 was male and 1 was female.

**2) Age distribution:** Our present study shows higher incidence of gall bladder stones in age group of 41-60 years (50%) which correlates with other studies. In our study patients of CBD stones were found maximum in age group of 50-60 years.

Jayanthi V et al have shown increase in prevalence of gallstones with age because of decrease in activity of cholesterol a reductase and increase in activity of HMG CO A reductase resulting in increase cholesterol secretion and saturation of bile.<sup>[6]</sup>

Saravith V et al also shows prevalence of CBD stone in age group more than 55 years.<sup>[3]</sup>

**3) Diet and Obesity:** In our study most of the patients were residing in rural areas and majority are living in poor conditions. In our study 28 cases took vegetarian diet, whereas mixed diet was consumed by only 12 cases.

In our study all the patient consuming mixed as well as vegetarian diet were diagnosed for having cholelithiasis. CBD stone and biliary pancreatitis were found to be secondary to cholelithiasis in our study, hence correlation with diet could not be made.

In our study 8 patients BMI were above normal (20%).

Obesity is associated with an increased risk of gallstones.<sup>[7,8]</sup> Weight loss may reduce the risk of gallstone formation in overweight individuals, but excessively rapid weight loss (i.e., more than three pounds per week) may promote the development of gallstones or increase the risk that silent gallstones will become symptomatic. The increased risk associated with rapid weight loss may be due to an increase in the ratio of cholesterol to bile salts in the gallbladder and to bile stasis resulting from a decrease in gallbladder contractions.<sup>[7,8]</sup>

**4) Parity:** In our study all 26 female patients were multipara which correlate to many studies which shows increased risk for gallstone formation.

Early child bearing and frequent pregnancies may result in increased exposure of Gall Bladder to progesterone for which receptors are present on Gall Bladder wall which was documented by Henriksson et al in. Calabrese C, et al reported less than 5% of cholecystectomies performed are in the patients less than 20yrs of age.

**5) Use of oral contraceptive:** In our present study 8 patients (20%) gives history of consumption of OCPs. All patients with OCP were having cholelithiasis.

Bennion et al in 1976 in his study states that bile becomes more lithogenic when women are placed on OCPs containing oestrogen.<sup>[61]</sup>

Large doses of estrogen have been shown to change Bile flow and composition. These changes are responsible for increased incidence of Gall stones in premenopausal women on oral contraceptives.

One of the Indian study by Anamika G et al shows higher incidence of gallstone formation with consumption of OCPs.<sup>[1]</sup> hence our observation also correleates with other studies where there is increase risk of gallstone formation by consumption of oral contraceptives.

#### 6) Genetic and associated diseases

In our study no patient have given any significant family history whereas all the cases of CBD stones and gallstone pancreatitis were secondary to gallstones.<sup>[10]</sup>

In mice, the Lith1 and Lith2 genes have been associated with gallstone formation. However, no human genes have been identified to date that are definitively linked to gallstones. Polymorphisms in the apolipoprotein E gene have been associated with gallstones in some populations, but this relationship is controversial.<sup>[10,11]</sup> Studies have shown genetic risk and have implicated genes, with a clear link to physicochemical changes in cholesterol and phospholipids. Analysis of mono - and dizygotic twins suggests that genetic factors account for 25% of the difference in the prevalence of gallstones. In an American family study, around 29% of the chance of having symptomatic gallstones was inherited.<sup>[11]</sup>

#### Liver function test

In our recent study we found that out of 40 patients 30 patients presented with gall bladder stones where liver function test was found to be in normal range. Raised bilirubin levels were found in 8 patients who were diagnosed with CBD stones secondary to cholelithiasis out of 8 patients of CBD stones 6 patients SGOT, SGPT and Alk phos was found to be raised. Serum bilirubin was not raised in 2 patients of biliary pancreatitis. Our present study shows in 2 cases of gallstone pancreatitis total bilirubin was not raised whereas SGOT, SGPT were borderline raised and ser. Alk Phos was in normal limit.

According to study by Cynthia W.K et al<sup>[10]</sup> Patients who have cholangitis or pancreatitis associated with abnormal serum liver function tests are at increased risk of having bile duct stones.

In a study done by Attali P, et al<sup>[16]</sup> elevations of serum alkaline phosphatase and gamma-glutamyl transpeptidase levels were detected in more than 90% of symptomatic CBD stones patients. The intensity of pain, degree of jaundice and<sup>[16]</sup> OQ serum levels of these tests can fluctuate over time. The serum bilirubin level typically is less than 15 mg/dL, because most bile duct stones cause intermittent and incomplete biliary obstruction. Rarely, the serum transaminase levels can be elevated profoundly (up to 2000 IU/L), mimicking acute viral hepatitis.

But Nathwani RA et al<sup>[14,17]</sup>, states that with biliary stones serum transaminase levels tend to decline rapidly over several days rather than slowly over several weeks, as occurs with viral syndromes. This pattern of liver function tests may be helpful diagnostically.

Our study coincides with other studies which shows that raised bilirubin level secondary to cholelithiasis suggest of CBD stones.<sup>[2,13,14,17]</sup> In our study in 2 cases of gallstone pancreatitis total bilirubin was borderline raised whereas SGOT, SGPT and ser. Alk Phos was in normal limit.

**Ultrasonography:** In our present study we found transabdominal ultrasonography showed 100% sensitivity for diagnosis of Extrahepatic biliary lithiasis. 8 patients were diagnosed cholelithiasis with CBD stones. In 2 patients transabdominal sonography showed cholelithiasis with acute pancreatitis.

Transabdominal ultrasonography (TUS) is the first choice examination used for the etiological diagnosis of extrahepatic cholestasis because it is a noninvasive, fast method and presently widely accessible<sup>[18]</sup> It is a non invasive, safe, and a widely available, low- cost procedure with more than 95% sensitivity and specificity for the detection of<sup>[98]</sup> gallbladder stones (>1-5 mm diameter in size).

In biliary pancreatitis TUS has a limited role because of examination difficulties caused by dynamic ileus or obesity. The method is efficient in tracking down the trigger causes such gallbladder lithiasis with migrated stones.<sup>[18,20]</sup>

**Computed tomography:** In our study CT scan was performed on the patients who were diagnosed of having CBD stone or dilatation of CBD and suspected gallstone pancreatitis. We found that CT scan was having 100% sensitivity in diagnosing CBD stones and biliary pancreatitis. According to Piero P et al CT scan should be used if biliary<sup>[19]</sup> pancreatitis or common bile duct stone obstruction are suspected. Conventional CT scan

has been reported to be around 70% sensitive in showing duct stones.<sup>[12]</sup> An early<sup>[14]</sup> CT scan is recommended to evaluate for biliary dilation.

#### **Endoscopic retrograde cholangiopancreatography**

Out of 8 patients of CBD stones 6 patients in our study underwent ERCP for therapeutic purpose. Endoscopic retrograde cholangiopancreatography (ERCP) has both diagnostic and therapeutic value for visualisation and extraction of the impacted stones.<sup>[19,21]</sup> The accuracy of MRCP is similar to ERCP. However, MRCP is not available in all medical centres and does not provide the therapeutic option of ERCP for the endoscopical extraction of stones.<sup>[19]</sup> MRCP might play a role in the preoperative screening of patients undergoing laparoscopic cholecystectomy for gallstones, in whom choledocholithiasis is suspected. In this situation some surgeons prefer laparoscopic cholecystectomy and ERCP.<sup>[19,22]</sup>

**Treatment:** In our present study out of 40 patients 6 patients underwent conservative management for acute cholecystitis (15%) and 2 patients underwent conservative treatment for biliary pancreatitis (5%) 8 patients underwent open cholecystectomy (20%) and 15 patients undergone laparoscopic cholecystectomy (15%). Open CBD exploration was done in 3 patients (7.5%). ERCP was done in 6 patients of CBD stones (15%).

**Conservative treatment:** The immediate management of Acute calculus cholecystitis (ACC) includes having the patient fast; fluid and electrolyte resuscitation; and parental (narcotic) analgesia. According to study by Kadakia S et al if the patient is vomiting, or if there is evidence of an ileus or gastric distention, nasogastric tube placement is appropriate.<sup>[15,22]</sup> Diclofenac has been reported to reduce the rate of progression to ACC in patients with symptomatic gallstones; however, it is not used on wide purpose. Indar A et al states that intravenous antibiotics are usually commenced empirically when there are systemic signs (eg, high fever, tachycardia and hypotension) or if there has been no improvement over 12 hours with conservative management.<sup>[15,24]</sup> The favorable results of antibiotic treatment that reduces septic complications seems to depend more on adequate serum rather than tissue concentrations.<sup>[15,25]</sup> The choice of antibiotic varies with patterns of bacterial resistance. Single-agent therapy with an extended spectrum cephalosporin provides safe, appropriate coverage in most cases; however, in severe or high-risk cases, anaerobe cover is required (ie, by adding a nitroimidazole).<sup>[15,26,27]</sup> It must be emphasized that the optimal therapy in ACC is surgery, not antibiotic therapy.<sup>[15,27]</sup>

**Open cholecystectomy:** In our study 8 patients underwent open cholecystectomy (OC). All the patients underwent elective cholecystectomy under 72 hrs. Open cholecystectomy was performed by Kocher's incision in all the patients. Intraoperative CBD was examined for

CBD stones. Post-operative drain was kept and was removed after 48 hrs. Injectable antibiotics were given for 5 days in open cholecystectomy. In our study no complication was noted postoperatively and also the procedure was cost effective.

Traditional management of acute cholecystitis is initial conservative management with antibiotics, followed by elective cholecystectomy.<sup>[4]</sup> The technical aspects of performing an OC have not changed significantly since Langenbuch's description of this procedure more than 100 years ago. In a study by Asif S et al early cholecystectomy within 72 hrs with upper right transverse incision and muscle retraction in acute cholecystitis is a safe cost effective procedure with shorter operating time, fewer complications.<sup>[4]</sup> Same has been stated by Domingo S et al in their study. Ian F Y et al in his study shows approximately 20% of patients with ACC require emergency surgery because of clinical deterioration or other features of<sup>[15,24]</sup> complicated disease, such as peritonitis or perforation.

In our study 15 patients underwent laparoscopic cholecystectomy (LC) all the patients underwent elective cholecystectomy under 72 hrs. Post-operative drain was kept and was removed after 24 hrs. 3 doses of injectable antibiotics were given in laparoscopic cholecystectomy in our study. In our study no complication was noted postoperatively but the procedure was costlier than open cholecystectomy. Today laparoscopic cholecystectomy is considered as gold standard for cholelithiasis.

In our study we found CBD stones in 8 patients preoperatively. 3 patients underwent cholecystectomy with CBD exploration out of which in 2 patients CBD stones were removed and one patient was diagnosed of having Mirizzi's syndrome intraoperatively. Drain was kept in all 3 patients. Prolong biliary leak in one patient as complication was noted postoperatively which resolved by itself.

#### **Endoscopic Retrograde cholangiopancreatography**

**(ERCP):** In our study out of 8 patients of CBD stones 6 patients underwent ERCP sphincterotomy. Patients were followed up after the procedure and they showed significant decrease in their signs and symptoms. Total bilirubin value was also reduced. There was no complication noted in our study after ERCP. 2 patients who were diagnosed of gallstone pancreatitis in our study were given conservative treatment for their symptoms and were advised for definitive treatment, but they do not come for followup later.

#### **CONCLUSION**

A total of 40 patients of Extrahepatic biliary lithiasis were included in our study. Out of 40 cases 30 (75%) patients were of cholelithiasis, 8 (20%) patients were of CBD stones and 2 (5%) patients were of gallstone pancreatitis. In our study females were more commonly affected than male patients in Cholelithiasis.

Laparoscopic cholecystectomy was found to be costlier as compared to open cholecystectomy. Thus our study shows that Extrahepatic Biliary Lithiasis can be managed by both open as well as laparoscopic and endoscopic procedures effectively.

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