



A CLINICAL STUDY ON CHEMICAL ANALYSIS OF GALLS STONES AND SURGICAL MODALITIES

General Surgery

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ABSTRACT

BACKGROUND: There has been a marked increase in the incidence of the gall stone in India due to westernization and availability of investigations. The patho physiological interest lies in the composition of gall stones. Analysis of chemical composition of gallstones can provide a significant reference to the treatment and prevention of their reoccurrence.

AIM AND OBJECTIVES OF THE STUDY: To study the chemical composition of gall stones, their presentations and various surgical modalities for cholelithiasis in AVMC&H, Pondicherry.

MATERIALS AND METHODS: Around 50 consecutive patients, diagnosed as a case of cholelithiasis, which were all examined, investigated and operated, were enrolled in the study during the period of 2 years. Those patients who were managed conservatively were excluded from the study. After detailed history taking and routine investigations patient were planned for emergency or elective operative procedures. Based on operative criteria either open or laparoscopic cholecystectomy was done. Gall stones retrieved was studied for its composition such as cholesterol, bilirubin, inorganic phosphate and calcium by various biochemical analyses. Type of stone and their correlation were analyzed by statistically.

RESULTS: The highest age incidence of cholelithiasis was in the 5th and 6th decade with maximum incidence in the 5th decade. There was an increased incidence in female. Pain was the most common symptom (present in 98% of the patients), nausea and vomiting were the second most common symptom presenting in 56% of patients, dyspepsia was present in 24% of patients, jaundice in 14% of the patients, 8% of patients had fever. Tenderness in the right hypochondrium was the most common sign present in 96%, guarding was the next sign present in 30% of the patients and mass abdomen in 8% of the patients. 48% of patients undergone laparoscopy cholecystectomy, 52% of patients undergone open cholecystectomy. Lap to open conversion rate was 4% in our study. Gallstones analysis showed mixed stone in 90% of the cases and cholesterol stones in 8% of the cases as the most common variety.

CONCLUSION: The gall stones were common in females and the most common presentation was pain over upper quadrants of abdomen. Commonly employed surgery for cholelithiasis was open cholecystectomy and most commonly mixed type of gall stones was retrieved.

KEYWORDS

INTRODUCTION

There has been a marked increase in the incidence of the gall stone in the west during the past century.¹ Autopsy series in the United states have shown gall stones in at least 20% of women and men at least 8% over the age of 40 years.² Gall stones affect 10 to 20% of adult population and about 1 million new patients annually are found to have gallstones of which approximately 600,000 undergo cholecystectomy.³ Incidence of gall stones are increasing in India due to westernization and availability of investigations such as ultrasound to urban as well as rural area.

Diagnosis of gall stone is by proper history and physical examination and combining it with appropriate investigation which varies from surgeon to surgeon and hospital to hospital and country to country.

Two third of patients are asymptomatic and one third of patient will at some time experience symptoms like 'biliary colic',⁴ pain in the upper abdomen especially in right hypochondriac region, back between the shoulder blades and right shoulder followed by nausea and vomiting.

Analysis of chemical composition of gallstones can provide a significant reference to the treatment and prevention of their reoccurrence. Major elements involved in the formation of human gallstones are cholesterol, bile pigment and calcium. Other substances found in gallstones include calcium salts of phosphate, mucin, glycoprotein, phospholipids and some metals.⁵

Increased pathophysiological interest in the formation of gallstones made the knowledge of their exact chemical composition very important especially of cholesterol gallstones, the only stone which can be treated with cholelitholytic agents.⁶ This clinical study is aimed at analyzing the chemical composition of the gall stones, their

presentation and corresponding treatment modalities.

AIMS AND OBJECTIVES

To analyze the chemical composition of the gall stones, their modes of presentation and various surgical modalities for cholelithiasis in a tertiary care hospital.

MATERIALS AND METHODS

Around 50 consecutive patients, diagnosed as a case of cholelithiasis, which were all examined, investigated and operated, were enrolled in the study during the period of 2 years. Those patients who were managed conservatively were excluded from the study. After detailed history taking and routine investigations patient were planned for emergency or elective operative procedures. Based on operative criteria either open or laparoscopic cholecystectomy was done. The gallstones retrieved were sent for chemical analysis and the gallbladder for histopathological examination.

Gallstones from 50 patients of cholelithiasis were collected after cholecystectomy. The stones were powdered in a pestle and mortar. To determine the total cholesterol and bilirubin, 30 mg of stone powder was dissolved in 3 ml chloroform in a test tube. The tube was kept in boiling water bath for 2 minutes. The stone solution thus obtained was used for determination of cholesterol and bilirubin. The stone solution was stored at 2-8 °C when not in use. To determine phosphate, calcium and iron, 30 mg stone powder was dissolved in 3 ml of 1N HCl in a graduated 10 ml tube and its final volume was made 10 ml with distilled water. The tube was kept in boiling water bath for one hour. The solution thus obtained was stored at 2-8 °C. All kits used in this study were manufactured by Biolabo 02160, Maizy, France.

The total cholesterol and bilirubin were determined by enzyme assay

using kit version AT-80106 and AT-80403 respectively. Determination of inorganic phosphate was done spectrophotometrically (without deproteinisation) and absorbance was measured at 340 nm. Iron was also determined spectrophotometrically, with absorbance at 600 nm using kit version AT-92108. All patients received antibiotics and routine post-operative care. The gall stones were studied for their composition and various other parameters were statistically analyzed.

RESULTS

DISTRIBUTION OF AGE

There was increased incidence of cholelithiasis in the 5th and 6th decade with the peak in the 5th decade. In our study the youngest patient was 15 years old and the oldest patient was 72 years old.

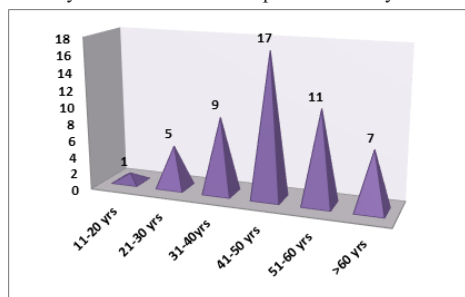


Figure 1: Distribution Of Age

DISTRIBUTION OF SEX

In our study 30 patients were female and 20 patients were male. The present study shows gallstones disease as a common problem in female population. The female to male ratio was 3:2.

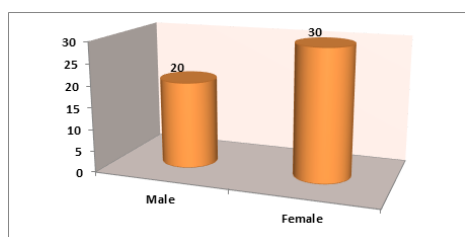


Figure 2: Distribution Of Sex

PRESENTING SYMPTOMS

In our study pain was the commonest symptom presenting in 49 patients, 28 patients had nausea and vomiting, 7 patients had jaundice, dyspepsia was present in 12 patients and fever was present in 6 patients.

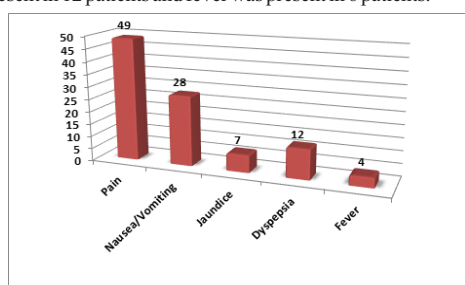


Figure 3: Distribution Of Symptoms

PRESENTING SIGNS

In our study 48 patients had tenderness in the right hypochondrium and pain was the predominate sign, 15 patients had guarding and 4 patients had mass in the right hypochondrium.

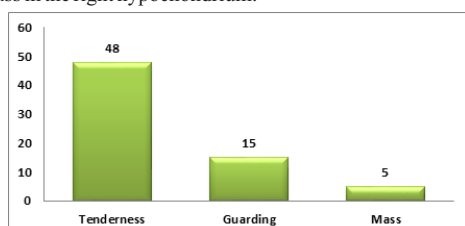


Figure 4: Distribution Of Signs

INVESTIGATIONS

All the patients underwent routine hematological & biochemical investigations. The hemoglobin of patients ranged from 5 to 15 gm %. Serum bilirubin was raised in 7 patients, there bilirubin levels ranged from 1.8 to 5 mg %

TYPE OF OPERATION

In our study 26 patients undergone laparoscopic cholecystectomy and 24 patients had undergone open cholecystectomy.

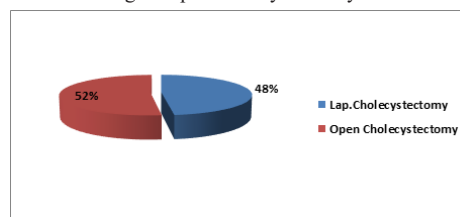


Figure 5: Distribution Of Type Of Surgery

TYPES OF STONES

In our study gallstones analysis was done in all patients. 45 patients had mixed type of stone, 4 patients had cholesterol stone and 1 patient had pigment stone.

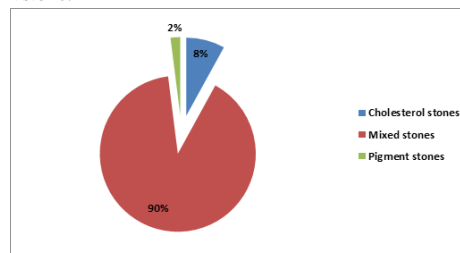


Figure 6: Distribution Of Type Of Gall Stone

DISCUSSION

In this study 50 cases of Cholelithiasis that were admitted in Aarupadai Veedu Medical College & Hospital for 2 years were studied.

DISTRIBUTION OF AGE

In our study, cases fall between 15 – 72 Yrs. There is a increased incidence in the 5th & 6th decade with the maximum incidence in the 5th decade. Similar incidence is seen in the studies of Herman et al⁷ and Hanif et al⁸. In western studies the peak incidence is in the 5th & 6th decades. The rise in the peak age of incidence is due to change in the dietary factor. Similar findings are noted in the studies of Ganey et al.⁹

Table-1: Literature Matrix For Age Distribution

Age in years	No. of cases	Percentage	Herman et al ⁷	Percentage	Hanif et al ⁸	Percentage
11-20	1	2%	25	1.60%	0	0
21-30	5	10%	92	5.90%	4	3.33
31-40	9	18%	226	14.60%	36	30
41-50	17	34%	325	21%	30	25
51-60	11	22%	473	30.60%	29	24.16
>60	7	14%	352	23.57%	21	17.5

SEX DISTRIBUTION

In our study 30 out of 50 cases were female while the rest 20 were male. Battacharya¹² series showed 71.4% were female, 28.6% were male. Similar sex preponderance in the favour of females were noted by A.P.Tamhankar¹⁰ Ganey et al.⁹ Major Alok Sharma et al¹¹, series showed that 70% were male & 30% were female.

Table 2: Literature Matrix For Sex Distribution

Sex	No of cases	Percentage	Battacharya et al ¹²	Percentage	Aloksharma et al ¹¹	Percentage
Male	20	40	26	28.6	41	70
Female	30	60	65	71.4	17	30

PRESENTING SYMPTOMS

Pain was the predominant symptoms in the present study with 98%. The commonest site of pain was in the Rt. Hypochondrium, & the next commonest site was Epigastria. Similar presentations were noted in

the series of Alok Sharma¹¹, Ganey *et al*⁹, Goswitz *et al*¹² 56%(28 patients) of cases in the present series had nausea/ vomiting. Vomiting was spontaneous, occurred mostly during the attack of pain. Vomiting in this study was similar to Ganey *et al*⁹. In the present study 7 patient had jaundice. The cause of the jaundice was stone the common bile duct. 24 %(12 patients) of patient had dyspepsia. The Endoscopic examination in these patients did not reveal any pathology. The incidence of dyspepsia in present series was similar to studies of Ganey *et al*⁹ and Alok Sharma *et al*¹¹. Fever was present in 4 cases in the present study. Fever was secondary to cholangitis due to Biliary obstruction.

Table 3: Literature Matrix For Presenting Symptoms

Symptoms	No of cases	Percentage	Alok sharma et al ¹¹	Percentage	Ganey et al ⁹	Percentage
pain	49	98	58	100	987	95
Nausea/ Vomiting	28	56	48	82.8	576	55.6
Jaundice	7	14	03	5.17	101	10
dyspepsia	12	12	05	8.62	222	21
Fever	4	4	0	0	92	9

TYPE OF OPERATION

In our study 26 patients underwent open cholecystectomy & 24 patients underwent Laproscopic cholecystectomy. The conversion rate from lap to open cholecystectomy was 4%. which was similar to studies of Trosden *et al* (4.3%).¹⁴

GALLSTONE ANALYSIS

In our study 90 % had mixed stones & 8 % had cholesterol stone, 2% had pigment stones similar to the studies of S.N. Mathur *et al*¹⁵.

Table 4: Literature Matrix For Gall Stone Analysis

Type of stone	No of cases	Percentage	Mathur et al ¹⁵	Percentage
Cholesterol stone	4	8	3	12
Mixed stones	45	90	21	84
Pigment stones	1	2	1	4

CONCLUSION

1. The highest age incidence of cholelithiasis was in the 5th and 6th decade with maximum incidence in the 5th decade. There was an increased incidence in female.
2. Pain was the most common symptom(present in 98% of the patients), nausea and vomiting were the second most common symptom presenting in 56% of patients, dyspepsia was present in 24% of patients, jaundice in 14% of the patients, 8% of patients had fever.
3. Tenderness in the right hypochondrium was the most common sign present in 96%, guarding was the next sign present in 30% of the patients and mass abdomen in 8% of the patients.
4. 48% of patients undergone laparoscopy cholecystectomy, 52% of patients undergone open cholecystectomy. Lap to open conversion rate was 4% in our study.
5. Gallstones analysis showed mixed stone in 90% of the cases and cholesterol stones in 8% of the cases as the most common variety.

LIMITATIONS

A single center study with small sample size is indeed the limitation of the study. Larger study with multicentric analysis would have earned better and concrete results.

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