

## A CLINICAL STUDY OF GALL STONE DISEASE

K. Lokesh<sup>1</sup>, Srideep Siddavaram<sup>2</sup>

<sup>1</sup>Assistant Professor, Department of General Surgery, Narayana Medical College, Nellore.

<sup>2</sup>Junior Resident, Department of General Surgery, Narayana Medical College, Nellore.

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### ABSTRACT

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#### BACKGROUND

Gallbladder disorders rank among the most common and costly of all digestive system diseases. This disease is more common in Western world. Prevalence rates vary from 15– 25% in developed countries. In India, it varies from 5 – 10%. Incidence of cholelithiasis is increasing considerably in India, possibly due to change in the dietary habits, which is becoming westernized and changing life style. Northern India show 7 times more incidence than that in southern parts. Because of the extensive studies on aetiology of gallstones, better understanding of the pathogenesis in the past two decades, the management has become more appropriate and effective. The operations on biliary tree and gall bladder rank next only to hernia repair and appendectomy. Minimally invasive surgery improves patient's compliance and reduces morbidity rates.

The objectives of this study were-

1. To study age and sex distribution, various types of clinical presentations in patients with gall stone disease,
2. To study the bacteriology of the bile collected from all cholecystectomy cases and
3. To determine the composition of gallstones removed from patients.

#### MATERIALS AND METHODS

**Study Type-** Prospective observational study, **Study Setting-** Department of General surgery, Narayana medical college and Hospital. **Study Period-** Study is done from November 2014 to October 2016. Study sample: 100 cases of clearly documented gall stones on USG abdomen. **Inclusion Criteria-** Patient aged > 11 years and <70 years, All patients of gallstone disease who got admitted to the hospital and who underwent cholecystectomy either open or laparoscopic procedures. **Exclusion Criteria-** Acalculous cholecystitis, Primary CBD stones. **Method of Study-** A detailed history of demographic data, clinical presentation, complications if any, and previous treatment are recorded in a proforma. Thorough clinical examination was done in them and was subjected to investigations. Relevant preoperative investigations like blood routine, Urine, Plain X-ray abdomen and USG were done in all cases. All cases underwent open or laparoscopic cholecystectomy under epidural or general anaesthesia. Intra operative findings, operative time is noted. Bile and gallstones are collected from removed gall bladder and was sent for culture and morphological analysis respectively. Specimen is subjected to histopathological examination.

#### RESULTS

In this series, age varies from 11 to 70 years. 3 patients (3%) were in the age group 11 - 20 years, 11 patients (11%) were in the 21- 30 age group, 26(26%) were between 31 – 40 years, 26 (26%) were in the age group between 41 - 50 years, 23 (23%) were in the age group 51 - 60 of age group and 11 (11%) were between 61 – 70 years. In the study, maximum number of cases is seen in 4<sup>th</sup> and 5<sup>th</sup> decade of life amounting for more than 50% of cases.

#### CONCLUSION

From our study, we concluded that symptomatic gallstone diseases were more common in 5th and 6th decade of life with a female predominance. Common presentation in symptomatic gallbladder is pain abdomen. Ultrasound was effective in diagnosing gallstones in all the patients in our series. Proper case selection decreases the conversion rate from lap to open surgery. In the present series majority of the cases showed positive bile culture, of which E. coli was the most common organism isolated. Multiple, mixed stones were the most common type of stone identified. All gallbladders removed for gallstone disease should be subjected for histopathology; to exclude gallbladder malignancy as significant pathology may be present with normal gross morphology.

#### KEYWORDS

Gall bladder, Cholelithiasis, Choledocholithiasis, Cholecystectomy.

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#### BACKGROUND

Among the many distinguished names in Hindu medicine that of Sushruta, the Father of Indian surgery stands out in prominence, he compiled the surgical knowledge of his time in his classic Susruta Samhitha. It is believed that this classic was compiled between 800 B.C and 400 A.D. He described

a Jaundice called "Pitta Ashmarjanya" meaning "Jaundice could be caused by stone in bile".<sup>1</sup>

Gallbladder disorders rank among the most common and costly of all digestive system diseases.<sup>2</sup> The disease is more common in Western world. Prevalence rates vary from 15 – 25 % in developed countries.<sup>3</sup> In India it varies from 5 – 10%. Incidence of cholelithiasis is increasing considerably in

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*Corresponding Author:*

*Dr. K. Lokesh,*

*S/o. K. Deepaiah, 20-1-471/53, Maruthi Nagar,*

*Korlagunta, Tirupathi.*

*E-mail: drlokesh04@gmail.com*

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India, possibly due to change in the dietary habits, which is becoming westernized and changing life style. Northern India show 7 times more incidence than that in southern parts.<sup>4</sup>

Prevalence of cholelithiasis is increasing because of improved detection methods in imaging modalities particularly ultra-sonogram. The best epidemiological screening method to accurately determine point prevalence of gallstone disease is ultrasonography. Prevalence of gallstones increases with age, without other risk factors and they are rare before puberty. The average age of female population with gallstone disease in India is 43 years which is decade younger than that in west. The peak incidence of male and female patients in north India has been reported to be 47.8 and 43.7 years compared to 50.6 and 45.6 years respectively from south India.<sup>5</sup>

In India three fourth patients with gallstones are women, The M: F ratio in north India is 1:2.7- 3.3 as compared to 1:1.2 in south Indian studies. The high frequency of gallstones in females suggests that female sex hormones increase the risk of gallstone formation. Both endogenous and exogenous oestrogens reduce bile flow and adversely affect bile lipid composition.<sup>5</sup>

Most gallstones are asymptomatic and remain so through lifetime of the patient. Among them only 15% to 20% become symptomatic. Most common initial symptom is biliary colic. The natural history of asymptomatic gallstone is quite benign, whereas that of symptomatic takes an aggressive course. These aspects are crucial in many clinical decisions regarding treatment with gallstones.<sup>6</sup>

Aetiopathogenesis of gallstones is multifactorial with interaction of genetic and environmental factors.<sup>7,8</sup> Primarily gallstones can be divide into two major groups cholesterol gallstones (10%) and pigmented gallstones (90%).<sup>9</sup>

Infection seems to be a major cause of gallstones formation. Electron microscopic (SEM) studies have suggested that bacteria play a significant structural and functional role in the formation of pigment and cholesterol gallstones.<sup>10,11,12</sup> Bacteria inside the gallstones have long been thought to be dead as is explicit in the well-known aphorism of Lord Moynihan "Tomb stone erected to the memory of organisms which lie dead with in them".<sup>13</sup> Even calculi spilled at laparoscopic cholecystectomy cause a variety of complications. Evidence in favour of infections include isolates recovery of *E. coli*, *Klebsiella*, *Bacterium typhosum*, *streptococcus*, slow growing *actinomyces* from the bile.<sup>14</sup>

Because of the extensive studies on aetiology of gallstones, better understanding of the pathogenesis in the

past two decades, the management has become more appropriate and effective. The operations on biliary tree and gall bladder rank next only to hernia repair and appendicectomy. Minimally invasive surgery improves patient's compliance and reduces morbidity rates.

### Objectives of the Study

1. To study age and sex distribution, various types of clinical presentations in patients with gall stone disease.
2. To study the bacteriology of the bile collected from all cholecystectomy cases.
3. To determine the composition of gallstones removed from patients.

### MATERIALS AND METHODS

This is a prospective observational study done on clearly documented cases of symptomatic Gallstones, confirmed by USG.

Study Setting- Department of General surgery, Narayana medical college and Hospital.

Study Period- Study is done from November 2014 to October 2016.

Type of Study- This is a prospective, observational study.

### Inclusion Criteria

- Patient aged >11 years and <70 years.
- All patients of gallstone disease who got admitted to the hospital and who underwent cholecystectomy either open or laparoscopic procedures.

### Exclusion Criteria

- Acalculous cholecystitis.
- Primary CBD stones.

**Method of Study-** Clearly documented cases of symptomatic Gallstones, confirmed by USG are included in the study.

Patients who came to emergency or outpatient department of general surgery with complaints of gallstone disease were admitted to wards and detailed history of all the 100 cases were taken according to the proforma approved by the guide. Information regarding the age, religion, socio- economic status, nature of the symptoms, duration of the symptoms, past history of similar complaints, diet history, history of oral contraceptive pills. Alcohol ingestion, diabetes was obtained. All patients undergone detailed examination, all patients had haemogram, electro cardiogram, liver function test, blood sugar, blood urea, serum creatinine, urine analysis, blood group, chest X-ray, ultrasound scan of the abdomen. Relevant investigations and after preoperative checkup, risk and complications of the condition as well as surgery has been explained to the patients, consent was taken.

Preoperative antibiotics were given. All cases underwent open or laparoscopic cholecystectomy under epidural or general anaesthesia. Intra operative findings, operative time are noted after opening the abdomen, the pathological features and anatomical variations were noted, bile obtained from the gallbladder with a syringe and sent for culture

sensitivity. The patients who had CBD stones confirmed by USG exploration of CBD was done and stones were extracted. Some of the patients undergone Open cholecystectomy and some of the patients undergone Lap cholecystectomy because of the reasons like previous operation, obese patient and affordability. A sub hepatic tube drain was used in patients who underwent open cholecystectomy and connected to Urosac bag. The abdominal wound was closed in layers.

The gallstones were sent for morphological analysis and the gallbladder for histopathological examination. All patients received antibiotics and routine postoperative care. Patient was properly examined in the postoperative period to note the development of any complications like fever, biliary leakage, biliary peritonitis, wound infection and retained stones. Suitable treatment given according to the need. Antibiotics were given and subsequently changed according to the bile culture and sensitivity report.

On an average, patients who had undergone Lap cholecystectomy were discharged on the 3rd day and Open cholecystectomy were discharged on the 7<sup>th</sup> day, unless there were any complications. Patients were advised regarding diet, rest and to visit the surgical outpatient department for regular follow up.

In the follow up period, attention was given to subject for improvement of the patients with regard to symptoms as well as examination of the operative scar.

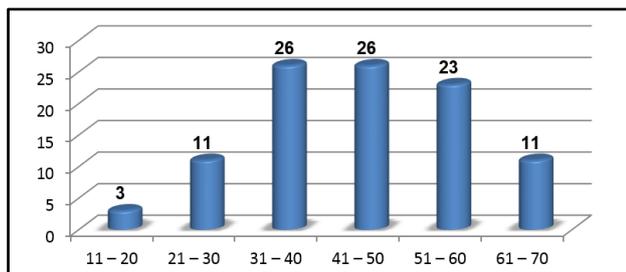
**Statistical Software methods-** Percentages and mean were calculated. Statistical software mainly SPSS 11.0 and Systat 8.00 was used for the analysis of the data and Microsoft word and excel have been used to generate graphs and tables etc.

**RESULTS**

Total number of cases considered in this study was 100, admitted in the Department of General surgery, Narayana Medical College and Hospital, Nellore. The results of the study are discussed as following.

Age in Years	No. of Cases	Percentage
11 – 20	3	3
21 – 30	11	11
31 – 40	26	26
41 – 50	26	26
51 – 60	23	23
61 – 70	11	11
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 1. Age Distribution**



**Graph 1. Age Distribution**

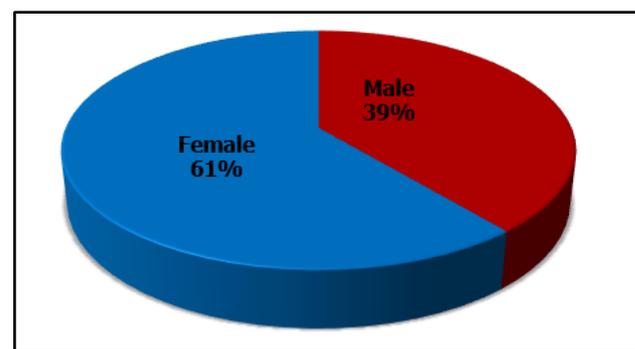
In this series, age varies from 11 to 70 years. 3 patients (3%) were in the age group 11 - 20 years, 11 patients (11%) were in the 21 - 30 age group, 26(26%) were between 31 – 40 years, 26 (26%) were in the age group between 41 - 50 years, 23 (23%) were in the age group 51 - 60 of age group and 11 (11%) were between 61 – 70 years.

In the study, maximum number of cases is seen in 4<sup>th</sup> and 5<sup>th</sup> decade of life amounting for more than 50% of cases.

Sex	Number of Cases	Percentages
Male	39	39
Female	61	61
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 2. Sex Distribution**

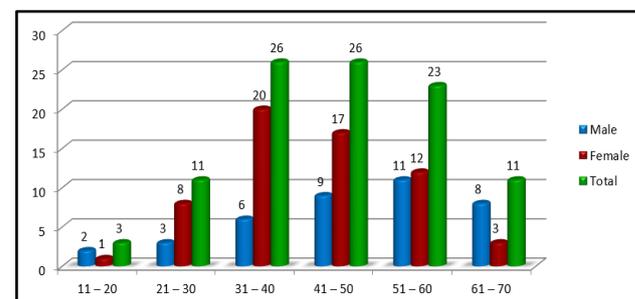
In total of 100 patients, 39 were males and the rest 61 were females. This shows that cholelithiasis is predominant in the female population with a female to male ratio of 1:1.56.



**Graph 2. Sex Distribution**

Age in Years	Male	Female	Total
11 – 20	2	1	3
21 – 30	3	8	11
31 – 40	6	20	26
41 – 50	9	17	26
51 – 60	11	12	23
61 – 70	8	3	11
<b>Total</b>	<b>39</b>	<b>61</b>	<b>100</b>

**Table 3. Age and sex Distribution**

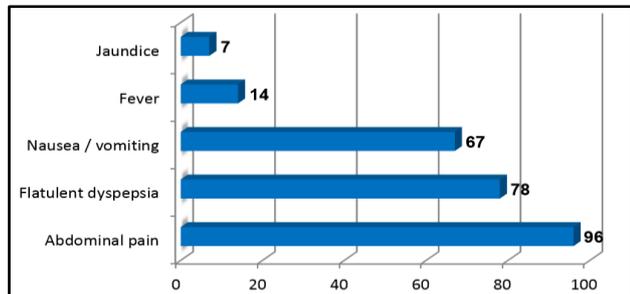


**Graph 3. Age and Sex Distribution**

In the present study, youngest patient was 16 years age and the oldest was 68 years with a mean age of 45 years. The mean age with reference to gender, the mean age of females was 42.7 years and 48.4 years in males.

Clinical Presentation	No. of Cases	%
Abdominal pain	96	96
Flatulent dyspepsia	78	78
Nausea /vomiting	67	67
Fever	14	14
Jaundice	7	7
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 4. Various Modes of Clinical Presentations**

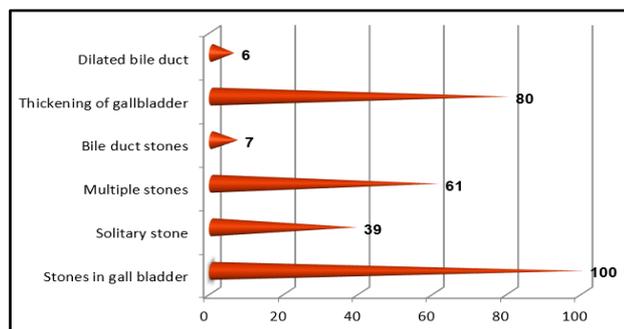


**Graph 4. Clinical Presentations**

In present study pain was the commonest symptom of presentation seen in 96% of patients, dyspepsia was present in 78% patients, 67% patients had nausea and vomiting, 14% patients had fever and jaundice was present in 4% patients.

Finding on USG	No. of Cases	%
Stones in gall bladder	100	100
Solitary stone	39	39
Multiple stones	61	61
Bile duct stones	7	07
Thickening of gallbladder	80	80
Dilated bile duct	6	06

**Table 5. Ultrasound Findings**

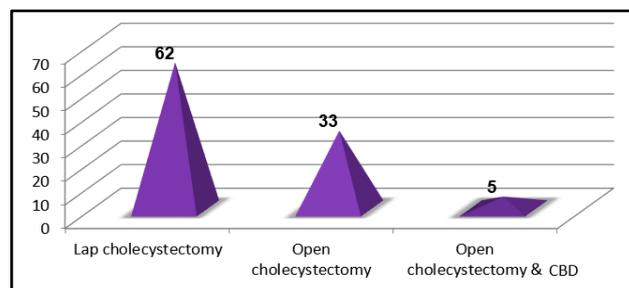


**Graph 5. Ultrasound Findings**

Abdominal Ultrasound of all patients revealed stones in gall bladder. 39 patients had solitary stones in the gall bladder, 61 patients had multiple stones in gall bladder, 7 patients had stones in both gall bladder and CBD, thickening of gall bladder was seen in 80 patients and dilated bile duct of more than 1.5 cms is seen in 6 patients.

Type of Surgery	No. of Cases	%
Lap cholecystectomy	62	62
Open cholecystectomy	33	33
Open cholecystectomy & CBD	5	5
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 6. Type of Surgery**



**Graph 6. Types of Surgery**

All 100 patients underwent surgery either by lap or open route. About 62 patients had laparoscopic cholecystectomy and 38 patients underwent open cholecystectomy.

A total of 7 patients had CBD calculus, of which 5 patients underwent open cholecystectomy with CBD exploration and 2 patients had ERCP guided stone removal followed by laparoscopic cholecystectomy. There are no conversions from laparoscopic to open cholecystectomy.

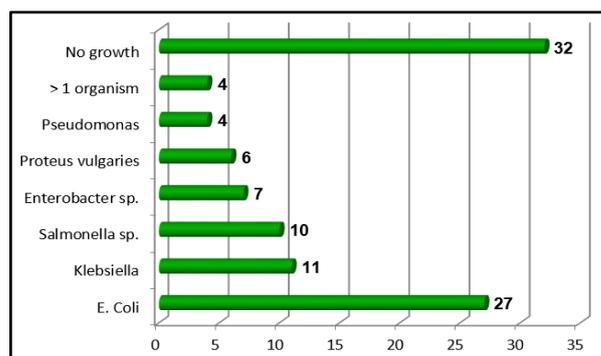
**Duration of Surgery-** The operative time for open cholecystectomy was ranged from 55 min to 100 min, with an average of 65 min, & laparoscopic cholecystectomy was ranged from 100 min to 130 min, with an average time of 115 min.

Bacteria	No. of Cases	%
E. Coli	27	40
Klebsiella	11	16
Salmonella sp.	10	15
Enterobacter sp.	07	10.3
Proteus vulgaris	06	9
Pseudomonas	04	6
> 1 organism	04	6
No growth	32	32

**Table 7. Bacteriology of Bile**

Bile culture was done in all 100 cases of this series. Numbers of patients with positive bile cultures were 68 (68%) and those with negative culture were 32 (32%).

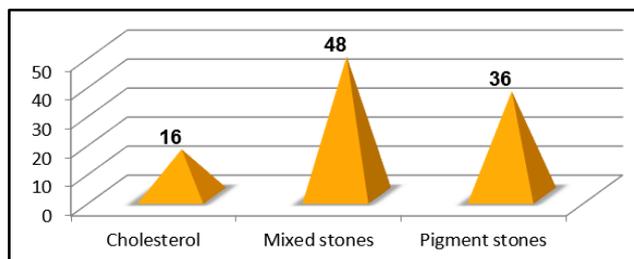
The most common bacteria isolated in our study was E. Coli 27 (27%) followed by Klebsiella 11 (11%), Salmonella 10 (10%), Enterobacter spp. in 7 (7%), proteus vulgaris in 6 (6%), pseudomonas in 4 (4%) and polymicrobial in 4 (4%), P. aeruginosa with K. pneumoniae was observed in 2 patients and in two cases E. coli with Enterobacter sp. were isolated.



**Graph 7. Bacteriology of Bile**

Type of Stones	Number of Stones	Percentage
Cholesterol	16	16
Mixed stones	48	48
Pigment stones	36	36
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 8. Composition of Stones**

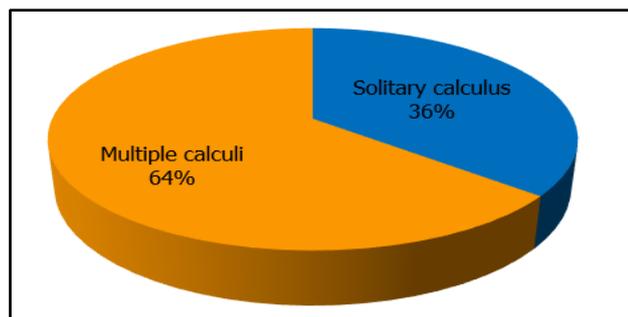


**Graph 8. Composition of Stones**

In the present study out of 100 patients, 48 patients had mixed stones, 36 patients had pigment stones and 16 patients had cholesterol stones.

Type	Number	Percentage
Solitary calculus	36	36.5
Multiple calculi	64	63.4
<b>Total</b>	<b>100</b>	<b>100</b>

**Table 9. Number of Stones**

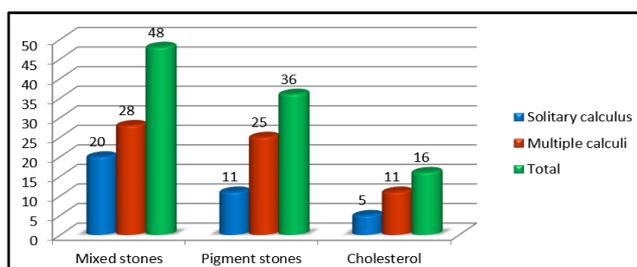


**Graph 9. Number of Stones**

In present study out of 100 patients, 64 patients had multiple stones and 36 patients had solitary stones. Preoperative USG showed 39 patients to have solitary stones but post operatively 3 patients were found to have multiple stones.

Type of Stones	Solitary	Multiple	Total
Mixed stones	20	28	48
Pigment stones	11	25	36
Cholesterol	5	11	16
<b>Total</b>	<b>36</b>	<b>64</b>	<b>100</b>

**Table 10. Composition and Number of Stones**



**Graph 10. Composition and Number of Stones**

**DISCUSSION**

In this study, 100 cases of cholelithiasis who were admitted in General surgery department of Narayana medical college and Hospital during the period from November 2014 to October 2016 were studied. After a detailed history, clinical examination, investigations & available treatment following observations were noted.

Gall stone disease is a common occurrence. It is the commonest disease involving the biliary tract and is associated with significant morbidity and mortality. The prevalence of the disease is affected by multiple factors like geographical distribution, genetic factors, different life styles and infection in the biliary tract.

**Age Distribution-** In our study cases fall between age group 11 - 70 Yrs. There is an increased incidence in the 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> decade with the maximum incidence in 4<sup>th</sup> and 5<sup>th</sup> decade of life, accounting for more than half of all cases (52%). The youngest patient was 16 years age and the oldest was 68 years, with a mean age of 45 years. In this study 3 cases were reported in age group of 11 – 20, gallstones are generally uncommon in this age group without any risk factors or underlying disease. Cholelithiasis in children can be divided into three groups; haemolytic, (sickle-cell disease, hereditary spherocytosis and thalassemia), other known aetiology (total parenteral nutrition, prolonged fasting, ileal disease or ileal resection, frusemide therapy, congenital biliary diseases), and idiopathic. In all 3 cases in our study no predisposing factor was found.

In a study by Bansal A et al<sup>15</sup> in 104 patients, gallstones were most common in fourth and fifth decade, accounting for more than half of all cases (56%), which is similar to our study. The mean age of patients with gallstones was 43.56 years with a standard deviation of 13.18 in a range from 13 to 70 years.

In K Srinivas Rao et al<sup>16</sup> study there was an increased incidence of cholelithiasis in the 5<sup>th</sup> and 6<sup>th</sup> decade with the peak incidence in 5<sup>th</sup> decade, which are similar to present study. In a study done by Aachi Srinivas & M. Venugopal K et.al<sup>17</sup> the youngest patient was 16 years age and the oldest was 66 years and maximum number of patients were between 41 to 50 age group.

In a study by Thamil Selvi et al<sup>18</sup>, in total of 78 cases, the mean age of presentation was 45.90 years. In North American series, the youngest patient was 7 years and the oldest patient was 70 years of age.

**Sex Distribution-** A varying female preponderance from 2.4:1 to 6.5:1 has been observed in several studies. In our series, also there is a female preponderance with a female to male ratio of 1.6:1.

In Bansal et al<sup>15</sup> study total of 104 patients, 36 were males and the rest 68 females, with a male to female ratio of 1:1.88. In K Srinivas Rao et al<sup>16</sup> study the female to male ratio is approximately 2: 1. Dniel et al & Vijaypal (1980) reported the female to male ratio 3.1:1 and 2.4:1 respectively. Aachi Srinivas & M. Venugopal K et. al<sup>17</sup>

reported a female to male ratio of 2:1. In a study conducted by Murali Mohan R et al<sup>19</sup> female to male ratio is 1.5:1.

This gender difference has been attributed to sex hormones, and parity of women. During pregnancy, biliary sludge (comprised of cholesterol crystals, calcium bilirubinate, and mucin), predisposes to stone formation. The risk with oral contraceptives appears quite modest and may decrease with time. In contrast, postmenopausal women on oestrogen replacement therapy have a definitely increased risk.

**Presenting Symptoms-** Pain was the predominant symptom in the study in 96% of cases. The commonest site of pain was in the right hypochondrium and the next common site was epigastrium. 28 patients complained of pain radiating to the back, 74 patients had chronic recurring pain. 22 patients had acute onset of pain, which was colicky in nature, 23 patients had dull aching pain, and 73 patients had colicky pain. Similar presentations were noted in the series of Alok Sharma.<sup>20</sup> Ganey series, Goswitz et al<sup>21</sup> series, Aachi S.<sup>17</sup>

In our series 78% of patient had dyspepsia. The flatulent dyspepsia was relieved after Cholecystectomy. The incidence of dyspepsia in present series was more than Ganey series.<sup>22</sup> Alok Sharma.<sup>20</sup> series, but similar to North American surgeon series.

In the present study 67% of cases had nausea/ vomiting, occurred mostly during the attack of pain. Vomiting in this study was similar to Bansal et al and Aachi Srinivas and Venugopal k series. In the present study 7 patients had jaundice. The cause of the jaundice was stone in the common bile duct. Open cholecystectomy with CBD exploration was done in 5 patients and stone were removed. Fever was present in 14 cases in the present study. Fever was secondary to cholangitis due to biliary obstruction. Fever was of moderate degree. In a study by Bansal A et al all patients presented with pain in the upper abdomen, of which 74 patients (71.1%) had chronic upper abdominal pain while 30 patients (28.9%) had acute upper abdominal pain. 72 patients (69.2%) presented with dyspepsia and flatulence, 67 patients (64.4%) with nausea or vomiting, only 7 patients (6.7%) had jaundice. 14 patients had fever, of these 7 patients were diagnosed as CBD calculus and rest were continuations of acute process of cholecystitis.

**Abdominal Ultrasound-** Ultrasound scanning was done in all patients, all the cases revealed stones in the gall bladder. 100 patients had stones in the gall bladder only, 7 patients had stones in both gall bladder & common bile duct. 39% (39 patients) had single stones in gall bladder, 61% (61 patients) had multiple stones in gall bladder. Thickening of gall bladder was present in 80% (80 patients) of the cases. Dilatation of the common bile duct more than 1.5 cm was present in 6 patients.

In Bansal A et al<sup>15</sup> study of 104 patients Ultrasound scanning revealed gall bladder calculus only in 99 patients and 5 patients had stones both in gallbladder and common bile duct. Solitary calculus was found in 38 patients on

sonography. In K Srinivas Rao et al<sup>16</sup> study gall bladder stones were seen in 126 patients. Out of which 25 were solitary stones, 101 were multiple, thickening of gall bladder was seen in 80 patients. In a study by Alok Sharma et al<sup>20</sup> of total 57 patients with stones in gall bladder 42 were multiple stones and 15 solitary stones, thickening of gall bladder was seen in 10 patients. In a study by Aachi Srinivas & M. Venugopal K et al<sup>17</sup>. Ultrasonography was done in 240 cases which revealed calculi in gall bladder in all the cases i.e. 100%.

**Type of Operation-** In the present study 38 patients underwent open cholecystectomy, in 5 cases CBD exploration was also done and 62 patients undergone Laparoscopic cholecystectomy. There was no conversion rate from lap to open in our study which is lower to studies of Scott et al (4.3%).<sup>23</sup> The conversion rate was 7% in Schlumpf et al<sup>24</sup>. The most common incision used in open cholecystectomy was right sub costal incision in 26 cases, midline laparotomy was done in the remaining 12 cases. Among the 100 cases of cholecystectomy, in 85 cases, duct first method was done and in 15 patients, fundus first method was done. The reason for fundus first method was dense adhesion. The duct first method was the method of choice. Out of 7 patients with GB stones and CBD stones, 2 patients underwent ERCP for stone extraction followed by laparoscopic cholecystectomy, rest of the 5 patients underwent Open cholecystectomy with CBD exploration was done and closed with T-tube drainage. In Bansal A et al study 56 patients had laparoscopic cholecystectomy and 43 patients underwent open cholecystectomy, 7 patients had CBD calculus, of which 5 patients underwent open cholecystectomy with CBD exploration and 2 patients had ERCP guided stone removal followed by laparoscopic cholecystectomy. In Aachi Srinivas & M. Venugopal K et al<sup>17</sup> study of 240 cases, Lap was procedure of choice in 160 cases while open cholecystectomy was done for 60 cases which included conversion from Lap to open cholecystectomy. In 20 cases CBD exploration with T-tube drainage was done. In a study by K Srinivas Rao et al<sup>16</sup> of total 126 patients, 40 patients underwent open cholecystectomy and 86 patients underwent Lap cholecystectomy. The conversion from lap to open cholecystectomy was 8% (10 cases). Several studies demonstrated that the risk of conversion depends mainly on the degree of inflammation, pathology of gallbladder disease (e.g. thickness of gallbladder wall), age, male sex, and CBD diameter. Conversion rate in elective laparoscopic cholecystectomy may be 0% to 15%, but in cases of gangrenous cholecystitis or empyema it may be 50-83%. Ultrasound may help to predict the risk of conversion. However, the surgeon has to decide intraoperatively whether to convert to the open procedure within a short time.<sup>25,26</sup> The conversion rate in other studies was 7% in Schlumpf et al.<sup>24</sup>

**Bacteriology of the Bile-** Bile culture was done in all 100 cases of this series. Number of patients with positive bile cultures were 68 (68%) in the study and those with negative

culture were 32 (32%). Positive culture was noted more in patients of 31-60 years age and majority of them were female. In different studies, the bacterial growth in the bile culture was found at the rates of 16-54%.<sup>27,28,29,30,31,32,33</sup>

The most common bacteria isolated in our study was *E. Coli* in 27% followed by *Klebsiella* in 11%, *Salmonella* in 10%, *Enterobacter* spp. in 7%, *Proteus vulgaris* in 6%, *Pseudomonas* in 4% and polymicrobial in 4%. *Pseudomonas aeruginosa* with *K. pneumoniae* was observed in 2 patients and in 2 cases *E. Coli* with *Enterobacter* sp. were isolated. In Acharya Suri et al.<sup>29</sup> on gram staining, no organism was found microscopically in the bile of 82.6% patients. *Escherichia coli* was one of the most common isolated bacteria in 53.84% followed by *Pseudomonas aeruginosa* in 26.92% and *Staphylococcus aureus* noted in 19.23%. Van Leeuren PA et al.<sup>27</sup> study in 840 patients, 138 (16.4%) patients showed positive bile culture and 72 (9%) patients showed wound infection. *E. coli* was the most common organism isolated in 36% cases on bile culture. In a study by Parekh et al.<sup>34</sup> on 78 patients, 19 patients showed positive bile culture and *Escherichia coli* was the most common isolated bacteria seen in 63.16% among positive bile culture cases and 15.38% among all patients and bile was sterile in 59 patients (75.64%). Other organisms isolated were *Pseudomonas* in 3.85%, *Klebsiella* in 2.56%, coagulase negative *Staphylococcus* and *Staphylococcus viridans* in 1.28% each. In a study by Ballal et al.<sup>35</sup>, a total of 125 bile samples along with 25 gall stones were processed for both aerobic and anaerobic microorganisms. Bile cultures showed bacteria in 88 (70.4%) of 125 patients out of which 71 (56.8%) were aerobes and the remaining 17 (13.6%) were anaerobes. Mixed bacterial flora was seen in 7 cases. Among the mixed flora, 2 had only aerobes and the remaining 5 had both aerobes and anaerobes in them *Escherichia coli* was the most common isolate both in bile as well as in gall stones which was isolated either singly or in association with other organisms in clinical specimens.

**Analysis of Stones-** In our study 48 (48%) patients had mixed stones, 36 (36%) patients pigment stones and 16 (16%) had cholesterol stones out of 100 patients of gallstone. A study done in Haryana by Chandra et al.<sup>36</sup> showed 26%, 38% and 36%, of mixed, pigmented and cholesterol stones respectively. In Haryana region study by Pundir et al.<sup>37</sup>. Showed mixed, pigmented and cholesterol stones in 14.2%, 68.6% and 17.2% respectively. Mixed stones are the most commonly encountered stones in North India. Similar high incidence of mixed stones had been observed in both western series Gamey (70%) and also in Indian series Vijay pal 91.30% and Bansal et al.<sup>15</sup> 83.3%

In our study, we found that out of 64 multiple stones 31 (48.4%) were mixed, 23 (35.9%) were pigment and 12 (18.75%) were cholesterol stones and in 36 single calculi 18 (50%) were mixed, 14 (38.8%) were cholesterol and rest 6 (16.66%) were pigment calculi. Similar results were observed in a study conducted by Arpit Bansal et al.<sup>15</sup> with 48 (46%) patients of mixed stones, 39 (38%) pigment stones and 17 (16%) cholesterol stones out of 104 patients

of gallstone In Thamil Selvi et al.<sup>18</sup>, analysis of the stones showed mixed stones in 37 cases (57%), pigmented stones in 27 cases (35.3%) and cholesterol stones in 5 cases (7.6%). In study conducted by K Srinivasa Rao et al.<sup>16</sup>, 70% had mixed stones, 10% had cholesterol stone, 20% had pigment stone. Vitetta et al.<sup>38</sup> and Hsing et al.<sup>39</sup> observed that gall bladder cancer patients were more likely to have multiple stones. Domeyer et al.<sup>40</sup> concluded that the solitary gallstones were the most important predictors for severe inflammation. Khanna et al.<sup>41</sup> could not document any association between the two in their respective studies. In the present series, there is no association between type of stones and carcinoma of gall bladder.

**Histopathology-** In our series 79 patients showed features of chronic cholecystitis, 21 showed features of Acute cholecystitis on post-operative histopathology. No associated carcinomatous changes were noted in this series. In Thamil Selvi et al.<sup>18</sup> Histopathological study showed chronic cholecystitis in 85.8%, acute cholecystitis in 2.5%, polyps in 2.5%, granulomatous cholecystitis in 1.2%, empyema gall bladder in 1.2%, eosinophilic cholecystitis in 5.1% and 1.2% cases had carcinoma on histopathological examination. In a study by Siddiqui et al.<sup>42</sup>, 220 specimens were sent for histopathology and among them 203 of the specimens showed evidence chronic cholecystitis, 7 acute cholecystitis with mucocoele, 3 acute cholecystitis with empyema and one incidental associated polyp. Six gallbladders (2.8%) showed evidence of adenocarcinoma of varying differentiation along with cholelithiasis.

**Follow Up-** There was no problem in the follow up period in any patient. On an average patient was followed for 6 months keeping their address and contact phone numbers.

## SUMMARY

In the study on 100 cases of cholelithiasis, admitted in General surgery department of Narayana medical college and Hospital during the study period the results were summarized as following.

1. The incidence of cholelithiasis was highest in the 5th and 6th decade with more than half of the cases in this age group, with a mean age of 45 years.
2. There was an increased incidence in female population with Female to male ratio of 1.6:1, in females the mean age of presentation was 42.7 years which is 5 years younger to mean age of presentation in males 48.4 years.
3. Pain was the most common symptom of presentation seen in 96% of cases, followed by dyspepsia in 78% of patients, nausea and vomiting in 67% of patients, fever in 14% of the patients, and jaundice in 7% of patients.
4. Ultrasonography was the investigation of choice in our hospital. All patients had gallstones, 39% of patients had solitary stone, 61% of patients had multiple stones, 07% of patients had bile duct stone, 80% of patients had thickening of gall bladder.

5. 62% of patients had laparoscopy cholecystectomy, 38% of patients had open cholecystectomy. There was no Lap to open conversion in our study.
6. Right sub costal incision was the most common incision used in open cholecystectomy followed by mid line laparotomy.
7. The Average operative time in our study was 65 min for open cholecystectomy and 115 min for laparoscopic cholecystectomy.
8. 68 % had positive bile culture and 32% had negative culture. The most common bacteria isolated was E. Coli seen in 27% of total 100 patients
9. In our study, most common stones were mixed stones in 48% of patients, 36% patients had pigment stones and 16% had cholesterol stones.
10. In the study 79 patients showed features of chronic cholecystitis and 21 showed features of Acute cholecystitis on histopathology. No carcinomatous changes were noted in this series.

### CONCLUSION

Gallbladder disorders rank among the most common and costly of all digestive system diseases. Incidence of cholelithiasis is increasing considerably in India, possibly due to change in the dietary habits, which is becoming westernized and changing life style. Because of the extensive studies on aetiology of gallstones, better understanding of the pathogenesis in the past two decades, the management has become more appropriate and effective.

In our study, we concluded that symptomatic gallstone diseases were more common in 5th and 6th decade of life with a female predominance. Common presentation in symptomatic gallbladder is pain abdomen. Ultrasound was effective in diagnosing gallstones in all the patients in our series. Proper case selection, decreases the conversion rate from lap to open surgery.

In the present series majority of the cases showed positive bile culture, of which E. coli was the most common organism isolated. Multiple, mixed stones were the most common type of stone identified. All gallbladders removed for gallstone disease should be subjected for histopathology; to exclude gallbladder malignancy as significant pathology may be present with normal gross morphology.

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