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Original Article

Clinical Study of Cholelithiasis

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Abstract

Introduction: Cholelithiasis is a chronic recurrent disease of the hepatobiliarysystem. The impaired metabolism of cholesterol, bile acids and bilirubin are characterized by gallstone formation.

Materials & Methods: In the present study, apart from studying the epidemiology i.e., demographic factors, dietary habits, clinical presentation, diagnostic tools and management, it also looks at the stone analysis, bile culture and complications after surgery in rural population in central India.

Results: In this study, 90 cases of cholelithiasis who were admitted in Mahatma Gandhi Memorial Hospital during November 2009 to October 2011 were studied. At present, available literature on cholelithiasis is reviewed and the results of the study are compared with those of other authors. The results are been tabulated in form of tables.

Conclusion: 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 females.

Key words: Cholelithiasis, Gallstones, Cholecystectomy, Laparoscopy

INTRODUCTION

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 "Sushruta Samhita." It is believed that this classic was compiled between 800 BC and 400 AD; he described a jaundice called pitta - ashmarijanya meaning a jaundice caused by stone in bile.[1-8] It was also known that such jaundice could be caused by wrong diet.

The prevalence of gallbladder stone varies widely in different parts of the world. In India, it is estimated to be around 4%. An epidemiological study restricted to railroad workers showed that North Indians have 7 times higher occurrence of gallstone as compared with South Indians.[9-15]

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There has been a marked increase in the incidence of the gallstone in the West during the past century. In the United States, the autopsy series has shown gallstones in at least 20% of women and 8% of men over the age of 40 years.

It is estimated that at least 20 million persons in the United States have gallstones and that approximately 1 million new cases of cholelithiasis develop each year. The prevalence in Europe is 18.5% from the autopsy studies with the lowest prevalence from Ireland (5%) and the highest from Sweden (38%). In Australia, the prevalence rate varies from 15% to 25%. Highest prevalence in Pima Indian tribe of Arizona with total and female prevalence of 49% and 73%, respectively.[10-17]

Gallstones are rare in Africa with the prevalence of <1% and in Japan, it has been increased from 2% to 7%.

Diagnosis of gallstone 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.

Changing incidence in India is mainly attributed to Westernization and availability of investigation that is ultrasound to urban as well as rural area and also because of increased affordability due to change in the socioeconomic structure and the cost of investigations.

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Due to the increased incidence of gallstones and its variable presentations in India as well as in the West, there is a great need for a study which can provide the information regarding the prevalence of the disease, various clinical presentation and management, and outcomes of the cholelithiasis.[18-25]

MATERIALS AND METHODS

This dissertation titled "A clinical study of cholelithiasis" was done at Mahatma Gandhi Memorial Hospital, Warangal, for a period of November 2009 to October 2011.

A total of 90 cases of cholelithiasis were admitted, examined, investigated, and operated during the period between November 2009 and October 2011. Detailed history of all the 90 cases was taken that included information regarding the age, sex, nature of the symptoms, duration of the symptoms, past history of similar complaints, diet history, history of OCP, alcohol ingestion, and diabetes. All patients underwent detailed examination, hemogram, electrocardiogram, liver function test, blood sugar, blood urea, serum creatinine, urine analysis, blood group, chest X-ray, and ultrasound scan of the abdomen. Relevant investigations and specialty consultations were taken for patients with associated medical illness and their control was ascertained pre-operatively.

Risk and complications of the condition as well as surgery have been explained to the patients, written consent was obtained. Appropriate pre-operative antibiotics were given. 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. Based on clinical investigation and operative criteria, exploration of the common bile duct (CBD) was done. In this study, some of the patients had undergone open cholecystectomy and some of the patients underwent laparoscopic cholecystectomy due to the factors such as previous operation and obese patient. A subhepatic tube drain was used in patients who undergone open cholecystectomy and connected to collecting bag. The abdominal wound was closed in layers. The gallstone was sent for chemical analysis and the gallbladder for histopathological examination. All patients received antibiotics and routine post-operative care. Patient was properly examined in the post-operative period to note the development in any complication. Suitable treatment was given according to the need. Antibiotics were given and subsequently changed according to the bile culture and sensitivity report. Patients who underwent laparoscopic cholecystectomy were discharged on the 3rd day and those who underwent open cholecystectomy were discharged on the 7th day, unless any complications. Patients were advised regarding diet, rest, and to visit the surgical OPD for regular follow-up.

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

RESULTS AND DISCUSSION

In this study, 90 cases of cholelithiasis who were admitted in Mahatma Gandhi Memorial Hospital during November 2009 to October 2011 were studied. At present, available literature on cholelithiasis is reviewed and the results of the study are compared with those of other authors.

Age of Incidence

There is an increased incidence of cholelithiasis in the 5th and 6th decade with the peak in the 5th decade. In the study, the youngest patient was 15-year-old and the oldest patient was 72-year-old (Table 1).

Similar incidence is seen in the studies of Herman *et al.* (5th decade). Hanif series showed peak incidence in the 5th decade. In Western studies, the peak incidence is in the 5th and 6th decades. The rise in the peak age of incidence is due to change in the dietary factor. Similar findings were noted in the studies of Ganey *et al.* and Moreaux *et al.*

Distribution of Cases by Sex

In the present study, 54 patients were female and 36 patients were male. The present study shows that gallstone disease is a common problem in female population. The female-to-male ratio is 3:2 (Table 2).

Battacharya's series showed 71.4% were female and 28.6% were male. Similar sex preponderance in favor of females was noted by Tamhankar, Ganey *et al.*, and Major Alok

Table 1: Age of incidence

Age in years	No. of cases (%)	Herman's series (%)	Rushad's series (%)
11-20	2 (2.22)	25 (1.60)	0 (0)
21-30	8 (8.88)	92 (5.90)	4 (3.33)
31-40	16 (17.78)	226 (14.60)	36 (30.00)
41-50	30 (33.33)	325 (21.00)	30 (25.00)
51-60	18 (20.00)	473 (30.60)	29 (24.16)
>60	16 (17.78)	352 (23.57)	21 (17.5)

Table 2: Sex distribution

Sex	No. of cases (%)	Battachary's series[59] (%)	Alok Sharma series (%)
Male	36 (40)	26 (28.6)	41 (70)
Female	54 (60)	65 (71.4)	17 (30)

Sharma *et al.* series showed that 70% were male and 30% were female.

Presenting Symptoms

Pain was the most common symptom presenting in 88 patients, 50 patients had nausea and vomiting, and 12 patients had jaundice (the cause of the jaundice was stone in the CBT. The CBT was explored in these patients and stones were removed). Dyspepsia was present in 20 patients (relieved after cholecystectomy) and fever (secondary to cholangitis due to biliary obstruction) was present in 8 patients (Table 3).

Similar presentations were noted in the series of Alok Sharma, Ganey series, and Goswitz *et al.* series.

General Physical Examination

In the study, 55 patients were moderately built and nourished, 20 were obese. These observations are against the time-honored aphorism that fat people are more prone for this disease. 60 patients were diabetic and 45 patients were hypertensive. Pallor was present in 26 patients who were corrected with blood transfusion.

Presenting Signs

In the present study, 87 patients had tenderness in the right hypochondrium, whereas 28 patients had guarding and 7 patients had mass in the right hypochondrium (Table 4).

Investigations

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

Ultrasound

Ultrasound scanning of the abdomen was done in all patients. 90 patients had stone in gallbladder, 13 patients had stones in both gallbladder and CBT (Table 5).

Pre-operative Evaluation

A hemoglobin level of 10 g% was accepted for the surgery. Blood transfusion was given to selected patients to improve the hemoglobin level. 10 cases diagnosed as acute cholecystitis were managed conservatively with IV fluids, nasogastric aspiration, antibiotics, and analgesics. These patients were treated conservatively and were then offered surgery after 6 weeks. All diabetic patients were maintained on insulin injection in the pre-operative period. Associated medical illness was treated accordingly before taking the patient to surgery.

Type of Operation

In the present study, 44 patients underwent laparoscopic cholecystectomy and 46 patients underwent open cholecystectomy (Table 6).

Incision in Open Cholecystectomy

Out of 46 patients who underwent open cholecystectomy, 31 were operated through a right subcostal incision, 13 patients were operated through right paramedian incision, and 2 patients through a right transverse incision (Table 7).

Post-operative treatment

All the patients were given IV fluids, nasogastric aspiration was done, and antibiotics and analgesics were given. Drainage tube was removed between 3 to 10 days based on the drainage. T-tube cholangiogram was performed in 13 patients and T-Tube was removed after confirmation of the patency of the duct.

Table 3: Various symptoms

Symptoms	No. of cases (%)	Alok Sharma series (%)	Ganey's series (%)
Pain	88 (97.78)	58 (100)	987 (95)
Nausea/vomiting	50 (55.56)	48 (82.8)	576 (55.6)
Jaundice	12 (13.33)	03 (5.17)	101 (10)
Dyspepsia	20 (22.22)	05 (8.62)	222 (21)
Fever	8 (8.88)	NA (0)	92 (9)

Table 4: Presenting signs

Signs	No. of cases (%)
Tenderness	87 (96.67)
Guarding	28 (31.11)
Mass	7 (7.78)

Table 5: Ultra sound

Finding on ultrasonography	No. of cases (%)	Alok Sharma series (%)
Stones in gallbladder	90 (100)	57 (98.3)
Solitary stones	22 (24.44)	15 (26.3)
Multiple stones	68 (75.56)	42 (73.7)
Stones in bile duct	13 (14.44)	3 (5.2)
Thickening of gallbladder	72 (80)	10 (17.2)
Distended gallbladder	11 (12.22)	3 (5.2)
Gallbladder mass	7 (7.78)	1 (1.7)

Table 6: Type of operation

Type of operation	No. of cases (%)
Laparoscopic cholecystectomy	44 (48.88)
Open cholecystectomy	46 (51.11)

Table 7: Incision in open cholecystectomy

Type of incision	No. of cases
Right subcostal	31
Right paramedian	13
Right transverse	02
Upper midline	00

Complications

In the present study, 6 patients had wound infection. 2 patients had post-operative bile leak which was managed conservatively and patients recovered. 4 patients had bile duct injury which was repaired on the T-tube (Table 8).

Histopathology Report

In the present study, 86 patients were reported as having chronic cholecystitis, 4 patients had acute cholecystitis, and no case of malignancy was noted (Table 9).

Types of Stones

In the present study, gallstones analysis was done in all patients. 81 patients had mixed type of stones, 7 patients had cholesterol stones, and 2 patients had pigment stones (Table 10).

Bile Culture

Bile culture was done in all patients, 68 patients had no growth, 14 cases reported growth of *Escherichia coli*, 4 patients had growth of *Klebsiella*, and 2 patients each having reported the growth of *Staphylococcus aureus* and *Pseudomonas*. These results were similar to the studies of Mathur *et al.*, Goswitz *et al.*, and Battacharya *et al.* (Table 11).

Follow-up

There was no problem in the follow-up period in any patient.

Table 8: Complications

Post-operative complication	Open cholecystectomy	Laparoscopic cholecystectomy	Total
Wound infection	4	2	6
Hemorrhage	0	0	0
Retained stone	0	0	0
Bile leak	2	0	2
prolonged ileus	0	0	0
Intraoperative complication	**Open cholecystectomy**	**Laparoscopic cholecystectomy**	**Total**
Bile duct injury	2	2	4
Total complications	8	4	12

Table 9: Various modes of presentation of patients of cholelithiasis

Histopathology report	No. of cases (%)
Chronic cholecystitis	86 (95.56)
Acute cholecystitis	4 (4.44)
Ruptured gallbladder	0 (0)
Gangrenous gallbladder	0 (0)

Table 10: Type of gall stones

Type of stone	No. of cases (%)	Mathur *et al.* (%)
Cholesterol stone	7 (7.78)	3 (12)
Mixed stone	81 (90.00)	21 (84)
Pigment stone	2 (2.22)	1 (4)

Table 11: Bile culture

Organism isolated	No. of cases (%)	Mathur *et al.* (%)
Staphylococcus aureus	2 (2.22)	3 (12)
Pseudomonas pyocyaneus	2 (2.22)	1 (4)
Salmonella	0 (0)	1 (4)
Escherichia coli	14 (15.56)	4 (16)
Klebsiella	4 (4.44)	0 (0)
No growth	68 (75.56)	13 (52)

SUMMARY

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 females.
2. Pain was the most common symptom (present in 97.78% of the patients), nausea and vomiting were the second most common symptom presenting in 55.56% of patients, dyspepsia was present in 22.22% of patients, jaundice in 13.33% of patients, and 8.88% of patients had fever.
3. Tenderness in the right hypochondrium was the most common sign present in 96.67%, guarding was the next sign present in 31.11% of the patients and mass abdomen in 7.78% of the patients.
4. Ultrasonography is the investigation of choice in our hospital. All patients had gallstones, 24.44% of patients had solitary stone. 75.56% of patients had multiple stones, 14.44% of patients had bile duct stones, 80% had thickening of gallbladder, 12.22% had gallbladder distension, and 7.78% had gallbladder mass.
5. About 48.88% of patients underwent laparoscopic cholecystectomy, 51.11% underwent open cholecystectomy. Laparoscopy to open conversion rate was found to be 4%. Right subcostal incision was the most common incision used in open cholecystectomy. 4 patients had intraoperative bile duct injury which was repaired immediately and the patients recovered.
6. The post-operative complication in the present study was 13.33%. Wound infection was the most common, 2 patients had post-operative bile leak which was managed conservatively and the patients improved.
7. Histopathology revealed chronic cholecystitis in majority of the cases while bile culture revealed no growth in majority of cases in the present study.
8. Gallstones analysis showed mixed stone in 90% of the cases and cholesterol stones in 7.78% of the cases as the most common variety.
9. There was no mortality in the present study.

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