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Gallstones in Cholelithiasis Cases in Western UP- A Morphological Study

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ABSTRACT

Introduction: Cholelithiasis means the "presence of stone in the gall bladder" is a common clinical entity affecting the adult population of both the gender. It is known to produce diverse morphological changes in the gallbladder. This research is based on a study of the gallstones' morphological features.

Methods & Material: The study was conducted on 140 cholecystectomy specimens with gallstones after approved by Ethical Committee. The stones were measured for morphological parameters i.e. number, type, size etc. Cases from age-group of 18-60 years were enrolled for the study. The size of the gall-stones was measured by Digital verniercaliper.

Result: Out of 140 specimens with gall stones, multiple number and cholesterol type of stones were the most common one. Further in gender-wise distribution, both the gender contain multiple no of stones in higher percentage whereas the cholesterol type of stone is higher in female whereas in male both cholesterol and pigmented type of stone were in same percentage.

Conclusion: It was concluded that this study established the link among gallstones types and Number with the gender of Cholelithiasis cases. Further research is needed to understand the various factors in cases of Cholelithiasis.

Keywords: *Gallstones, Gall bladder, Cholesterol stone, Mixed stone*.

INTRODUCTION

Study of Gall Bladder and Cholelithiasis is very important as Gallstone associated symptoms. It is a disease of civilization [1] Gallstones are a leading cause of morbidity and death around the world. The frequency varies according to age, gender, and ethnicity. The majority of people have no idea they have the illness and live asymptomatic lives.[2]Gallstones are a widespread issue in India as well as other countries. It is well accepted that the primary cause of gallstone development is bile stasis. [3]

Gallstones are hard deposits in the gallbladder that similar to pebbles. The Greek word cholelithiasis (chol = bile + lith = stone + iasis = process) is the source of the word. Gallstones typically develop as a result of the bile becoming saturated with bilirubin or cholesterol, which causes the bile to become supersaturated, nucleate and precipitate crystals of monohydrate cholesterol, and grow into aggregates the size of stones. [4]

Cholelithiasis is characterized by a number of signs and symptoms, such as vomiting, mild to moderate fever, obstructive jaundice, loss of appetite, weight loss, and acute pain in Murphy's point in the right upper quadrant

of the abdomen. The gall bladder's role includes storing bile and concentrating it all over the inter-digestive phase by independent water absorption.[5] Bile composition performs an important role in the development of stones. The formation of gallstones is greatly affected by factors like age, gender, and hormones also. The presence of bile and liver proteins that can encourage or prevent cholesterol from crystallizing into gallstones.[6] Gallstones can be identified as asymptomatic, caused by biliary colic, or correlated to cholelithiasis problems.[7] Cholelithiasis is regulated by the gall bladder mucus, which encourages the formation of stones. Gallstones are created by a mixture of lipids, calcium, and mucus.[8]

Gallstones can be classified into the following categories according to their composition:

1) Cholesterol gallstones- Cholesterol stones are huge, single, spherical to oval in shape, ranging in colour from light yellow to dark green or brown to bluish-white. They range in size from 2 to 3 cm. More than 70–80% of cholesterol is present in cholesterol gallstones.
2) Pigmented gallstones- Pigment stones consist of calcium salts from bile and bilirubin. They are small (2–5 mm), numerous, and range in colour from brown to jet black (dark). Gallstone pigment contains 40–60% calcium bilirubinate. Its cholesterol content is less than 20% or 30%, according on the Japanese classification system.
3) Mixed gallstones - These are generally composed of calcium carbonate, calcium bilirubinate, palmitate phosphate, and other bile pigments, along with 20–80% or 30–70%, cholesterol, using the Japanese classification system[9] The makeup of gallstones varies, with mixed and blended gallstones making up 80% of the total and pure gallstones making up 20%. Cholecystitis is often linked to mixed gallstones. There are several numbers of stones occur. Single, double, and triple gallstones can occur. [10,] Individuals who have gallstones require close monitoring using imaging methods. Most damage caused by gallstones is to the mucosal columnar epithelium. [11]

Given the increasing global incidence of gallstones and their substantial impact on healthcare systems, it is imperative to support research initiatives that address the morphological aspects of gallstone-induced changes to the gall bladder. Thus, the present study was aimed to study the morphology features of the gall bladder stones.

MATERIAL AND METHODS -

The study was designed as prospective research at the Department of Anatomy, School of Medical Sciences& Research, Sharda University & Noida International Institute of Medical Sciences, Noida International University Greater Noida, Uttar Pradesh. Before the initiation of the study, ethical approval was taken from the institutional Committee. Participants were informed about the study details, and written consent was obtained to ensure volunteer participation. All personal data were concealed to maintain confidentiality. Post cholecystectomy 140 gall bladder specimens with stones were preserved for study.

Inclusion criteria-

- Participants who are willing the age group between 18-60 years, having with symptoms indicative of gallstone disease were included in the study.

Exclusion criteria-

- Participants with severe diseases and those who did not consent to participate in the study.

The morphometric features included for the studied was based on –

Number – One, two or Many.

Type - Cholesterol, Pigmented and Mixed Gall stone

Size – Measured the averages of the two diameters. If there were more than one gallstone, the biggest and smallest stone's diameter was noted.
Study instrument – The size of the gall-stones was measured by Digital vernier calliper.
Statistical Analysis- Data were analysed using statistical software.

RESULTS –
Total 140 cases of cholelithiasis are enrolled and the number of cases of gallstone disease is higher in women than men in this study. The most common types of stones are found to be cholesterol stones, which are followed by mixed and pigment stones. The findings of the statistical analysis are summarized in following Table and Figures.

Table-1 Showing the gender wise distribution of number& types of stones in Cholelithiasis cases.

Gender	No of Stone	No of cases	Percentage	Types of Stone	No of cases	Percentage (%)
Female	Single	39	34.20%	Cholesterol	58	50.90%
	Double	11	9.60%	Pigment	41	36.00%
	Multiple	64	56.10%	Mixed	15	13.20%
Male	Single	9	34.60%	Cholesterol	10	38.50%
	Double	2	7.70%	Pigment	10	38.50%
	Multiple	15	57.70%	Mixed	6	23.10%

Table No-1 Shows that frequency of cholesterol stone is more in females and Cholesterol and Pigmented both types of stones are same in males & the multiple no of gall-stone in female 64 (56.10%) and in male 15 (57.10%) and the cholesterol type of the gall-stone was the most common among all the cases.

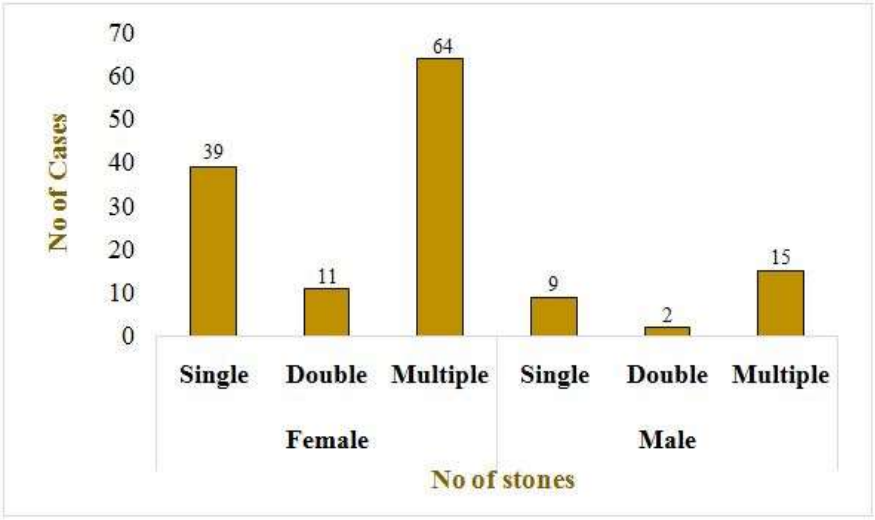

Figure - 1 Shows graphical distribution of No of stone in both male & female

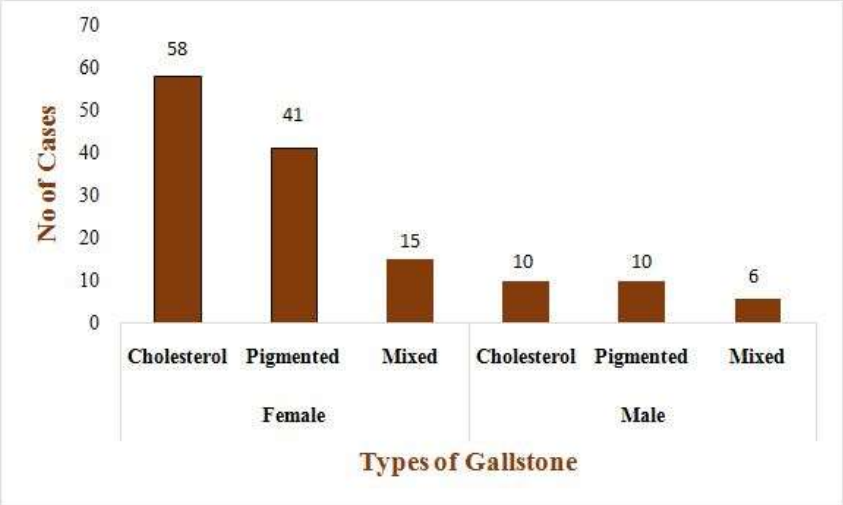

Figure- 2 Shows Graphical distribution of Types of stone in male & female

Figure No-1 and 2 Shows the gender-wise graphical distribution of no. of stones and type of stones in females and males in Cholelithiasis cases. It shows that multiple no of stones are higher in percentage in both whereas the cholesterol type of stone is higher in female but in males both cholesterol and pigmented type of stone is the same percentage.

Table-2 Showing length, breadth, mean and SD of Gallstones Size

Size(cm)	Minimum	Maximum	Mean ±SD
Length	0.2	2	0.93±0.35
Breadth	0.2	2.3	0.91±0.38

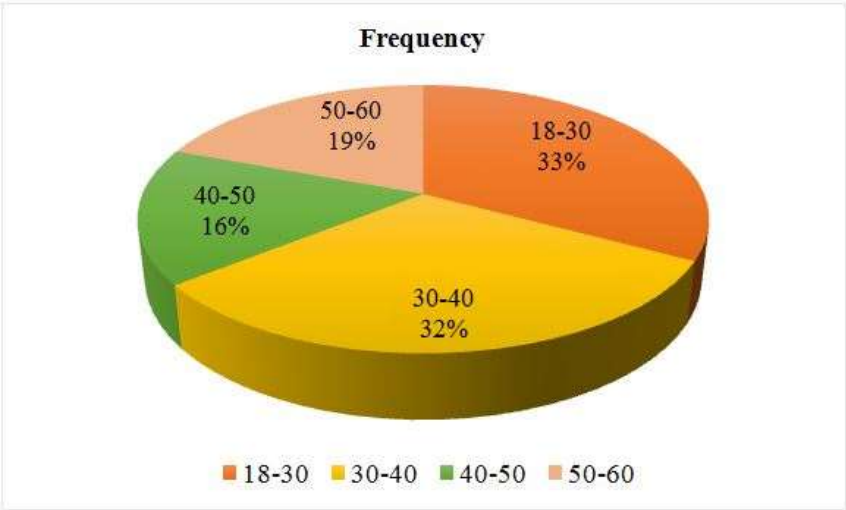

Figure- 3 Pie-chart represents the Age-group wise distribution of Cholelithiasis cases.

Figure No-3 showing age-group wise distribution where maximum no of cases was 46(33%) in age-group of 18-30 year.

DISCUSSION:-

Table-3 Comparision of Morphology of Gallstones with the previous study

Authours	No of Stones (%)			Types of Stones (%)		
	Single	Double	Multiple	Cholesterol	Pigmented	Mixed
Mathur, S et al.(2013)[12]	39.6	8.8	51.6	22	-	194
Narang et al.(2014)[13]	7	-	93	7.03	1.62	90.8
Hemlata et al.(2015)[5]	30	12	58	24	30	46
Gupta A et al (2017)[14]	-	-	-	30	8	50
Areeba N et al.(2021)[15]	-	-	-	58.7	15.4	26
Mishra, S et al.(2023)[16]	-	-	-	70	30	-
Present study	34.2	9.2	56.4	48.5	36.4	15

Mathur, S. K *et al*, 2013 reported in his study that out of the 330 cases studied, mixed stones cases were maximum 194 where cholesterol type was 22. Whereas the number of stones varied from a single in 131 (39.6%) cases, double in 29 (8.8%) and multiple in the remaining 170 (51.6%) cases. [12]

Narang et al, 2014 in their study Cholesterol stones were in cases 13(7.08%), Pigmented stone in 3(1.62%) and mixed stones in 168(90.8%) and No of stones had 7% single, 93% multiple.[13]

Hemlata Sharma *et al*, 2015 observed that Thirty percent of the cases have single stone, twelve percent have double, and the remaining fifty-eight percent have multiple stones. 24% had cholesterol stones, followed by mixed stones 46% and pigment gallstones 30% which is similar to our present study. [6]

Gupta A.M *et al,* 2017 reported in their studies that in female mixed type gall-stone were more common followed by cholesterol type, whereas in male population mixed type were in maximum number in the study.[14]

Areeba N et al, 2021 found that the majority of gallbladder cases 61 (58.7%) had cholesterol stones, followed by mixed stones in 27 instances (26.0%) and pigment gallstones in 16 cases (15.4%).[15]

Savita Mishra *et al*, 2023 also reported the same that significant majority of the gallstones examined were of the cholesterol type, constituting 70% of the total. This dominance in prevalence might be indicative of the dietary and lifestyle patterns of the population studied.[16]Multiple stones (56.42%) have been found more commonly than single stones (34.28%) in our study as well as previous studies. This indicates that cases with multiple number of stones are more symptomatic than those with single number stone. The pure cholesterol-type stones were present in the majority of cases and none of these had either brown or black pigment stones.[17-21]

In our study, the multiple number (79) of gall stone and cholesterol type (68) of gall stone was the most common one in among the three types as shown in Table.No-1. Further, we explained the gender-wise distribution of number and type of stones in our study and found that in female (64) and male (15) both contain multiple number of stones in higher percentage whereas the cholesterol type of stone is higher in female (58) whereas in male both cholesterol (10) and pigmented type (10) of stone were in the same percentage. So, our study is similar to study done by Savita Mishra et al (2023), Gupta A,M et al (2017) & Hemlata Sharma et al (2015) But varies to other studies done by Mathur S, K et al (2013) and Narang et al (2014) shows Mixed stone more common.

CONCLUSION:

This study has established the link between gallstones types and Number with the gender of Cholelithiasis cases and to find out the regional differences in the cholelithiasis development in this population. So, further research is needed to understand the various factors like races, Environmental factor in cases of Cholelithiasis to establish treatment according to it.

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