Correlation of Gallstone Characteristics with the Clinical Parameters in Cases of Cholelithiasis

HEMLATA SHARMA, GHANSHYAM GUPTA, MANOJ KUMAR SHARMA

ABSTRACT

Introduction: Cholelithiasis means the “presence of stone in the gall bladder” is a common clinical entity affecting the adult population of both sexes. Various sign and symptoms like severe pain in Murphy’s point in right upper quadrant of abdomen, bilious vomiting, mild to moderate increase in temperature, obstructive jaundice, loss of appetite and weight are present in cholelithiasis. Gallstones are known to produce diverse histopathological changes in the gallbladder. Aims: The study was undertaken to assess prospectively the influence of physical, clinical and biochemical characteristics on type of gallstones and their relationship in patients of cholelithiasis. Materials and Objectives: The study was done in hundred patients of cholelithiasis of both sexes, aged between 12 years to 80 years who underwent cholecystectomy. The stones were assessed for various parameters i.e. number, size, morphological types and correlated with clinical indices of cases (Hemoglobin, TLC, DLC, Blood sugar, SGOT, SGPT, Alkaline phosphatase, total serum bilirubin, direct serum bilirubin, indirect serum bilirubin, total serum protein and albumin values ) and also with diabetes mellitus, smoking, tobacco chewing, alcohol intake and dietary habits of cases of cholelithiasis.

Results: Out of total 100 specimens examined in present study, 24 had cholesterol (male -4, female- 20), 46 had mixed (male-11, female- 35) and 30 had pigmented (male-11, female-19) gallstones respectively. Number of stones varies from a single calculus in 30% cases, double in 12% cases and multiple in remaining 58% cases. Shape of stone varied from polygonal/rectangular in 1% cases, ovoid in 15%, rounded in 22%, irregular in 29% and maximum had faceted shaped gallstone in 32% of cases. Haemoglobin, TLC, DLC, Blood sugar, SGOT, SGPT, Alkaline phosphatase, total serum bilirubin, direct serum bilirubin, indirect serum bilirubin, total serum protein and albumin values did not showed statistically significant correlation with gallstone types. The mean systolic BP (p<0.27) and the mean diastolic BP (p<0.012) in patients having cholesterol, mixed and pigmented gallstones showed statistically significant association with gallstone types. Conclusion: Mixed gallstones more common among females and association of biochemical indices needs further exploration. Therefore gender, ethnicity and other clinical features can be used as the factor to predict the formation of gallstones disease. It is also recommended that all patients should go through the analysis of all the biochemical parameters before cholecystectomy.

Keywords: Black pigment, Cholecystitis, Cholesterol stone, Gallbladder, Gallstone disease, Mixed stone

INTRODUCTION

The gallbladder is stimulated to contract and expel the bile in to duodenum by the hormone cholecystokinin pancreozymin (CCK) produced by the endocrine cells of the duodenal mucosa in response to food (Norman S. Williams, Bailey and Loves, 25th edition) [1]. The inner surface of bladder is covered by mucosa with simple columnar epithelium with microvilli, Muscularis mucosa and submucosa are absent in gallbladder .Mucus glands are only present in neck region of gallbladder [2].

Cholelithiasis has been described as a disease of civilization. It is observed in Egyptian mummies dating as far back as 3400 B.C. It appears likely that Charaka (2nd century B.C.) and Sushruta (6th Century B.C.) from India were also familiar with this disease of the biliary tract [3,4].The severity of gallstone disease has previously been shown to related to gallstone type and particularly septic complications are much more common in patients with pigment gallstones than in patients with cholesterol gallstones [5,6]. Various sign and symptoms like severe pain in Murphy’s point in right upper quadrant of abdomen, bilious vomiting, mild to moderate increase in temperature, obstructive jaundice, loss of appetite and weight are present in cholelithiasis [7].

Cholecystitis and cholelithiasis are very common particularly in fatty, fertile and female in 40. Gallstones are a major cause of morbidity and mortality throughout the world. The prevalence
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Gallstone disease is a common problem worldwide including India. It is commonly believed that bile stasis is the prime factor for formation of gall stone [9]. The function of gallbladder not only to store bile but also to concentrate it during the inter digestive phase by means of self dependent water re absorption. Risk factors for gall stone formation are [10]. –

1  Advancing Age
2  Sex- prevalence rate of cholelithiasis is higher in women of all age groups.
3  High fat diet.
4  Genetics.
5  Bariatric surgery.

Cholelithiasis produces diverse histopathological changes in gallbladder mucosa namely acute inflammation, glandular hyperplasia, granulomatous inflammation, cholesterosis, dysplasia and carcinoma [11].

**AIMS AND OBJECTIVES**

The present study was undertaken to correlate various gallstone characteristics (number, size, and morphological...
types,) with Clinical Indices of cases (Hemoglobin, TLC, DLC, Blood sugar, SGOT, SGPT, Alkaline phosphatase, total serum bilirubin, direct serum bilirubin, Indirect serum bilirubin, total serum protein and albumin values) and also with diabetes mellitus, smoking, tobacco chewing, alcohol intake and dietary habits.

**MATERIALS AND METHODS**

Gallbladder of 100 patients (Male – 26, Female – 74) aged between 12 years to 80 years were obtained from Department of General Surgery, R.N.T Medical College and attached M.B. Government Hospital, Udaipur, Rajasthan, India who underwent cholecystectomy for gallstone disease with chronic cholecystitis after due approval of research project by Institutional Ethical Committee.

Physical characteristics of stones were noted as per the following parameters:

- **Type**: based on morphology
- **Number**: single/double/multiple.
- **Size**: average of two major diameters with a Vernier caliper (accuracy: 0.01cm). In the event of multiple stones, the diameter of largest and smallest stone were recorded.

Statistical analysis was performed by using Chi-square test for tables and proportions.

**RESULTS**

Out of total 100 specimens examined in present study, 24 had cholesterol (male -4, female- 20), 46 had mixed (male-11, female- 35) and 30 had pigmented (male-11, female-19) gallstones respectively. Number of stones varies from a single calculus in 30% cases, double in 12%cases and multiple in remaining 58% cases. Shape of stone varied from polygonal/rectangular in 1% cases, ovoid in 15%, rounded in 22%, irregular in 29% and maximum had faceted shaped gallstone in 32% of cases. The average weight of patients having cholesterol stone was 63.500 kg, with mixed stone 65.93kg, and with pigmented stone 62.76kg respectively and association of weight with types of gallstones was statically not significant (p>0.3666) [Table/Fig-6].

**Clinical and biochemical correlations**

The incidence of diabetes mellitus (9%), smoking (7%), tobacco chewing (11%), alcohol intake (10%) and dietary habits (veg. - 66%, mix. - 34%) were noted at the time of admission of patients for cholecystectomy. No statistical association observed between the types of gallstones and above mentioned clinical features [Table/Fig-7,8].

<table>
<thead>
<tr>
<th>S.NO</th>
<th>Type of stone</th>
<th>Age</th>
<th>Weight</th>
<th>Sex (Male)</th>
<th>Sex (Female)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cholesterol</td>
<td>42.12</td>
<td>65.50</td>
<td>4 (16.7%)</td>
<td>20 (83.3%)</td>
</tr>
<tr>
<td>2</td>
<td>Mixed</td>
<td>45.76</td>
<td>65.93</td>
<td>11 (23.9%)</td>
<td>35 (76.1%)</td>
</tr>
<tr>
<td>3</td>
<td>Pigmented</td>
<td>39.43</td>
<td>62.76</td>
<td>11 (35.7%)</td>
<td>19 (63.3%)</td>
</tr>
</tbody>
</table>

| f-value | 1.908 | 1.015 | 2.2965 | 2.2965 |

| p-value | 0.154 Not Significant | 0.3666 Not Significant | 0.227 Not Significant | 0.227 Not Significant |

**Table/Fig-6**: Association of age, sex and weight of patients with gallstones type

**Table/Fig-7**: Association of alcohol intake and diet in cases with gallstones type

Hemoglobin, TLC, DLC, Blood sugar, SGOT, SGPT, Alkaline phosphatase, total serum bilirubin, direct serum bilirubin, Indirect serum bilirubin, total serum protein and albumin values are shown in [Table/Fig-9]. No significant correlation between the gallstone type and biochemical values were detected in present study [Table/Fig-9].

The mean systolic BP were 131.25mmHg, 123.43mmHg and 120.90mmHg in patients having cholesterol, mixed and pigmented gallstones respectively. This parameter was statistically significant (p<0.27) [Table/Fig-9].

The mean diastolic BP was 83.08, 78.86 and 76.66 in patients having cholesterol, mixed and pigmented gallstones
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respectively. The association of this parameter with gallstone types was statistically significant (p<0.012) [Table/Fig-9].

**DISCUSSION**

Gallstone formation results from many complex factors working together. The pathologic factor related to gallstone formation is still the hot debate. Bile stasis secondary to gallbladder dyskinesia is the most widely accepted theory. The study demonstrated that mixed type of gallstones account for about 46% of stones found in cholecystectomized patients, mainly in females and the ratio of male & female was 1:3. It is consistent with the reports of Bruce W. Trotman et al., [12] and Harshi T W Weerakoon et al., [13] and Aslam H.M. et al., [14].

Raised values of SGPT and Alkaline phosphatase were observed in present study which is as similar as the findings of Aslam H.M. et al, 201314 so, the occurrence of gallstones was positively correlated with rise in SGPT levels.

It is also proved that obese women secretes more cholesterol into their bile then a non obese female [15]. In present study, the incidence of Diabetes, Alcoholism, smoking, Tobacco chewing, Dietary habits in cases do not predispose to either type of gallstone formation. These findings are similar with the results of Harshi T W Weerakoon et al., [13]  and Sherlock [16] .

Gallstone disease appeared to be increasing in incidence over past couple of decades in India and western world due to increased intake of fatty and high calorie diet and increased consumption of alcohol [17].

It was observed that despite the diverse mechanism of stone induction and the differences before in stone composition, the incidence of gallstones was positively correlated with rise in SGPT levels.
there is a quantitative increase in the epithelium mucus production in the period stone formation.

CONCLUSION

Gallstones appear to be most important risk factor being reported in 70 % to 98% cases of gallbladder cancer and it is the most common cancer of biliary tree and 5th most common gastrointestinal malignancy. This present prospective study confirms that femininity and obesity are strongly associated with gallstones formation presumably due to excess cholesterol in bile which eventuates in cholecystectomy at a mean age from 39 years to 45 years.

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REFERENCES
