

ORIGINAL ARTICLE

Evaluation of gallbladder mucosal changes among patients with gallstones

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ABSTRACT:

Background: The present study was conducted for evaluating gallbladder mucosal changes among patients with gallstones. **Materials & methods:** 100 gallstone patients who were scheduled to undergo Cholecystectomy were enrolled. Only those patients were enrolled which had symptomatic cholecystitis due to cholelithiasis irrespective of age or gender. The tissue was properly sampled and processed by routine histological techniques for paraffin embedding and sectioning at 4 micron thickness. Four sections including entire wall were obtained: two from body, one each from fundus and neck of the gall bladder. Additional sections were taken from abnormal mucosa. Histopathological diagnosis was established on routine hematoxylin and eosin staining of the sections. **Results:** Adenomatous hyperplasia, Chronic cholecystitis, Hyperplastic polyp with chronic cholecystitis and Malignancy was present in 32 percent, 33 percent, 22 percent and 13 percent of the patients respectively. Non-significant results were obtained while correlating Gallbladder mucosal changes and number of stones in gallbladder (p -value > 0.05). **Conclusion:** Gallstones are accompanied by major changes in the gallbladder epithelium which might be due to irritation to the mucosa by stones.

Key words: Gallbladder, Gallstones, Mucosal

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INTRODUCTION

Gallstones are hardened deposits of the digestive fluid bile, that can form within the gallbladder. They vary in size and shape from as small as a grain of sand to as large as a golf ball. Gallstones occur when there is an imbalance in the chemical constituents of bile that result in precipitation of one or more of the components.¹⁻³

Gallstone disease per se also carries inherent risks. Prospective population-based surveys have revealed an increased overall mortality, particularly from cardiovascular disease and cancer, as seen in Americans and Pima Indians with cholelithiasis. Further, as the incidence of gallstone disease escalates, there is a concomitant increase in complications like gallstone-related pancreatitis.^{4,5} Important risk factors have been identified as being associated with gallstones. Multiple case-control studies, comparing those with gallstones versus those without, have shown that gallstone formation is multifactorial. Some features, such as ethnicity, genetics, advancing age and female gender cannot be modified, whereas others (e.g., diet, physical activity, rapid weight loss and obesity) are modifiable.⁶ Cholelithiasis produces diverse histopathological changes in gallbladder mucosa namely acute inflammation, chronic inflammation, glandular hyperplasia, granulomatous inflammation, cholesterosis, dysplasia, and carcinoma.⁷ Hence; the present study was conducted for evaluating gallbladder mucosal changes among patients with gallstones.

MATERIALS & METHODS

The present study was conducted for evaluating gallbladder mucosal changes among patients with gallstones. 100 gallstone patients who were scheduled to undergo Cholecystectomy were enrolled. Only those patients were enrolled which had symptomatic cholecystitis due to cholelithiasis irrespective of age or gender. The tissue was properly sampled and processed by routine histological techniques for paraffin embedding and sectioning at 4 micron thickness. Four sections including entire wall were obtained: two from body, one each from fundus and neck of the gall bladder. Additional sections were taken from abnormal mucosa. Histopathological diagnosis was established on routine hematoxylin and eosin staining of the sections. The hematoxylin and eosin (H & E) stained sections were systematically examined and the pattern of response in the gallbladder mucosa. All the results were analyzed by SPSS software. Assessment of results was done by using chi-square test. P-value of less than 0.05 was taken as significant.

RESULTS

A total of 100 gallstone patients were analysed. Mean age of the patients was 46.2 years. 73 cases (73 percent) were females, while the remaining 27 cases (27 percent) were males. 23 cases (23 percent) had single stone, while the remaining 77 cases (77 percent) had multiple stones. Adenomatous hyperplasia, Chronic cholecystitis, Hyperplastic polyp with chronic cholecystitis and Malignancy was present in 32 percent, 33 percent, 22 percent and 13

percent of the patients respectively. Non-significant results were obtained while correlating Gallbladder mucosal changes and number of stones in gallbladder (p-value > 0.05).

Table 1: Distribution of cases according to number of stones in gallbladder

Number of stones	Number	Percent
Single	23	23
Multiple	77	77
Total	100	100

Table 2: Gallbladder mucosal changes

Gallbladder mucosal changes	Number	Percent
Adenomatous hyperplasia	32	32
Chronic cholecystitis	33	33
Hyperplastic polyp with chronic cholecystitis	22	22
Malignancy	13	13
Total	100	100

Table 3: Correlation of Gallbladder mucosal changes and number of stones in gallbladder

Gallbladder mucosal changes	Number of stones		
	Single	Multiple	Total
Adenomatous hyperplasia	9	23	32
Chronic cholecystitis	8	25	33
Hyperplastic polyp with chronic cholecystitis	4	18	22
Malignancy	2	11	13
Total	23	77	100
p-value	0.325		

DISCUSSION

Gallbladder disease represents a major healthcare problem in the United States. Approximately 12% of the U.S. population, or 30,000,000 Americans have gallstones. More than 750,000 cholecystectomies are performed each year, and the cost of caring for these patients is between 8 and 10 billion dollars annually. Age, gender, race, obesity, diabetes, and parity have all been identified as significant risk factors for the development of gallstones. Many of these patients also have a family history of gallstones, but surprisingly little is known about the link between genetics and gallstone disease in humans.^{8, 9} Since most gallstones are asymptomatic, it is essential to define exactly which symptoms are caused by gallstones: true biliary pain and/or complications, versus nonspecific abdominal complaints including dyspepsia.³²⁻³⁴ Gallstone-associated pain seems to follow a certain pattern in most patients.^{10, 11} Metaplastic changes of the epithelial cells are common adaptive response and usually associated with chronic irritation. In the gallbladder, gallstone and subsequent inflammation may induce epithelial injury and resultant metaplastic changes. It has been suggested that the metaplastic epithelium is more susceptible to malignant transformation than normal mucosal and intestinal metaplasia-dysplasia-carcinoma sequence exists in the gallbladder.¹⁰⁻¹² Hence; the present study was conducted for evaluating gallbladder mucosal changes among patients with gallstones.

A total of 100 gallstone patients were analysed. Mean age of the patients was 46.2 years. 73 cases (73 percent) were females, while the remaining 27 cases (27 percent) were males. 23 cases (23 percent) had single stone, while the remaining 77 cases (77 percent) had multiple stones. Adenomatous hyperplasia, Chronic cholecystitis, Hyperplastic polyp with chronic cholecystitis and Malignancy was present in 32 percent, 33 percent, 22 percent and 13 percent of the patients respectively. Non-significant results were obtained while correlating Gallbladder mucosal changes and number of stones in gallbladder (p-value > 0.05). In a similar study conducted by Baig SJ et al, authors evaluated whether any correlation existed between the chemistry of gallstones and any particular histopathologic picture. Twenty-eight patients had mixed stones, 8 had pigment stones and 4 had cholesterol stones. Out of 28 patients with mixed stones 14 had histological picture of chronic cholecystitis, 8 had granulomatous cholecystitis, 4 had adenomatous hyperplasia, 1 had dysplasia and 1 had carcinoma. All 8 patients having pigment gallstones had chronic cholecystitis. Out of 4 patients with cholesterol gallstones, 2 had chronic cholecystitis, 1 had adenomatous hyperplasia and 1 had cholesterosis.¹² In a similar study conducted by Mathur SK et al, authors correlated various gallstone characteristics with the type of mucosal response in gall bladder. Cholecystitis, hyperplasia, metaplasia and carcinoma were more commonly seen with mixed and multiple stones.¹³ Chang et al, in another study investigated the pathologic change of gallbladder

mucosa related to gallstone formation, 52 mice were fed a lithogenic diet containing 1% cholesterol and 0.5% cholic acid and we evaluated the sequential morphologic changes in the gallbladder from two days to 40 weeks. Their results suggested hyperplasia and metaplasia are closely related to the gallstone formation. Hyperplasia is probably reactive to irritating effect of lithogenic bile or stone. Metaplasia and cholesterol gallstone may develop simultaneously, and act synergistically.¹⁴

CONCLUSION

Gallstones are accompanied by major changes in the gallbladder epithelium which might be due to irritation to the mucosa by stones in addition to the toxic effect of the lithogenic bile which produce chemical injury to the mucosa.

REFERENCES

- Hofmann AF, Scheingart CD, vanSonnenberg E, Esch O, Zakko SF. Contact dissolution of cholesterol gallstones with organic solvents. *Gastroenterol Clin North Am.* 1991;20:183–99.
- Foerster EC, Matek W, Domschke W. Endoscopic retrograde cannulation of the gallbladder: Direct dissolution of gallstones. *Gastrointest Endosc.* 1990;36:444–50.
- Almasy L, Blangero J. Multipoint quantitative-trait linkage analysis in general pedigrees. *Am J Hum Genet* 1998; 62: 1198–1211.
- Gaby AR. Nutritional approaches to prevention and treatment of gallstones. *Altern Med Rev.* 2009;14:258–67.
- Simon JA, Hudes ES. Serum ascorbic acid and other correlates of gallbladder disease among US adults. *Am J Public Health.* 1998;88:1208–12. Harvald B, Hauge M. A catamnestic investigation of Danish twins: a preliminary report. *Danish Med Bull* 1956; 3: 151–158.
- Hopper JL, Mathews JD. Extensions to multivariate normal models for pedigree analysis. *Ann Hum Genet* 1982; 46: 373–383.
- Pixley F, Wilson D, McPherson K, Mann J. Effect of vegetarianism on development of gall stones in women. *Br Med J (Clin Res Ed)* 1985;291:11–2.
- Moerman CJ, Smeets FW, Kromhout D. Dietary risk factors for clinically diagnosed gallstones in middle-aged men. A 25-year follow-up study (the Zutphen Study) *Ann Epidemiol.* 1994;4:248–54.
- van Erpecum KJ, van Berge Henegouwen GP, Stolk MF, Hopman WP, Jansen JB, Lamers CB. Fasting gallbladder volume, postprandial emptying and cholecystokinin release in gallstone patients and normal subjects. *J Hepatol.* 1992;14:194–202.
- Portincasa P, Di Ciaula A, Vendemiale G, Palmieri V, Moschetta A, Vanberge-Henegouwen GP, Palasciano G. Gallbladder motility and cholesterol crystallization in bile from patients with pigment and cholesterol gallstones. *Eur J Clin Invest.* 2000;30:317–324.
- Etgen SH. Calculus II. In: Salas SL, Etgen GJ, Hille E., editors. *Calculus, One and Several Variables*, 9th ed; 2004. pp. 314, 945–950, 985-986.
- Baig SJ, Biswas S, Das S, Basu K, Chattopadhyay G. Histopathological changes in gallbladder mucosa in cholelithiasis: correlation with chemical composition of gallstones. *Trop Gastroenterol.* 2002 Jan-Mar;23(1):25-7
- Mathur SK, Duhan A, Singh S, Aggarwal M, Aggarwal G, Sen R, Singh S, Garg S. Correlation of gallstone characteristics with mucosal changes in gall bladder. *Trop Gastroenterol.* 2012 Jan-Mar;33(1):39-44. doi: 10.7869/tg.2012.6. PMID: 22803294.
- Chang, H. J., Suh, J. I., & Kwon, S. Y. (1999). Gallstone formation and gallbladder mucosal changes in mice fed a lithogenic diet. *Journal of Korean medical science*, 14(3), 286–292.