Journal of Cardiovascular Disease Research
ISSN: 0975-3583,0976-2833 VOL15, ISSUE 07, 2024

ORIGINAL RESEARCH

Evaluation of the Morphological Properties of Cholecystectomy Specimen Gallstones

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Received:10 May 2024 Accepted: 16 June 2024

Abstract:
Aim: The aim of the present study was to evaluate the morphological properties of cholecystectomy specimen gallstones.
Materials & methods: Permission to conduct research using human subjects was obtained from the Research & Ethical Committee of the Institution where the study was conducted.The study was conducted on specimens obtained from 60 post-cholecystectomy patients at the Index Medical College Indore, Madhya Pradesh.
Results: Of the 60 gallbladders that showed pigmented calculi, 49 had numerous calculi and 11 had only one. Of the gallbladders that had several calculi, 13 were cholesterol stones, 30 were mixed stones, and six were pigmented stones.Among the 60 gallbladders that contained calculi, 36 had calculi that were round to ovoid, 11 had calculi that were polyhedral and multifaceted, and 14 had calculi that were irregular in shape.The gallbladder size was normal in 35 patients, enlarged in 16 patients, and fibrotic in 9 patients.
Conclusion: Various factors such as lifestyle and dietary habits play a significant role in gallstone development. It would have been beneficial to conduct chemical analysis of the stones to determine the causes more precisely. The risk factors for developing chronic cholecystitis, a condition associated with gallstones, were found to be associated with the female sex.
Keywords: Morphology, Cholecystectomy, gallstones, gallbladder, specimen,

Introduction:

Gallstones, which are solid formations that develop in the gallbladder or bile ducts, are a highly common gastrointestinal condition that has substantial consequences for patient well-being and healthcare systems globally. Cholecystectomy, the surgical extraction of the gallbladder, is the established procedure for treating gallstones that cause symptoms [1,2]. This procedure provides a special chance to examine the physical characteristics of these stones [1]. Comprehending the morphological traits of gallstones is essential for clarifying their origin, foreseeing clinical results, and directing therapeutic measures [3].

Gallstones have significant variability in their size, shape, content, and texture, which reflects differences in how they are formed and the underlying pathophysiology [4,5]. An analysis of the physical characteristics of gallstones and their connection to gallbladder illness can be obtained through morphological assessment of cholecystectomy specimens [4]. This introduction seeks to examine the importance of evaluating the morphological characteristics of gallstones and emphasize the methods used in their assessment [6].

The morphological attributes of gallstones comprise various crucial elements, including dimensions, form, hue, surface features, and composition [7]. Cholecystectomy specimens can be visually examined and measured to observe and categorize gallstones based on their size and shape [4]. Gallstones can be classified into several morphological forms, including cholesterol stones, pigment stones, mixed stones, and uncommon variations such calcium carbonate or protein-based stones [5]. Therefore, the aim of the present study was to evaluate the morphological properties of cholecystectomy specimen gallstones.

Materials & methods:
This was a retrospective observational study to examine the various features of common gall-bladder diseases (obtained after cholecystectomy), namely clinical features, ultrasonological changes, histological changes, and gross morphological changes, to observe whether the changes were present in all the cases and also note any observations present differently from the established findings.Permission to conduct research using human subjects was obtained from the Research & Ethical Committee of the Index Medical College, Hospital & Research Centre, Malwanchal University.The study was conducted on specimens obtained from 60 post-cholecystectomy patients at the Index Medical College Indore, Madhya Pradesh. Preoperative ultrasonological reports were collected from patients 'medical records. The gall-bladder specimens were collected with the consent of the patients/patient parties from the surgery department of the college. After procurement of gallbladder samples from cholecystectomy, a histological study of the gallbladder wall was performed. The histological study was performed in the Department of Anatomy, Index Medical College, Indore, Madhya Pradesh.Methods: A detailed history was obtained from patients directly and from medical records, as necessary. After cholecystectomy, the gall-bladder specimens were collected in 10% buffered formaldehyde. The gross external appearance of the gallbladder and its shape, size, presence or absence of stones, and type were observed and recorded.

Statistical analysis:
The units of expression for all data are presented as mean and standard deviation (±). Data analysis was conducted using SPSS 20.0. Pie charts and bar diagrams were used to statistically represent results.

Results:
Of the 60 gallbladders showing calculi, the majority 41 patients were females when compared to males were 19.Of the 60 gallbladders that showed pigmented calculi, 49 had numerous calculi and 11 had only one. Of the gallbladders that had several calculi, 13 were cholesterol stones, 30 were mixed stones, and six were pigmented stones (Figure 2).Among the 60 gallbladders that contained calculi, 36 had calculi that were round to ovoid, 11 had calculi that were polyhedral and multifaceted, and 14 had calculi that were irregular in shape (Figure 3).The gallbladder size was normal in 35 patients, enlarged in 16 patients, and fibrotic in 9 patients.

Figure 1: Gallbladders with calculi in percentage

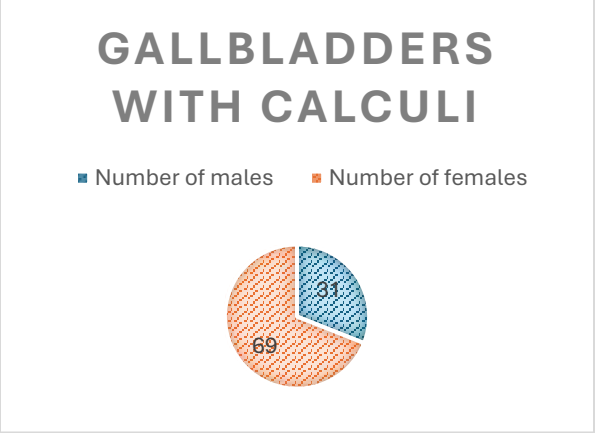


Figure 2: Distribution in this study was determined using a certain number of calculi.

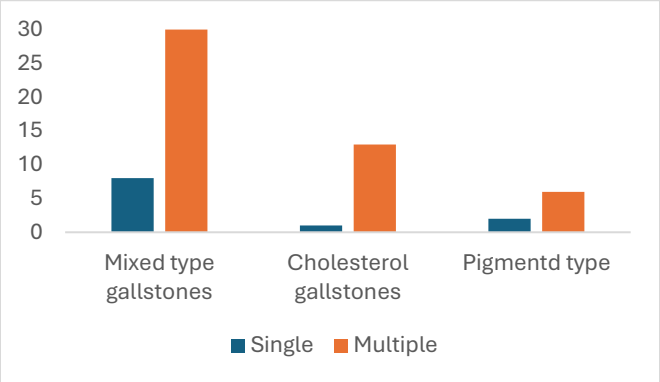
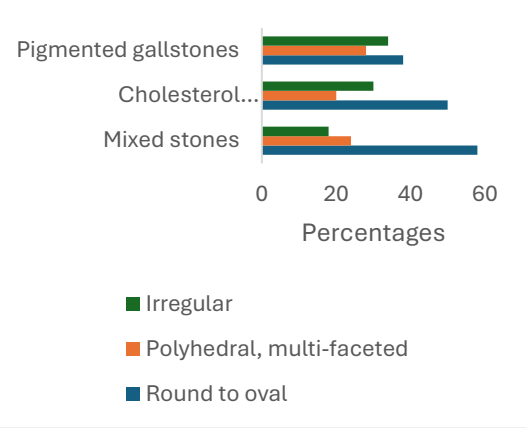


Figure 3: Percentages of the shape of calculi in the study population



Discussion:

In this investigation, 116 gallbladder specimens were obtained, of which only 60 were related to gallstones. Previous research [5-9]has demonstrated a higher prevalence of gallbladder calculi, ranging from 65% to 95.45%. The lower prevalence of gallstones in the gallbladder specimens obtained from surgeons may be due to the absence of these stones, as we typically receive sectioned gallbladders.

The majority of participants in this study were female, accounting for 69% of the total, which is consistent with the findings of previous studies [8-13]. Mixed gallstones were the most common type discovered in this study, accounting for 64.04% of all gallstones. Studies conducted by [7,8,14,15] reported that 62.3%, 68%, 71.4%, and 81.12% of the participants experienced multifactorial changes in dietary habits along with an infectious origin. This is consistent with their findings.

Of the 38 patients in the current study who had calculi in their gallbladders, most had multiple gallstones. This finding is similar to those of studies conducted by Nayak et al. [16] (84.3%) and Goyal et al. [9] (69.65%).

Cholelithiasis is responsible for almost 95% of biliary tract illnesses. As chronic cholecystitis is linked to cholelithiasis in over 90% of cases, individuals at risk for cholelithiasis are also at risk for chronic cholecystitis. The presence of excessive bile increases the likelihood of developing chronic inflammation and, in most cases, stone formation. Bacteria such as E. coli and enterococci can be grown in the laboratory from bile in approximately 33% of cases. Biliary symptoms often arise because of the prolonged presence of gallstones and chronic low-level inflammation [17].

Conclusion:

The current study showed a significant correlation between female sex and gallstone formation, particularly in the age range–40-49 years. Most gallstones detected were of a mixed variety. Various factors such as lifestyle and dietary habits play a significant role in gallstone development. It would have been beneficial to conduct chemical analysis of the stones to determine the causes more precisely. The risk factors for developing chronic cholecystitis, a condition associated with gallstones, were found to be associated with the female sex.

Conflict of interest:
There is no conflict of interest among the present study authors.

References:

1. Khan I, Yadav P, Saran RK, Sharma S, Sharma AK, IRSHAD I, YADAV Jr PA, kishan Saran R, SHARMA S, SHARMA AK. A Study of the Degree of Gall Bladder Wall Thickness and Its Impact on Patients Undergoing Laparoscopic Cholecystectomy. Cureus. 2023 May 14;15(5).
2. Rifai AO, Rembetski EM, Stutts LC, Mazurek ZD, Yeh JL, Rifai K, Bear RA, Maquiera AJ, Rydell DJ. Retrospective analysis of operative time and time to discharge for laparoscopic vs robotic approaches to appendectomy and cholecystectomy. Journal of Robotic Surgery. 2021 Jun 4:1-7.
3. Lammert F. Gallstones: The thing in itself. Clinical Liver Disease. 2022 Nov;20(Suppl 1):57.
4. Soleimani N, Zare Sheibani A, Khajeh S, Mohammadzadeh S, Taheri N, Mokhtari M, Farhadi M, Hajizade Z, Khaleghpanah S, Dehghani S. Critical value in surgical pathology: evaluating the current status in a multicenter study. Diagnostic Pathology. 2023 Apr 27;18(1):55.
5. Beena D, Shetty J, Jose V. Histopathological spectrum of diseases in gallbladder. National Journal of Laboratory Medicine. 2017 Oct;6(4):6-9.
6. Karlatti SS, Kumar GR. Incidence of various types of gallstones in patients of cholelithiasis in belagavi. International Journal of Scientific Study. 2016;4(7):21-3.
7. Awasthi N. A retrospective histopathological study of cholecystectomies. International Journal of Health & Allied Sciences. 2015 Jul 1;4(3):203-.
8. Mohan H, Punia RP, Dhawan SB, Ahal S, Sekhon MS. Morphological spectrum of gallstone disease in 1100 cholecystectomies in North India. Indian journal of surgery. 2005 Jun 1;67(3).
9. Goyal S, Singla S, Duhan A. Correlation between gallstones characteristics and gallbladder mucosal changes: A retrospective study of 313 patients. Clin Cancer Investig J. 2014 Mar 1;3(2):157-61.
10. Swartz DE, Felix EL. Elective cholecystectomy after Roux-en-Y gastric bypass: why should asymptomatic gallstones be treated differently in morbidly obese patients?. Surgery for Obesity and Related Diseases. 2005 Nov 1;1(6):555-60.
11. Sharma I, Choudhury D. Histopathological patterns of gall bladder diseases with special reference to incidental cases: a hospital-based study. Int J Res Med Sci. 2015 Dec;3(12):3553-7.
12. Kumar P, Shukla P, Kumari S, Dixit R, Narayan G, Dixit VK, Khanna AK. Expression of Mucoproteins in Gallbladder Cancer. Indian Journal of Surgery. 2022 Jun;84(3):456-62.
13. Murmu S, Topno VJ, Baitha B. Histopathological study of gallbladder lesions in East Singhbhum, Jharkhand. IOSR Journal of Dental and Medical Sciences. 2017;16:01-3.
14. Mondal B, Maulik D, Biswas BK, Sarkar GN, Ghosh D. Histopathological spectrum of gallstone disease from cholecystectomy specimen in rural areas of West Bengal, India-an approach of association between gallstone disease and gallbladder carcinoma. Int J Community Med Public Health. 2016 Nov;3(11):3229-5.
15. Kumar H, Dundy G, Kini H, Tiwari A, Bhardwaj M. Spectrum of gallbladder diseases—A comparative study in north vs south Indian population. Indian Journal of Pathology and Oncology. 2018 Apr;5(2):273-6.
16. Nayak G. A Clinicopathological Study of Cholelithiasis in an EasternIndian Population. Int. J Pharm Bio Sci. 2016;7(3):6-11.
17. Soleimani N, Zare Sheibani A, Khajeh S, Mohammadzadeh S, Taheri N, Mokhtari M, Farhadi M, Hajizade Z, Khaleghpanah S, Dehghani S. Critical value in surgical pathology: evaluating the current status in a multicenter study. Diagnostic Pathology. 2023 Apr 27;18(1):55.