Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1807
Original Article

Incidental discovery of xanthogranulomatous cholecystitis as a mimicker of gall bladder adenocarcinoma: A retrospective cohort study.

Zeenat Sarmadi Imam[1], Shadan Rabab[2*], Kumari Sunita Bharti[2], Makarand Hemant Langhe[3], Bipin Kumar[4], Manish Mandal[5], Rakesh Kumar Singh[6]

Associate Professor, Department of Pathology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India[1]
Senior Resident, Department of Pathology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India[2]
Senior Resident, Department of Surgical Gastroenterology and Liver Transplant, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India[3]
Professor and HOD, Department of Pathology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India[4]
Professor and HOD, Department of Surgical Gastroenterology and Liver Transplant, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India[5]
Additional Professor, Department of Surgical Gastroenterology and Liver Transplant, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India[6]

Abstract

Background: Xanthogranulomatous cholecystitis (XGC) is an inflammatory condition characterised by the intramural accumulation of lipid-laden macrophages in the bladder wall. Sometimes, XGC results in adhesions of the gall bladder to adjacent organs, causing the formation of fistulous tracts and bladder perforation. Intense adhesions lead to mass formation, giving a false impression of malignancy on radiological investigations and intraoperatively. Such cases are resolved only after final histopathological diagnosis, making it the gold standard.
Aims and Objectives: The study was conducted to outline and review the presentations and investigations in cases of XGC in order to structure an approach to managing diagnostic dilemmas in treating such patients.

Materials and methods: An observational, retrospective study was conducted in the Pathology department at IGIMS, Patna. A total of 1260 cholecystectomy samples with a preoperative diagnosis of gall bladder cancer (GBC), received from January 2019 to December 2024, were included in our study. Cases were selected as per the inclusion and exclusion criteria.

Results: Statistical analysis showed that out of 1260 specimens, preoperatively diagnosed as GBC, 59 were diagnosed as XGC on histopathological examination (Group X). Group Y had a greater incidence of anorexia and weight loss. Radiological findings on retrospect in group X displayed specific features suggestive of XGC, namely diffuse gall bladder wall thickening, hypoattenuated submucosal nodules, intrahepatic duct dilatation, continuous mucosal line enhancement, and loss of interface between the gall bladder and liver.

Conclusion: It is difficult to diagnose XGC from GBC preoperatively in all cases. Histopathological examination serves as the cornerstone in such diagnostic dilemmas.

Recommendations: A multidisciplinary approach and increased awareness are key to accurate diagnosis and appropriate management.

Keywords: *Xanthogranulomatous Cholecystitis, Cholelithiasis, Cancer, Gall bladder, Cholecystectomy*
Submitted: *2025-01-09* ***Accepted:*** *2025-03-31* ***Published:*** *2025-06-30*

Corresponding author: *Shadan Rabab[*]*
Email*: shadan.rababd@gmail.com*
Senior Resident, Department of Pathology, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1807
Original Article

Introduction

Identified in the year 1970 by Christensen and Ishak [1] and later christened as XGC in the year 1976 by Mc Coy et al [2], XGC is a destructive inflammatory reaction presenting as a diffuse or focal lesion, characterized by production of xanthogranulomas, extensive fibrosis and the infiltration of gall bladder wall by foam cells and macrophages [3]. Frequently associated with cholelithiasis and cholesterolosis, XGC is a granulomatous inflammatory and cellular immune response followed by the extravasation of bile in the gall bladder wall [4]. Manifesting from subtle lesions to extensions into adjacent organs, leading to adhesions, perforations, mass and abscess formation, XGC causes difficulties in surgical dissections and diagnostic dilemmas, frequently being misdiagnosed as GBC clinicoradiologically [5-8]. Some studies have reported an incorrect diagnosis as high as 25%, leading to open exploration rather than simple cholecystectomy indicated for XGC [9,10,11]. Postoperative histopathological examination confirms the diagnosis in such cases, highlighting the fact that preoperative distinctions between XGC and GBC are imperative to prevent morbidity, particularly in cases of radical surgery as well as in cases where laparoscopic surgery is converted to open surgery [12,13].
The study was conducted to outline and review the presentations and investigations in cases of XGC to structure an approach to managing diagnostic dilemmas in treating such patients.

Methodology

Study design

A retrospective, cohort study.

Study settings

The study was conducted at the Department of Pathology at Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India.

Study population and time of study

A total of 1260 cholecystectomy samples with a preoperative diagnosis of gall bladder carcinoma, between the period of January 2019 to December 2024, were selected as per the following inclusion and exclusion criteria.

Inclusion criteria

Formalin-fixed cholecystectomy specimens resected with a preoperative diagnosis of GBC and received in the Pathology department.

Exclusion criteria

Small biopsies of the gall bladder.

- Cholecystectomies are associated with other malignancies
- Cholecystectomies are associated with distant metastasis.
- Cholecystectomies post-neoadjuvant chemotherapy.
- Autolysed and poorly preserved specimens.

Data collection and study procedure

After selecting the cases as per the inclusion and exclusion criteria, all the details were collected from histopathology request forms and hospital record sheets. Gross and microscopic features were recorded and analysed. Radiological features which were considered in the study were gall bladder wall thickness, type of gall bladder wall thickness (diffuse or focal), mucosal line continuity, mucosal enhancement characteristics (heterogenous or homogenous), lymphadenopathy, and presence of bands or hypoattenuated nodules in the submucosa. These parameters were compared between GBC and XGC to determine the identifying features of XGC preoperatively.

Figure 1 shows a gross image of the resected specimen of the gall bladder & adherent liver, showing diffuse thickening of the gall bladder wall. Figure 2 depicts xanthogranulomatous cholecystitis in Hematoxylin and eosin stain at 10X. Figure 3 shows xanthogranulomatous cholecystitis in Hematoxylin and eosin stain at 40X.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1807
Original Article

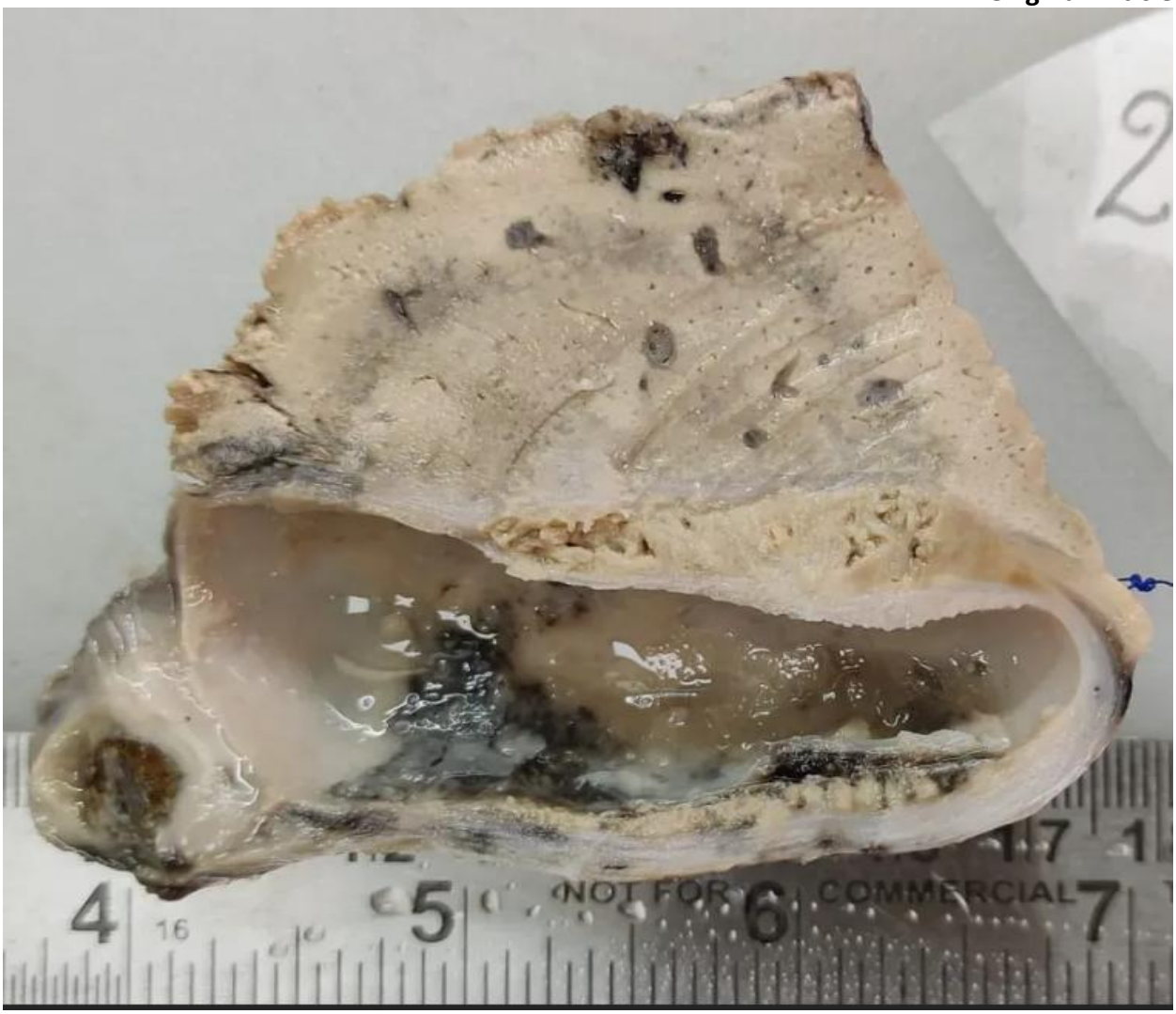

Figure 1: Gross image of resected specimen of gall bladder & adherent liver showing diffuse thickening of the gall bladder wall

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1807
Original Article

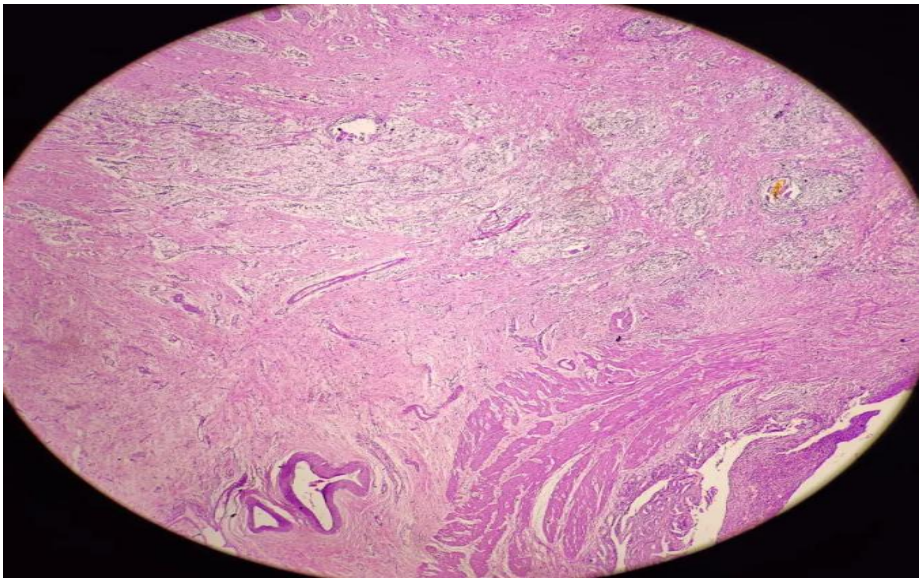

Figure 2: H&E (10X): Xanthogranulomatous cholecystitis

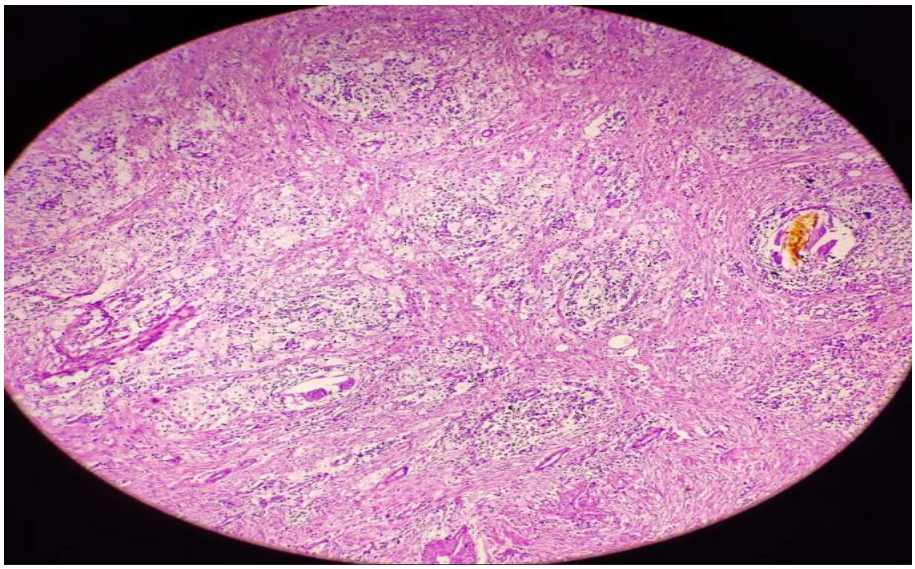

Figure 3: H&E (40X): Xanthogranulomatous cholecystitis

Statistical analysis

Data analyses were done using SPSS version 23. Quantitative variables were expressed as mean±SD, whereas qualitative variables were expressed as absolute and relative frequencies. Chi-square test and z test were used as tests of significance. A p-value of less than 0.05 was considered significant.

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1807
Original Article

Ethical clearance

The study protocol was reviewed and approved by the Institutional Ethics Committee, Indira Gandhi Institute of Medical Sciences, Patna, Bihar, India.

Informed consent

Written informed consent was obtained from all participants before their enrolment in the study.

Results

A total of 1260 cholecystectomy specimens with a preoperative diagnosis of gall bladder carcinoma, received during the study period in the department, were analysed based on clinical, surgical, radiological, and histopathological parameters. Out of these, 59 were diagnosed as XGC (Group X) on postoperative histopathological examination, and the remaining 1201were confirmed as GBC (Group Y). Retrospective analysis showed that Group X showed a higher incidence of cholelithiasis, acute cholecystitis, and abdominal pain as compared to Group Y, which was more frequently associated with loss of weight and appetite (Table 1).

Table 1: Comparison of clinical features and tumour markers between Xanthogranulomatous cholecystitis and gall bladder carcinoma

	Xanthogranulomatous Cholecystitis (N1=59)	**Gall Bladder Carcinoma** (N2=1201)	**p-value** (Significant when p-value <0.05)
Age (Mean$\pm SD$)	48.22yrs$\pm$11.34yrs	51.93yrs$\pm$11.56yrs	Not significant
Male/Female	39/20	290/911	Not significant
Abdominal Pain (%)	51(86.4 %)	214(17.8%)	Chi-square statistics=159.45 p-value<0.00001
Chronic Cholecystitis (%)	42(71.2%)	204(17%)	Chi-square statistics=105.14 p-value<0.00001
Cholelithiasis (%)	38(64.4%)	325(27%)	Chi-square statistics=38.24 p-value<0.00001
Weight loss (%)	11(18.7%)	634(52.8%)	Chi-square statistics=26.24 p-value<0.00001
Appetite loss (%)	32(54.2%)	230(19.2%)	Chi-square statistics=42.03 p-value<0.00001
Mass (%)	12(20.3%)	156(13%)	Not significant
Tumour Marker CEA ($\geq 4ng/ml$)	9(15.2%)	649(55%)	Chi-square statistics=33.90 p-value<0.00001
CA19.9 ($\geq 20IU/ml$)	28(47.5%)	803(67%)	Chi-square statistics=9.42 p-value<0.00001

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1807
Original Article

XGC was found to affect males more commonly, whereas females showed a dominance in GBC with a female-to-male ratio of 1:2 and 3:1, respectively (Figs 4&5). Significant difference was not identified in regard to age and the finding of a palpable mass. Though a few cases of XGC showed an increase in serum level of CEA or CA19.9, these cases were few, and the level was only moderately high. Significantly elevated levels were noted in Group Y.

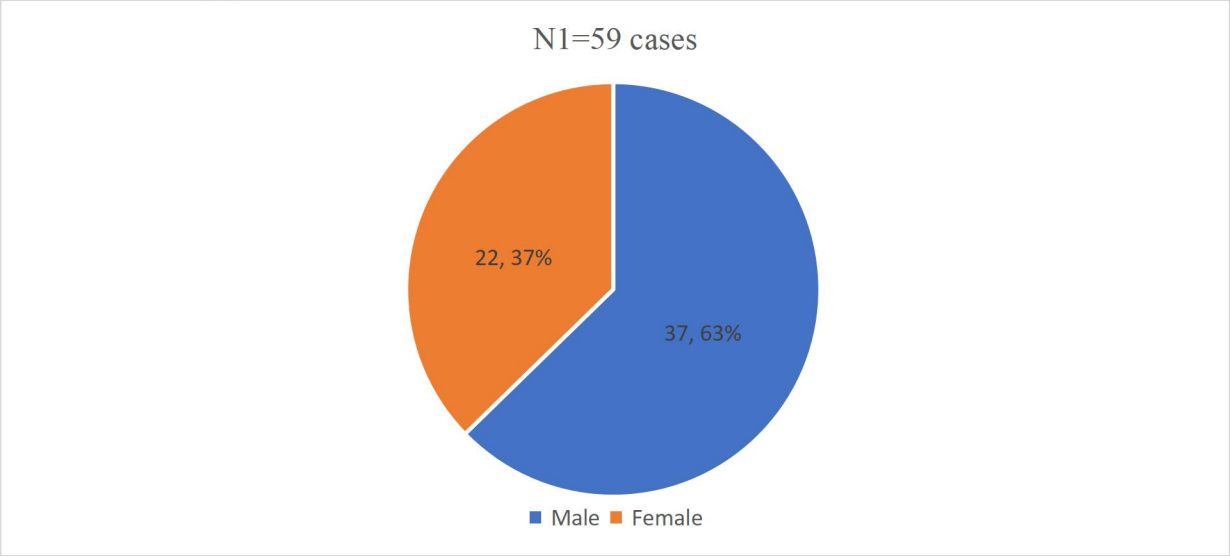

Figure 4: Gender distribution of the total number of cases of xanthogranulomatous cholecystitis

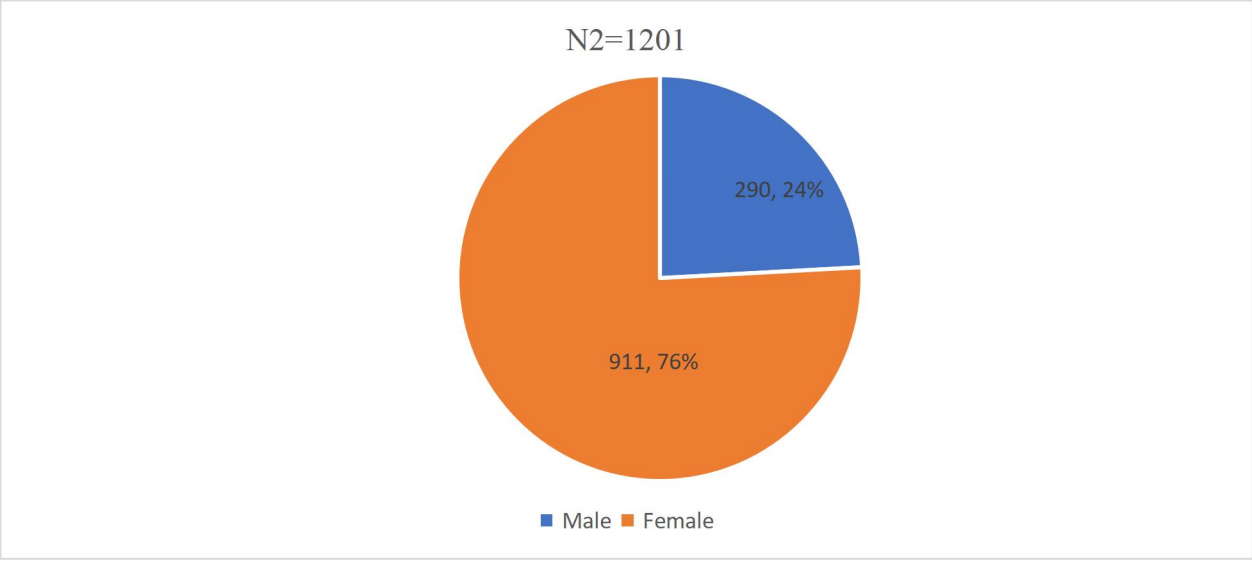

Figure 5: Gender distribution of the total number of cases of gall bladder carcinoma

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1807
Original Article

Radiologically, Group X was more frequently associated with the findings of diffuse thickening of the gall bladder wall, enhancement of continuous mucosal lines, and hypoattenuated bands and nodules submucosally (Table 2). A minimum of one of these findings was identified in 71.2% (42/59) cases in Group X.

Table 2: Comparison of radiological features between xanthogranulomatous cholecystitis and gall bladder carcinoma

Radiological Features	**Xanthogranulomatous Cholecystitis**	**Gall Bladder Carcinoma**	**p-value**(significant when p-value <0.05)
GB with wall thickness (Mean plusMean$\pm SD$)	mm9.12 mm $mm \pm 5.76mm$	11.23mm$\pm 4.mm$	Not Significant
Diffuse GB wall thickness(mm)	20	83	Chi-square statistics=54.56 p-value<0.00001
Continuous mucosal line	23	116	Chi-square statistics=49.27 p-value<0.00001
Submucosal hypoattenuated nodules/band	27	169	Chi-square statistics=42.99 p-value<0.00001
Lymph node enlargement	13	637	Chi-square statistics=21.64 p-value<0.00001

Discussion

Owing to the similar radiological and intraoperative findings of XGC and GBC, XGC is often misdiagnosed as GBC, usually leading to unnecessary surgical interventions [14,15,16]. The findings of a higher incidence of cholecystitis, cholelithiasis, and abdominal pain occurring in XGC (Group X) corroborate with the study of Zhang LF et al [17]. The study showed a higher incidence of XGC in males and GBC in females, which is in accordance with the studies done by Guzman-Valdivia [4] and Han and Chen et al [8]. However, varied reports have been submitted through different studies. Yucel et al noted an equal sex incidence in XGC [2]. Female preponderance in XGC was highlighted by Srinivasan GN et al [18].

Our findings revealed that XGC was more commonly associated with abdominal pain, cholelithiasis, and chronic cholecystitis. In contrast, GBC cases demonstrated a higher incidence of constitutional symptoms like anorexia and weight loss.

Though the study showed a direct relationship of Group Y with increased serum tumor markers, studies performed by Yang T et al [19], Sharma D et al [20], and Zhang LF et al [21] did not show any significant correlation. Radiological findings in Group X of the study are in agreement with the studies of Pin KM et al [22], Uchiyama K et al [23], and Chang S et al [24].

As the radiological characteristic features of XGC are also shared by GBC, various studies opine that the different frequencies of these features can be utilized to differentiate between the two entities [25,26]. Diffuse gall bladder wall thickening favours XGC, whereas focal gall bladder wall thickening, early gall bladder wall enhancement, and loss of continuous mucosal line favour GBC [26]. However, the proportion of cases displaying these features varies significantly, and the reliance solely on these features for treatment may lead to under- or over-treatment. Endoscopic ultrasound, along with intraoperative frozen section examination, is the most effective method of diagnosing XGC [27,28].

Conclusions

Differentiating XGC from GBC causes diagnostic dilemmas, necessitating histopathological examination for definitive diagnosis. An integrated review of clinical

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1807
Original Article

observations and radiological findings is required for an accurate preoperative diagnosis in order to avoid radical cholecystectomies in certain cases.

Limitations

The study's limitations included its retrospective nature, which relied on available medical records and histopathology forms, potentially resulting in incomplete clinical or radiological data. The study was conducted at a single tertiary care center, which may affect the generalizability of findings to broader populations or primary care settings.

Recommendations

A multidisciplinary approach and increased awareness are key to accurate diagnosis and appropriate management.

Generalizability

Being a single-centre, retrospective study, its results may not fully apply to other regions or healthcare settings.

List of abbreviations

GBC- Gall bladder carcinoma
XGC- Xanthogranulomatous cystitis

Acknowledgement

The author sincerely acknowledges the support of the Department of Pathology and the Department of Surgical Gastroenterology and Liver Transplant at Indira Gandhi Institute of Medical Sciences, Patna, for their constant support and collaboration throughout the study.

Source of funding

The study was self-funded by the department, with no external funding.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

All authors contributed to the study design, data collection, analysis, and manuscript preparation.

Data availability

The data generated during this study are available from the corresponding author upon reasonable request.

References

1. Goodman ZD, Ishak KG. Xanthogranulomatous cholecystitis. Am J Surg Pathol. 1981;5(7):653-9. https://doi.org/10.1097/00000478-198110000-00007 PMid:7337158
2. Yucel O, Uzun MA, Tilki M, Alkan S, Kilicoglu ZG, Goret CC. Xanthogranulomatous cholecystitis: analysis of 108 patients. Indian J Surg 2017;79:510 4. https://doi.org/10.1007/s12262-016-1511-0 PMid:29217901 PMCid:PMC5711709
3. Kwon AH, Matsui Y, Uemura Y. Surgical procedures and histopathologic findings for patients with xanthogranulomatous cholecystitis. J Am Coll Surg 2004;199:204 10. https://doi.org/10.1016/j.jamcollsurg.2004.03.018 PMid:15275874
4. Guzmán-Valdivia G. Xanthogranulomatous cholecystitis: 15 years' experience. World J Surg 2004;28:254 7. https://doi.org/10.1007/s00268-003-7161-y PMid:14961199
5. AhnYJ, KimTH, MoonSW, ChoiSN, KimHJ, JungWT, et al. A case of perforated xanthogranulomatous cholecystitis presenting as biloma. Korean J Gastroenterol 2011;58:153 6. https://doi.org/10.4166/kjg.2011.58.3.153 PMid:21960104
6. Cui Y, Zhang H, Zhao E, Cui N, Li Z. Differential diagnosis and treatment options for xanthogranulomatous cholecystitis. Med Princ Pract 2013;22:18-23. https://doi.org/10.1159/000339659 PMid:22814128 PMCid:PMC5586703
7. Deng YL, Cheng NS, Zhang SJ, Ma WJ, Shrestha A, Li FY, et al. Xanthogranulomatous cholecystitis mimicking gallbladder carcinoma: an analysis of 42 cases. World J Gastroenterol

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1807
Original Article

2015;21: 12653-9. https://doi.org/10.3748/wjg.v21.i44.12653n PMid:26640342 PMCid:PMC4658620

8. Han SH, Chen YL. Diagnosis and treatment of xanthogranulomatous cholecystitis: a report of 39 cases. Cell Biochem Biophys 2012;64:131 5. https://doi.org/10.1007/s12013-012-9381-y PMid:22707297
9. Yang T, Zhang B, Zhang J, Zhang Y, Jiang X, Wu M. (2007) Surgical treatment of xanthogranulomatous cholecystitis: experience in 33 cases. Hepatobiliary Pancreat Dis Int 6:504-508.
10. Kwon A-H, Matsui Y, Uemura Y. (2004) Surgical procedures and their topathologic findings for patients with xanthogranulomatous cholecystitis. J Am Coll Surg 199:204 10. https://doi.org/10.1016/j.jamcollsurg.2004.03.018 PMid:15275874
11. Spinelli A, Schumacher G, Pascher A, Lopez-hanninen E, Al-abadi H, Benckert C et al. (2006) Extended surgical resection for xanthogranulomatous cholecystitis mimicking advanced gallbladder carcinoma: a case report and review of literature. World J Gastroenterol 12:2293 96. https://doi.org/10.3748/wjg.v12.i14.2293 PMid:16610041 PMCid:PMC4087666
12. Srikanth G, Kumar A, Khare R, Siddappa L, Gupta A, Sikora SS, et al. Should laparoscopic cholecystectomy be performed in patients with a thick-walled gallbladder? J Hepatobiliary Pancreat Surg. 2004;11(1):40-4. https://doi.org/10.1007/s00534-003-0866-3 PMid:15754045
13. Guzman-Valdivia G. Xanthogranulomatous cholecystitis in laparoscopic surgery. J Gastrointest Surg. 2005 Apr;9(4):494-7. https://doi.org/10.1016/j.gassur.2004.09.036 PMid:15797229
14. Guzman VG. "Xanthogranulomatous cholecystitis: 15 years' experience. World Journal of Surgery. 2004;28(3)254-57. https://doi.org/10.1007/s00268-003-7161-y PMid:14961199
15. Spinelli A, Schumacher G, Pascher et al. Extended surgical resection for xanthogranulomatous cholecystitis mimicking advanced gallbladder carcinoma: a case report and review of the literature. World Journal of Gastroenterology. 2006;12(14)2293-96. https://doi.org/10.3748/wjg.v12.i14.2293 PMid:16610041 PMCid:PMC4087666
16. Srinivas GN, Sinha S, Ryley N, Houghton W. Perfidious gallbladders-a diagnostic dilemma with xanthogranulomatous cholecystitis. Annals of The Royal College of Surgeons of England. 2007;89:168-72. https://doi.org/10.1308/003588407X155833 PMid:17346415 PMCid:PMC1964568
17. Zhang LF, Hou CS, Liuetal JY. Strategies for diagnosis of xanthogranulomatous cholecystitis masquerading as gall bladder cancer. Chinese Medical Journal. 2012;125(1)109-13.
18. Srinivas GN, Sinha S, Ryley N, Houghton PW. Perfidious gall bladder - a diagnostic dilemma with xanthogranulomatous cholecystitis. Ann R Coll Surg Engl. 2007;89(2):168-72. https://doi.org/10.1308/003588407X155833 PMid:17346415 PMCid:PMC1964568
19. Yang T, Zhang BH, ZhanG, Zhang YJ, Jiang XQ, Wu MC. Surgical treatment of xanthogranulomatous cholecystitis: experience in33cases. Hepatobiliary and Pancreatic Diseases International. 2007;.6(5)504-08.
20. Sharma D, Babu R, Sood G, Kapoor G, Solanki RS, Thomas S. Xanthogranulomatous cholecystitis masquerading as malignancy with liver metastasis. ANZ Journal of Surgery. 2009;79(12):946-47. https://doi.org/10.1111/j.1445-2197.2009.05150.x PMid:20003001
21. Zhang LF, Hou CS, Liuetal JY. Strategies for diagnosis of xanthogranulomatous cholecystitis masquerading as gallbladder cancer. Chinese Medical Journal. 2012;125(1):109-13. https://doi.org/10.1097/CM9.0000000000000022 PMCid:PMC6629301
22. Kim PM, Lee SH, Gongetal GY. Xanthogranulomatous cholecystitis: radiologic findings with histologic correlation that focuses on intramural nodules. American Journal of Roentgenology. 1999;172(4):949-53. https://doi.org/10.2214/ajr.172.4.10587127
23. Uchiyama K, Ozawa S, Ueno et al. M. Xanthogranulomatous cholecystitis: the use of preoperative CT findings to differentiate it from

Student's Journal of Health Research Africa
e-ISSN: 2709-9997, p-ISSN: 3006-1059
Vol.6 No. 6 (2025): June 2025 Issue
https://doi.org/10.51168/sjhrafrica.v6i6.1807
Original Article

gall bladder carcinoma. Journal of Hepato-Biliary Pancreatic Surgery. 2009;16(3):333-38. https://doi.org/10.1007/s00534-009-0067-9 PMid:19280109

24. Chang S, , Wang JH,, Kanematsu M, Bae KT, Federle MP. Xanthogranulomatous cholecystitis: diagnostic performance of CT to differentiate from gallbladder cancer. European Journal of Radiology. 2012;74(3):79-83. https://doi.org/10.1016/j.ejrad.2009.04.017 PMid:19446416
25. Goshima S, Chang S, Wang JH, Kanematsu M, Bae KT, Federle MP. Xanthogranulomatous cholecystitis: diagnostic performance of CT to differentiate from gallbladder cancer. Eur J Radiol. 2010;74:79 83. https://doi.org/10.1016/j.ejrad.2009.04.017 PMid:19446416
26. Chang BJ, Kim SH, Park HY, Lim SW, Kim J, Lee KH et al. Distinguishing xanthogranulomatous cholecystitis from the wall thickening type of early-stage gallbladder cancer. Gut Liver. 2010; 4:518-523. https://doi.org/10.5009/gnl.2010.4.4.518 PMid:21253302 PMCid:PMC3021609
27. Krishnani N, Dhingra S, Kapoor S, Pandey R. Cytopathologic diagnosis of xanthogranulomatous cholecystitis and coexistent lesions. A prospective study of 31 cases. Acta Cytol. 2007;51:37 41. https://doi.org/10.1159/000325680 PMid:17328493
28. Hsu C, Hurwitz JL, Schuss A, Katz DS. Radiology pathology conference: xanthogranulomatous cholecystitis. Clin Imaging. 2003;27:421-25. https://doi.org/10.1016/S0899-7071(02)00589-2 PMid:14585573

PUBLISHER DETAILS

Student's Journal of Health Research (SJHR)
(ISSN 2709-9997) Online
(ISSN 3006-1059) Print
Category: Non-Governmental & Non-profit Organization
Email: studentsjournal2020@gmail.com
WhatsApp: +256 775 434 261
Location: Scholar's Summit Nakigalala, P. O. Box 701432, Entebbe Uganda, East Africa