International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 10; Issue 01 (A); January 2021; Page No.23575-23579
DOI: http://dx.doi.org/10.24327/ijcar.2021.23579.4671

Research Article

GROWING BURDEN OF GALL STONE DISEASE:- A RETROSPECTIVE ANALYSIS AT TERTIARY CARE CENTER IN RURAL NORTH INDIA

Pratul A., Akhil K., Dheer S. Kalwaniya*., Pawan T., Jayum A and Brinda P

Department of General Surgery, SGT Medical College, Hospital and Research Centre, Gurugram

A R T I C L E I N F O

Article History:
Received 12th October, 2020
Received in revised form 23rd November, 2020
Accepted 7th December, 2020
Published online 28th January, 2021

Key words:

Cholelithiasis, gall bladder stone disease, chronic cholecystitis.

A B S T R A C T

Introduction:- Gallstone disease is a common health problem all over the world including India. The present study was conducted to analyse the presentation of gallstone disease and its associated complications and their surgical management in our tertiary care center in rural North India.

Material & Methods:- It is a retrospective study of 212 cases of symptomatic gallstone disease with its complications managed in Tertiary care center in rural North India (SGT University hospital), Gurugram over a duration from 1st June 2017to 31st August 2020. In total 212 patients were included in the study with age more than 11 years and not having any contraindication for surgery. Parameters evaluated were the growing burden of patients with gallstone disease and to determine its gender predilection, the mean age of presentation, its associated complications, different operative procedures performed, its post-operative complications & their management.

Results:- Gall stone disease was more common in fourth decade of life with male to female ratio 1:4.3. Serious complications of gallstone disease were reported in 11.78% of the study subjects like pancreatitis, gall bladder perforation, gall bladder cancer. More than 75% cases were managed with laparoscopic cholecystectomy. Post-operative complications were detected in 11% of the cases. Wound infection was the most common which happened in 5.18% of cases. All the patients were managed conservatively except a single patient with bile duct injury, which was managed with T-tube placement.

Conclusion:- Gallstone disease was more common in 31-40 years with female predominance. Histopathologically chronic cholecystitis was the one of the most common finding. Early intervention in symptomatic gallstone disease can prevent its complications.

INTRODUCTION

Cholelithiasis is a serious health problem that is of major concern all over the globe.[1]It is the one of the most common cause that leads to surgical intervention. Although mortality rates are much less as 0.6% but it's morbidity is high.[2] Growing burden of gallstone disease is due to life style changes associated with high junk food consumption.[3] The prevalence of gall stone disease is more common in individuals living in north India than south India.[4] Individuals with first degree relatives of gall stone disease have two fold greater prevalence which indicates a genetic predisposition and women are three times more likely to develop gallstones than men.[5]

In the western countries the most common type of gall stones are cholesterol stones but mixed stones are most commonly found in people of Asian origin.[6]

Corresponding author:* **Dheer S. Kalwaniya
Department of General Surgery, SGT Medical College, Hospital and Research Centre, Gurugram

Certain conditions like patients on somatostatin analogues and estrogen containing oral contraceptives and other predisposing factors like pregnancy, non HDL hyperlipidemia, Crohn's disease, certain blood disorders like sickle cell anaemia, thalassemia and hereditary spherocytosis and gastrointestinal surgeries like terminal ileal resection and gastric or duodenal surgery are at increased risk of developing cholelithiasis.[2]

Approximately 80% of the individuals with gallstone disease remains asymptomatic but 2-3% will become symptomatic per year and out of symptomatic individuals 3-5 % develops dreadly complications like carcinoma gallbladder, acute cholecystitis, gall stone pancreatitis, choledocholithiasis, mucocele, empyema, gall bladder perforation.[2,7,8] There are very few studies done on this topic so due to paucity of information on the incidence, epidemiology and burden of disease in rural India. Therefore we planned to study the epidemiology, diagnostic tools, complications after surgery in 212 cases of symptomatic gall stone disease in a rural population of North India.

MATERIAL AND METHODS

It is a retrospective study of symptomatic gallstone disease who presented in a surgical unit at SGT Medical College, Hospital & research center, Gurugram, Haryana, India from 1st June 2017 to 31st August 2020. In total 274 patients were presented in this time duration at outpatient department (OPD)/ Emergency. Out of them 62 patients refused for any kind of surgery/intervention or being referred to higher center for further management, therefore 212 patients were included in this study. All cases were admitted and operated after necessary investigations/ interventions.

Duration of Study: 3 years and 3 months (1st june, 2017- 31 st august, 2020)

Study Design: Retrospective study.

Inclusion Criteria

All patients with symptomatic gallstone disease with evidence of gall stones on ultrasonography, age more than 11 years, not having any contraindications for surgery were included in the study. Data of all cases were recorded from OPD and IPD records of patients and analyzed by using SPSS 20.0 software.

OBSERVATION AND RESULTS

Age & Gender Distribution:- In this retrospective study 212 patients were included with a male female ratio of 1:4.3, numbers were 40 and 172 respectively. Majority of the cases in the study were young and fertile females below 50 years of age. 131 out of total 212 which accounts for 61.79%. Though among females it is nearly 76% of total diseased females (Table 1). Overall most cases belonged to fourth decade of life 30.19% followed by fifth decade 24.06% and third decade 19.81% whereas lowest number of patients were from 2nd decade 0.94% followed by greater than 70 years of age that is 3.77% (Table 1).

Table 1

Age distribution	Male	Female	Total	Total %
11-20	0	2	2	0.94
21-30	8	34	42	19.81
31-40	10	54	64	30.19
41-50	10	41	51	24.06
51-60	6	22	28	13.21
61-70	4	13	17	8.02
>70	2	6	8	3.77
Total	40	172	212	100

Youngest patient in our study was a female of 15.5 year and oldest one was a male of 82 years of age.

Surgical methods:- Out of total 212, 189 cases were started with laparoscopy and 29 patients were being converted from laparoscopic to open due to different reasons. In 160 patients laparoscopic cholecystectomy was done (Table 2). Dense adhesions with frozen Calot'striangle was the most common cause to convert from laparoscopic to open cholecystectomy.

Table 2 surgeries performed

Surgeries Performed	Male	Percentage	Female	Percentage	Total	Percentage
Laparoscopic Cholecystectomy	24	60%	136	79.06%	160	75.47%
Lap to Open Cholecystectomy	12	30%	17	9.88%	29	13.67%
Open Cholecystectomy	4	10%	19	11.04%	23	10.84%

Diagnosis wise distribution and operative findings

Distribution of the patients with final diagnosis based on clinical, radiological and histopathological correlation and operative findings as well as associated complications all the patients were classified as follows.(Table 3)(Figure 1)

Table 3 Cases with gall stone disease and associated complications

Complication	Male	Female	Total	Percentage%
Chronic cholecystitis	12	63	75	35.37
Cholesterosis	6	25	31	14.62
Acute Cholecystitis	4	23	27	12.73
Mucocele	3	19	22	10.37
Pancreatitis	3	11	14	6.60
Empyema gall bladder	2	8	10	4.71
Carcinoma gall bladder	3	6	9	4.24
Mirrizi s Syndrome	2	5	7	3.30
Common bile duct Stone	1	6	7	3.30
Xanthogranulomatous Cholecystitis	1	4	5	2.35
Metaplasia gall bladder	2	1	3	1.41
Gall bladder Perforation	1	1	2	0.94
Total	40	172	212	100

Histopathological evaluation (HPE) was done in all 212 patients (100%).Out of the 212 patients 126 patients (59.43%) had chronic cholecystitis (figure 3), 41 (19.33%) had acute cholecystitis (figure 2), 9 (4. 24%) had carcinoma gall bladder(figure 5), 5 (2.35%) had xanthogranulomatous cholecystitis(figure 4) and 31(14.62 %) had cholesterolosis of gallbladder.

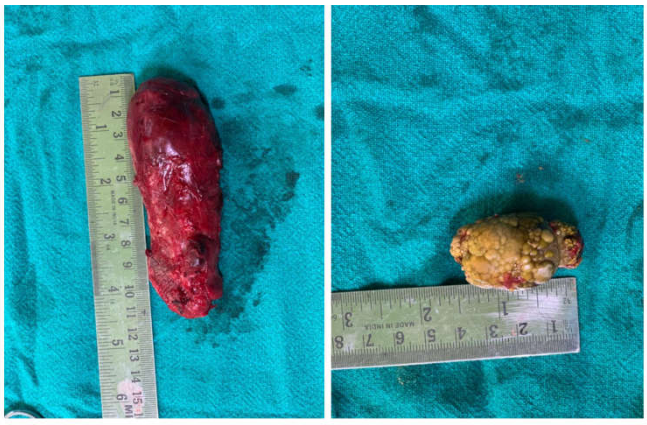

Figure 1 Post operative gall bladder specimen with large calculus extracted from its lumen

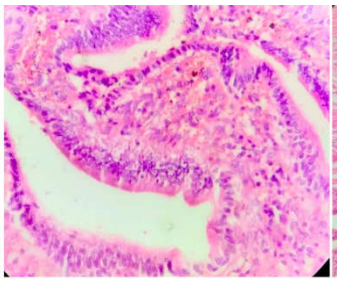

Figure 2 HPE of specimen showing Acute Haemorrhagic Cholecystitis

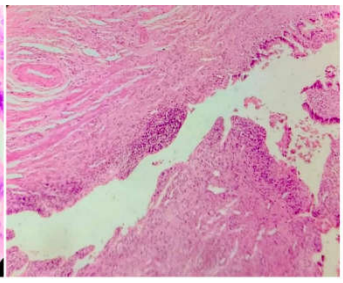

Figure 3 HPE of specimen showing chronic cholecystitis denuded with dense inflammation

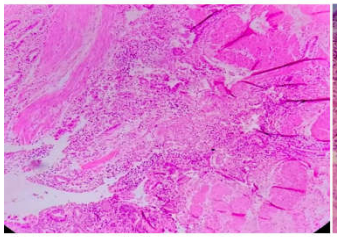

Figure 4 HPE of specimen showing Xanthogranulomatous Cholecystitis with chronic inflammation and histiocytes infiltrating into muscles.

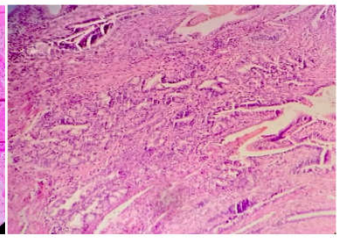

Figure 5 HPE of specimen showing well differentiated Carcinoma of gall bladder

Post Operative Complications:-Table 4

Table 4

Complications	Males	Females	Total	Percentage(%)
Wound Infection	2	9	11	5.18
Haemorrhage (Bleeding from liver bed)	4	5	9	4.24
Incisional Hernia	1	1	2	0.94
Bile Leak	1	0	1	0.47
Bile duct Injury	0	1	1	0.47
Total	8	16	24	11.30

Wound infection was the most common complication as shown in (Table 4) encountered in 5.18% of the individuals and was more common in females as compare to males and were more common in patients underwent open/lap converted to open cholecystectomy. Ten patients out of eleven had wound infection were more than 50 years of age and nine out of eleven had Diabetes Mellitus II as a comorbidity. Haemorrhage was the second most common complication seen in nine patients and was found out to be around 150ml intra operative and postoperative period were managed conservatively. Bile leak was seen in one male patient because of presence of accessory duct of Luschka in a patient with intrahepatic gallbladder. So drain was placed at the same time and removed after 5 days and managed conservatively.

Bile duct injury was encountered in one female patient of 50 years of age with involvement of diameterless than one third of circumference of common bile duct and was being managed with primary repair and T tube placement. Two cases of incisional hernias were reported one in male and other in female and both the patients had long standing history of smoking and COPD both cases underwent open cholecystectomy.

DISCUSSION

Cholelithiasis is a common clinical problem all over the world.[1] The prevalence was more common in northern Indians as compared to the population living in south India.[4] It commonly occurs in fatty, forty and fertile females. Incidence in India is on the rise due to its widespread use of ultrasonography (USG) in the last two decades but changing socio-economic structure and changes in various other epidemiological factors including diet are also responsible.[9]In the present study 52% of the total cases presented before the age of 40 years and similar results were found in the study conducted by Sangwan MK *et al* where about 45% of the total cases of symptomatic gall stone disease were present before the age of 40 years.[10]Maskey CP *et al* found that the commonest age group for cholelithiasis was below 30 years comprising 37.5%.[11]

Female to male ratio varies from 1.2:1 to 10:1 in Pima Indians and 2.3:1 in European females.[12,13] In this study we observed that out of 212, 172 (81.13%) were females and rest were males with male to female ratio is 1:4.3. A study carried out by Sangwan MK *et al* showed that 23.26 % were male and 76.74 % were female with male to female ratio 1:3.3 and Thamil S *et al* showed 20.5% males and 79.5% females were patients of cholelithiasis.[10,14]

Acute cholecystitis is a common complication of gallstones due to obstruction of cystic duct by gallstones. Most (90%) of these cases are having associated gallstones. Usually these patients have recurrent attacks of biliary colic. It may progress to mucocele, empyema or even perforation of gallbladder. In our study mucocele was present in 10.37% of patients with symptomatic gall stone disease patients and empyema and GB perforation in 4.71 and 0.94 percent of patients with gall stones. Acalculus cholecystitis typically occurs in critically ill patients, elderly men in setting of major surgery, total parenteral nutrition, trauma and burns. Biliary stasis, inflammation and ischemia are pathological steps of this cascade. These patients are more prone for complications than calculus cholecystitis. Rarely, infectious agents like cytomegalovirus, cryptosporadia and salmonella may lead to acute cholecystitis. In present study all cases were associated with gallstones.

Pancreatitis, choledocholithiasis and cholangitis are common complications due to migration of gallstones. In present study about 10% of the cases presented with these complications. Gallstones are the leading cause of pancreatitis accounting for at least one half of the 4.8-24.2 cases of pancreatitis per 1,00,000 people in western world.[8] However its incidence in USA and Japan is 17 per 1,00,000 and 5-80 per 1,00,000 cases respectively.[15,16]Although most of these cases resolve without significant complications but 15-30% cases have severe symptoms needing intensive care.[17]Choledocholithiasis have been reported in 10- 15 % cases of gallstones. Most (95%) of these CBD stones are secondary due to migration from gallbladder. However incidence of primary CBD stones is high in Asian population due to high incidence of hepatobiliary infestation by parasitic worm resulting in secondary biliary stasis.[18] Acute suppurative cholangitis is a common complication of CBD stone. E.coli, Klebsiella and pseudomonasare most common culprit organisms in these cases.

Carcinoma, metaplasia and xanthogranulomatouscholecystitis are most lethal complications of gallstones. Adenocarcinoma is the most common variety of gallbladder carcinoma (>80%) involving fundus (60%), body (30%) and neck (10%).[2] In contrary to our study also all cases (4.24%) had adenocarcinoma of gallbladder arising from the fundus (100%).

Gallbladder carcinoma is a rare but lethal malignancy with marked geographic variations. Although it is rare in developed world accounting only for 0.5% cases of all gastrointestinal malignancies but high incidence of gallbladder carcinoma have been reported in certain regions of the world like north India, south Pakistan, Chile and eastern Europe.[2,19,20] It is leading cause of death in Chilean women, exceeding even breast and lung cancers. Gallbladder carcinoma is the fifth most common gastrointestinal tract malignancy in United States with 5000 cases reported annualy.[21] It is 2-6 times greater in women than men and its incidence increases with advancing age. It has a incidence of 7.5/1,00,000 in men and 23/1,00,000 in women

in Chile, Peru, north India and north American Indians.[21]Females predominance (66.66%) was also noted in present study. Gallstones have a high risk for gallbladder carcinoma with a relative risk of 4.9. All the cases of gallbladder carcinoma in our study had gallstone. In the present study chronic cholecystitis and cholesterosis were present in about 50% of the cases while others (50%) had one or the gallstone induced complications. Glassgow *et al* also reported an incidence of about 44% in California in 2000 which is comparable to present study as cholesterosis was included as incidental finding rather than complication of gallstone.[22]Leukocytosis with a 'left shift' is usually observed in acute complications like acute cholecystitis, cholangitis and pancreatitis. Serum markers like aminotransferases, alkaline phosphatase, bilirubin and amylase levels may also be elevated in these conditions. In the recent studies, serum ALT is showing a specificity of 96 % in gallstone pancreatitis with a level above 150 u/l but with a low (48%) sensitivity.[23]

In our study 212 patients underwent surgery. 160 patients had laparoscopic cholecystectomy and 29 patients underwent lap to open cholecystectomy and 23 patients underwent open cholecystectomy. Laparoscopic cholecystectomy is a feasible and safe procedure even in most cases of acute cholecystitis albeit the conversion rate may be as high as 32%.[24] The risk of bile duct injuries is higher and the operation time longer than in elective laparoscopic cholecystectomy. Factors associated with the need to convert may be male gender, duration of right upper abdominal pain and severity of the inflammatory process.[24] Several studies demonstrated that the risk of conversion depends mainly on the degree of inflammation, pathology of gallbladder disease (e.g. thickness of gallbladder wall), age, male sex, and CBD diameter. Conversion rate in elective laparoscopic cholecystectomy may be 0% to 15%, but in cases of gangrenous cholecystitis or empyema it may be 50-83%. Ultrasound may help to predict the risk of conversion. However, the surgeon has to decide intraoperatively whether to convert to the open procedure within a short time.[25,26]

The conversion rate from laparoscopic to open cholecystectomy was about 16 % of the total attempted laparoscopic cases (29 out of 189) and was more common in men 30 % (12/40) than in females 9.88 % (17/172). The conversion rate in other studies was 7% in Schlumpf *et al*.[27]Our results matched with a study of 104 patients by Bansal A *et al* for evaluation of the patients for conversion of laparoscopic to open cholecystectomy in Indianpopulation.[28] Wound infection was the most common complication noted in about 5.18 % of the cases, followed by postoperative hemorrhage (<150 ml/day) in 4.24%. All cases were managed conservatively without needing exploration. Various studies also reported almost similar results.[29] In present study only one case (0.47%) of bile duct injury was reported and was managed with primary repair and T tube placement which is comparable with literature (0.2-0.4%) reports.[30]

CONCLUSION

Gall stone disease is more common in fourth decade of life with male to female ratio 1:4.3. As the patients with symptomatic gall stone disease is on the rise early intervention can prevent its deadly complications. Chronic cholecystitis was the most common diagnosis which was confirmed by histopathology postoperatively. In our study laparoscopic cholecystectomy was considered gold standard and offers best surgical management with a conversion rate of 16% to open cholecystectomy. Wound infection was the most common complication which was encountered in 5.18% of the individuals and was more common in females as compare to males and were more in patients who underwent open/lap converted to open cholecystectomy and occurred more commonly in study population with age more than 50 years and Diabetes Mellitus II as a comorbidity. Iatrogenic injuries can be reduced by early conversion from laparoscopic cholecystectomy to open cholecystectomy in difficult gall bladder surgeries.

References

1. Johnston DE, Kaplan MM. Pathogenesis and Treatment of Gallstones. *N Engl J Med*.1993;328(6):412-21.
2. Stinton LM and Shaffer EA. Epidemiology of gallbladder disease: cholelithiasis and cancer. Gut and Liver. 2012;6(2):172-87.
3. Haribhakti SP, Mistry JH. Techniques of laparoscopic cholecystectomy: Nomenclature and selection. *J Minim Access Surg*. 2015;11(2):113–8.
4. Unisa S, Jagannath P, Dhir V, Khandelwal C, Sarangi L, Roy TK. Population-based study to estimate prevalence and determine risk factors of gallbladder diseases in the rural Gangetic basin of North India. Hpb. 2011;13(2):117–25.
5. Nakeeb A, Comuzzie AG, Martin L, *et al*. Galltones: genetics versus environment. Ann Surg.2002; 235:842-849.
6. Mohan H, Punia RPS, Dhawan SB, Ahal S and Sekhon MS. Morphological spectrum of gallstone disease in 1100 cholecystectomies in North India. *Indian J Surg*. 2005; 67:140-2.
7. Gibney EJ. Asymptomatic gallstones. *Br J Surg*. 1990; 77:368-72.
8. Friedman GD. Natural history of asymptomatic and symptomatic gallstones. *Am J Surg*. 1993;165:399-404.
9. Shaffer EA. Epidemiology and risk factors for gallstone disease: Has the paradigm changed in the21st century? CurrGastroenterol Rep. 2005;7(2):132-40.
10. Sangwan MK *et al*. Gallstone disease menacing rural population in north India: a retrospective study of 576 cases in a rural hospital. *Int Surg J*. 2015 Nov;2(4):487-491.
11. Maskey CP, Shrestha ML, Sato Y. Gallstone in tuth. JIOM. 1990;12:45-54.
12. Sampliner RE, Bennett PH and Comess LJ. Gallbladder disease in Pima Indians: demonstration of high prevalence and early onset by cholecystography. *N Engl J Med*. 1970; 283:1358-64.
13. The Rome Group for Epidemiology and Prevention of cholelithiasis (GREPCO), The Epidemiology of gallstone disease in Rome, Italy. Part I Prevalence data in men. Hepatology. 1988;8:904-6.
14. Selvi TR, Sinha P, Subramaniam PM, Konapur PG, Prabha CV. A clinicopathological study of cholecystitis with special reference to analysis of cholelithiasis. *Int J Basic Med Sci*. 2011;2(2):68-72.
15. Hazem ZM. Acute Biliary Pancreatitis: Diagnosis and Treatment. *The Saudi J of Gastroentrol*. 2009;15(3):147-55.

16. Imamura M. epidemiology of acute pancreatitis-incidence by etiology, relapse rate, cause of death and long term prognosis. Nippon Rinsho. 2004;62:1993-7.
17. Death from acute pancreatitis. MRC Multicenter Trial Glucagon Aprotinin. Lancet. 1977;2:632-5.
18. Ahmed A, Cheung RC and Keeffe EB. Management of gallstones and their complications. Am Fam Physician. 2000;61(6):1673-80.
19. Pandey M. Risk factors for gallbladder cancer: a reappraisal. Eur J Cancer Prev. 2003;12:15-24.
20. Randi G, Franceschi S, La Vecchia C. Gallbladder cancer worldwide: geographical distribution and risk factors. Int J Cancer. 2006;118:1591-602.
21. Wistuba II and Gazdar AF. Gallbladder cancer: lessons from a rare tumour. Nature Rev Cancer. 2004;4:695.
22. Glasgow RE, Cho M, Hulter MM and Mulvihill SJ. The spectrum and cost of complicated gallstone disease in California. Arch Surg. 2000;135(9):1021-5.
23. Agarwal N, Pitchumoni CS and Sivaprasad AV. Evaluating tests for acute pancreatitis. Am J Gastroenterol. 1990;85:356-66.
24. Taylor EW, Guirguis LM, Johna SD. Laparoscopic cholecystectomy in histologically confirmed acute cholecystitis. *J Laparoendosc Surg*. 1996;6(4):227-32.
25. Lo CM, Liu CL, Fan ST, Lai EC, Wong J. Prospective randomized study of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. Ann Surg. 1998;227(4):461-7.
26. Schwesinger WH, Sirinek KR, Strodel WE 3rd. Laparoscopic cholecystectomy for biliary tract emergencies: State of the art. *World J Surg*. 1999; 23(4):334-42.
27. Schlumpf EA. Epidemiology of gallbladder stone disease. Best Pract Res ClinGastroenterol. 2006;20:981-96.
28. Bansal A *et al*. A clinical study: prevalence and management of cholelithiasis. *Int Surg J*. 2014 Nov;1(3):134-139.
29. Khan JS, Qureshi U, Fatima Z, Hassan H, Khan MM and Iqbal M. Clipless laparoscopic cholecystectomy by Ultrasonic. Ann Pak Inst Med Sci. 2012;8(4):229-31.
30. Strasberg S, Hertl N and Soper N. An analysis of problem of biliary injury during laparoscopic cholecystectomy. *J Am Coll Surg*. 1995;180:101-25.

How to cite this article:

Pratul A *et al* (2021) 'Growing burden of gall stone disease:- A retrospective analysis at tertiary care center in rural north India', *International Journal of Current Advanced Research,* 10(01), pp. 23575-23579.
DOI: http://dx.doi.org/10.24327/ijcar.2021.23579.4671

****