Original Article

A survey on concomitant common bile duct stone and symptomatic gallstone and clinical values in Shiraz, Southern Iran

Seyed Vahid Hosseini, Abbass Ayoub[1], Abbas Rezaianzadeh[2], Ali Mohammad Bananzadeh[1], Leila Ghahramani[1], Salar Rahimikazerooni[1], Hajar Khazraei[1]

Laparoscopy Research Center, [1]Colorectal Research Center, [2]Research Center for Health Sciences, Shiraz University of Medical Sciences, Shiraz, Iran

Abstract

Background: Common bile duct stone (CBDS) as a result of gallstone is one of the gastrointestinal disorders. In this study, the incidence of CBDS and symptomatic gallstone in Shiraz were investigated, and their management suggested.

Materials and Methods: This is a retrospective study that enrolled among 560 patients. The incidence of gallstone together with CBDS was evaluated using an ultrasonography studyand clinical data in the period between March 2014 and 2014 in Shiraz. Comparison between data was done using Student's *t*-test or Chi-square test.

Results: Of these patients, 18.6% were male, and 81.4% were female with a mean age of 47.67 ± 0.74 years. The concomitant rate of gallstone and CBDS was 8.6%. 6.8% of patients with concomitant of gallstone and CBDS showed symptoms while 1.8% had not been diagnosed before the operation. The mean of serum alkaline phosphatase level in patients with the only gallstone was 255.80 IU/L and patients with concomitant gallstone, and CBDS was 580.88 IU/L with a significant difference between two groups ($P < 0.001$). Furthermore, liver function tests (aspartate aminotransferase, alanine transaminase) showed a significant difference between two groups of patients ($P < 0.01$, $P < 0.001$).

Conclusions: Clinical variables such as tenderness, fever, and Morphy sign were more severein patients with concomitant gallstone and CBDS. The concomitant rate of gallstone and CBDS in our society is less that Western countries and asymptomatic patients showed fewer ratios than other countries. We think the approach for asymptomatic CBDS patients with gallstone can be affected by our results.

Key Words: Cholecystectomy, common bile duct stone, gallstone

Address for correspondence:
Dr. Hajar Khazraei, Colorectal Research Center, Shiraz University of Medical Sciences, Shiraz, Iran. E-mail: colorectal2@sums.ac.ir
Received: 06.12.2015, **Accepted:** 07.03.2016

INTRODUCTION

Impaired metabolism of cholesterol, bilirubin and bile acids are causative factors for the formation of stones in the hepatic bile duct, common bile duct, or gallbladder.[1,2] Sedentary lifestyle, female gender, increasing age, ethnicity/family history, obesity, low-density lipoprotein levels, metabolic syndrome, rapid weight loss, certain diseases such as cirrhosis,

Access this article online	
Quick Response Code:	Website: www.advbiores.net
	DOI: 10.4103/2277-9175.187402

How to cite this article: Hosseini SV, Ayoub A, Rezaianzadeh A, Bananzadeh AM, Ghahramani L, Rahimikazerooni S, *et al*. A survey on concomitant common bile duct stone and symptomatic gallstone and clinical values in Shiraz, Southern Iran. Adv Biomed Res 2016;5:147.

Crohn disease, and gallbladder stasis were reported as risk factors for gallstones.[3,4] Regarding concomitant prevalence of gallstone and common bile duct stone (CBDS), old age,[5] Asian race,[6] chronic bile duct inflammation,[7] and hypothyroidism[8] were shown as risk factors of the disease.

Prevalence and epidemiology of gallstone diseases could be helpful to clinicians, policy makers, and researchers. It was demonstrated that in the US, 10–15% of the adult population suffered from gallstones.[9] In Asian countries, this figure was 10% and in Middle Eastern countries, the rate was found to be 4–12%.[10] The prevalence of gallstones in asymptomatic subjects was 0.8% in Northern Iran regardless of the gender of the participants, 4.7% in southern parts and 4.4%in eastern regions of the country.[11-13]

These differences can be related to the diets and lifestyles of the people in various regions.[12] The worldwide prevalence of choledocholithiasis concomitant with gallstones is approximately 3–10%.[14] In Western countries, this figure was more in the last three decades with an increasing trend up to 20%.[9,15-17] The incidence of silent CBDSs in a nonjaundiced patient with normal ducts on transabdominal ultrasound was reported 4%, and only 15% of these patients showed complication.[18]

However, ultrasonography (US) is a noninvasive and safe method for clinical diagnosis of CBDS, but there are many undiagnosed subjects. In most cases, gallstone was symptomatic and needed cholecystectomy.[19] Cholecystectomy and common bile duct exploration were the standard treatment for patients with concomitant gallstones and CBDS.[15,20]

The rate of false positive intra-operative cholangiography incorrectly suggested CBDSs to be 2–16%.The failure rate of nonselective intra-operative cholangiography was reported 15% with a sensitivity and specificity of 97% and 99%, respectively.[18] Intra-operative cholangiography could remove unsuspected stones in 1–4% of cases, but it needs additional radiological personnel and more cost; so it is not advised routinely.[18] This method as an invasive approach in highly concomitant gallstone and CBDS may be suitable but if there was no high concomitant rate in society, preoperative endoscopic retrograde cholangiopancreatography (ERCP) can be used according to clinical data related to CBDS (e.g. jaundice, itching, clay color stool, and tea color urine) while treatment is necessary.[18]

In our country, to the best of our knowledge, there is not any precise report about concomitant CBDS and symptomatic gallstone. On the other hand, the ideal management for them is still unclear. Therefore, any information onboth of them may help the patient's treatment measure under a laparoscopic cholecystectomy (LC) procedure necessitating a new treatment algorithm according to regional features. This aimed the management of concomitant gallbladder stones and CBDSs under laparoscopic surgery. The aim of study was to assess the rate of concomitant CBDS and gallstone. Clinical data such assign and symptoms of patients in gallstone and concomitant gallstone and CBDS groups was compared.

MATERIALS AND METHODS

Patients

To assess the rate of concomitant gallstone and CBDS disorders, the number of admissions of patients to the hospitals affiliated with Shiraz University of Medical Sciences in Shiraz, Southern Iran was recorded. All patients with evidence of gallstone or CBDS who underwent laparoscopy surgery were enrolled. In our study, 560 patients were enrolled who were admitted with the impression of gallstone or CBDS, in the period between March 2012 and March 2014. The information of patients undergoing LC or cholangitis within two years was evaluated retrospectively.

Information of patients from clinical data was recorded in a questionnaire. Demographic and clinical histories (sex, age, fasting blood glucose, and body mass index) of all patients undergoing cholecystectomy were evaluated. The primary CBDS possibilities were illustrated by preoperative US (Medison Accuvix V10, Korea) and the clinical signs and symptoms of CBDS were clarified. Ethical approval was provided from Ethics Committee of Shiraz University of Medical Sciences (number 5179).

Statistical analysis

All statistical analyses were done by SPSS software (version 15, Chicago, IL, USA). The frequency of patients in each group was demonstrated as percent. The correlation between two groups for the categorized variables was analyzed by Chi-square test. The $P < 0.05$ was considered statistically significant.

RESULTS

A total of 560 eligible patients were enrolled in this study that 512 patients had gallstone only and 48 patients had concomitant gallstone and CBDS. One hundred and four of patients (18.6%) were male and 456 (81.4%) were female. The mean age of patients with gallstone was 47.11 ± 0.77 years and in patients with concomitant gallstone and CBDS were 53.63 ± 2.75 years. The mean body mass

index in patients with gallstone was 26.05 ± 0.36 and in patients with concomitant gallstone and CBDS was 22.99 ± 0.76. Fasting blood glucose was 100.23 ± 1.76 mg/dl in patients with gallstone and 112.57 ± 11.54 mg/dl in patients with concomitant gallstone and CBDS.

Clinical characteristics were presented in Table 1. Although the signs and symptoms of obstructive jaundice such as itching and changing in color of urine, stool, and sclera were seen in patients with gallstone due to impacted stones in cystic duct or Hartmann's pouch but in patients with concomitant gallstone and CBDS, these signs showed a significant increase, especially for tenderness, fever, and Morphy sign [$P < 0.05$; Table 1].

Sonographical data of patients with only gallstone wereconfirmed in 6.8% of subjects. Patients with concomitant gallstone and CBDS showed cholecystitis approximately 2 times more than patients with only gallstone [Table 2]. As a whole, 19.1% of patients showed cholecyctitis and 11.1% of patients had sludge.

The serum alkaline phosphatase level in patients with only gallstone was 255.80 ± 8.42 IU/L and patients with concomitant gallstone, and CBDS was 580.88 ± 102.22 IU/L with a significant difference between two groups ($P < 0.001$). In addition, liver function tests (aspartate aminotransferase, alanine transaminase) showed a significant difference between two groups of patients ($P < 0.01$, $P < 0.001$).

DISCUSSION

In our study, concomitant CBDS and gallstone was found 8.6% regardless of gender of patients. Most of them showed signs and symptoms of obstructive jaundice, a high level of alkaline phosphatase even some of them were asymptomatic (1.8%). The global rate of concomitant CBDS and gallstones was shown to be 3–15%.[14,15] The prevalence of asymptomatic bile duct stones was reported 5.2–12% in Western population.[18]

In Western countries, the concomitant prevalence increased in the last three decades to 20%.[4,16,17] The rate in our study in comparison with other countries was much lower that may be due to different ways of diagnosis or treatments of concomitant gallstone and CBDS including surgery or nonsurgical methods such as ERCP, US, magnetic resonance cholangiopancreatography (MRCP), or computed tomographyscan. The sensitivity of the US in detection of gallstones has been more than 95% in uncomplicated cases while the sensitivity in trans-abdominal US for choledocolithiasis varied between 50% and 80%, and with a specificity of 95%.[21]

ERCP could be performed in symptomatic patients with severe biliary pancreatitis, acute obstructive suppurative cholangitis, ampullary stone impaction, or severe comorbidity.[22]

In our asymptomatic patients with CBDS (1.8% of patients with only gallstone) they not become symptomatic in 2 years and LC alone seems to be enough for them. Choledocholithiasis was reported to be 3.4–7.2% in patients undergoing LC, but more than one-third of them pass the calculi spontaneously within 6 weeks of operation.[23] If they became symptomatic after surgery, postoperative ERCP as a routine treatment could be done for them.

Different management approaches of concomitant gallbladder stones and CBDSs were shown to have equivalent efficacy. However, LC and laparoscopic common bile duct exploration management are equivalent to management of LC and ERCP in terms of clinical outcomes regarding stone clearance from the CBD, postoperative morbidity, mortality, and total operating time; even it had the advantage of a shorter hospital stay.[7,8,23]

The concomitant rate of gallstone and CBDS in our society is less that Western countries and asymptomatic patients showed fewer ratios than other countries. We think the approach for asymptomatic CBDS patients with gallstonecan be affected by our results.

CONCLUSIONS

Clinical variables such as tenderness, fever, and Morphy sign were more severe in patients with concomitant gallstone and CBDS. 6.8% of patients with concomitant of gallstone and CBDS showed

Table 1: Signs and symptoms of patients with only gallstone or with concomitant gallstone and common bile duct stone

Parameters	Morphy sign (%)	Tenderness (%)	Fever (%)	Itching (%)	Tea color urine (%)	Yellowish sclera (%)	Clay color stool (%)	Chills (%)	Jaundice (%)
Gallstone only	20.9	76.8	10.7	2.3	4.1	8	2.5	5.3	8.2
Gallstone and CBDS	50	97.9	20.5	8.3	22.9	52.1	18.8	10.4	43.8
P	0.001	0.001	0.037	0.017	0.001	0. 001	0.001	0.142	0.001

CBDS: Common bile duct stone

Table 2: Sonographic data from patients

Parameters	Gallstone (%)	Gallstone and CBDS (%)	*P*
Cholecyctitis	17.2	39.6	0.001
Sludge	11.2	10.4	0.876
Common bile duct diameter			
Normal	93.2	2	0.001
Dilated	6.8	98	

CBDS: Common bile duct stone

symptoms while 1.8% had not been diagnosed before the operation. However, the optimal management of patients with CBDS should depend on the condition of patients, the expertise of surgeon and local resources.

Acknowledgment

The authors are grateful to vice-chancellor of Shiraz University of Medical Sciences for their supports. This article extracts from Dr. Abbass Ayoub medical thesis (Number 91-01-01-5179).

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Hosseini SV, Motazedian GR, Mehrabani D, Kumar PV, Bagheri MH, Tanideh N, *et al*. Instillation of hypertonic glucose into gall bladder of rabbit: Does it induce sclerosing cholangitis? JAppl Anim Res 2006;2:73-6.
2. PanjehshahinMR, Owji AA, Mehrabani D, Mirzaee M, Vasei M. Effect of curcumin on cholesterol gall-stone induction in rats. JAppl Anim Res 2003;23:75-80.
3. Chen YC, Chiou C, Lin MN, Lin CL. The prevalence and risk factors for gallstone disease in taiwanese vegetarians. PLoS One 2014;9:e115145.
4. Halldestam I, Kullman E, Borch K. Incidence of and potential risk factors for gallstone disease in a general population sample. Br J Surg 2009;96:1315-22.
5. Alexakis N, Connor S. Meta-analysis of one- vs. two-stage laparoscopic/endoscopic management of common bile duct stones. HPB (Oxford) 2012;14:254-9.
6. Ghazal AH, Sorour MA, El-Riwini M, El-Bahrawy H. Single-step treatment of gall bladder and bile duct stones: A combined endoscopic-laparoscopic technique. Int J Surg 2009;7:338-46.
7. Li MK, Tang CN, Lai EC. Managing concomitant gallbladder stones and common bile duct stones in the laparoscopic era: A systematic review. Asian J Endosc Surg 2011;4:53-8.
8. Wang P, Li ZS, Liu F, Ren X, Lu NH, Fan ZN, *et al*. Risk factors for ERCP-related complications: A prospective multicenter study. Am J Gastroenterol 2009;104:31-40.
9. Stinton LM, Myers RP, Shaffer EA. Epidemiology of gallstones. Gastroenterol Clin North Am 2010;39:157-69, vii.
10. Stinton LM, Shaffer EA. Epidemiology of gallbladder disease: Cholelithiasis and cancer. Gut Liver 2012;6:172-87.
11. Zamani F, Sohrabi M, Alipour A, Motamed N, Saeedian FS, Pirzad R, *et al*. Prevalence and risk factors of cholelithiasis in Amol city, Northern Iran: A population based study. Arch Iran Med 2014;17:750-4.
12. Toosi FS, Ehsanbakhsh AR, Tavakoli MR. Asymptomatic gallstones and related risk factors in Iran. Hepatogastroenterology 2011;58:1123-6.
13. Massarrat S. Prevalence of gallstone disease in Iran. J Gastroenterol Hepatol 2001;16:564-7.
14. Lu J, Cheng Y, Xiong XZ, Lin YX, Wu SJ, Cheng NS. Two-stage vs single-stage management for concomitant gallstones and common bile duct stones. World J Gastroenterol 2012;18:3156-66.
15. Bansal VK, Misra MC, Garg P, Prabhu M. A prospective randomized trial comparing two-stage versus single-stage management of patients with gallstone disease and common bile duct stones. Surg Endosc 2010;24:1986-9.
16. Collins C, Maguire D, Ireland A, Fitzgerald E, O'Sullivan GC. A prospective study of common bile duct calculi in patients undergoing laparoscopic cholecystectomy: Natural history of choledocholithiasis revisited. Ann Surg 2004;239:28-33.
17. Shaffer EA. Gallstone disease: Epidemiology of gallbladder stone disease. Best Pract Res Clin Gastroenterol 2006;20:981-96.
18. Mohandas S, John AK. Role of intra operative cholangiogram in current day practice. Int J Surg 2010;8:602-5.
19. Pedersen G, Hoem D, Andrén-Sandberg A. Influence of laparoscopic cholecystectomy on the prevalence of operations for gallstones in Norway. Eur J Surg 2002;168:464-9.
20. Ye L, Liu J, Tang Y, Yan J, Tao K, Wan C, *et al*. Endoscopic minimal invasive cholecystolithotomyvs laparoscopic cholecystectomy in treatment of cholecystolithiasis in China: A meta-analysis. Int J Surg 2015;13:227-38.
21. Surlin V, Saftoiu A, Dumitrescu D. Imaging tests for accurate diagnosis of acute biliary pancreatitis. World J Gastroenterol 2014;20:16544-9.
22. Kharbutli B, Velanovich V. Management of preoperatively suspected choledocholithiasis: A decision analysis. J Gastrointest Surg 2008;12:1973-80.
23. Kenny R, Richardson J, McGlone ER, Reddy M, Khan OA. Laparoscopic common bile duct exploration versus pre or post-operative ERCP for common bile duct stones in patients undergoing cholecystectomy: Is there any difference? Int J Surg 2014;12:989-93.