

Post-Cholecystectomy Biliary Dilatation

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ABSTRACT

Introduction: Despite the fact that the common bile duct (CBD) is thought to dilate following surgery, post-cholecystectomy CBD dilatation still remains a source of debate. Intravenous cholangiography made it possible to measure the common duct directly. Although most patients did not have a substantial increase in duct diameter following cholecystectomy, there was a trend toward a modest degree of duct dilatation, according to prospective studies employing sonography to assess the common duct.

Objective: To determine the frequency of common bile duct dilatation after cholecystectomy for chronic cholecystitis.

Study Design: Descriptive study

Place and Duration of Study: General Surgery Department, Hayatabad Medical Complex, Peshawar from 1st February 2020 to 31st January 2021.

Methodology: Eighty seven patients and age range is 20-60 years booked for cholecystectomy in outpatient department were included and followed up to 6 month to determine the frequency of common bile duct dilatation.

Results: The mean age was 38.6±10.3 years with 25 (28.7%) males and 62 (71.2%) females. Mean body mass index of the sample was 25±2.3kg/m². Sixty (68.9%) underwent laparoscopic cholecystectomy while 17 (19.5%) underwent open cholecystectomy. Mean baseline common bile duct diameter on ultrasound was 1.3±0.1 mm while the mean follow up common bile duct diameter was 1.8±0.2 mm (p<0.001). Common bile duct dilatation was recorded in 20 (22.98%) patients.

Conclusion: Common bile duct dilatation after cholecystectomy is controversial, but in asymptomatic patients, a dilation of up to 10mm should be accepted as normal.

Keywords: Cholecystectomy, Cholecystitis, Common bile duct dilatation, Body mass index

INTRODUCTION

Gallstone disease, which affects about 12% of people in the United States and 18.5% in Europe, is the most prevalent biliary tract pathology in the world.¹ Even those who are asymptomatic and have gallstones are at risk for complications.² As a result of the development of cutting-edge technologies, laparoscopic cholecystectomy (LC), the gold standard therapeutic approach, has gained rapid popularity.³

Oddi in 1887 hypothesized that CBD dilatation after cholecystectomy is physiological and is due to loss of the reservoir function of the gallbladder. However there is great controversy in the frequency and degree of dilatation after surgery. Mostly the post cholecystectomy dilatation of CBD is asymptomatic; it will be difficult to decide whether it is physiological after surgery or the early findings of otherbiliary tract lesion which may be a serious condition. To differentiate between the two one has to do many investigations. Most of these investigations are expensive and invasive. There is a lot of disagreement in the laparoscopic, radiographic and sonographic literature despite the fact that CBD dilatation is physiological after surgery.⁴ Although most patients did not show a substantial increase in duct diameter following cholecystectomy, a modest degree of dilatation is reported by several prospective studies employing sonography to assess the common bile duct.⁵

For the liver and extrahepatic biliary system, ultrasonography has become the preferred medical imaging technique.⁶ Ultrasound is unique in that it allows for rapid post-operative observation of altering structures. The typical CBD size range is determined by age. The recommended CBD size is 2 mm for infants, 4 mm for children, and 7 mm for adults.⁷

The purpose of this study is to provide local data about the magnitude of CBD dilatation after cholecystectomy. This will help prevent subjecting patients to unnecessary investigations which are both expensive and invasive.

MATERIALS AND METHODS

This descriptive study was carried out at General Surgery Department, Hayatabad Medical Complex, Peshawar from 1st February 2020 to 31st January 2021 and 87 patients were enrolled. All patients with chronic cholecystitis, age group 20-60 years, both sexes, CBD size of less than 7mm on ultrasound, ASA class I and

II and body mass index less than 30 were included. All patients with history of any other abdominal surgery involving the biliary tract and ERCP in last 6 months were excluded. Data was analyzed with SPSS-25. Chi square test and student's 't' were used to stratify the CBD dilatation in terms of age, BMI, type of cholecystectomy, baseline size of CBD and gender with P≤0.05 taken as significant.

RESULTS

The mean age was 38.6±10.3 years including 25 (28.7%) males and 62 (71.3%) females. Mean BMI of the sample was 25±2.3. Mean duration of cholecystitis was 3.6±1.5 months. Sixty (68.9%) patients underwent laparoscopic cholecystectomy while 17 (19.5%) patients underwent open cholecystectomy (Table 1). Mean baseline CBD diameter on sonography was 1.3±0.1 mm and mean follow up CBD diameter was 1.8±0.2 mm (p<.001). The CBD dilatation was recorded in 32 (36.7%) of patients. Out of them 11 (12.6%) occurred after open cholecystectomy and 21 (24.1%) after laparoscopic cholecystectomy (Table 2).

Table 1: Patients demographic

Variable	No.	%
Gender		
Male	25	29
Female	62	71
Type of cholecystectomy		
Laparoscopic	60	68.9
Open	27	31.1
Age (years)	38.6±10.3	
Body mass index (kg/m ²)	25±2.3	
Duration of cholecystitis (months)	3.6±1.5	

Table 2: Common bile duct dilatation at 6 months

Variable	CBD Dilatation	P value
Open cholecystectomy	11 (12.6%)	0.438
Laparoscopic cholecystectomy	21 (24.1%)	
Baseline diameter (mm) on US	1.3±0.1	0.001
Follow-up diameter (mm) on US	1.8±0.2	

DISCUSSION

Due to the frequent use of abdominal ultrasound, bile duct dilatations are commonly found in patients who had undergone

cholecystectomy. It can be challenging to differentiate between the physiological change brought on by gallbladder removal and the early symptoms of bile duct lesions when bile duct dilatation is found in asymptomatic patients. Magnetic resonance cholangiopancreatography (MRCP) or endoscopic retrograde cholangiopancreatography (ERCP), both of which are costly and invasive procedures, are needed to differentiate the diagnosis. Therefore, it is essential to comprehend how the bile duct changes physiologically following cholecystectomy in order to minimize irrelevant testing for the early detection of bile duct lesions.

Role of cholecystectomy in the development of CBD dilatation has been most debated. In 1890, Oddi was the first to document its prevalence in dogs.⁸ Judd and Mann published an identical observation in 1917. Mahour et al⁹ noted its prevalence in dogs in 1968. Graham et al¹⁰ released an ultrasonographic research of 67 asymptomatic patients more recently, and 56 (84%) of these patients demonstrated normal duct size following cholecystectomy. They also came to the conclusion that channel dilatation following cholecystectomy was uncommon. Clinical studies' contradictory results haven't been able to settle this argument.

All patients in the current research had CBD diameters <7 mm before surgery and investigated after surgery for any dilatation, after a 6-month follow-up, 32 (36.7%) of the patients experienced CBD dilatation. Out of these, 11 (12.6%) occurred after an open cholecystectomy and 21 (24.1%) after laparoscopic surgery.

The magnitudes and frequency of dilatation vary depending on the study, despite the fact that numerous cross-sectional studies have shown an increase in CBD diameter in gallbladder resection patients compared to healthy individuals. In one study, the gallbladder-resection group had a CBD diameter of 4.5 mm, which was only slightly different from the 3.7 mm dilatation in the control individuals (a difference of 0.7 mm).¹¹ According to another study, the gallbladder removal group's CBD diameter was 6.2 mm as opposed to 2.8 mm in the control group.¹² 80% of the proximal CBD and 58% of its distal parts of gallbladder-resected cohort showed bile duct dilatation of >6 mm.¹³

Although there are no formal standards, individuals under the age of 65 are thought to have bile ducts with diameters of <6 mm and >7 mm, respectively. The patient's gender, body weight, or height has no effect on the size of the bile duct. However, a significant correlation with age has been found, with a rise of 0.3 to 0.6 mm for patients who were separated by 10 years.¹⁴ The findings of a study that measured the CBD diameter of 230 patients showed that they had CBD diameters of 1.8 mm, compared to <7.3 mm in 95% of the populations examined.¹⁵

CONCLUSION

Bile duct dilatation after cholecystectomy occurs due to physiological change. Patients with asymptomatic bile duct

dilatation of up to 10 mm after cholecystectomy considered to be within the normal range and should not undergo additional investigations.

REFERENCES

1. Ruhl CE, Everhart JE. Gallstone disease is associated with increased mortality in the United States. *Gastroenterology* 2011;140(2):508-16.
2. Duncan CB, Riall TS. Evidence-based current surgical practice: calculous gallbladder disease. *J Gastroenterol Surg* 2012;16(11):211-25.
3. Broderick RC, Omelanczuk P, Harnsberger CR, Fuchs HF, Berducci M, Nefa J, et al. Laparoscopic cholecystectomy using a novel single-incision surgical platform through a standard 15mm trocar: initial experience and technical details. *Surg Endosc* 2015;29(5):1250-6.
4. Pan MX, Jiang ZS, Cheng Y, Xu XP, Zhang Z, Qin JS, et al. Single-incision vs three-port laparoscopic cholecystectomy: prospective randomized study. *World J Gastroenterol*. 2013; 19(3):394-8.
5. Barbier L, Souche R, Slim K, Ah-Soune P. Long-term consequences of bile duct injury after cholecystectomy. *J Visc Surg* 2014;151(4):269-79.
6. McArthur TA, Planz V, Fineberg NS, Berland LL, Lockhart ME. CT evaluation of common duct dilation after cholecystectomy and with advancing age. *AbdImag* 2015;40(6):1581-6.
7. Landry D, Tang A, Murphy-Lavallée J, Lepanto L, Billiard JS, Olivie D. Dilatation of the bile duct in patients after cholecystectomy: a retrospective study. *Canad Assoc Rad J* 2014;65(1):29-34.
8. Bruno M, Brizzi RF, Mezzabotta L, Carucci P, Elia C, Gaia S, et al. Unexplained common bile duct dilatation with normal serum liver enzymes: diagnostic yield of endoscopic ultrasound and follow-up of this condition. *J Clin Gastroenterol* 2014;48(8):e67-70.
9. Sharma S, Goyal S, Goyal R. A prospective study to determine the effect of cholecystectomy on common bile duct diameter in Indian population. *Int J Clin Exp Physiol* 2015;2(1):61-5.
10. Bhalerao SB, Batra P, Utaal MS, Sasan C. Evaluation of effect of cholecystectomy on common bile duct diameter using ultrasonography and liver function test: a prospective study. *Int Surg J* 2018;5(4):1323-9.
11. Park SM, Kim WS, Bae IH. Common bile duct dilatation after cholecystectomy: a one-year prospective study. *J Korean Surg Soc* 2012; 83(2):97-101.
12. Sandzen B, Haapamaki MM, Nilsson E, Stenlund HC, Oman M. Surgery for acute gallbladder disease in Sweden 1989-2006 - a register study. *Scand J Gastroenterol* 2013;48(4):480-486.
13. Falor AE, de Virgilio C, Stabile BE, Kaji AH, Caton A, Kokubun BA et al. Early laparoscopic cholecystectomy for mild gallstone pancreatitis: time for a paradigm shift. *Arch Surg* 2012; 147(11):1031-5.
14. Panagiotopoulou IG, Carter N, Lewis MC, Rao S. Early laparoscopic cholecystectomy in a district general hospital: is it safe and feasible? *Int J Evid Based Health* 2012;10(2):112-6.
15. Sankarankutty A, da Luz LT, De Campos T, Rizoli S, Fraga GP, Nascimento B Jr. Uncomplicated acute cholecystitis: early or delayed laparoscopic cholecystectomy? *Rev Col Bras Cir* 2012; 39(5): 436-40.