

Study of role of pre-operative ultrasonographic evaluation of common bile duct in gall bladder diseases.

Dr. Manoranjan Kuswaha¹, Dr. Paltial Palat², Dr. Jigar Jariwala³, Dr. Jigar Patel^{4*}

¹Associate Professor, ³MBBS MS, ⁴Third Year Resident, Department of General surgery, Smt. NHL Municipal Medical College, Sardar Vallabhbhai Patel Institute Of Medical Science And Research Center, Ahmedabad.

²Associate Professor, Department of General Medicine, Smt. NHL Municipal Medical College, Ahmedabad.

Abstract:

Objective- to study the sensitivity and specificity of ultrasonography in pre-op evaluation of gallbladder and common bile duct(CBD), and to co-relate it with the intra-op findings during surgery, and to finally infer about the role of ultrasonography in pre-op evaluation of CBD in case of gallbladder diseases. **Method-**this study was conducted on 50 patients attending the surgical OPD having gb diseases (gallbladder calculous, cholecystitis, gallbladder perforation, gallbladder mass etc), requiring open surgery (open cholecystectomy, open common bile duct exploration, open choledochoduodenostomy, whipple procedure etc.)were selected for study. patients underwent laproscopic surgery excluded from study. **Result-**this study recorded that out of total 50 patients 44 had calculous cholecystitis, 3 had gb perforation with gb cal and other 3 had gb mass with gb cal. this shows that gallstones are the most common gallbladder disease. sensitivity of usg in detecting gall stones in our study is 98%, CBD dilatation is 88.46%, CBD stones is 90% and CBD strictures is 75%. specificity of usg in detecting these 4 parameters is 100%. ultrasonographic measurements of CBD were accurate as confirmed by subsequent direct measurements made intra-op. **Conclusion-**stones are the commonest cause of gall bladder disease. ultrasound is very sensitive and specific in detecting CBD pathology. it can be used as an initial modality for investigation of biliary tree as it is very cost effective, non-invasive and no radiation exposure. usg measurements of CBD are accurate. they compare very well with that of intra-op measurements of CBD.

Key Words: CBD diameter, Gall bladder disease, Intra operative finding.

Introduction:

Over the last few years, the development of new diagnostic techniques has revolutionized the evaluation of common bile duct in patients with gall-bladder diseases. For the surgeon, the diagnosis of hepatobiliary diseases has always offered a unique intellectual challenge. The most reliable, risk-free, efficient and cost-effective approach to the patient with right upper quadrant pain, hepatomegaly or jaundice is

* Corresponding Author:

Dr. Jigar Patel

Email: jigarsalvi95@gmail.com

QR Code:



often unclear.

Gall bladder diseases are quite common in India. More often they are associated with some abnormality of the common bile duct(CBD) such as choledocholithiasis, CBD stricture, etc. Preoperative evaluation of CBD is of utmost importance in cases of gall bladder diseases because the entire course of management will depend upon the anatomy and the associated abnormality in the CBD. For instance, in cases with gall stones, if there is an associated CBD stone, we would have to go for ERCP for CBD stone removal and stenting first, followed by laparoscopic cholecystectomy. This is just one of many examples encountered in daily practice. My publication is to evaluate ultrasonography (usg) as a tool for pre-op evaluation of CBD and to compare it with intra-op findings and finally come to a conclusion about the role of USG for assessment of CBD in gall bladder diseases.

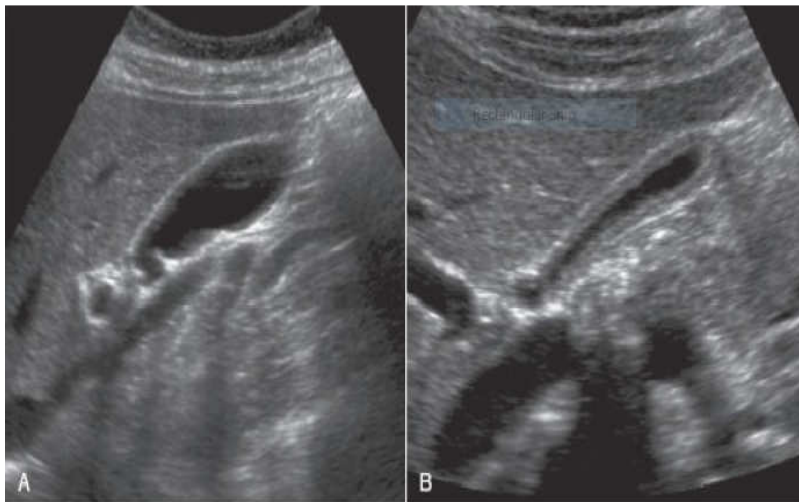
Materials and Methods:

A cross sectional study was conducted at tertiary care hospital, SVP Hospital in ahmedabad with a sample size of 50 cases from june 2017 to October 2019.

Patients for the study were selected from amongst those attending the surgical OPD with the patients having gall bladder diseases (gallbladder calculous, cholecystitis, gallbladder perforation, gallbladder mass etc), requiring open surgery (open cholecystectomy, open common bile duct exploration, open choledochoduodenostomy, whipple procedure etc.) Patients underwent laproscopic surgery excluded from study. Informed Consent was taken from all patients.

Pre-operative ultrasound examination of the gall bladder, intrahepatic and extrahepatic biliary tree, particularly the common bile duct was done in all the cases.

Image 1 Pre-operative ultrasound of Intrahepatic and extrahepatic biliary tree.



Normal gallbladder. A- Distended (fasting) gallbladder, B–contracted gallbladder (postprandial)

Surgery

Having fully investigated and evaluated, all the 50 patients underwent surgery. Open Cholecystectomy was done in all the patients either as the desired procedure or as a part of some other procedure(choledochoduodenostomy,whipple procedure etc). During operation, the gallbladder and CBD were evaluated and compared with the pre-op ultrasonography findings. Type of pathology in both gallbladder and CBD was noted and direct measurement of the common bile duct diameter was done at the time of surgery using a silk 215 tie cut into the diameter size and then measuring by a standard ruler (scale). The operative findings were compared with the pre-operative USG findings and the other investigative results.

Results:

This study was conducted on fifty cases of gall bladder disease. Pre-operative ultrasound evaluation of the gall bladder and the biliary ductal system was done in all the patients. Depending upon the pre-operative ultrasonographic findings for CBD, patient were divided into following major sub-groups :

Table 1 subdivision of group of patients according to pathology

Group No.	Group Category	No of Patients
1	Diseased GB with normal CBD	24
2	Diseased GB with pathology of CBD not identified by USG	3
3	Diseased GB with dilated CBD and cause of dilatation identified as CBD cal.	17
4	Diseased GB with dilated CBD and cause of dilatation identified as CBD stricture	3
5	Diseased GB* with dilated CBD and cause of dilatation identified as Choledochal Cyst with cal. Within it	1
6	Diseased GB with dilated CBD and cause of dilatation identified as CBD mass	2
	Total	50

*(in this patient, gb was found normal on usg but on MRCP and CECT, there was presence of gb cal,which was later confirmed during surgery. Hence it was diseased gb with choledochal cyst+ CBD cal)

All the 50 cases underwent surgery; operative findings were compared & correlated with above written preoperative USG findings.

Total patients with GB cal in our study is 44(calculous cholecystitis)+3(GB perforation with GB cal) + 3(GB mass with GB cal)=50. This clearly shows that gallstones are the most common gallbladder disease.

Table 2 Distribution of gall bladder cases according to the disease entity

Sr. No.	Presentation	No. Of case	Percentage
1	GB cal (calculous cholecystitis)	44	88
2	GB mass (with GB cal)	3	6
3	GB perforation (with GB cal)	3	6
	Total cases	50	100

Table 3 Sensitivity of ultrasonography according to the disease entity

Sensitivity of Usg in Detecting	No. Cases Detected by Usg	No. Cases Proven by Surgery	False negative
Gall stones	49	50	1
Cbd dilatation	23	26	3
Cbd stones	18	20	2
Cbd strictures	3	4	1

Sensitivity of USG in detecting gall stones in our study is 98% and Specificity is 100%. There were no false positives in our study. All the 49 cases of gb cal detected on usg had stones in gall bladder intraoperatively. Sensitivity of USG in detecting CBD dilatation is 88.46% and Specificity is 100%. There were no false positives in our study. Sensitivity of USG in detecting CBD stones is 90% and Specificity is 100% because of no false positive result. Sensitivity of USG in detecting CBD strictures is 75% and Specificity is 100%. No false positive result.

Table 4 Comparison between pre-operative ultra – sonographic and direct operative measurement of CBD

No. Of cases size of cbd	Pre-operative usg Measurement	Direct Measurement at surgery	Chisquare value is 0.8887 with Df= 3 and P= 0.8281 (as p value is >0.05, the difference between the two is insignificant.
< or = 6 mm	27	24	
7-10 mm	7	10	
11-15 mm	4	3	
> or = 16 mm	12	13	
Total	50	50	

Table 5 Comparison between pre-operative ultra – sonographic and direct operative measurement of cbd

SR NO.	CBD DIAMETER ON USG	CBD DIAMETER INTRA-OP	SR NO.	CBD DIAMETER ON USG	CBD DIAMETER INTRA-OP
1	9 mm	8 mm	26	10 mm	11 mm
2	5 mm	9 mm	27	15 mm	16 mm
3	14 mm	14 mm	28	18 mm	18 mm
4	5 mm	8 mm	29	4 mm	5 mm
5	5 mm	5 mm	30	16 mm	17 mm
6	4 mm	4 mm	31	6 mm	6 mm
7	26 mm	26 mm	32	9 mm	9 mm
8	9 mm	9 mm	33	6 mm	6 mm
9	11 mm	10 mm	34	5 mm	16 mm
10	5 mm	5 mm	35	16 mm	15 mm
11	6 mm	6 mm	36	9 mm	9 mm
12	5 mm	5 mm	37	6 mm	6 mm
13	9 mm	9 mm	38	25 mm	25 mm
14	24 mm	24 mm	39	5 mm	5 mm
15	18 mm	20 mm	40	35 mm	35 mm
16	5 mm	4 mm	41	4 mm	4 mm
17	4 mm	5 mm	42	4 mm	4 mm
18	5 mm	5 mm	43	28 mm	28 mm
19	5 mm	5 mm	44	6 mm	6 mm
20	5 mm	5 mm	45	10 mm	10 mm
21	5 mm	6 mm	46	18 mm	18 mm
22	5 mm	5 mm	47	16 mm	16 mm
23	6 mm	5 mm	48	11 mm	10 mm
24	5 mm	6 mm	49	5 mm	5 mm
25	16 mm	17 mm	50	6 mm	6 mm

Using the paired 't' test for comparison, two tailed P value equals to 0.07. This difference is considered as not statistically significant at 95% confidence interval with $t=1.83$ and $df=49$. Since $p > 0.05$, the difference between sonographic measurements & direct pre-operative measurements, in our study is not statistically significant. In other words, ultrasonographic measurements of cbd were accurate in our study as confirmed by subsequent direct measurements made at operation.

Discussion:

50 patients of gall bladder disease were studied with an aim to evaluate preoperatively gall bladder and common bile duct by USG which was compared with that of intra-op findings.

1. In our study, sensitivity of ultrasound in detecting gall bladder stones was as high as 98% & specificity was 100%. Real-time USG with its capacity for visualization of the entire gall bladder in most patients, has become the initial procedure of choice (Cooperberg et al 1980)¹
2. 24 patients out of 50 in our study with gall bladder disease were found to have normal common bile duct (48%) i.e. less than or equal to 6 mm. Sample et al² followed up 139 patients with Jaundice, using 6mm as the upper limit for diameter of the normal common duct. Cronan³ took the upper limit of normal CBD as 6 mm.
3. There was total of 26 cases (52%) of gall bladder disease associated with dilated common bile duct in our study. Ultrasound could detect common bile duct dilatation in 23 cases, preoperatively; sensitivity being 88.46%. Specificity of ultrasound in detecting CBD dilatation was 100%. Honickman et al⁴ in their report found sonography as an excellent screening procedure for distinguishing dilated bile duct from non-dilated ducts.
4. patients in our study had CBD stricture. Out of these, 3 cases were detected preoperatively by usg. (Sensitivity 75%). USG compares well with direct cholangiography in accurately detecting the site and cause of biliary obstruction (Isikoff et al 1977)⁵ and Koenigsberg et al in 1979⁶, could accurately define the anatomical site and etiology of obstruction in 81% of their cases.
5. Ultrasonographic measurement of CBD were found to be accurate in our study as confirmed by subsequent direct measurements made at surgery. The difference between both the measurements being statistically insignificant ($p > 0.05$)

Conclusion:

Stones are the commonest cause of gall bladder disease and ultrasound is highly sensitive in detecting these, and is now the first line investigating modality for GB diseases. Ultrasound is highly sensitive in detecting biliary dilatation and thus differentiating between medical and surgical Jaundice. Ultrasound is very sensitive and specific in detecting CBD pathology (stones /stricture /mass /choledochal cyst etc). It can be used as an initial/primary modality for investigation of biliary tree as it is very costeffective, non-invasive and without

any side effects like radiation exposure. Ultrasonographic measurements of CBD are accurate. They compare very well with that of intra-operative measurements of CBD.

References:

1. Cooperberg PL, David Li, Wong P, Cohen MM Jr. et al. Accuracy of common hepatic duct size in the evaluation of extrahepatic biliary obstruction. *Radiology*, 1980 : 135 : 141 – 144
2. Sample WF, Sartix DA, Goldstein LT. Gray scale ultrasonography of the Jaundiced patient. *Radiology*, 1978; 128; 719-725
3. Cronan JJ, The imaging of biliary obstruction. *Seminar in ultrasound, CT & NMR*, 1984 : 5(4) : 376-398
4. Honickmen SP, Muelier PR, Wittenberg J, Cronar JJ, et al. Ultrasound in obstructive jaundice, prospective evaluation of site and cause. *Radiology*, 1983, 147 : 511 – 515
5. Isikoff MB, Diaconis JN. Ultrasound, a new diagnostic approach to Jaundiced patients. *J.A.M.A*, 1977 : 238 : 221 – 223
6. Koenigsberg M, Weiner SN, Walzer A. The accuracy of sonography in the differential diagnosis of obstructive jaundice : a comparison with cholangiography. *Radiology*, 1979 : 133 : 157-165