

Significance of Ultrasonographic Common Bile Duct Dilation in Predicting Complicated Biliary Pathology: A Retrospective Study

Summaya Saeed, Aun Ali, Muhammad Rauf Sheikh, Amjad Siraj Memon,
Khursheed Samo, Mujeeb Abbasi

ABSTRACT

OBJECTIVE: To evaluate the diagnostic ability of sonographic Common bile duct (CBD) dilation in the presence or absence of laboratory abnormalities for the diagnosis of complicated biliary pathology.

METHODOLOGY: This was a retrospective study, data were obtained from hospital medical record files and electronic medical records database from 1st January 2015 to 31st December 2017 from Department of Surgery, Dow University of Health Sciences Hospital, Karachi. In these patients, the Ultrasound and relevant laboratory tests were done. In selected cases where Common Bile Duct (CBD) was dilated, ERCP was also done.

RESULTS: A total of 240 patients met the inclusion and exclusion criteria. Out of these, 186 (77.5%) patients were diagnosed with cholelithiasis. CBD was dilated in 42 patients (17.5%). Among these 42 patients, 28 had abnormal labs, while 14 patients had normal labs. All the patients who had dilated CBD and altered labs (n=28) had complicated biliary pathology, while only 14% (2/14) of patients who had isolated CBD dilation had an associated complicated biliary pathology (p-value < 0.0001).

CONCLUSION: We can conclude by saying that CBD dilatation on ultrasound in the presence of normal laboratory values is rarely associated with complicated biliary pathology.

KEYWORDS: Common bile duct, Ultrasonography, Complicated biliary Pathology.

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INTRODUCTION

The first diagnostic investigation is an ultrasound of the upper abdomen for a patient presenting with signs and symptoms of acute cholecystitis. In the United States, twenty million patients present with signs and symptoms related to gallstones¹⁻³. Ultrasound (US) can detect gallstones, Gall bladder (GB) wall thickening, pericholecystic fluid, and Common bile duct (CBD) dilatation, but the results are operator dependent^{4,5}. There are limitations to the US in the diagnosis of complicated biliary pathology. According to the guidelines by European Society of Gastrointestinal Endoscopy and British Society of Gastroenterology, the incidence of CBD stones with the association of gallstones is between 10% to 20%^{6,7}. In most of the cases, we get information from ultrasonologist regarding CBD diameter but actual visualization of CBD stones is obscured by gut distension and inflammation around the gall bladder. Before dealing with gallstones, it is essential to rule out associated biliary pathology. CBD dilatation alone is of little clinical significance in the presence of normal laboratory values⁸⁻¹¹. However, it is essential to rule out the presence of CBD stones in a patient with gallstones before surgery by the US, laboratory

parameters or even Endoscopic retrograde cholangiopancreatography (ERCP), if strongly suspected¹². Isolated CBD dilation is unlikely to affect the final diagnosis of patients with normal laboratory values and a point-of-care US that does not demonstrate GB wall thickness, pericholecystic fluid and sonographic Murphy's sign as reported by Lahham S et al¹¹. They also found CBD dilation to be a very insensitive (23%) marker for the diagnosis of complicated biliary pathology in the emergency department (ED) population. A recent systematic review by Smith I 2015⁹ concluded that patients having incidental CBD dilation without any symptoms and laboratory abnormalities should be followed closely with clinical and laboratory follow-up to help decide whether any additional imaging would be appropriate. Isolated ultrasonographic CBD dilation is present in <1% of the patients having cholecystitis and choledocholithiasis as reported by Becker BA et al⁸ suggesting that omission of CBD measurement is unlikely to result in missed cholecystitis or choledocholithiasis in the setting of a routine ED evaluation with otherwise normal US and normal laboratory values. Moreover, Boys JA 2014¹⁰ concluded that US CBD diameter is not sufficient to identify patients at significant risk for

CBD stones.

The purpose of our study was to find out if there is any significance of isolated CBD dilatation with normal laboratory values in diagnosing complicated biliary pathology.

METHODOLOGY

In this retrospective study, data were obtained from hospital medical record files and electronic medical records database dated from 1st January 2015 to 31st December 2017 at Department of Surgery, Dow University of Health Sciences Hospital, Karachi. Inclusion criteria were adult patients (above the age of 18 years) presenting with right upper abdominal pain or those suspicious of biliary pathology based on history and examination. In these patients, the US abdomen and relevant laboratory tests were done. In selected cases where CBD was dilated, ERCP was also done. Exclusion criteria were age below 18 years, patients presenting with associated acute pancreatitis or generalized abdominal pain and pregnant patients. The final diagnosis was made based on US findings, laboratory results and in selected cases with the help of ERCP. With these data, we assessed the significance of dilated CBD on US on the final diagnosis.

Laboratory tests were considered abnormal if serum bilirubin > 2mg/dl, alkaline phosphatase >120u/L, AST > 40u/L and ALT >40u/L. US assessment included the finding of gallstones, GB wall thickness, free fluid around gallbladder and CBD diameter. CBD was considered dilated if its diameter was >7mm.

All statistical analysis was done on Statistical Package for the Social Sciences version 20. A chi-square test was applied to evaluate the association. P-value of <0.05 was considered as statistically significant.

RESULTS

A total of 240 patients participated in our study, 86 males (36%) and 154 females (64%). Age ranged from 18 to 74 years (mean age 43 years)

Out of 240 patients, 186 (77.5%) patients had gallstones on the US. CBD was dilated (>7mm) in 42 patients (17.5%) in the US. Out of these 42 patients, laboratory values were abnormal in 28 patients. We performed ERCP in all these 42 patients for finding complicated biliary pathology. In patients with abnormal laboratory values (n=28) , 23 had CBD stone, two had periampullary carcinoma, two had carcinoma of the head of the pancreas and one had a biliary stricture. We also performed ERCP on those 14 patients who had isolated CBD dilatation (>7mm) on the US with normal laboratory values, where only two patients had a CBD stone, and the rest had no complicated biliary pathology and the actual cause of

CBD dilatation was not identified. Further investigations were required in those cases (Table II).

A chi-square test was applied to evaluate the association. The difference was statistically significant (p-value < 0.0001).

TABLE I: DEMOGRAPHIC DATA (n=240)

	Frequency	Percentage	Age range	Mean age ± SD (years)
Total	240	--	18 – 74	43±21
Male	86	36%	31 – 69	47±23
Female	154	64%	18 – 74	37±19

TABLE II: ENDOSCOPIC RETROGRADE CHOLANGIOPANCREATOGRAPHY RESULTS IN PATIENTS WITH DILATED COMMON BILE DUCT (n=42)

	Endoscopic retrograde cholangiopancreatography		
	Common bile duct Stone	Common bile duct stricture	Pancreatic pathology
Dilated common bile duct (>7mm) with abnormal labs (n=28)	23 (82%)	01 (4%)	04 (14%)
Dilated common bile duct (>7mm) with normal labs (n=14)	02 (14%)	-	-

TABLE III: ASSOCIATION OF COMMON BILE DUCT DILATION WITH COMPLICATED BILIARY TRACT PATHOLOGY

	Complicated Biliary pathology	P-value
Dilated common bile duct with abnormal labs (n=28)	28/28 (100%)	<0.0001
Dilated common bile duct with normal labs (n=14)	2/14 (14%)	

DISCUSSION

The biliary disease is one of the most common pathologies seen in surgical practice^{13,14}. Clear identification of exact pathology is essential to see the best result in biliary surgery. For this, we use different modalities-clinical assessment, laboratory test, US, ERCP, per-operative cholangiogram. According to the literature, 10% - 20% of the patients have associated CBD stones in addition to gallstones^{6,7}. Similarly, in our study, 13% of patients had associated CBD stones. Use of the US to assess the presence of CBD stones by considering CBD diameter is debatable. Many studies have shown CBD diameter cut off from 7-12mm¹⁵. If the CBD diameter is 7-10mm, the

predictability of CBD stone is 58% to 78%, but if the diameter is >12mm alone, predictability is 90%¹⁵. Predictability (of complicated biliary pathology) is 100% if the dilation is associated with altered liver function tests¹⁶.

In comparison, in our study only 14% of patients had complicated biliary pathology when CBD was dilated alone with normal labs, and 86% of patients had no complicated biliary pathology with dilated CBD alone. Further, in our study, 100% of patients had complicated biliary pathology when dilated CBD was associated with abnormal labs. This correlates with the findings of Watkin DS 1994¹⁵ and Lacaine F 1980¹⁶.

In our study, the majority of patients with complicated biliary pathology had abnormal laboratory values when compared with other studies^{8,11,17,18}. We observed that CBD dilatation is a very insensitive index for the diagnosis of complicated biliary pathology. It testifies the studies by Becker BA et al⁸ and Bose SM et al¹⁸.

There were some limitations in our study. Although all ultrasonologists were experienced, some variability remains. Secondly, facilities for per-operative cholangiogram were not available. All patients were enrolled as a convenience sample from only one of the tertiary care hospital and so the study findings are not generalizable. What procedure was done and what were the operative findings, this was not taken into account.

CONCLUSION

At this stage, considering our study and other studies cited above, we can conclude by saying that CBD dilatation on ultrasound in the presence of normal laboratory values is rarely associated with complicated biliary pathology.

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AUTHOR AFFILIATION:

Dr. Summaya Saeed

Assistant Professor, Department of Surgery
Dow Medical College/ Dow University of Health Sciences
Karachi, Sindh-Pakistan.

Dr. Aun Ali

Associate Professor, Department of Surgery
United Medical Dental College
Karachi, Sindh-Pakistan.

Dr. Muhammad Rauf Sheikh

Assistant Professor, Department of Surgery
Dow Medical College/ Dow University of Health Sciences
Karachi, Sindh-Pakistan.

Dr. Amjad Siraj Memon

Professor, Department of Surgery
Dow Medical College/ Dow University of Health Sciences
Karachi, Sindh-Pakistan.

Dr. Khursheed Samo

Assistant Professor, Department of Surgery
Dow Medical College/ Dow University of Health Sciences
Karachi, Sindh-Pakistan.

Dr. Mujeeb Abbasi (*Corresponding Author*)

Associate Professor, Department of Surgery
Dow Medical College/ Dow University of Health Sciences
Karachi, Sindh-Pakistan.
Email: abbasimujeeb@gmail.com