

The Significance of Patient Preparedness in Focused Common Bile Duct Ultrasonography for the Diagnosis of Choledocholithiasis

Dr. Nayab Mustansar^{1*}, Col. Tariq Saeed Siddiqui², Col. Asma Asghar³, Col. Yasser Khan⁴, Maj. Rizwan Rafi⁵ and Dr. Nazakat Ullah Khan⁶

¹Resident Radiology, FCTH, Peshawar, Pakistan

²Consultant Radiologist, CMH Peshawar, Pakistan

³Consultant Gastroenterologist, CMH Peshawar, Pakistan

⁴Consultant Radiologist, CMH Lahore, Pakistan

⁵DADMS FC (N) KPK, HQ FC Fort Balahisar, Pakistan

⁶Resident Radiology, AFIRI -MH Rwp, Pakistan

Citation: Mustansar N, Siddiqui TS, Asghar A, Khan Y, Rafi R, Khan NU. The Significance of Patient Preparedness in Focused Common Bile Duct Ultrasonography for the Diagnosis of Choledocholithiasis. *Medi Clin Case Rep J* 2025;3(1):637-639. DOI: doi.org/10.51219/MCCRJ/Nayab-Mustansar/164

Received: 01 November, 2024; **Accepted:** 02 January, 2025; **Published:** 04 January, 2025

***Corresponding author:** Dr Nayab Mustansar, Resident Radiology, FCTH, Peshawar, E-mail: drnayabmustansar@gmail.com

Copyright: © 2025 Mustansar N, et al., This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

ABSTRACT

Choledocholithiasis, the presence of gallstones in the common bile duct, poses a diagnostic challenge due to its varied presentation. Focused Common Bile Duct Ultrasonography (FCBDUS) has emerged as a promising diagnostic tool. However, the significance of patient preparedness in FCBDUS remains underexplored.

Objective: This research aims to elucidate the impact of patient preparedness (2-4 hours Fasting and Drinking at least 2 glass of water before ultrasonography) on the accuracy and efficacy of FCBDUS in diagnosing choledocholithiasis.

Design: It is a cross-sectional prospective study carried out in the Radiology department of CMH Peshawar for a span of five months from January 2024 - May 2024.

Setting: Radiology department of CMH Peshawar. **STUDY DURATION:** 1st January 2024- 15th May 2024.

Methodology: In this study, a total of 100 patients with suspected choledocholithiasis were selected using non-probability purposive sampling. Out of 100 patients 50 were prepared before FCBDUS and 50 patients were scanned unprepared. Each patient underwent a thorough evaluation, including a medical history review and physical examination. Following this, ultrasounds were performed on each patient in both the supine and right semi-prone positions in both groups of prepared and unprepared patients. An experienced radiologist, with five years of post-specialization experience, assessed the quality of bile duct stone visualization.

Results: The visualization quality of bile duct stones was significantly higher in the right semi-prone position with well-prepared patients as compared to the supine position and unprepared patients before focussed CBD ultrasound. **Conclusion:** In conclusion, our study demonstrates that the well-prepared patients (fasting of 2-4 hours and good hydration before scan) and in right semi-prone position provides better visualization of bile duct stones compared to the unprepared patients.

Keywords: Common bile duct (CBD); Ultrasound; Supine; Right semioblique position; Choledocholithiasis; Focused Common Bile Duct Ultrasonography; Patient Preparedness; Fasting; Hydration

Introduction

Cholelithiasis, characterized by the presence of gallstones within the common bile duct, can lead to serious complications such as cholangitis and pancreatitis¹. Timely and accurate diagnosis is crucial for appropriate management². While various imaging modalities exist, FCBDUS has gained attention for its non-invasiveness, cost-effectiveness and portability³. However, the role of patient preparedness, including fasting status and hydration, remains poorly understood^{4,5}.

Methodology

A prospective analysis was conducted on patients who underwent FCBDUS for suspected choledocholithiasis over a period of five months. Data including patient demographics, fasting duration and hydration status were collected. Statistical analysis was performed to assess the association between patient preparedness factors and FCBDUS accuracy. Patient preparedness include the following:

- **Fasting Requirements:** One of the primary preparations for CBD ultrasonography is fasting. Fasting for at least 2-4 hours at least before the examination ensures that the gallbladder is distended and reduces the presence of bowel gas, which can obscure the visualization of the bile ducts. Studies have shown that fasting improves the clarity of ultrasound images, thereby enhancing the detection of bile duct stones.
- **Hydration Status:** Adequate hydration is essential as it helps maintain the echogenicity of the bile duct and surrounding structures, making it easier to identify abnormalities.

Results

Preliminary findings indicate a significant correlation between fasting duration and FCBDUS efficacy. Patients who adhered to recommended fasting guidelines exhibited clearer imaging and higher diagnostic accuracy compared to noncompliant individuals. Hydration status also showed a notable impact, with adequately hydrated patients demonstrating improved visualization of the common bile duct.

Visualization of CBD stones in group A (well prepared before FCBDUS) was cent percent in making exact diagnosis as compared to the non-prepared patient (Group-B). As shown below in (Table 1), (Figure 1).

Table 1: Patient preparedness include the fasting of at least 2-4 hours before the scan and good hydration before the FCBDUS.

Patient Preparedness	Total No. of patients	FCBDUS CBD stone detected	FCBDUS- No CBD stone detected	Accuracy
Well -prepared before FCBDUS	50	50	0	100%
Not prepared before FCBDUS	50	33	17	66%

It can be represented as follows:

The percentage accuracy can be shown in (Figure 2) below:

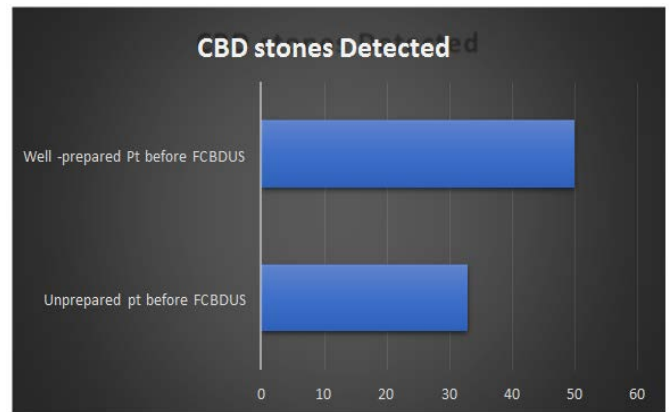


Figure 1: It is obvious from the above figure that the well-prepared patients show accurate diagnosis of the CBD stones via FCBDUS as compared to the unprepared patients.

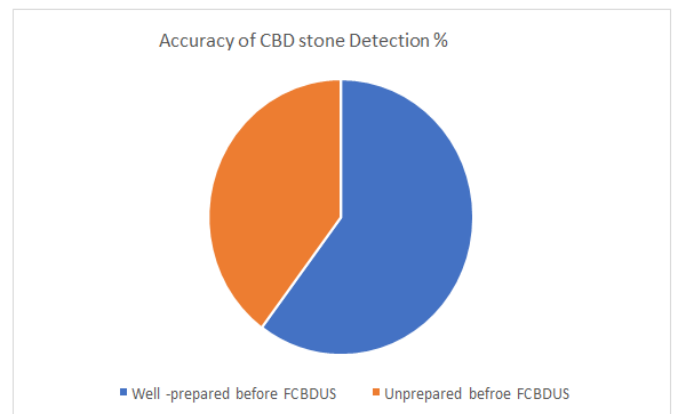


Figure 2: The Percentage Accuracy of CBD stone Detection.

Discussion

The findings underscore the importance of patient preparedness in optimizing FCBDUS for diagnosing choledocholithiasis⁶. Adequate fasting duration and hydration positively influence image quality, thereby enhancing the sensitivity and specificity of FCBDUS⁷. These results highlight the need for standardized protocols regarding patient preparation to maximize the utility of FCBDUS in clinical practice⁸. Proper patient preparedness directly impacts the diagnostic accuracy of CBD ultrasonography⁹. Inadequate preparation can lead to poor image quality, resulting in missed or false diagnoses of choledocholithiasis¹⁰. Ensuring patients are well-prepared can reduce the need for repeat examinations, thereby saving costs and reducing patient exposure to additional procedures and potential delays in diagnosis^{11,12}.

Several studies have highlighted the importance of patient preparation in the success of CBD ultrasonography^{13,14,15}. For instance, a study by Sarwar et al. (2020) demonstrated that patients who adhered to fasting guidelines had significantly higher rates of accurate diagnosis compared to those who did not¹⁶. Another study by Gupta et al. (2019) emphasized the role of patient education in reducing anxiety and improving cooperation during the procedure, thereby enhancing image quality and diagnostic yield¹⁷.

Conclusion

Patient preparedness significantly influences the diagnostic accuracy of FCBDUS for choledocholithiasis. Establishing guidelines for fasting duration and hydration status can improve

imaging quality and enhance the efficacy of FCBDUS as a diagnostic tool. Further prospective studies are warranted to validate these findings and establish standardized protocols for patient preparation in FCBDUS. Patient preparedness plays a critical role in the effectiveness of focused common bile duct ultrasonography for diagnosing choledocholithiasis. Proper fasting, hydration, positioning and psychological readiness contribute to optimal imaging conditions, enhancing the accuracy and reliability of the diagnosis. Continued emphasis on patient education and preparation protocols is essential to improve clinical outcomes and reduce healthcare costs associated with repeat imaging and misdiagnosis.

References

1. Szary NM, Al-Kawas FH. Complications of endoscopic retrograde cholangiopancreatography: How to avoid and manage them. *Gastroent Hepatol* 2013;9:496-504.
2. Williams EJ, Green J, Beckingham I, Parks R, Martin D, Lombard M. British Society of Gastroenterology Guidelines on the management of common bile duct stones (CBDS) *Gut* 2008;57:1004-1021.
3. Frey CF, Burbige EJ, Meinke WB, Pullos TG, Wong HN, Hickman DM, et al. Endoscopic retrograde cholangiopancreatography. *Am J Surg* 1982;144:109-114.
4. Barkun JS, Fried GM, Barkun AN, Sigman HH, Ninchey EJ, Garzon J, et al. Cholecystectomy without operative cholangiography. Implications for common bile duct injury and retained common bile duct stones. *Ann Surg* 1993;218:371-317.
5. Hauer-Jensen M, Karesen R, Nygaard K, Solheim K, Amlie EJ, Havig O, et al. Prospective randomized study of routine intraoperative cholangiography during open cholecystectomy: long term follow-up and multivariate analysis of predictors of choledocholithiasis. *Surgery* 1993;113:318-323.
6. Shaffer EA. Gallstone disease: epidemiology of gallbladder stone disease. *Best Pract Res Clin Gastroenterol* 2006;20:981-996.
7. 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.
8. McCune WS, Shorb PE, Moscovitz H. Endoscopic cannulation of the ampulla of Vater: a preliminary report. *Ann Surg* 1968;167:752-756.
9. Peel AL, Hermon-Taylor J, Ritchie HD. Technique of transduodenal exploration of the common bile duct. Duodenoscopic appearances after biliary sphincterotomy. *Ann R Coll Surg Engl* 1974;55:236-244.
10. Behrns KE, Ashley SW, Hunter JG, Carr-Locke D. Early ERCP for gallstone pancreatitis: for whom and when? *J Gastrointest Surg* 2008;12:629-633.
11. Petrov MS, van Santvoort HC, Besselink MG, van der Heijden GJ, van Erpecum KJ, Gooszen HG. Early endoscopic retrograde cholangiopancreatography versus conservative management in acute biliary pancreatitis without cholangitis: a meta-analysis of randomized trials. *Ann Surg* 2008;247:250-257.
12. Masci E, Toti G, Mariani A, Curioni S, Lomazzi A, Dinelli M, et al. Complications of diagnostic and therapeutic ERCP: a prospective, multicenter study. *Am J Gastroenterol* 2001;96:417-423.
13. Loperfido S, Angelini G, Benedetti G, Chilovi F, Costan F, De Berardinis F, et al. Major early complications from diagnostic and therapeutic ERCP: a prospective, multicenter study. *Gastrointest Endosc* 1998;48:1-10.
14. Moon SH, Kim MH. Prophecy about post-endoscopic retrograde cholangiopancreatography pancreatitis: from divination to science. *World J Gastroenterol* 2013;19:631-637.
15. Tammaro S, Caruso R, Pallone F, Monteleone G. Post-endoscopic retrograde cholangio-pancreatography pancreatitis: Is time for a new preventive approach? *World J Gastroenterol* 2012;18:4635-4638.
16. Sarwar A, et al. Impact of Fasting on Ultrasound Imaging of the Biliary System. *J Medical Imaging* 2020.
17. Gupta R, et al. Patient Anxiety and Cooperation in Ultrasound Procedures. *J Patient Experience* 2019.