

Comparison of magnetic resonance cholangiopancreatography (MRCP) with ultrasonography (USG) in the evaluation of patients with obstructive jaundice

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Abstract

From a radiologist's perspective, accurate diagnosis and evaluation of obstructive jaundice are crucial for guiding effective management and treatment. Radiological imaging plays a pivotal role in identifying and characterizing the obstruction. Recent advancements in imaging technology have significantly improved the diagnosis of biliary tract diseases. Comparison of Magnetic Resonance Cholangiopancreatography (MRCP) with Ultrasonography (USG) in the evaluation of patients with Obstructive Jaundice. To evaluate the diagnostic accuracy of Magnetic Resonance Cholangiopancreatography (MRCP) in assessing the level of obstruction in patients with obstructive jaundice. To establish the accuracy of MRCP over Ultrasound in diagnosing the cause of obstructive jaundice.

Keywords: Obstructive jaundice, Magnetic Resonance Cholangiopancreatography, Ultrasonography, Diagnostic accuracy, Cholelithiasis, Biliary obstruction.

Introduction

Obstructive jaundice is a clinical condition characterized by the blockage of bile flow, often leading to significant morbidity. Accurate diagnosis of the level and cause of obstruction is essential for appropriate management. This study aims to evaluate and compare the diagnostic accuracy of Magnetic Resonance Cholangiopancreatography (MRCP) and Ultrasonography (USG) in assessing patients with obstructive jaundice.

Objectives

To evaluate the diagnostic accuracy of Magnetic Resonance Cholangiopancreatography (MRCP) in assessing the level of obstruction in patients with obstructive jaundice and to establish the accuracy of MRCP over Ultrasound in diagnosing the cause of obstructive jaundice.

Materials and Methods

This cross-sectional study was conducted at the Department of Radiodiagnosis, KVG Medical College, Sullia, involving 45 patients with suspected obstructive jaundice. Participants underwent both USG and MRCP to assess the cause and level of biliary obstruction. The results of these imaging modalities were compared with the final clinical diagnosis, established after further investigations or surgical procedures. Demographic data, clinical presentation, and imaging findings were recorded and analyzed.

Study Design: Cross sectional study

Sample size

The proportion of patients visiting the Department of Radiology with obstructive jaundice is 3 % according to the records available in the department.

Sample size was hence calculated with the formula,

$$\frac{Z^2 P(1 - P)}{d^2}$$

Substituting, p=3 in the above formula, with d (allowable error) at 5%, sample size was calculated.

$$\frac{(1.96)^2 3 \times 97}{5^2}$$

So the minimum sample size was estimated to be 45.

Table 1: Ultrasound Findings in the study population

Sno.	Usg findings	No. Of patients	Percentage
1	Cholelithiasis with choledocholithiasis	11	24.44%
2	Cholelithiasis with Dilated CBD and IHBRD	12	26.66%
3	Dilated CBD and IHBRD	19	42.22%
4	Malignancy	3	6.66%
	Total	45	100%

Table 2: MRCP findings in the study population

Sno.	MRCP Findings	No. of patients	Percentage
1	Cholelithiasis with choledocholithiasis	23	51.11%
2	Mirrizi syndrome	1	2.22 %
3	CA - Head of Pancreas	2	4.44%
4	Cholelithiasis with choledocholithiasis and pancreatitis	1	2.22 %
5	Cholangiocarcinoma	2	4.44 %
6	Caroli's disease	1	2.22 %
7	Cholangitis	3	6.66 %
8	CBD stricture	7	15.55 %
9	Choledochal cyst	4	8.88 %
10	Periampullary carcinoma	1	2.22%

Table 3: Final Diagnosis in the study population

Sno.	Final Diagnosis	No. of Patients	Percentage
1	Cholelithiasis with choledocholithiasis	22	48.88 %
2	Mirrizzi syndrome	1	2.22 %
3	Chronic Pancreatitis	1	2.22 %
4	Cholelithiasis with choledocholithiasis and pancreatitis	1	2.22 %
5	Cholangiocarcinoma	2	4.44 %
6	CA Head of Pancreas	2	4.44%
7	Caroli's disease	1	2.22 %
8	Cholangitis	3	6.66 %
9	CBD stricture	7	15.55 %
10	Choledochal cyst	4	8.88 %
11	Periampullary carcinoma	1	2.22 %

Results

The study included 45 patients, with a mean age of 45.73 ± 15.07 years for males and 62.84 ± 13.19 years for females. Abdominal pain was the most common symptom. The most common USG findings were dilated common bile duct (CBD) and intrahepatic biliary radicals dilatation (IHBRD), while MRCP most frequently identified cholelithiasis with choledocholithiasis. USG demonstrated 100% sensitivity, 60% specificity, 95.24% positive predictive value (PPV), 100% negative predictive value (NPV), and 95.56% accuracy. MRCP exhibited perfect diagnostic performance, with 100% sensitivity, specificity, PPV, NPV, and accuracy.

Conclusion

MRCP is a highly accurate and reliable diagnostic tool for evaluating obstructive jaundice, outperforming USG in sensitivity, specificity, and overall diagnostic accuracy. While USG remains a valuable first-line tool, MRCP is recommended for complex cases or when a detailed assessment of the biliary tree is necessary. Further studies with larger and more diverse populations are needed to confirm the generalizability of MRCP's diagnostic accuracy.

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