RESEARCH PAPER

COMPARISON OF DIAGNOSTIC EFFICACY OF COMPUTED TOMOGRAPHY AND MAGNETIC RESONANCE CHOLANGIOPANCREATOGRAPHY IN PATIENTS WITH OBSTRUCTIVE JAUNDICE

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Received: 25 May, 2026; Revised: 10 Jun, 2026; Accepted: 30 Jun, 2026

ABSTRACT

Background: Obstructive jaundice is a common hepatobiliary disorder requiring prompt and accurate diagnosis to identify the level and cause of biliary obstruction. Computed tomography (CT) and magnetic resonance cholangiopancreatography (MRCP) are widely used non-invasive imaging modalities, while endoscopic retrograde cholangiopancreatography (ERCP) remains the gold standard for definitive diagnosis.

Aim: To compare the diagnostic efficacy of CT and MRCP in patients with obstructive jaundice using ERCP as the gold standard.

Materials and Methods: A hospital-based observational study was conducted over 18 months in the Department of Radio-diagnosis, Geetanjali Medical College and Hospital, Udaipur, Rajasthan. Fifty adult patients with clinically suspected or diagnosed obstructive jaundice were enrolled. All patients underwent CT, MRCP, and ERCP. The diagnostic performances of CT and MRCP were assessed by calculating sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and overall diagnostic accuracy.

Results: Among the 50 patients, the majority were aged 31–45 years (44%), and 62% were males. Abdominal pain (98%) was the most common presenting symptom. ERCP identified choledocholithiasis in 50% of patients, malignancy in 30%, chronic pancreatitis in 14%, prominent intrahepatic biliary radicles in 4%, and common bile duct stricture in 2%. MRCP demonstrated higher diagnostic performance than CT, with sensitivity of 81.25% versus 73.33%, specificity of 94.12% versus 85.71%, PPV of 86.67% versus 68.75%, NPV of 91.43% versus 88.24%, and overall diagnostic accuracy of 90.0% versus 82.0%, respectively.

Conclusion: MRCP demonstrated superior diagnostic efficacy over CT in evaluating obstructive jaundice, particularly for biliary calculi and ductal abnormalities. CT remained valuable for assessing malignant lesions and extra-biliary disease. A complementary approach using both modalities can optimize diagnosis and guide appropriate clinical management.

Keywords: Obstructive jaundice; Computed tomography; Magnetic resonance cholangiopancreatography; Endoscopic retrograde cholangiopancreatography; Choledocholithiasis; Diagnostic accuracy.

How to cite this article: Bansal S, Kundu R K, Khandekar A K, Meena V K. Comparison Of Diagnostic Efficacy Of Computed Tomography And Magnetic Resonance Cholangiopancreatography In Patients With Obstructive Jaundice. Int J Drug Deliv Technol. 2026;16(68s):294-305. DOI: 10.25258/ijddt.16.68s.34

INTRODUCTION

Obstructive jaundice is a common hepatobiliary disorder caused by partial or complete obstruction of the biliary drainage system, resulting in impaired excretion of conjugated bilirubin into the intestine. The condition represents a significant diagnostic and therapeutic challenge because delayed identification of the level and cause of obstruction may lead to serious complications such as ascending cholangitis, biliary cirrhosis, hepatic dysfunction, coagulopathy, pancreatitis, sepsis, and ultimately increased morbidity and mortality. Patients typically present with progressive jaundice, dark urine, pale stools, pruritus,

abdominal pain, fever, and weight loss, although the clinical manifestations vary depending on the underlying pathology. The most frequent benign causes include choledocholithiasis, postoperative biliary strictures, chronic pancreatitis, and inflammatory biliary diseases, whereas malignant obstruction commonly results from carcinoma of the pancreatic head, cholangiocarcinoma, gallbladder carcinoma, ampullary carcinoma, and metastatic lymphadenopathy compressing the biliary tree. Accurate differentiation between benign and malignant obstruction is crucial because treatment strategies, prognosis, and long-term outcomes differ considerably.[1,2]

Biochemical investigations such as serum bilirubin, alkaline phosphatase, gamma-glutamyl transferase, and transaminases provide evidence of cholestasis but cannot accurately determine the level, extent, or etiology of biliary obstruction. Consequently, imaging plays a central role in the diagnostic workup of patients presenting with obstructive jaundice. Ultrasonography is generally the first-line imaging modality because of its wide availability, low cost, absence of ionizing radiation, and ability to demonstrate biliary ductal dilatation. However, its diagnostic performance is often limited by obesity, bowel gas, operator dependency, and difficulty in visualizing the distal common bile duct and periampullary region. These limitations necessitate further cross-sectional imaging for comprehensive evaluation.[3,4]

Computed tomography (CT) has become an indispensable imaging technique in the assessment of obstructive jaundice owing to its rapid acquisition, excellent spatial resolution, and superior ability to evaluate the liver, pancreas, biliary tract, lymph nodes, and surrounding vascular structures simultaneously. Multidetector CT provides valuable information regarding the level of obstruction, presence of calculi, inflammatory changes, mass lesions, local invasion, vascular encasement, lymphadenopathy, and distant metastases, thereby contributing significantly to staging and surgical planning, particularly in malignant biliary obstruction. Nevertheless, CT has limitations in detecting small bile duct calculi, early benign strictures, and subtle intraductal abnormalities, especially when biliary dilatation is minimal. Furthermore, exposure to ionizing radiation and the requirement for iodinated contrast administration remain important considerations in selected patient populations.[5,6]

Magnetic resonance cholangiopancreatography (MRCP) is a highly accurate, non-invasive imaging modality for evaluating the pancreatobiliary system. Using heavily T2-weighted sequences, it provides excellent visualization of the biliary and pancreatic ducts without the need for intravenous contrast or invasive instrumentation. MRCP accurately identifies the level and cause of biliary obstruction, differentiates benign from malignant lesions, and detects choledocholithiasis and pancreatic duct abnormalities, often reducing the need for diagnostic ERCP. Recent advances, including three-dimensional MRCP and diffusion-weighted imaging, have further improved diagnostic accuracy and lesion characterization.[7,8]

Although both computed tomography (CT) and magnetic resonance cholangiopancreatography (MRCP) are widely used for evaluating obstructive jaundice, their relative diagnostic performance remains an area of ongoing research. CT is valuable for detecting mass lesions, vascular involvement, and disease staging, whereas MRCP provides superior non-invasive visualization of the biliary and pancreatic ducts. Comparative evaluation of these modalities is essential to optimize diagnosis and guide appropriate management. Therefore, the present study aimed to compare the diagnostic performance of CT and MRCP in patients with obstructive jaundice, using ERCP as the reference standard.[9,10]

The present study aimed to compare the diagnostic performance of CT and MRCP in evaluating extrahepatic biliary obstruction in patients with obstructive jaundice, using ERCP as the reference standard, with emphasis on identifying the level, cause, and associated biliary and pancreatic abnormalities.

MATERIALS AND METHODS

Study Design: Hospital-based observational study.

Study Population: Patients aged >18 years with clinically suspected or previously diagnosed obstructive jaundice who were referred to the Department of Radiodiagnosis for imaging evaluation and subsequently underwent ERCP.

Sample Size: Time-bound study. All eligible patients fulfilling the inclusion criteria during the study period were consecutively enrolled after obtaining written informed consent.

Study Duration: 18 months.

Study Place: Department of Radio-diagnosis, Geetanjali Medical College and Hospital, Udaipur, Rajasthan. ERCP procedures and clinical management were performed in the Department of Gastroenterology of the same institution.

Inclusion Criteria:

- Patients aged more than 18 years.
- Patients clinically suspected or diagnosed with obstructive jaundice.
- Patients willing to participate and provide written informed consent.

Exclusion Criteria:

- Patients with contraindications to CT or MRI examination.
- Patients unwilling to participate in the study.
- Patients with known hypersensitivity to contrast media.
- Pregnant patients.
- Patients with severe renal impairment precluding contrast administration.

Statistical Analysis: Data were entered into Microsoft Excel and analyzed using SPSS version 27.0 (IBM Corp., Armonk, NY, USA). Categorical variables were expressed as frequencies and percentages, and continuous variables as mean ± standard deviation (SD). Comparisons were performed using the Chi-square test or Fisher's exact test for categorical variables and the independent Student's *t*-test for continuous variables. The diagnostic performance of CT and MRCP was assessed using ERCP as the reference standard by calculating sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), and diagnostic accuracy. A *p*-value <0.05 was considered statistically significant.

RESULTS

A total of 50 patients with obstructive jaundice were included in the study. The majority of patients belonged to the 31–45 years age group (22; 44%), followed by 46–60 years (13; 26%), 61–75 years (10; 20%), 18–30 years (3; 6%), and >75 years (2; 4%). The study population showed a male predominance, with 31 (62%) males and 19 (38%) females.

Regarding the duration of illness, the largest proportion of patients presented within 10–30 days of symptom onset (22; 44%), while 11 (22%) had symptoms for 3–6 months, 7 (14%) for 6–9 months, 5 (10%) for 1–3 months, 3 (6%) for 9–12 months, and only 2 (4%) had symptoms persisting for 1–3 years. Past medical history revealed that 14 (28%) patients had diabetes mellitus and 9 (18%) had undergone previous surgery, whereas 27 (54%) had no significant past medical history. Dietary habits were almost equally distributed, with 26 (52%) patients following a vegetarian diet and 24 (48%) consuming a non-vegetarian diet. Among personal habits, 10 (20%) patients reported alcohol consumption and 8 (16%) had a history of smoking.The demographic profile, duration of illness, past medical history, dietary habits, and personal habits of the study population are summarized in Table 1.

Table 1. Baseline Demographic and Clinical Characteristics of the Study Population

Variable	Category	N	%
Age Group (years)	18–30	3	6
	31–45	22	44
	46–60	13	26
	61–75	10	20
	>75	2	4
Gender	Male	31	62
	Female	19	38
Durationof Illness	10–30 days	22	44
	1–3 months	5	10
	3–6 months	11	22
	6–9 months	7	14
	9–12 months	3	6
	1–3 years	2	4
Past History	Diabetes mellitus	14	28
	Previous surgery	9	18
	None	27	54
Diet	Vegetarian	26	52
	Non-vegetarian	24	48
Personal Habits	Alcohol consumption	10	20
	Smoking	8	16

Abdominal pain was the most common presenting symptom, reported by 49 (98%) patients. This was followed by steatorrhoea (33; 66%) and pruritus (33; 66%), indicating significant biliary obstruction. Fever was observed in 24 (48%) patients, while clay-colored stool and melena were each present in 21 (42%) patients.

On clinical examination, tenderness was the most frequent physical finding, noted in 22 (44%) patients. Palpable gall bladder and abdominal mass were each identified in 15 (30%) patients, whereas ascites was present in 8 (16%) patients.

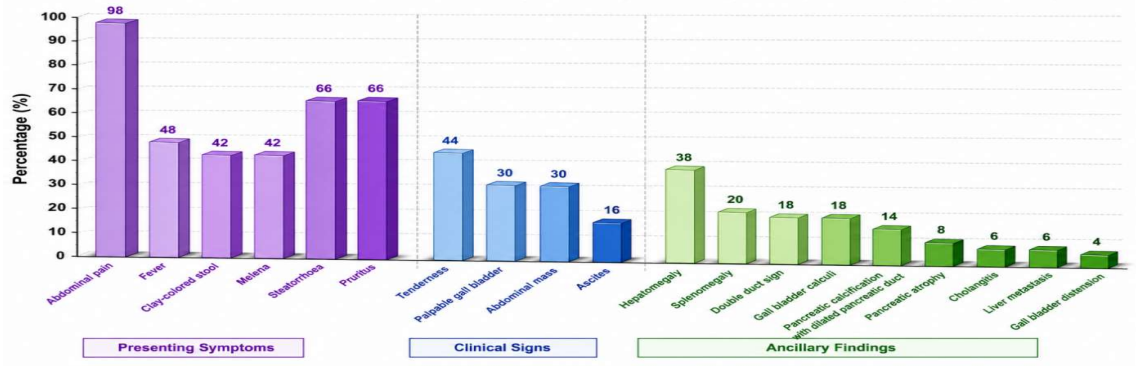
Evaluation of ancillary imaging findings demonstrated hepatomegaly in 19 (38%) patients, making it the most common associated finding. Splenomegaly was observed in 10 (20%) patients, while both the double duct sign and gall bladder calculi were detected in 9 (18%) patients each. Pancreatic calcification associated with a dilated pancreatic duct was present in 7 (14%) patients, followed by pancreatic atrophy in 4 (8%), cholangitis in 3 (6%), liver metastasis in 3 (6%), and gall bladder distension in 2 (4%) patients.The

presenting symptoms, clinical examination findings, and ancillary imaging findings are summarized in **Table 2** and illustrated in **Figure 1**.

Table 2. Clinical Presentation and Ancillary Findings Among Study Participants

Variable		n	%
Presenting Symptoms	Abdominal pain	49	98
	Fever	24	48
	Clay-colored stool	21	42
	Melena	21	42
	Steatorrhoea	33	66
	Pruritus	33	66
Clinical Signs	Tenderness	22	44
	Palpable gall bladder	1	3
		5	0
	Abdominal mass	15	30
	Ascites	8	16
Ancillary Findings	Hepatomegaly	19	38
	Splenomegaly	10	20
	Double duct sign	9	18
	Gall bladder calculi	9	18
	Pancreatic calcification with dilated pancreatic duct	7	14
	Pancreatic atrophy	4	8
	Cholangitis	3	6
	Liver metastasis	3	6
	Gall bladder distension	2	4

Figure: 1.Clinical Presentation and Ancillary Findings



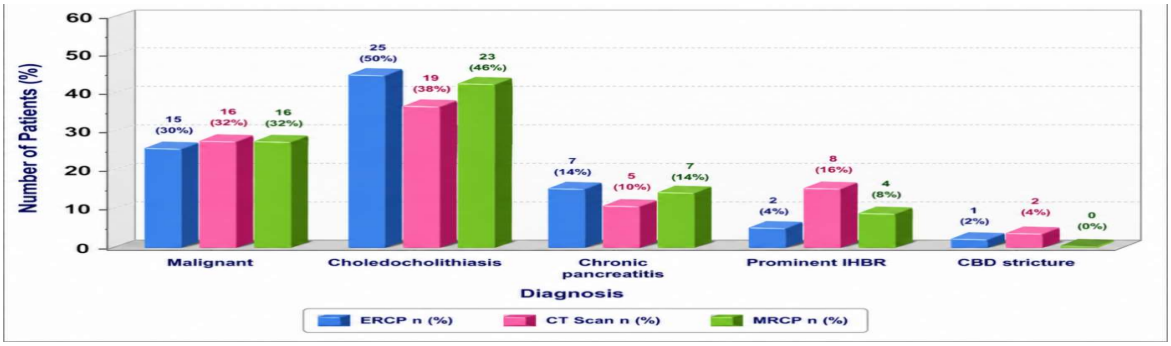
Comparison of imaging findings demonstrated that choledocholithiasis was the most common diagnosis by ERCP, occurring in 25 (50%) patients. CT scan identified 19 (38%) cases, whereas MRCP detected 23 (46%) cases, indicating closer agreement between MRCP and ERCP.

Malignant biliary obstruction was identified in 30% of patients on ERCP and in 32% by both CT and MRCP. MRCP showed complete concordance with ERCP in diagnosing chronic pancreatitis (14%), whereas CT detected fewer cases (10%). MRCP also demonstrated better overall agreement with ERCP than CT for most biliary pathologies. The comparative imaging findings of CT, MRCP, and ERCP are summarized in **Table 3** and illustrated in **Figure 2**.

Table 3. Comparison of ERCP, CT scan and MRCP Findings

Diagnosis	ERCP n (%)	CT Scan n (%)	MRCP n (%)
Malignant	15 (30)	16 (32)	16 (32)
Choledocholithiasis	25 (50)	19 (38)	23 (46)
Chronic pancreatitis	7 (14)	5 (10)	7 (14)
Prominent IHBR	2 (4)	8 (16)	4 (8)
CBD stricture	1 (2)	2 (4)	0
Total	**50**	**50**	**50**

Figure: 2. Comparison of ERCP, CT scan and MRCP Findings



Using ERCP as the reference standard, MRCP demonstrated superior diagnostic performance compared with CT. MRCP showed higher sensitivity (81.25% vs. 73.33%), specificity (94.12% vs. 85.71%), positive predictive value (86.67% vs. 68.75%), negative predictive value (91.43% vs. 88.24%), and overall diagnostic accuracy (90.00% vs. 82.00%). These findings indicate that MRCP is more accurate than CT in the evaluation of obstructive jaundice. The detailed diagnostic performance of both modalities is presented in **Table 4**.

Table 4. Diagnostic Performance of CT scancompared to MRCP

Parameter	CT Scan	MRCP
True Positive	11	13
False Positive	5	2
True Negative	30	32
False Negative	4	3
Sensitivity (%)	73.33	81.25
Specificity (%)	85.71	94.12
Positive Predictive Value (%)	68.75	86.67
Negative Predictive Value (%)	88.24	91.43
Accuracy (%)	82	90

Comparison of biochemical parameters demonstrated significant differences between malignant and benign obstructive jaundice for several laboratory variables. Mean blood urea (29.20 ± 7.49 vs. 28.91 ± 9.81 mg/dL; p = 0.91) and blood urea nitrogen (BUN) (14.40 ± 3.50 vs. 13.31 ± 4.54 mg/dL; p = 0.37) were comparable between the two groups.

Patients with malignant obstruction exhibited significantly higher serum creatinine (2.97 ± 0.29 vs. 1.07 ± 0.33 mg/dL; p < 0.01) and uric acid (6.94 ± 0.57 vs. 5.16 ± 0.68 mg/dL; p < 0.01) levels. Total bilirubin was also significantly elevated in malignant cases (13.23 ± 4.74 vs. 8.85 ± 6.36 mg/dL; p = 0.01), while indirect bilirubin showed a marked increase (4.71 ± 1.10 vs. 2.08 ± 1.44 mg/dL; p < 0.01). Although direct bilirubin was numerically higher in malignant cases (8.52 ± 3.93 vs. 6.77 ± 4.92 mg/dL), the difference was not statistically significant (p = 0.19). Liver enzymes SGOT (AST) (123.60 ± 69.99 vs. 143.09 ± 90.90 U/L; p = 0.42) and SGPT (ALT) (126.80 ± 89.15 vs. 146.17 ± 109.18 U/L; p = 0.52) were similar between groups. However, alkaline phosphatase (ALP) was significantly higher in malignant obstruction (813.33 ± 327.00 vs. 579.89 ± 357.87 U/L; p = 0.03).

Analysis of protein profile revealed significantly higher total protein levels in malignant patients (8.69 ± 0.38 vs. 6.49 ± 0.38 g/dL; p < 0.01). Likewise, albumin (5.04 ± 0.35 vs. 2.92 ± 0.34 g/dL; p < 0.01), globulin (5.65 ± 0.12 vs. 3.57 ± 0.08 g/dL; p < 0.01), and albumin-to-globulin (A:G) ratio (2.83 ± 0.09 vs. 0.82 ± 0.09; p < 0.01) were significantly higher among malignant cases.

Electrolyte analysis also demonstrated significantly elevated serum sodium (137.67 ± 2.66 vs. 135.23 ± 3.26 mmol/L; p < 0.01), potassium (5.94 ± 0.31 vs. 3.94 ± 0.37 mmol/L; p < 0.01), and chloride (102.20 ± 2.62 vs. 99.23 ± 3.17 mmol/L; p < 0.01) levels in malignant patients. Conversely, serum lipase (1235.07 ± 1824.70 vs. 1582.74 ± 2162.64 U/L; p = 0.56), serum amylase (1771.20 ± 2649.83 vs. 2245.09 ± 3063.50 U/L; p = 0.58), random blood sugar (128.40 ± 17.17 vs. 132.86 ± 23.11 mg/dL; p = 0.46), and C-reactive protein (18.28 ± 7.82 vs. 19.81 ± 10.37 mg/L; p = 0.57) did not differ significantly between malignant and benign obstructive jaundice. These findings suggest that alterations in protein profile and electrolyte parameters were more strongly associated with malignant obstruction, whereas pancreatic enzymes and inflammatory markers showed no statistically significant differences.The detailed laboratory and biochemical comparisons are presented in **Tables 5 and 6** and illustrated in **Figures 3 and 4**.

Table 5. Comparison of Biochemical Parameters Between Malignant and Benign Cases

Parameter	Malignant (Mean ± SD)	Benign (Mean ± SD)	p-value
Blood Urea	29.20 ± 7.49	28.91 ± 9.81	0.91
BUN	14.40 ± 3.50	13.31 ± 4.54	0.37

Serum Creatinine	2.97 ± 0.29	1.07 ± 0.33	<0.01
Uric Acid	6.94 ± 0.57	5.16 ± 0.68	<0.01
Total Bilirubin	13.23 ± 4.74	8.85 ± 6.36	0.01
Direct Bilirubin	8.52 ± 3.93	6.77 ± 4.92	0.19
Indirect Bilirubin	4.71 ± 1.10	2.08 ± 1.44	<0.01
SGOT (AST)	123.60 ± 69.99	143.09 ± 90.90	0.42
SGPT (ALT)	126.80 ± 89.15	146.17 ± 109.18	0.52
ALP	813.33 ± 327.00	579.89 ± 357.87	0.03

Table 6. Comparison of Protein Profile, Electrolytes and Metabolic Markers Between Malignant and Benign Cases

Parameter	Malignant (Mean ± SD)	Benign (Mean ± SD)	p-value
Total Protein	8.69 ± 0.38	6.49 ± 0.38	<0.01
Albumin	5.04 ± 0.35	2.92 ± 0.34	<0.01
Globulin	5.65 ± 0.12	3.57 ± 0.08	<0.01
A:G Ratio	2.83 ± 0.09	0.82 ± 0.09	<0.01
Sodium	137.67 ± 2.66	135.23 ± 3.26	<0.01
Potassium	5.94 ± 0.31	3.94 ± 0.37	<0.01
Chloride	102.20 ± 2.62	99.23 ± 3.17	<0.01
Serum Lipase	1235.07 ± 1824.70	1582.74 ± 2162.64	0.56
Serum Amylase	1771.20 ± 2649.83	2245.09 ± 3063.50	0.58
Random Blood Sugar	128.40 ± 17.17	132.86 ± 23.11	0.46
C-Reactive Protein	18.28 ± 7.82	19.81 ± 10.37	0.57

Figure: 3. Biochemical Profile of Malignant and Benign Cases

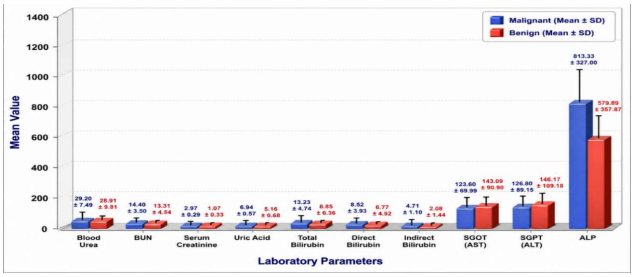
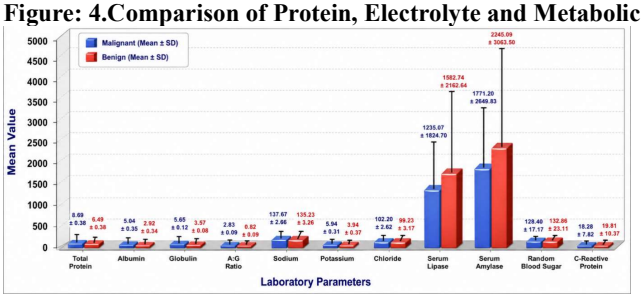


Figure: 4.Comparison of Protein, Electrolyte and Metabolic Profiles



CASE FILE

CASE 1: Multimodality Imaging and ERCP Findings in Advanced Gallbladder Carcinoma with Choledocholithiasis, Malignant Biliary Obstruction, and Hepatic Metastases

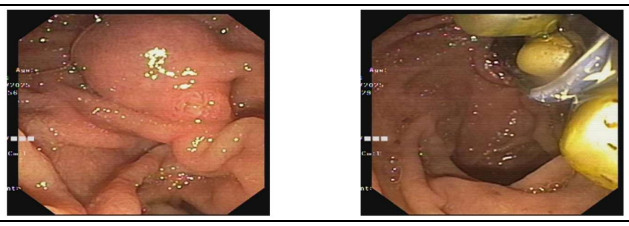


Figure A: ERCP findings in Gallbladder Carcinoma revealing choledocholithiasis (10 mm yellow pigmented stones and sludge) within a markedly dilated CBD (2.5 cm). Biliary decompression was achieved via sphincterotomy, balloon extraction, and placement of a 7 Fr plastic stent.

Figure B: Axial contrast-enhanced CT (CECT) image of the abdomen showing gallbladder carcinoma with a deformed, thick-walled gallbladder containing a calculus.

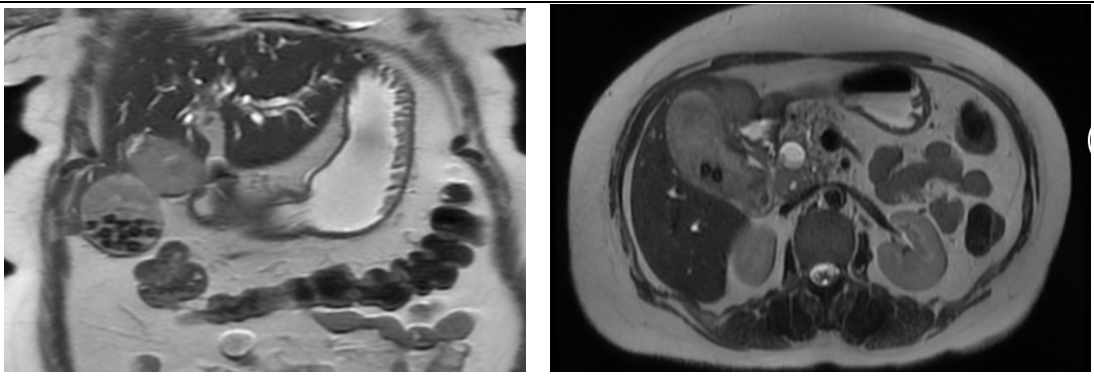


Figure C: Coronal and axial MRCP revealing advanced Gallbladder Carcinoma with cholelithiasis and bilobar liver metastases. Note the upstream biliary dilatation (CHD 12.2 mm, IHBR) caused by a combined mechanical obstruction: a 10 mm CBD calculus/sludge and a metastatic porta hepatis lymph node prolapsing into the distal CBD lumen.

CASE 2: ERCP Demonstrating Choledocholithiasis with Selective Cannulation of the Common Bile Duct and Cross-Sectional Imaging (CT and MRCP) Findings of Malignant Distal Biliary Stricture

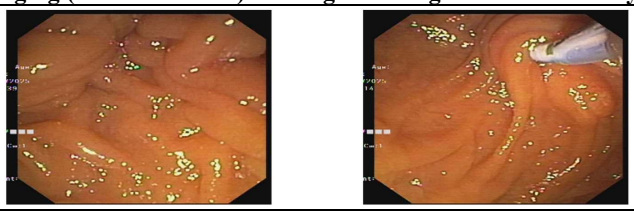


Figure 1a: ERCP image demonstrating selective cannulation of the common bile duct (CBD) with cholangiographic evidence of a hilar biliary stricture involving the upper end of the CBD in a case of obstructive jaundice.

Figure 1b: Post-procedural ERCP image showing placement of a self-expanding metallic stent (SEMS) across the biliary stricture following sphincterotomy, with restoration of bile flow.

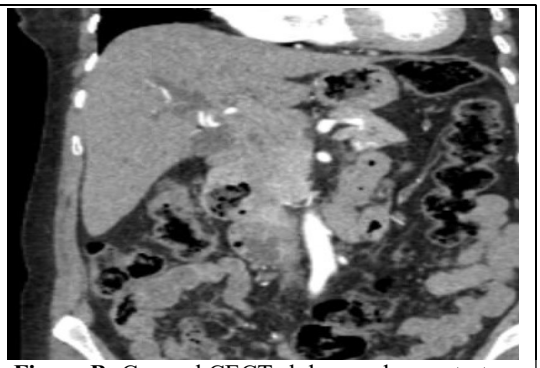


Figure B: Coronal CECT abdomen demonstrates long-segment periductal thickening causing a malignant biliary stricture, with associated upstream biliary dilatation.

Figure C: Axial MRCP image T2-weighted image showing intra-and extra-hepatic biliary dilatation.

CASE 3: Multimodality Imaging (MRCP, CT, and ERCP) Demonstrating Choledocholithiasis Managed by ERCP-Guided Stone Extraction and Biliary Stent Exchange

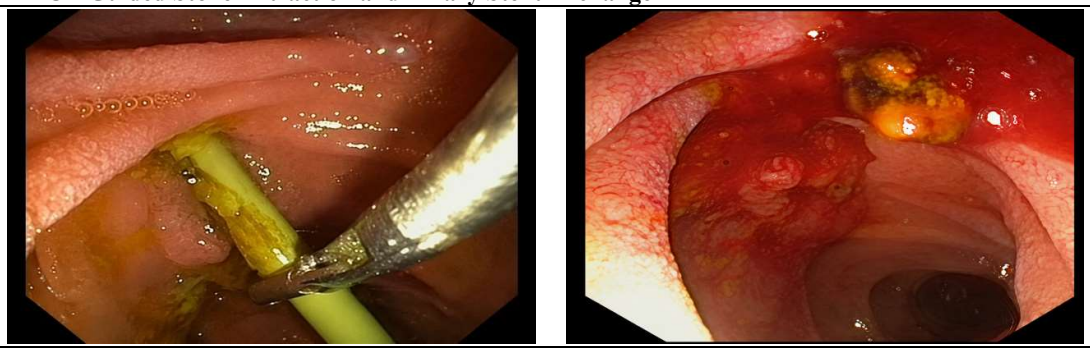


Figure 1a: ERCP image demonstrating removal of previously placed CBD stent and balloon extraction of a black pigmented common bile duct (CBD) calculus following selective cannulation of the CBD.

Figure 1b: Post-extraction ERCP image showing exchange and placement of a new 10 Fr straight biliary stent within the CBD following clearance of choledocholithiasis.

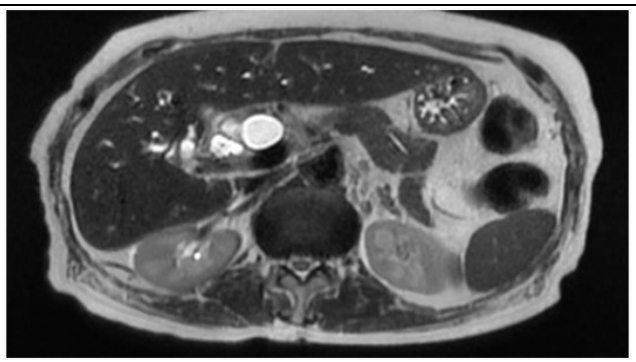


Figure B: Axial MRCP image demonstrating an impacted distal common bile duct (CBD) calculus with associated mural thickening of the distal CBD and ampullary region, resulting in significant upstream biliary dilatation involving the proximal CBD, common hepatic duct (CHD), and intrahepatic biliary radicles (IHBR), suggestive of obstructive choledocholithiasis.

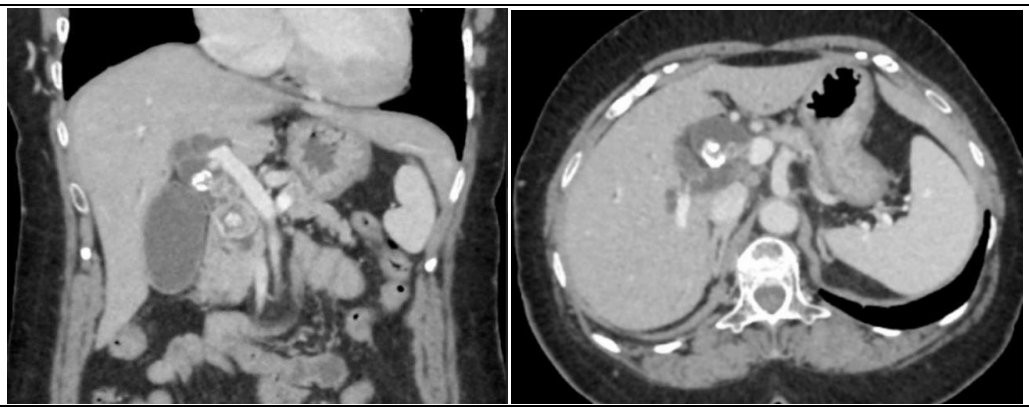


Figure C: Coronal and axial CECT abdomen showing moderate intrahepatic biliary radicle dilatation with dilated common hepatic and common bile ducts containing multiple calculi involving the left hepatic duct, common hepatic duct, common bile duct, and gallbladder. Calculi demonstrate variable attenuation, ranging from poorly calcified (<140 HU) to densely calcified (300–400 HU). Associated hepatomegaly is seen.

CASE 4: Multimodality Imaging (ERCP, CT, and MRCP) Demonstrating Blocked Biliary Stent and Subsequent Stent-in-Stent Placement in Distal Biliary Obstruction Due to Carcinoma Head of Pancreas

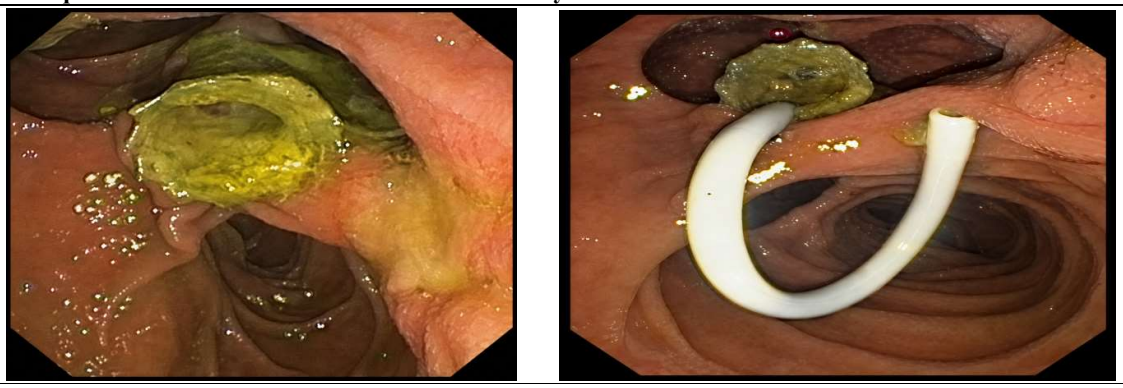


Figure 1a: ERCP image demonstrating a previously placed biliary self-expanding metallic stent (SEMS) in situ with luminal blockage by sludge and food debris in a patient with carcinoma head of pancreas causing extrahepatic biliary obstruction (EHBO).

Figure 1b: Post-procedural ERCP image showing placement of two 10 Fr plastic biliary stents (one double pigtail and one straight stent) within the blocked SEMS, with restoration of bile flow following clearance of obstructing sludge and food material.

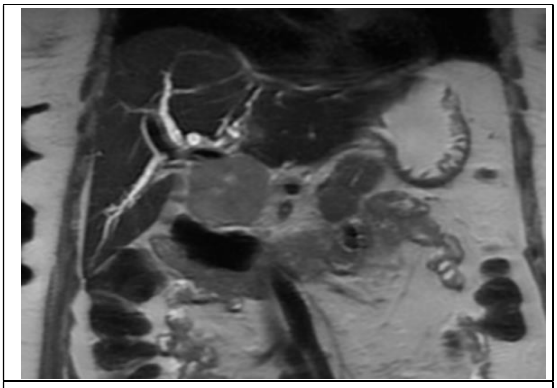


Figure 2a: Coronal MRCP image demonstrating dilatation of the intrahepatic biliary radicles (IHBR) with prominent right and left hepatic ducts and common hepatic duct, secondary to distal biliary obstruction in a case of carcinoma head of pancreas.

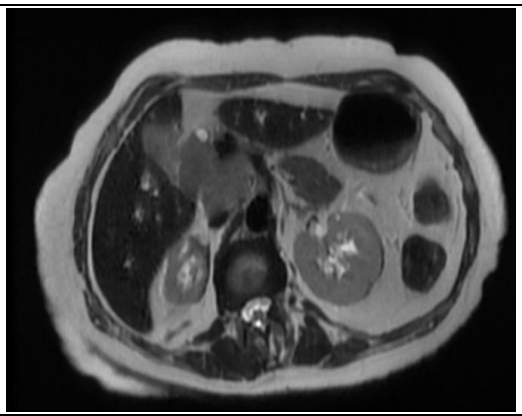


Figure 2b: Axial MRCP image showing dilated biliary channels with proximal biliary dilatation in a patient with carcinoma head of pancreas, suggestive of obstructive biliopathy.

Figure C: Axial contrast-enhanced CT reveals a large, necrotic, heterogeneously enhancing neoplastic mass in the pancreatic head. Mass effect on the lower CBD and MPD causes upstream dilatation of the biliary tree (CHD and IHBR), accompanied by portal vein encasement and gallbladder calculi.

DISCUSSION

The present hospital-based observational study compared the diagnostic performance of computed tomography (CT) and magnetic resonance cholangiopancreatography (MRCP) in patients with obstructive jaundice, using endoscopic retrograde cholangiopancreatography (ERCP) as the reference standard. The study demonstrated that MRCP had superior diagnostic performance compared with CT in accurately identifying the etiology of biliary obstruction, whereas CT remained valuable for evaluating associated extrabiliary pathology, local tumor extension, vascular involvement, and metastatic disease. These findings are consistent with recent studies highlighting the complementary roles of CT and MRCP in the comprehensive evaluation of obstructive jaundice.[11–14]

In the present study, the majority of patients belonged to the 31–45-year age group (44%), with a male predominance (62%). Similar demographic patterns have been reported in previous studies, which demonstrated that obstructive jaundice predominantly affects middle-aged men, reflecting the higher prevalence of pancreatobiliary disorders in this population.[15] These findings emphasize the importance of early diagnosis and appropriate imaging in this economically productive age group.

Regarding clinical presentation, abdominal pain (98%) was the most common symptom, followed by pruritus (66%), steatorrhoea (66%), and fever (48%). Hepatomegaly was the most frequent ancillary imaging finding (38%), while the double duct sign and gallbladder calculi were each observed in 18% of patients. Similar clinical profiles have been reported in recent studies, where abdominal pain and jaundice were the predominant presenting symptoms, emphasizing the heterogeneous presentation of obstructive jaundice and the importance of imaging in establishing the underlying aetiology.[11] Our findings further support the complementary role of cross-sectional imaging in evaluating both the clinical manifestations and associated hepatobiliary abnormalities.

In the present study, ERCP identified choledocholithiasis as the most common cause of biliary obstruction (50%), followed by malignant obstruction (30%) and chronic pancreatitis (14%). MRCP demonstrated closer agreement with ERCP than CT in detecting choledocholithiasis and chronic pancreatitis. These findings are consistent with previous studies, which have shown that MRCP has excellent diagnostic accuracy for detecting biliary calculi and benign biliary strictures and closely correlates with ERCP findings, making it a reliable non-invasive alternative for evaluating obstructive jaundice.[12]

Assessment of diagnostic performance demonstrated that MRCP outperformed CT in the evaluation of obstructive jaundice, with higher sensitivity (81.25% vs. 73.33%), specificity (94.12% vs. 85.71%), positive predictive value (86.67% vs. 68.75%), negative predictive value (91.43% vs. 88.24%), and overall diagnostic accuracy (90% vs. 82%). These findings are consistent with recent studies demonstrating the superior diagnostic performance of MRCP in detecting the level and cause of biliary obstruction, particularly choledocholithiasis and benign biliary strictures, while CT remains complementary for assessing extra-biliary pathology, local tumor extension, vascular involvement, and disease staging.[11-13]

The biochemical profile in the present study demonstrated significantly higher serum creatinine, uric acid, total bilirubin, indirect bilirubin, and alkaline phosphatase levels in patients with malignant obstruction, whereas blood urea, blood urea nitrogen, transaminases, and direct bilirubin did not differ significantly between malignant and benign groups. Similar observations have been reported in previous studies, which showed that malignant biliary obstruction is associated with more pronounced cholestatic biochemical abnormalities, particularly elevated serum bilirubin and alkaline phosphatase levels, reflecting the severity and duration of biliary obstruction.[16] However, these biochemical parameters alone are insufficient to distinguish benign from malignant causes and should be interpreted in conjunction with imaging findings.

The present study further demonstrated significant differences in total protein, albumin, globulin, albumin-to-globulin ratio, sodium, potassium, and chloride levels between malignant and benign

obstructive jaundice, whereas serum amylase, serum lipase, random blood sugar, and C-reactive protein did not differ significantly. Similar findings have been reported in previous studies, which observed that malignant biliary obstruction is associated with greater metabolic and biochemical derangements owing to prolonged cholestasis and impaired hepatic function, while pancreatic enzyme levels remain comparable unless accompanied by acute pancreatitis.[16] These findings suggest that biochemical abnormalities may support clinical assessment but should be interpreted alongside imaging to accurately determine the underlying aetiology.

Overall, the findings of the present study strengthen the existing evidence that MRCP is superior to CT for diagnosing biliary obstruction, particularly in detecting choledocholithiasis, benign biliary strictures, and ductal abnormalities, while CT remains indispensable for evaluating pancreatic masses, vascular invasion, lymphadenopathy, metastatic disease, and preoperative staging of malignancy. Therefore, CT and MRCP should be considered complementary imaging modalities, with MRCP serving as the preferred non-invasive diagnostic investigation and CT providing valuable additional information regarding the extent of disease and surgical operability.

CONCLUSION

The present study demonstrates that both computed tomography (CT) and magnetic resonance cholangiopancreatography (MRCP) are valuable imaging modalities in the evaluation of obstructive jaundice; however, MRCP exhibited superior overall diagnostic performance when compared with CT, using ERCP as the reference standard. MRCP showed higher sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy, particularly in detecting choledocholithiasis, benign biliary strictures, and pancreaticobiliary ductal abnormalities. In contrast, CT remained highly useful for identifying malignant lesions, assessing local tumor extent, vascular involvement, metastatic disease, and associated extra-biliary findings. The complementary strengths of CT and MRCP facilitate comprehensive evaluation and appropriate therapeutic planning. Considering its non-invasive nature, absence of ionizing radiation, and excellent visualization of the biliary tree, MRCP should be considered the preferred initial cross-sectional imaging modality for patients with obstructive jaundice, while CT should be employed when detailed assessment of malignancy, surrounding structures, and disease staging is required.

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