Research Article

Prospective And Retrospective Clinical Study And Management Of Obstructive Jaundice

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A B S T R A C T

Background: Obstructive jaundice (OJ) is a clinical condition caused by blockage of bile flow, resulting in conjugated hyperbilirubinemia. It may arise from benign causes such as choledocholithiasis and strictures, or malignant causes including pancreatic, gallbladder, and periampullary carcinomas.

Objective: To evaluate the clinical profile, laboratory findings, imaging features, management strategies, and postoperative outcomes in patients with obstructive jaundice.

Methods: This prospective and retrospective observational study included 40 patients with obstructive jaundice admitted to the Department of General and Oncology Surgery, P.B.M. Hospital, Bikaner, between July 2009 and December 2011. Clinical features, laboratory parameters, imaging findings (USG, MRCP, CT), operative procedures, and postoperative complications were recorded and analyzed. Statistical significance was assessed using Chi-square, Fisher's exact, and Student's t-tests ($p < 0.05$).

Results: The peak incidence of OJ was between 31–70 years, with a female predominance (67.5%). Pain (82.5%) and jaundice (62.5%) were the most common presenting symptoms. Benign causes accounted for 62.5% of cases, predominantly choledocholithiasis (47.5%), while malignancy accounted for 37.5%, mainly pancreatic and periampullary carcinomas. Laboratory findings showed significantly higher bilirubin, alkaline phosphatase, and prothrombin time in malignant cases, with lower serum albumin. USG accurately detected CBD calculi and choledochal cysts in most cases. Surgical interventions were the mainstay for benign causes, whereas curative and palliative procedures were employed for malignant cases. Postoperative complications occurred in 27.5% of patients.

Conclusion: Clinical evaluation, biochemical markers, and imaging play vital roles in differentiating benign from malignant obstructive jaundice. Early diagnosis and individualized management are essential to optimize outcomes and minimize postoperative complications.

Keywords: Obstructive jaundice, Choledocholithiasis, Benign biliary stricture, Malignant biliary obstruction, Pancreatic carcinoma.

INTRODUCTION

Obstructive jaundice (OJ) is defined as the blockage of bile flow from the liver to the duodenum, resulting in the accumulation of conjugated bilirubin in the blood [1]. It can arise from **benign causes**, such as choledocholithiasis, strictures, and choledochal cysts, or **malignant causes**, including carcinoma of the pancreatic head, periampullary carcinoma, gallbladder carcinoma, cholangiocarcinoma, and duodenal carcinoma [2,3].

Clinically, patients present with **jaundice, pruritus, pale stools, dark urine, abdominal pain, nausea, vomiting, and weight loss**. The severity and combination of these symptoms often vary depending on the underlying etiology [4,5]. Biochemical investigations such as **serum bilirubin, alkaline phosphatase, transaminases, serum albumin, and coagulation profile** provide important diagnostic and prognostic information [6,7].

Imaging modalities play a crucial role in identifying the site and cause of obstruction. **Ultrasonography (USG)** is widely used as an initial screening tool due to its accessibility, non-invasiveness, and cost-effectiveness [8]. **Magnetic Resonance Cholangiopancreatography (MRCP)** and **Computed Tomography (CT) scans** are employed for further delineation, particularly in complex or malignant cases [9,10]. Endoscopic interventions such as **Endoscopic Retrograde Cholangiopancreatography (ERCP)** are both diagnostic and therapeutic, allowing for stone extraction, stent placement, and tissue sampling [11].

Management strategies are guided by the etiology of obstruction. **Benign cases** are commonly managed with surgical interventions like choledochoduodenostomy, hepaticojejunostomy, or T-tube drainage [12]. In contrast, **malignant cases** may require palliative procedures, including biliary bypass surgeries or the Whipple procedure, aimed at symptom relief and improving quality of life [13,14].

Despite advances in diagnosis and treatment, obstructive jaundice continues to pose significant challenges due to postoperative complications such as cholangitis, residual stones, pleural effusion, and hepatorenal syndrome [15,16]. Therefore, studies examining the clinical profile, laboratory findings, imaging results, and treatment outcomes are essential for optimizing patient management and improving prognosis.

MATERIAL AND METHODS
Study Design and Setting
This prospective and retrospective observational study was conducted in the Department of General Surgery (all units) and the Oncology Surgery Department at P.B.M. Hospital, Bikaner. A total of 40 patients diagnosed with obstructive jaundice were included between July 2009 and December 2011.

Data Collection
For retrospective cases, data were obtained from hospital records, operation theatre (O.T.) registers, and medical records. For prospective cases, information was collected directly from patients through clinical examination, investigations, operative findings, and postoperative outcomes.

After admission, patients were evaluated based on clinical features, biochemical investigations, and imaging studies (USG, MRCP, CT scan). Patients were categorized as having either surgical jaundice or medical jaundice.

In prospective cases, patients with surgical jaundice were assessed preoperatively and subsequently underwent surgical or palliative procedures depending on their clinical status. Postoperative outcomes, including complications, were documented, and photographic records were maintained where possible. All excised tissues were sent for histopathological examination.

Inclusion Criteria
1. Age more than 14 years
2. Confirmed cases of obstructive jaundice
3. Patients with radiological evidence of obstruction along the biliary tree (USG, MRCP, or CT scan)
4. Patients undergoing surgical intervention for obstructive jaundice

Exclusion Criteria
1. Age less than 14 years
2. Patients diagnosed with medical jaundice

Statistical Analysis
Data were analyzed using Chi-square and Fisher's exact tests to evaluate the significance of differences in symptoms and signs between benign and malignant cases. The Student's t-test was applied to assess mean differences in laboratory parameters between the two groups. Odds ratios were calculated to determine the strength of association between symptoms and diagnostic categories. A p-value of <0.05 was considered statistically significant

RESULTS AND OBSERVATIONS
A prospective and retrospective clinical study consisting of 40 surgical jaundice cases was undertaken to investigate the pattern and magnitude of clinical presentation and laboratory parameters, to study the causes of obstructive jaundice, and to evaluate different modes of treatment adopted.

Table 1: Age and Sex Distribution

Age (years)	Male (n=13) No.	Male %	Female (n=27) No.	Female %	Total (n=40)
≤40	3	23.07	9	33.33	12 (30.1%)
41-50	3	23.07	8	29.62	11 (27.5%)
51-60	2	15.38	1	3.70	3 (7.5%)

61-70	4	30.70	7	25.92	11 (27.5%)
>70	1	7.69	2	7.41	3 (7.5%)

Chi-square test χ^2 = -3.19, P-value = 0.06 (Not Significant). The peak incidence was between 31 and 70 years (92.5%). Out of 40 patients, 13 (32.5%) were males and 27 (67.5%) were females.

Table 2: Association of Symptoms and Signs with Diagnosis

Symptom / Sign	Benign (n=25) No.	Benign %	Malignant (n=15) No.	Malignant %	Total (n=40)	Significance (χ^2 / p)	Odds Ratio (95% CI)
Pain abdomen	19	76.0	14	93.3	33 (82.5)	1.95 / 0.16	3.0
Jaundice	13	52.0	12	80.0	25 (62.5)	3.13 / 0.07	2.0
Itching	4	16.0	11	73.3	15 (37.5)	13.14 / 0.001	6.0 (0.06–0.33)
High coloured urine	7	28.0	10	66.7	17 (42.5)	5.13 / 0.001	—
Clay coloured stool	11	44.0	10	66.7	21 (52.5)	1.93 / 0.16	2.0
Nausea / Vomiting	8	32.0	4	26.7	12 (30.0)	0.12 / 0.73	6.0
Loss of weight	9	36.0	11	73.3	20 (50.0)	5.22 / 0.001	—
Icterus	25	100.0	15	100.0	40 (100.0)	—	—
Pallor	4	16.0	7	46.7	10 (25.0)	4.42 / 0.04	—
Abdominal tenderness	2	8.0	4	26.7	6 (15.0)	2.56 / 0.109	—
Fever	2	8.0	0	0.0	2 (5.0)	1.26 / 0.26	—
Palpable lump	0	0.0	5	33.3	5 (12.5)	4.52 / 0.001	—

Table 3: Benign Etiology of Obstructive Jaundice

Diagnosis	No. of Cases	Percentage of Total
Choledocholithiasis	19	47.50%
Benign CBD stricture	5	12.50%
Choledochal cyst	1	2.50%
Total	**25**	**62.50%**

Table 4: Malignant Etiology of Obstructive Jaundice

Diagnosis	No. of Cases	Percentage of Total
Carcinoma head of pancreas	5	12.50%
Periampullary carcinoma	5	12.50%
Carcinoma gall bladder	2	5.00%
Carcinoma 2nd part duodenum	1	2.50%
Cholangiocarcinoma	2	5.00%
Total	**15**	**37.50%**

Table 5: Laboratory Investigations in Benign and Malignant Obstructive Jaundice

Parameter	Benign (n=25) Mean ± SD	Malignant (n=15) Mean ± SD	Total Mean ± SD	p-value	Interpretation
Hemoglobin (gm%)	9.55 ± 1.83	11.56 ± 1.96	10.81 ± 2.13	0.002	↑ in malignant (significant)
Total Bilirubin (mg/dl)	5.05 ± 2.79	11.11 ± 4.68	7.32 ± 4.63	0.001	↑ in malignant (significant)
Direct Bilirubin (mg/dl)	3.22 ± 1.69	7.24 ± 3.53	4.73 ± 3.18	0.001	↑ in malignant (significant)

Alkaline Phosphatase (IU/L)	296.36 ± 148.88	793.27 ± 467.74	482.70 ± 389.04	0.001	↑ in malignant (significant)
Serum Albumin (g/dl)	3.69 ± 0.39	3.25 ± 0.53	3.52 ± 0.49	0.004	↓ in malignant (significant)
Prothrombin Time (sec)	12.58 ± 0.47	13.63 ± 1.77	12.97 ± 1.24	0.007	↑ in malignant (significant)
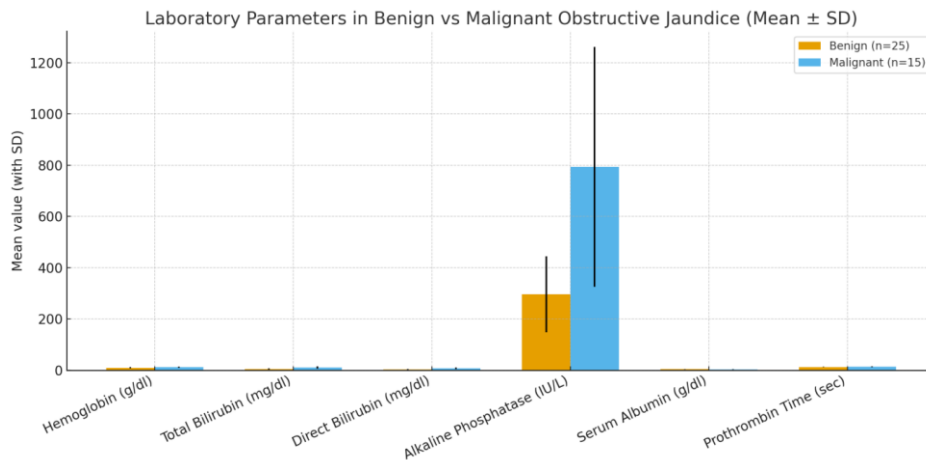
Figure 1: Laboratory Investigations in Benign and Malignant Obstructive Jaundice (Mean ± SD)

**Table 6: Comparison of USG Findings with Final Diagnosis**

Diagnosis / Etiology	USG Findings (%)	Final Diagnosis (%)
CBD Calculi	47.5%	50.0%
Benign CBD Stricture	12.5%	10.0%
Choledochal Cyst	2.5%	2.5%
Malignancy (overall)	37.5%	37.5%
Total	**100%**	**100%**

Table 7: Non-Operative Procedures for Benign Etiology

Procedure	Number of Patients (n)	Percentage of Total
ERCP and removal of CBD calculi	1	5
ERCP and Stenting	1	5

Table 8: Operative Procedures for CBD Calculi / Choledochal Cyst

Procedure	Number of Cases (n)	Percentage of Total (%)
Cholecystectomy and CBD with T-tube drainage	14	70
CBD exploration & T-tube drainage	1	5
ERCP + CBD exploration	2	10
Choledochoduodenostomy	1	5
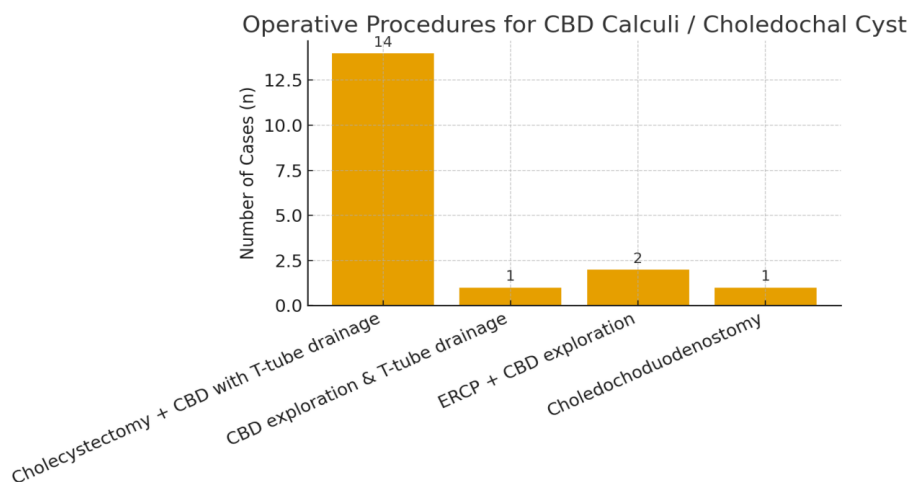
Figure; 2 Operative Procedures for CBD Calculi / Choledochal Cyst

Table 9: Operative Procedures for Benign CBD Stricture

Procedure	Number of Cases (n)	Percentage (%)
Hepaticojejunostomy	2	40
Choledochoduodenostomy	1	20
Hepaticojejunostomy with enteroenterostomy	1	20
CBD exploration with dilatation	1	20

Table:10 Operative Procedures for Malignant Causes of Obstructive Jaundice

Procedure Type / Specific Procedure	Number of Patients (n)	Percentage (%)
Curative Whipple procedure (Ca head of pancreas – 2, periampullary Ca – 1, Ca 2nd part duodenum – 1)	4	26.67
Palliative triple bypass (Choledochojejunostomy, Gastrojejunostomy, Jejunojejunostomy)	4	26.67
Palliative double bypass (Choledochojejunostomy, Gastrojejunostomy)	2	13.34
Cholecystectomy with CBD dilatation (lower CBD cholangiocarcinoma)	1	6.66
Choledochoduodenostomy	2	13.34
Total Malignancy Cases	13	100

Table 11: Operative / Non-Operative Procedures for Malignancy

Procedure Type	Number of Patients (n)	Percentage (%)
Operative	13	86.67
Non-Operative	2	13.33
Total	15	100

Table 12: Postoperative Complications

Complication	Number of Cases (n)	Percentage (%)
Residual CBD stone	2	18.18
Pancreatic leakage / Whipple-related death	1	9.09
Death due to ARDS after hepaticojejunostomy	1	9.09
Postoperative cholangitis (fever and rigor)	3	27.27
Right pleural effusion	2	18.18
Hepatorenal syndrome	1	9.09
Other / minor complications	1	9.09
Total	11	100

DISCUSSION

Obstructive jaundice represents a significant clinical problem owing to its varied etiologies, diagnostic challenges, and impact on patient morbidity and mortality. In this prospective and retrospective study of 40 patients, the majority were between 31 and 70 years of age (92.5%), confirming that obstructive jaundice is predominantly a disease of middle-aged and elderly individuals. This observation parallels earlier reports highlighting similar age distribution [2,3]. A clear female predominance (67.5%) was observed, attributable primarily to gallstone disease, which is well established as being more common among women [4].

The clinical profile in the present study demonstrated abdominal pain (82.5%) and jaundice (62.5%) as the most frequent presenting complaints. These findings are consistent with the symptomatology described in other series, where pain and icterus form the hallmark of presentation [5]. Pruritus (37.5%) and weight loss (50%) were more frequently observed in malignant cases, corroborating earlier observations that these features are strongly associated with malignant obstruction [6]. Palpable abdominal mass was detected in 33.3% of malignant cases and absent in benign cases, reaffirming its diagnostic relevance in distinguishing neoplastic from benign etiologies [7].

Biochemical evaluation revealed significantly higher levels of total bilirubin, direct bilirubin, alkaline phosphatase, and prolonged prothrombin time in malignant obstruction, while serum albumin was markedly lower. These derangements reflect the cholestatic process, progressive hepatocellular dysfunction, and nutritional compromise associated with malignancy, consistent with previous studies [8,9]. Interestingly, hemoglobin levels were comparatively lower in benign cases, likely due to chronic inflammation and nutritional deficiencies secondary to gallstone disease [10].

Ultrasonography, performed in all patients, proved highly effective in identifying choledocholithiasis (47.5%) and choledochal cysts (2.5%). However, its diagnostic sensitivity in differentiating malignant strictures remained limited. This limitation is well documented in the literature, emphasizing the need for advanced imaging modalities such as MRCP and CT for more accurate assessment of malignant obstruction [8,11].

Dr Rajpal Meena, *et al.* Prospective And Retrospective Clinical Study And Management Of Obstructive Jaundice. *Int. J Med. Pharm. Res.,* 6 (5): 1001-1007, 2025

1005

The etiological distribution in this study demonstrated benign causes in 62.5% of patients, predominantly choledocholithiasis (47.5%), followed by benign CBD stricture (12.5%) and choledochal cyst (2.5%). These findings are in accordance with both regional and international data underscoring gallstone disease as the leading cause of surgical obstructive jaundice [12,13]. Malignant causes accounted for 37.5% of cases, chiefly carcinoma of the pancreas and periampullary carcinoma, which mirrors the rising global burden of hepatopancreatobiliary malignancies [2,14].

Surgical intervention remained the mainstay of management for benign obstruction. Cholecystectomy with CBD exploration and T-tube drainage was the most frequently performed procedure (70%). ERCP with stone extraction and stenting was selectively employed, particularly in high-risk surgical candidates. Malignant obstruction was primarily managed with palliative procedures, including biliary bypass and stenting, aimed at relieving jaundice and improving quality of life, reflecting global trends in the management of advanced biliary malignancy [14,15].

Overall, the present findings are consistent with established literature, reinforcing that benign causes, particularly choledocholithiasis, continue to dominate the spectrum of obstructive jaundice in developing regions, whereas malignancies contribute significantly to morbidity and require a multidisciplinary approach for diagnosis and management.

CONCLUSION
Obstructive jaundice is caused by both benign and malignant conditions, with pain and jaundice being the most common symptoms. Laboratory markers such as elevated bilirubin, alkaline phosphatase, and hypoalbuminemia help differentiate malignancy. Ultrasonography is useful as an initial diagnostic tool, while MRCP and CT aid in complex cases. Surgical management is definitive for benign causes, whereas malignant cases require curative or palliative procedures based on resectability. Early diagnosis, tailored management, and careful perioperative care are key to improving outcomes and reducing complications.

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