

Clinical Study of Obstructive Jaundice: Etiology, Clinical Presentation, Management and Outcomes at a Tertiary Centre in Vijayawada, Andhra Pradesh

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Abstract

Background: Obstructive jaundice is an important clinical and surgical problem caused by interruption of normal bile flow at the intrahepatic or extrahepatic level. Its etiological spectrum ranges from benign conditions such as choledocholithiasis to malignant disorders involving the pancreas, periampullary region and biliary tract. Appropriate evaluation requires integration of clinical findings, biochemical investigations and imaging, followed by endoscopic or surgical intervention according to the underlying cause [1–3]. The aim is to study the clinical presentation, etiological spectrum, management strategies and short-term outcome of patients presenting with obstructive jaundice at a tertiary-care teaching hospital – Siddhartha Medical College, Vijayawada. **Material and Methods:** A prospective observational study was conducted in the Department of General Surgery, Government General Hospital, Siddhartha Medical College, Vijayawada, over 15 months from December 2018 to March 2020. Thirty-five patients with obstructive jaundice fulfilling the study criteria were evaluated clinically and biochemically and underwent imaging with ultrasonography and contrast-enhanced computed tomography, with ERCP performed when indicated. Patients were managed according to the underlying pathology and operative findings and were followed for 6 months. **Results:** The study included 35 patients with a mean age of 47.34 years and an age range of 25–70 years. The most frequently represented age group was 41–50 years (31.4%). There were 20 males (57.1%) and 15 females (42.9%), giving a male-to-female ratio of 1.33:1. Jaundice was the commonest presenting complaint, occurring in 25 patients (71.4%), followed by abdominal pain in 21 (60.0%) and pruritus in 13 (37.1%). Loss of appetite/weight loss as a combined recorded variable was present in 10 patients (28.6%). Benign etiologies accounted for 26 cases (74.3%), while 9 (25.7%) were malignant. Cholelithiasis with common bile duct calculi was the commonest etiology, occurring in 24 patients (68.6%), followed by periampullary carcinoma/growth in 9 (25.7%) and pancreatic pseudocyst in 2 (5.7%). ERCP stenting followed by laparoscopic cholecystectomy was performed in 15 patients (42.9%), open cholecystectomy with CBD exploration in 5 (14.3%), triple bypass in 6 (17.1%), laparoscopic CBD exploration with laparoscopic cholecystectomy in 4 (11.4%), Whipple procedure in 3 (8.6%), and cystogastrostomy in 2 (5.7%). One postoperative death occurred following Whipple procedure. No recurrence was reported among survivors during 6 months of follow-up. **Conclusion:** In this cohort, benign biliary disease, particularly choledocholithiasis, was the predominant cause of obstructive jaundice. ERCP followed by laparoscopic cholecystectomy was the most frequently used treatment strategy for patients with gallstone-related CBD obstruction. Malignant disease was associated with more complex operative management and the only mortality observed in the study. Management should be individualized according to etiology, anatomical findings, patient fitness and available expertise.

Keywords: Obstructive jaundice; choledocholithiasis; ERCP; laparoscopic cholecystectomy; CBD exploration; periampullary carcinoma; biliary obstruction.

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INTRODUCTION

Obstructive jaundice results from impairment of bile flow caused by obstruction of the biliary system. The obstruction may be intraluminal, mural or extrinsic and may arise from benign or malignant pathology. Choledocholithiasis remains an important benign cause, whereas malignant obstruction may occur with pancreatic, periampullary or biliary tract neoplasms.^[1–3]

The clinical presentation varies according to the cause, level and duration of obstruction. Jaundice, abdominal pain and pruritus are common manifestations, while anorexia and weight loss may be particularly relevant in patients with malignant disease. Laboratory abnormalities generally reflect cholestasis, with elevation of conjugated bilirubin and

cholestatic enzymes such as alkaline phosphatase and gamma-glutamyl transferase.^[1,4]

The etiological pattern of obstructive jaundice differs between populations and healthcare settings. Studies from developing

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countries have demonstrated considerable variation in the relative proportions of benign and malignant disease. Lawal et al. reported pancreatic and biliary malignancies as important causes in their Nigerian series, whereas choledocholithiasis was the predominant benign cause.^[5] Siddique et al. similarly reported choledocholithiasis as the commonest benign etiology, with malignant disease accounting for a substantial proportion of cases.^[6] Other series have demonstrated a predominance of malignant obstruction, particularly carcinoma of the head of the pancreas.^[7,8] Evaluation of suspected biliary obstruction usually begins with liver biochemical testing and abdominal ultrasonography. Current guidelines recommend ultrasonography and liver function tests as initial investigations in suspected common bile duct stones, with magnetic resonance cholangiopancreatography or endoscopic ultrasonography used when further diagnostic clarification is required.^[9,10] ERCP is primarily a therapeutic procedure because it permits stone extraction and biliary drainage, while exposing patients to procedure-related adverse events.^[10,11] The management of obstructive jaundice has evolved considerably with the development of therapeutic endoscopy and minimally invasive surgery. In patients with choledocholithiasis, ERCP with stone extraction followed by laparoscopic cholecystectomy remains an established two-stage strategy, while laparoscopic common bile duct exploration provides an alternative single-stage approach in appropriately selected patients and where expertise is available.^[9,10,12-14] Evidence suggests broadly comparable efficacy between these approaches, although individual outcomes depend on patient selection and local expertise.^[12-14] Malignant obstruction requires a different therapeutic approach. Depending on tumor location, resectability and patient fitness, treatment may involve curative resection, biliary drainage or palliative surgical/endoscopic procedures.^[15,16]

Pancreaticoduodenectomy remains an important potentially curative operation for selected resectable periampullary and pancreatic-head malignancies, but is associated with substantial postoperative morbidity.^[17,18]

The present study was undertaken to evaluate the clinical presentation, etiological spectrum, treatment modalities and outcomes of patients with obstructive jaundice managed at a tertiary-care teaching hospital.

Aim: To study the etiopathogenesis, clinical presentation, management and outcome of patients with obstructive jaundice at Government General Hospital, Siddhartha Medical College, Vijayawada.

Objectives

1. To study the clinical history and presentation of patients with obstructive jaundice.
2. To identify the various causes and sites of biliary obstruction.
3. To study the different modalities of treatment used for obstructive jaundice.
4. To assess the postoperative outcome, recurrence and mortality during follow-up.

MATERIALS AND METHODS

Study design and setting: This was a hospital-based prospective observational study conducted in the Department of General Surgery, Government General Hospital, Siddhartha Medical College, Vijayawada.

The study period was 15 months, from December 2018 to March 2020.

Study population: Thirty-five patients admitted to the general surgery ward with clinical features suggestive of obstructive jaundice were included.

The original study population consisted of patients presenting with jaundice, abdominal pain, itching and/or loss of appetite/weight loss. Patients were evaluated clinically and biochemically and subsequently investigated to determine the site and cause of biliary obstruction.

Inclusion criteria

Patients satisfying the study criteria were included if they:

- were between 12 and 70 years of age;
- had clinical evidence of obstructive jaundice;
- had serum bilirubin above the specified threshold in the original study protocol;
- had evidence of biliary obstruction, including common bile duct dilatation on imaging;
- were considered suitable for surgical or endoscopic management.

Exclusion criteria

Patients were excluded if they:

- were younger than 12 years or older than 70 years;
- had viral hepatitis;
- had alcoholic jaundice;
- were considered unfit for definitive surgical treatment.

Clinical evaluation: A detailed history was obtained with particular attention to jaundice, abdominal pain, pruritus and appetite/weight loss. A complete physical examination was performed.

Laboratory investigations

Patients underwent routine hematological and biochemical investigations, including:

- complete blood count;
- serum bilirubin;
- liver enzymes;
- alkaline phosphatase;
- gamma-glutamyl transferase;
- serum proteins and albumin;
- prothrombin time;
- activated partial thromboplastin time;
- INR;
- serum creatinine.

The biochemical pattern of cholestasis in obstructive jaundice has been well described, with conjugated hyperbilirubinemia and elevation of cholestatic enzymes being characteristic findings.^[1]

Imaging: Abdominal ultrasonography was used as the initial imaging investigation. It provided information regarding gallstones, gallbladder abnormalities, common bile duct dilatation and, in some patients, a possible obstructing lesion.

Contrast-enhanced CT of the abdomen was subsequently used to assess the level and cause of obstruction and, particularly in malignant disease, to evaluate the pancreas, biliary tract, lymph

nodes, metastatic disease and other abdominal structures. Current evidence supports ultrasound and liver biochemical testing as initial assessment, followed by MRCP or EUS when the diagnosis of choledocholithiasis remains uncertain.^[9,19] EUS and MRCP both have high diagnostic accuracy, with EUS demonstrating somewhat greater sensitivity in some meta-analyses.^[19,20]

ERCP: ERCP was performed in patients in whom therapeutic intervention was indicated, particularly those with suspected or confirmed CBD calculi. ERCP permitted stone extraction and biliary stenting when required.

Current guidelines emphasize that ERCP should primarily be used as a therapeutic procedure rather than as a purely diagnostic test because of its potential adverse events.^[9,11] ERCP-related complications include pancreatitis, bleeding, perforation and infection.^[11]

Treatment: Treatment was individualized according to the etiology of obstruction, anatomical findings, stone characteristics, operability and available expertise.

The principal treatment modalities were:

1. ERCP stenting followed by laparoscopic cholecystectomy;
2. open cholecystectomy with CBD exploration;
3. triple bypass procedures;
4. laparoscopic CBD exploration with laparoscopic cholecystectomy;
5. Whipple procedure;
6. cystogastrostomy.

For patients with choledocholithiasis, the choice between ERCP followed by laparoscopic cholecystectomy and laparoscopic CBD exploration depends on local expertise, stone characteristics, patient factors and available resources.^[9,12-14]

Guidelines recommend definitive laparoscopic cholecystectomy after successful treatment of CBD stones to reduce recurrent biliary events.^[10] Recent meta-analyses also support early laparoscopic cholecystectomy after ERCP in appropriately selected patients.^[21]

Follow-up: Patients were followed for 6 months after treatment. The follow-up assessment included recurrence of symptoms, postoperative complications and mortality.

Statistical analysis: Categorical variables were expressed as frequencies and percentages. Continuous variables were summarized using mean values and ranges. The original study protocol described the use of chi-square/Fisher exact tests for categorical comparisons, Student's t-test for comparison of means and odds ratios for associations between selected clinical variables, with $p < 0.05$ considered statistically significant. Because the verified master dataset available for the present manuscript does not contain the underlying statistical output, unsupported p-values or effect estimates have not been reproduced.

RESULTS

Age distribution

Thirty-five patients were included in the study. The mean age was 47.34 years, with a range of 25–70 years. The largest proportion of patients belonged to the 41–50-year

age group, comprising 11 patients (31.4%). The age distribution demonstrates that obstructive jaundice occurred predominantly in middle-aged and older adults in this cohort. The mean age was lower than that reported in some series of predominantly malignant obstructive jaundice.^[5,7,8]

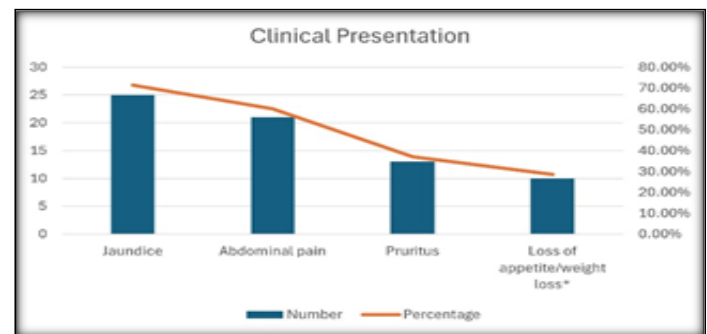
Sex distribution

There were:

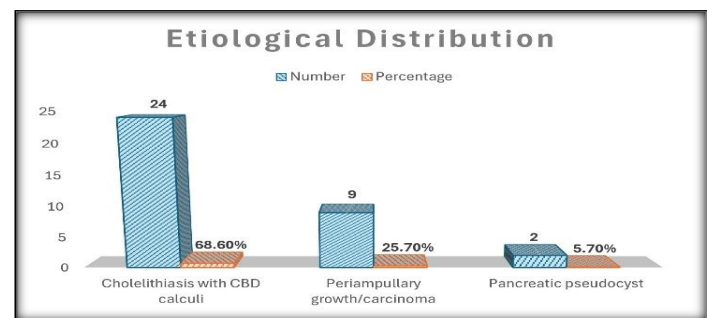
- 20 males (57.1%)
- 15 females (42.9%)

The male-to-female ratio was 1.33:1.

The sex distribution differs from several published series in which female predominance has been reported. For example, Mabula et al. reported a male-to-female ratio of 1:1.6, while Asare et al. reported a ratio of 1:1.6 in their Ghanaian series.^[7,8] Such differences may reflect variation in the etiological spectrum and referral population.



Graph 1: Clinical Presentation



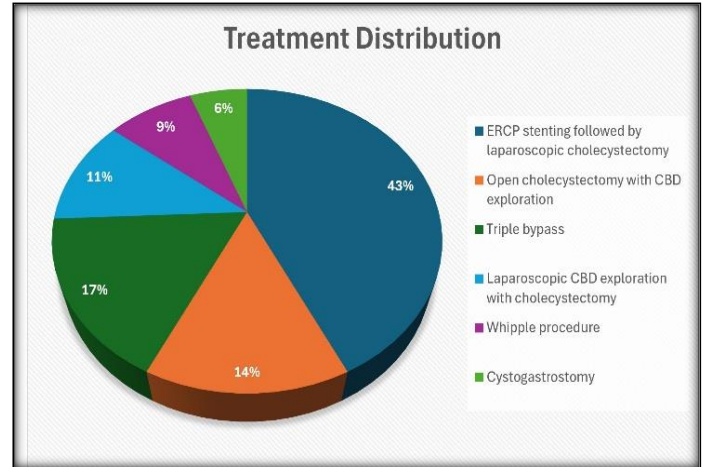
Graph 2: Etiological Distribution



Figure 1: ERCP Stent Placement



Figure 2: Tube Placement during Lap CBD Exploration



Graph 3 Treatment Distribution

Clinical presentation

The presenting features were:

Clinical feature	Number	Percentage
Jaundice	25	71.4%
Abdominal pain	21	60.0%
Pruritus	13	37.1%
Loss of appetite/weight loss*	10	28.6%

*The master chart recorded appetite/weight loss as a combined variable; therefore, separate frequencies for anorexia and weight loss are not reported.

Jaundice was the most frequent presenting feature, occurring in 71.4% of patients. Abdominal pain was the second most common symptom, followed by pruritus.

The predominance of jaundice as a presenting feature is consistent with other clinical series of obstructive jaundice.^[6-9]

Etiology

The etiological distribution was:

Etiology	Number	Percentage
Cholelithiasis with CBD calculi	24	68.6%
Periampullary growth/carcinoma	9	25.7%
Pancreatic pseudocyst	2	5.7%
Total	35	100%

- Benign causes: 26/35 (74.3%)
- Malignant causes: 9/35 (25.7%)

Choledocholithiasis was therefore the predominant cause of obstructive jaundice in this cohort.

This finding is consistent with several reports in which choledocholithiasis was the commonest benign cause of

obstructive jaundice.^[6-8] However, the overall benign-to-malignant distribution varies considerably between studies. Lawal et al. and Rahman et al., for example, reported a substantial malignant burden, particularly pancreatic malignancy,^[5,22] whereas the present cohort contained a larger proportion of benign disease.

Treatment

The treatment distribution was:

Treatment	Number	Percentage
ERCP stenting followed by laparoscopic cholecystectomy	15	42.9%
Open cholecystectomy with CBD exploration	5	14.3%
Triple bypass	6	17.1%
Laparoscopic CBD exploration with cholecystectomy	4	11.4%
Whipple procedure	3	8.6%
Cystogastrostomy	2	5.7%
Total	35	100%

ERCP stenting followed by laparoscopic cholecystectomy was the most frequently used treatment.

In patients with CBD stones, laparoscopic CBD exploration was used in selected cases. Open CBD exploration was performed when laparoscopic treatment was considered

difficult or inappropriate, including cases with large or multiple stones and difficult dissection.

These treatment patterns are consistent with the concept that

both ERCP-based and laparoscopic approaches have an established role in the management of choledocholithiasis,

with selection influenced by anatomy, expertise and available resources.^[9,12-14]

Treatment outcomes

Treatment	Hospital stay	Major recorded complications	Recurrence	Mortality
ERCP stenting followed by laparoscopic cholecystectomy	4–6 days	None recorded	0	0
Open cholecystectomy with CBD exploration	12–14 days	Wound infection	0	0
Triple bypass	18–21 days	None recorded	0	0
Laparoscopic CBD exploration with cholecystectomy	8–10 days	None recorded	0	0
Cystogastrostomy	7–10 days	None recorded	0	0
Whipple procedure	24–30 days	Wound infection; pancreatic fistula	0	1

The ERCP/laparoscopic cholecystectomy group had a recorded hospital stay of 4–6 days without documented complications. Patients undergoing Whipple procedure had a longer hospital stay of 24–30 days and experienced wound infection and pancreatic fistula; one patient died postoperatively.

The original study's outcome data demonstrate an association between the more extensive operative procedure and greater postoperative morbidity in this small cohort, but the study was not designed or powered to establish comparative treatment effectiveness.

Overall outcome

There was one death among 35 patients, giving an overall mortality of 2.9%.

All surviving patients completed the reported 6-month follow-up, and no recurrence was documented during this period.

DISCUSSION

Obstructive jaundice encompasses a heterogeneous group of diseases with markedly different therapeutic requirements. The present prospective observational study of 35 patients demonstrated a predominance of benign disease, with choledocholithiasis accounting for approximately two-thirds of cases.

Age and sex: The mean age in the present study was 47.34 years, with the greatest representation in the 41–50-year age group. Lawal et al. reported a mean age of 42 years among 50 patients with obstructive jaundice, while Siddique et al. reported a mean age of 49.5 years in a series of 60 patients.^[5,6] Mabula et al. reported a higher median age of 58 years, particularly reflecting the significant proportion of malignant disease in their population.^[7]

Differences in age distribution between studies may be related to variations in referral patterns, disease prevalence and the proportion of malignant cases.

There was a modest male predominance in the present study, with a male-to-female ratio of 1.33:1. This contrasts with studies from Tanzania and Ghana in which females predominated.^[7,8] Such differences further emphasize the heterogeneous epidemiology of obstructive jaundice.

Clinical presentation: Jaundice was the most frequent symptom in the present study, occurring in 71.4% of patients. Abdominal pain was reported in 60%, followed by pruritus in 37.1%.

The predominance of jaundice is consistent with reports from other populations. Both benign and malignant obstruction

may produce jaundice, although the accompanying symptom profile can differ according to etiology. Patients with stone disease commonly present with abdominal pain and jaundice, whereas malignant obstruction may be associated with progressive jaundice, pruritus and constitutional symptoms such as appetite and weight loss.^[5-8]

In the present study, appetite/weight loss was recorded as a combined variable in 10 patients (28.6%). Because the master chart does not independently distinguish anorexia from weight loss, separate percentages have not been reported.

Etiological spectrum: Choledocholithiasis was the commonest cause of obstructive jaundice in the present study, accounting for 24 of 35 patients (68.6%). Periampullary malignancy accounted for 9 patients (25.7%), while pancreatic pseudocyst accounted for 2 patients (5.7%).

The predominance of choledocholithiasis among benign causes is consistent with several published studies [6–8]. Siddique et al. reported choledocholithiasis as the commonest benign etiology, accounting for 35% of their patients.^[6] Mabula et al. similarly found choledocholithiasis to be the commonest benign cause.^[7]

However, the present distribution differs substantially from studies in which malignant obstruction predominated. Rahman et al. reported carcinoma of the head of the pancreas in more than 60% of patients in their Nigerian series, and Asare et al. found malignant disease in 87.2% of their Ghanaian cohort.^[8,22] These differences are important when interpreting studies of obstructive jaundice because the etiological spectrum is strongly influenced by the study population and referral setting.

Evaluation and imaging: Ultrasonography was used as the initial imaging investigation in the present study. This is consistent with current recommendations for suspected CBD stones, where liver function tests and abdominal ultrasonography constitute appropriate initial assessment.^[9,10]

CT was subsequently used to further characterize the obstruction and evaluate surrounding abdominal structures. In patients with suspected malignant obstruction, cross-sectional imaging is particularly useful for assessing the primary lesion, vascular involvement, lymphadenopathy and metastatic disease.

MRCP and EUS are important non-invasive or minimally invasive diagnostic alternatives when choledocholithiasis remains suspected but is not adequately demonstrated on initial imaging. Meta-analyses have shown high diagnostic performance for both modalities, with EUS generally demonstrating somewhat higher sensitivity and comparable specificity.^[19,20]

The present study did not evaluate the diagnostic sensitivity, specificity or accuracy of individual imaging modalities. Therefore, no such diagnostic performance measures are

claimed.

ERCP and management of choledocholithiasis

ERCP followed by laparoscopic cholecystectomy was the most frequently used treatment in the present study, accounting for 15 patients (42.9%). ERCP is an established therapeutic modality for CBD stone extraction and biliary drainage.^[9,10]

Current guidelines recommend definitive laparoscopic cholecystectomy after treatment of choledocholithiasis in suitable patients because leaving the gallbladder in situ exposes patients to recurrent biliary events.^[10] The ESGE guideline recommends laparoscopic cholecystectomy within 2 weeks of ERCP for patients treated for choledocholithiasis.^[10]

Recent evidence further supports early cholecystectomy following successful ERCP.^[23] A 2026 systematic review of randomized trials similarly found that early laparoscopic cholecystectomy probably reduces conversion to open surgery, recurrent biliary events, postoperative complications and hospital stay.^[21] These findings support the general management pathway observed in the present study, although the timing between ERCP and cholecystectomy was not independently analyzed.

Laparoscopic CBD exploration

Four patients in the present study underwent laparoscopic CBD exploration with laparoscopic cholecystectomy.

Laparoscopic CBD exploration is an established alternative to the ERCP-based two-stage approach in patients with concomitant gallbladder and CBD stones. Meta-analyses comparing laparoscopic CBD exploration with ERCP followed by laparoscopic cholecystectomy have generally demonstrated broadly comparable stone clearance, morbidity and mortality, although differences in hospital stay and technical failure have been reported in some analyses.^[12–14]

The choice between these approaches should therefore be individualized. Factors include stone size and number, location of impacted stones, local expertise, availability of endoscopic facilities and the patient's operative risk.^[9,10]

The present study was not designed to compare the two strategies statistically, and therefore no claim of superiority can be made.

Open CBD exploration

Five patients underwent open cholecystectomy with CBD exploration. The original study selected open exploration in patients with large or multiple stones and difficult dissection. Open CBD exploration remains relevant in selected situations, particularly when endoscopic clearance fails or laparoscopic exploration is unavailable or technically inappropriate.^[13] The role of T-tube drainage and primary closure following CBD exploration has also evolved, with evidence suggesting that routine T-tube drainage is not necessarily required in every patient.^[23,24]

The relatively longer hospital stay observed in the open surgery group in the present study should be interpreted descriptively because the group was small and treatment selection was not randomized.

Malignant obstruction: Nine patients in the present study had periampullary growth/carcinoma. Malignant biliary obstruction can arise from pancreatic, periampullary or

biliary tract malignancy and requires assessment of resectability, performance status and the overall treatment objective.^[15,20]

For potentially resectable periampullary tumors, pancreaticoduodenectomy is an established curative-intent operation. However, it is a complex procedure with recognized risks including postoperative pancreatic fistula, infection, delayed gastric emptying and mortality.^[17,18]

In the present cohort, three patients underwent Whipple procedure. Their recorded hospital stay was 24–30 days, with wound infection and pancreatic fistula reported, and one postoperative death. The findings are compatible with the recognized morbidity associated with pancreaticoduodenectomy but should not be interpreted as an estimate of the expected mortality or morbidity of Whipple surgery because the sample size was very small.

The current evidence also emphasizes that preoperative biliary drainage in potentially resectable malignant obstruction should not be performed routinely in every patient. It may be appropriate in selected circumstances such as cholangitis, severe symptomatic jaundice, delayed surgery or planned neoadjuvant therapy.^[15,20]

Outcome: The overall mortality in the present cohort was 2.9%, with one death following Whipple procedure. No recurrence was documented among survivors during the 6-month follow-up period.

Published series of obstructive jaundice have reported substantially different mortality rates. Mabula et al. reported a mortality of 20.3% in a much larger and more heterogeneous population with a substantial malignant burden,^[7] while Lawal et al. reported better outcomes for benign obstruction than malignant disease.^[5] The relatively low mortality observed in the present study may partly reflect the high proportion of benign disease, but no causal inference can be made from this small observational cohort.

Strengths and limitations: The strengths of this study include its prospective observational design, systematic clinical evaluation, inclusion of both benign and malignant causes and assessment of multiple treatment modalities with follow-up.

However, several limitations should be recognized. The sample size was small, limiting the ability to make statistically reliable comparisons between treatment groups. Treatment allocation was not randomized and was determined by the underlying pathology and operative findings. The study was conducted at a single institution, limiting generalizability. The follow-up period was only 6 months. In addition, detailed comparative diagnostic accuracy data for individual imaging modalities were not available.

The study should therefore primarily be interpreted as a descriptive clinical series rather than as a comparative effectiveness study.

CONCLUSION

Obstructive jaundice represents a heterogeneous group of disorders requiring individualized evaluation and treatment.

In the present study of 35 patients, the mean age was 47.34 years and males were slightly predominant. Jaundice was the commonest presenting feature, followed by abdominal pain and pruritus.

Benign disease accounted for 74.3% of cases, with cholelithiasis and CBD calculi being the predominant etiology. Periapillary malignancy accounted for 25.7% of cases. ERCP stenting followed by laparoscopic cholecystectomy was the most frequently employed treatment strategy. Laparoscopic CBD exploration provided an alternative approach in selected patients, while open CBD exploration was used when laparoscopic treatment was considered unsuitable. Malignant disease required more extensive procedures, including bypass surgery and pancreaticoduodenectomy. One postoperative death occurred following Whipple procedure, resulting in an overall mortality of 2.9%. No recurrence was documented among survivors during the 6-month follow-up. The findings emphasize the importance of accurate etiological diagnosis and individualized treatment of obstructive jaundice. Modern management should integrate appropriate non-invasive imaging, therapeutic endoscopy and minimally invasive or open surgery according to the patient's pathology, anatomy, physiological status and available expertise.

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Conflicts of interest

There are no conflicts of interest.

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