

Management Outcome Assessment of Obstructive Jaundice and Associated Factor from Yekatit 12 Hospital Medical College Addis Ababa, Ethiopia

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Abstract

Background: Obstructive jaundice is common problem in daily clinical practice and among the most challenging conditions for planning current and future management. The causes are varied, but it is most commonly due to choledocholithiasis; benign strictures of the biliary tract, pancreaticobiliary malignancies, and metastatic disease. Surgery in patients with obstructive jaundice is generally considered to be associated with a higher incidence of complication and mortality.

Objective: The purpose of the study was to assess outcome of obstructive jaundice and associated factors at Yekatit 12 Hospital Medical College, Addis Ababa, Ethiopia.

Methods: A longitudinal study design was used to conduct the study and all patients admitted to the surgical wards for whom surgery was done for obstructive jaundice from May 1, 2022 to April 30, 2023 G.C were included. Chi square fisher's exact test was used to see the association between obstructive jaundice outcome and independent variables, significance was determined by p-value <0.05.

Results: In these study 31 patients were enrolled and the mean age was 49.03 SD±16.16 years. Of patients diagnosed to have obstructive jaundice majority are due to benign causes. Common bile duct stones are the commonest benign condition accounting 88.2% and peri-ampullary cancers are the most frequent (48.4%) cause of obstructive jaundice from malignant condition. Among patients operated 38.7% were underwent bypass procedures. Post-operative complications occurred in 9 (24.3. %) of patients, with surgical site infection being commonest (55.5%). Significant association was identified between types of post-operative complication and management outcome (P=0.034).

Conclusion: The most common cause of obstructive jaundice was bile duct stone. Post-operative complications were significantly associated with management outcome of obstructive jaundice.

Keywords: Obstructive Jaundice, associated factors, outcome

Introduction

Jaundice in surgical perspective refers to an increase in bilirubin concentration, causing yellowing of the skin, sclera, and mucous membranes, often due to bile outflow obstruction (cholestasis). Obstructive Jaundice (OJ) results from bile transport blockages from the liver to the intestine, caused by various benign (e.g., biliary stones, strictures, parasites) and malignant conditions (e.g., pancreatic tumors, biliary tree tumors) [1, 2, 3,4]. Management of OJ has challenges in resource-limited settings, where late presentation and lack of diagnostic tools prevail. Surgery in jaundiced patients carries

higher risks of complications such as sepsis, hemorrhage, and impaired wound healing [7, 8, 9]. Despite advances, mortality and morbidity remain significant, especially in regions with limited resources [10, 11, 12]. This study aimed to evaluate OJ management in our facility, identifying factors influencing outcomes and providing recommendations based on our experiences. The findings showed future departmental and hospital activities regarding OJ.

Methods and Materials

Study Area and Period

The study conducted in Y12HMC from May 2022 to April 2023 which is located in Addis Ababa, Ethiopia administered under Addis Ababa health bureau under Addis Ababa City administration and currently providing patient care and training services for medical students, residents and other health post graduates in collaboration with higher education institutions in Ethiopia.

Study Design

A longitudinal study design was conducted to assess outcome of obstructive jaundice and its associated factors at Yekatit 12 HMC from May 2022 to April 2023.

Source and Study Population

The source population for this study consisted of patients who were admitted to the surgical ward with a diagnosis of obstructive jaundice. These patients were admitted either as emergencies or electively, and they were considered for elective or emergency surgery. The study population specifically included those patients from the source population who were fit for surgery.

Inclusion and Exclusion Criteria

Inclusion criteria consisted of patients who were admitted with a diagnosis of obstructive jaundice and were suitable for surgery. On the other hand, exclusion criteria encompassed pediatric patients under the age of 15 and individuals diagnosed with OJ but were not eligible for an operation.

Study Variable

Outcome of OJ was the dependent variable while Age, Gender, clinical presentation, preoperative complication, mode of investigation modality, operability, type of operation proposed, operative finding and length of stay were the independent variables studied in the research.

Data Collection Instruments and Methods

Data was obtained from patients, hospitals Smart care, daily interns and nurses round books and operating theater registry using structured questionnaire designed through literature review and extracted by Resident Attaching Hepatobiliary unit after they were trained on data collection. Completeness and consistency of collected data at the end of each week was checked throughout data collection period by principal investigator.

Data Analysis and Presentation

Data was collected via data collection questioner. Data entry and analysis was done by SPSS Version 26 computer system. Finally, the data is presented in tables and graphs and cross tabulation with statistical test for association. For comparison of data, chi-square probability test was performed. For each analytical test level of confidence was 0.05 and $p < 0.05$ was considered significant between independent variable and outcome of obstructive jaundice.

Results

Demographic and Pattern of Admission

A total of 34 OJ patients were Admitted to surgical ward of Y12HMC from May 1 2022 to April 30, 2023. From these 31 patients for whom operation was done were included in the study with response rate of 91.2 %. Male to female ratio was 1:1.2. The mean age of OJ patients was (49.03 ±SD) 16.16 year. The mean age for patients diagnosed with benign etiologies was 50.59 years (SD ±16.8), while for malignant etiologies, it was 47.14 years (SD ±15.63) (Table 1). Among the 17 patients diagnosed with benign etiologies, 13 were females (76.4%), whereas among the 14 patients with malignant etiologies, 10 were males (71.42%). Emergency admissions constituted 51.61% of cases, while the remaining 48.38% were admitted electively. Of the emergency admissions, 75% were due to benign causes, with females accounting for 68.75%, while among the 15 elective admissions, males comprised 66.66% (Table 2).

Variable	Mean	Standard Deviation
Age Of OJ Patients	49.03	16.16
Age distribution in nature of etiology	Benign	50.59
	Malignant	47.14

Table 1: Demographic Distribution of OJ at Y12HMC, Addis Ababa, Ethiopia, from May 1/2022 to April 31/2023G.C.

Variables	frequency	Percent %
Gender		
Male	14	45.2
Female	17	54.8
Pattern of Admission		
Elective	15	48.4
Gender distribution of Elective	Male	9
	Female	6
Nature of etiology for elective admission	Benign	5
	Malignant	10
Emergency	16	51.6
Gender distribution for Emergency	Male	5
	Female	11
Nature of Etiology for emergency admission	Benign	12
	Malignant	4

Table 2: Demographic and clinical factors of OJ at Y12HMC, Addis Ababa, Ethiopia, from May 1/2022 to April 31/2023G.C.

Etiology of Obstructive Jaundice

Among the 31 patients included in the study, 17 (54.8%) presented with a benign cause of obstruction. Among these cases, CBD stone was the predominant factor, accounting for 88.23% (15/17). Biliary stricture and post-cholecystectomy iatrogenic bile duct injury each represented 5.88% (1/17) of the remaining benign cases. Conversely, 14 patients (45.2%) exhibited malignant causes, with periampullary carcinoma

being the most common at 42.8% (6/14), followed by cholangiocarcinoma at 31.2% (5/14), and pancreatic carcinoma at 21.4% (3/14) of malignant cases (Table 3). The analysis reveals a statistically significant association between the nature of etiology and the pattern of admission, as determined by a two-sided chi-square test with a p-value of 0.024 (Table 4).

Variable		Frequency	Percent
Nature and cause of etiology			
Benign causes		17	54.8
Etiology of Benign obstruction	CBD stone	15	88.4
	Biliary Stricture	1	3.2
	Biliary tract Injury	1	3.2
Gender distribution of Benign causes	Male	4	30.77
	Female	13	76.47
Imaging that confirmed Benign	US	5	29.4
	CT	5	29.4
	ERCP	1	5.8
	MRCP	6	35.2
Malignant causes		14	45.1
Etiologies of Malignant obstruction	Periampullary Ca.	6	19.4
	Cholangiocarcinoma	5	16.1
	Pancreatic Ca.	3	9.7
Gender distribution of malignant Etiology	Male	10	71.42
	Female	4	28.57
Imaging that confirmed malignant	CT	10	71.42
	MRCP	4	28.57
Imaging modality used			
CT		15	48.4
MRCP		10	32.3
US		5	16.1
ERCP		1	3.2
preoperative complication		8	25.8
preop complication in Emergency		7	43.75
preop complication in Elective		1	16.6

Table 3: clinical factors of OJ; at Y12HMC, Addis Ababa, Ethiopia, from May 1/2022 to April 31/2023G.C.

Independent Variable		pattern of admission		X ²	Df	P-Value
Nature of etiology	Benign	5	12		1	0.024
	Malignant	10	4			

Table 4: Association between nature of etiology and pattern of admission at Y12HMC, Addis Ababa, Ethiopia, from May 1/2022 to April 31/2023G.C.

Clinical Presentations

The most common symptom prompting patients to seek medical attention was jaundice, observed in 90.3% of cases. It occurred in 88.2% of patients with benign causes and 92.8% of those with malignant causes. Abdominal pain was the second most prevalent symptom, affecting 80.64% of patients, with 94.1% of benign cases and 64.2% of malignant cases experiencing it. Anorexia and vomiting were present in 64.5% of cases, with vomiting occurring in 70.5% of patients with benign causes and anorexia in 64.7%. Less common complaints included stool or urinary color change (51.6%), fever (48.4%), and skin itch (32.3%). The mean duration of symptoms was 37.84

days (ranging from 2 to 180 days) with a standard deviation of ± 40.29 . For the benign group, the mean duration was 24.29 days (± 27 days), whereas for malignant cases, it was 54.29 days (± 48.14 days). The mean duration of symptoms for emergency room admissions was 11.06 days (± 9.56 days), while for elective cases, it was 66.40 days (± 41.08 days).

Imaging Modalities Utilized

Computed Tomography (CT) emerged as the primary imaging modality in our study, utilized in 48.4% (15/31) of cases, serving as the first-line tool for identifying obstruction etiology, particularly in the malignant group, where it

identified causes in 71.42% of patients. Magnetic Resonance Cholangiopancreatography (MRCP) confirmed diagnoses in 35% of benign and 28.5% of malignant cases. Abdominal ultrasound (US) detected 29.41% of benign cases (CBD stone), though it was not the primary modality for identifying malignant causes. Lastly, abdominal Endoscopic Retrograde Cholangiopancreatography (ERCP) was used in 3.2% (1/31) of benign cases to identify the cause of obstruction.

Complications on Admission

Preoperative complications were observed in 25.8% (8 patients) upon admission. Among emergency OJ admissions, 43.75% (7/16) presented with initial complications. The most common complication was sepsis, occurring in 31.25% (5 patients) of emergency admissions. However, there was no statistically significant association between the presence of complications upon admission and the outcome of OJ.

Management and Outcome

Of the total admitted patients, 83.8% (31) underwent surgery, while 16.2% (6) were unfit due to poor health or inoperable metastasis. Curative surgery was performed in 45.16% of OJ patients, with 56.25% of emergency cases and 33.3% of elective cases receiving curative operations. The most common

surgery for benign cases (CBD stone) was CBD exploration in 10 out of 17 patients, while the rest underwent ERCP or T-tube insertion. Biliary stricture and bile duct injury patients received palliative bypass. For malignancies, Whipple's procedure was common (7/14), with others undergoing various bypass surgeries. The average hospital stay was 18.97 days (3 to 36 days), with a longer stay for patients with postoperative complications (22.33 days) compared to those without (17 days). There was no association between hospital stay, etiology, admission pattern with outcome. Of the 31 patients who underwent surgery, 29 had favorable outcomes, while 6.45% had unfavorable outcomes.

Factors Associated with Outcome of OJ

Out of 31 patients who underwent surgery, 29.03% experienced postoperative complications, with 35.7% among those with malignant causes and 23.52% among those with benign causes of obstruction. Surgical site infections were most common (55.5%), followed by intraabdominal leaks (33.3%) and pneumonia (11.1%). The two recorded mortalities were associated with intraabdominal leaks. Fisher's exact test revealed a statistically significant association between complication type and patient outcome (P value= 0.013) (Table 5).

Variables		Outcomes of OJ		X ²	Df	P-value
Type of Post op complication	Frequency	Favorable	Unfavorable			
				10.631	1	0.013

Table 5: Association between post-operative complication and outcome of OJ at Y12HMC, Addis Ababa, Ethiopia, from May 1/2022 to April 31/2023G.C.

Discussion

Obstructive Jaundice presents a common challenge in surgical practice. Our study included 31 OJ patients, with a mean age of 49.03 years (16 - 76 years, SD ±16.16). This finding contrasts with studies from other study in Ethiopia and India, where all patients were above 50 years of age [20, 21, 27, 28].

Contrary to previous studies indicating a significant association between malignant obstruction and ages above 50 years [20, 21], our study showed a median age of 50.59 years for benign causes and 47.14 years for malignant causes, with no outcome association for OJ. Among benign etiologies, 70.58% (12/17) were over 50 years, while 43% (6/14) of malignant cases were under 50 years. This age variation may explain why some studies only opted for palliative surgery, while our study leaned towards relatively invasive source control palliative surgery, especially for younger patients (<50 years) and early presentations.

The male-to-female ratio was 1:1.2, with females outnumbering males by 3 (54.8% vs. 45.2%), unlike studies in Mumbai, India, and Togo, Lomé, where males were more prevalent [27, 25]. Stone disease, more common in females, affected over 3/4ths of patients in the benign group, whereas 10/14 patients in the malignant group were male.

In terms of clinical presentation, jaundice and abdominal pain were the most common symptoms leading patients to seek medical attention, aligning with findings in Sweden [19] and

Mumbai, India [27]. This contrasts with studies in Ethiopia where abdominal pain preceded jaundice in frequency [8, 13]. Both symptoms were prevalent in both benign and malignant groups. Change in mentation and cholangitis, less common symptoms, were noted in three patients but were excluded from the study due to their unfit status for surgery. The average symptom duration of 37.84 days was shorter than in a previous Ethiopian study over a 3-month interval [28]. This shorter duration and the relatively early disease status may explain the more aggressive palliative surgery in the malignant group, where the mean symptom duration was 54 days.

In this study, the most common cause of obstruction was benign (54.8%), similar to other study done in Ethiopia [8]. Malignant causes accounted for 45.2% of cases, with periampullary cancer being the most common (42.8%), followed by cholangiocarcinoma (35.7%) and pancreatic cancer (21.4%), differing from studies in Tanzania and St. Paul where pancreatic cancer predominated [4, 8]. CBD stone was the most common benign cause of obstruction, consistent with findings in most literature reviewed, accounting for 88.2% of cases.

In many developing and sub-Saharan countries where advanced imaging modalities are unavailable or unaffordable, abdominal ultrasound (US) is often the primary investigation tool for identifying the etiology of obstructive jaundice. With CBD stone being the most common cause identified in many studies, abdominal US demonstrates good sensitivity and specificity.

However, in our study and similar to research in Pakistan, CT scan of the abdomen emerged as the main investigation modality due to the diversity of etiologies beyond CBD stone, accounting for half of the cases.

Out of the total participants, 31 patients were eligible for surgery; while 6 were deemed unfit for surgical intervention due to medical conditions (see Table 2). The predominant surgical procedures included open bypass surgeries, notably CBD exploration in 12 patients, with 8 of them also undergoing biliary-enteric bypass. Previous research in a North Central Nigerian hospital and St. Paul indicated a higher frequency of bypass surgeries due to advanced malignant obstructions. However, in our study, Whipple's procedure emerged as the primary surgical intervention for malignant obstructions, contrasting prior findings [8, 18].

The postoperative course in the study revealed a 29.03% rate of postoperative complications (morbidity) and 6.4% in-hospital mortality, primarily observed in cases of malignant obstruction, aligning with findings from St. Paul [13]. Surgical site infection was the most common complication, consistent with the St. Paul study. Postoperative intraabdominal leak from the anastomosis site ranked as the second most frequent complication, differing from studies in Nigeria and Iran where ascending cholangitis, distant metastasis, and cardiac arrest were more common [18, 16]. Similar to the St. Paul study, there were no mortalities among patients with benign obstruction, while the mortality rate among those with malignant obstruction was 14.28%, higher than the 8.1% reported in the St. Paul study [13].

Conclusion and Recommendation

Postoperative complications affected 29.03% of patients in the study, with a notable association between complication types and OJ outcomes. To mitigate such complications, implementing preventive measures is advised. Additionally, further research with a larger sample size is recommended to deepen our understanding of OJ factors and outcomes.

Informed Consent

We obtained documented and witnessed informed verbal consent for publication from the administration bodies otherwise informed consent from the subjects was not required.

Competing Interest

No conflict of interest

Author's Contribution

Analyzed and interpreted of data, review main manuscript text, approved the summated version and agrees for publication.

Dr Saleamlak Dessalegn: develop the concept and design, write main manuscript, approved the summated version of the article and agreed for the contribution of the article.

Dr Wondwossen Amtataw: developed the concept and designed it, edit main manuscript, approved the summated version of the article and agreed for the contribution of the article.

Dr Ephrem Mamo: review and edit manuscript, supervised

data collection approved the summated version and agrees for publication.

Dr Getachew Desta: review and edit manuscript, supervised data collection, approved the summated version and agrees for publication.

Alemu Kibret: review and edit manuscript, supervised data collection, approved the summated version and agrees for publication.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethical Statement

Institutional ethics committee approval this study (protocol number: 210/22, dated 25/05/2022).

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