ORIGINAL ARTICLE

Etiological Profile of Obstructive Jaundice and Acute Cholangitis: Three-year Data from a Tertiary Care Center in Eastern India

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Abstract

Background and objective: Obstructive jaundice (OJ) and acute cholangitis (AC) are common presentations of biliary obstruction. In Eastern India, data regarding the causes of OJ and AC are scarce. This study aimed to determine the etiological spectrum of OJ and AC in a tertiary center in Eastern India.

Materials and methods: The data of consecutive patients admitted to the Department of Gastroenterology from January 2021 to December 2023 with a diagnosis of OJ with or without AC was collected from the hospital's computerized database. The data were analyzed for different etiologies of OJ and AC. The results were compared with the various etiologies of OJ reported in previous publications from different centers across India.

Results: Totally 772 patients were admitted during this period with a diagnosis of OJ with or without AC. There were 368 male and 404 female patients with a male-to-female ratio of 0.91. In 454 (58.8%) and 309 (41.2%) cases, the etiology of OJ was benign biliary obstruction (BBO) and malignant biliary obstruction (MBO), respectively. The etiologies of BBO-associated OJ were choledocholithiasis (51%) and distal biliary stricture (9%). The causes of MBO-associated OJ were gallbladder cancer (GBC) (21%), periampullary malignancy (10.2%), cholangiocarcinoma (CCA) (5.3%), and carcinoma head of the pancreas (3.4%). Acute cholangitis was observed in 203 (26.2%) with OJ; 23% and 10% of cases of BBO-associated OJ and MBO-associated OJ had AC, respectively. BBOs that presented with AC were choledocholithiasis (50.24%) and distal biliary stricture (14.77%). Similarly, MBOs that presented with AC were GBC (16.74%), periampullary malignancy (10.34%), CCA (6.4%), and carcinoma head of the pancreas (0.0098%).

Conclusion: Among the etiologies of AC and OJ, BBOs were more common than MBOs. The most common cause of OJ was choledocholithiasis. Gallbladder cancer was the second most common cause of OJ and the most common cause of malignancy-associated OJ. The most common benign and malignant etiologies of AC were choledocholithiasis and GBC, respectively.

Keywords: Acute cholangitis, Choledocholithiasis, Gallbladder cancer, Obstructive jaundice.

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Introduction

Obstructive jaundice (OJ) and acute cholangitis (AC) are common causes of hospitalization in gastroenterology. "Obstructive jaundice" refers to jaundice due to biliary obstruction in the large intrahepatic and/or extrahepatic bile ducts.[1] Obstructive jaundice due to extrahepatic biliary obstruction (EHBO) is generally more common than intrahepatic biliary obstruction. Patients with OJ remain at risk of liver dysfunction, coagulopathy, organ failure, malnutrition, compromised immunity, infections, and increased morbidity and mortality.[2] The management of OJ depends on several factors, such as etiology, presentation severity, and AC. Most benign biliary obstruction (BBO) requires definitive treatment of etiological factors after cholangitis resolution. Surgery, endoscopic biliary drainage (EBD), or percutaneous transhepatic biliary drainage (PTBD) are the management options for OJ due to malignant biliary obstruction (MBO). The troubling fact is that most MBO cases are unresectable at the time of presentation. Therefore, performing palliative biliary drainage followed by chemotherapy remains the treatment of choice.

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Aims and Objectives

Limited data exist on the etiological spectrum of OJ and AC in Eastern India. Knowledge of the factors causing OJ and AC will guide clinicians in the early and better management of these cases.

Table 1: Etiology of OJ

Etiology of EHBO	*2021*	*2022*	*2023*	*3-year data (2021–2023) n (%)*
Benign	87	145	222	454 (58.8%)
Malignant	66	84	159	309 (41.2%)
Total	153	238	381	772

Table 2: Etiological spectrum of OJ

Etiology of EHBO	*2021*	*2022*	*2023*	*3-year data (2021–2023) n (%)*
Ca HOP	7	8	1	26 (3.4%)
Periampullary malignancy	15	17	47	79 (10.2%)
CCA	8	12	21	41 (5.3%)
GBC	36	47	80	163 (21.1%)
BBS	11	25	35	71 (9.2%)
Choledocholithiasis	76	129	187	392 (50.8%)
Total	153	238	381	772

BBS, benign biliary stricture; CCA, cholangiocarcinoma; Ca HOP, carcinoma head of the pancreas; GBC, gallbladder cancer; OJ, obstructive jaundice

Therefore, the present study focused on the etiology of OJ and AC in a tertiary care setting.

Materials and Methods

Patients admitted to the Department of Gastroenterology from 2021 to 2023 with a diagnosis of OJ and AC were included in the study. From the hospital database, the data on the etiology of OJ and AC, gender, and type of intervention were obtained. The data was categorized into the etiology of OJ and AC, whether benign or malignant and the most common etiology of benign or MBO. The results of the study were then compared with previously published papers on the etiology of OJ and AC across different parts of India.

Results

From January 2021 to December 2023, the Department of Gastroenterology admitted a total of 772 patients with an OJ diagnosis. There were 368 men and 404 women, and the male-to-female ratio was 0.91. The etiology of OJ was benign and malignant in 454 (58.8%) cases and 309 (41.2%) cases, respectively (Table 1). The ratio of cases of OJ due to BBO and MBO was 1.46.

The etiology of BBO was choledocholithiasis (n = 392, 50.8%) and distal biliary stricture (n = 71, 9.2%) (Table 2). Gallbladder cancer (GBC), periampullary carcinoma, cholangiocarcinoma (CCA), and carcinoma of the head of the pancreas (Ca HOP) caused MBO in 26 cases (3.4%), 79 cases (10.2%), 41 cases (5.3%), and 163 cases (21.1%), respectively.

Also, 203 (26.2%, one-fourth) patients had AC (Table 3). Among patients with AC, BBO, and MBO, this was observed in 132 (65%) and 78 (35%) cases, respectively. The most common etiology of AC was choledocholithiasis (n = 102; 50.2%), followed by GBC (n = 34; 16.74%) (Table 4). Other malignant causes of AC were periampullary carcinoma (10.34%), CCA (6.4%), and Ca HOP (0.0098%).

Table 3: Etiology of AC

Etiology of AC	*2021*	*2022*	*2023*	*3-year data (2021–2023) n (% of total cases)*
Benign	25	46	61	132 (29%)
Malignant	18	26	27	78 (25.24%)
Total	43	72	88	203 (26.3%)

Table 4: Etiological spectrum of AC

Etiology of cholangitis	*2021*	*2022*	*2023*	*3-year data (2021–2023) n (%)*
Ca HOP	1	1	0	2 (0.0098%)
Periampullary malignancy	6	6	9	21 (10.34%)
CCA	2	4	7	13 (6.4%)
GBC	9	14	11	34 (16.74%)
BBS	6	12	12	30 (14.77%)
Choledocholithiasis	19	34	49	102 (50.24%)
Total	43	72	88	203

BBS, benign biliary stricture; CCA, cholangiocarcinoma; Ca HOP, carcinoma head of the pancreas; GBC, gallbladder cancer; OJ, obstructive jaundice

Discussion

Obstructive jaundice and AC are the two most common biliary obstruction symptoms. Other symptoms of biliary obstruction are abdominal pain, generalized pruritus, and significant weight loss. Over a period of 3 years, our ward admitted 772 patients with biliary obstruction. Male patients outnumbered female patients by 14%. Among patients with OJ, BBO was far more common than MBO. Choledocholithiasis was the most common cause of BBO while GBC was the most common cause of MBO. The second and third most common causes of MBO were periampullary carcinoma and CCA, and Ca HOP was the least common cause of MBO.

In a study by Bhutia et al. from northeastern India, the commonest cause of OJ was choledocholithiasis (95.83% of the benign etiologies) (Table 5). The most common causes of BBO and MBO were choledocholithiasis and GBC (62.5% of the MBO), respectively. Benign etiologies outnumbered malignant etiologies. Other etiologies of MBO were periampullary malignancy (12.5%), CCA (12.5%), and Ca HOP (12.5%). The male-to-female ratio was 0.35:1.[3] In a study published in eastern India in 2019, among the 350 patients admitted with a diagnosis of OJ due to MBO, the most common etiology of MBO was Ca HOP, followed by periampullary carcinoma, CCA, and GBC. Also, the number of male and female patients was almost equal (male-to-female ratio 1.02).[4] Another prospective study from eastern India evaluated patients with OJ and found that the etiology of biliary obstruction was choledocholithiasis (46.6%), benign stricture (10%), choledochal cyst (6.7%), Ca HOP (20%), CCA (10%), and periampullary mass (6.7%). In this study, the male-to-female ratio was 0.8.[5] In a study by Umeshchandra and Maitra 30 patients with OJ were admitted to a tertiary care center. Malignant biliary obstruction was far more common than BBO (67 vs 33%) and Ca HOP (40%) was the most common etiology of OJ. The commonest causes of BBO and MBO were choledocholithiasis (26.7%) and Ca HOP, respectively.[6]

A study from North India by Sharma and Ahuja also observed the etiological spectrum of surgical OJ. The male-to-female ratio was 1.18. The malignant causes were more common than benign

causes (75.3 vs 24.7%) and GBC (28.7%) was the most common etiology of OJ. Choledocholithiasis (12.4%) and Ca GB were the commonest causes of BBO and MBO, respectively. The other etiologies of OJ were Ca HOP (26.5%), CCA (10.8%), ampullary Ca (9.8%), and benign stricture (10.8%).[7] Verma et al. in a prospective study, evaluated 110 patients with OJ and reported that MBO was more common than BBO (62.73 vs 47.27%). The commonest cause of OJ was Ca HOP (33.63%). The most common cause of BBO was choledocholithiasis (29%). Other reported etiologies of OJ were GBC (18.18%), periampullary carcinoma (5.45%), CCA (3.64%), CBD stricture (2.73%), acute pancreatitis (2.73%), choledochal cyst (2.73%), and HCC (1.8%). In this study, the male-to-female ratio was 1.29.[8] Another study from North India evaluated 201 patients with OJ who presented to the surgery department. The male-to-female ratio was 1.25:1 and MBO was more common than BBO (59 vs 41%). Choledocholithiasis was the most common etiology of OJ; Ca HOP (26%) and choledocholithiasis (30%) were the most common causes of MBO and BBO, respectively. Other causes of OJ were CCA (15.92%), periampullary carcinoma (9.45%), BBS (8.46%), and choledochal cyst (2.49%).[9] Yadav et al. prospectively evaluated 50 patients with OJ at two tertiary care centers in northern India. The gender ratio was 0.72 and BBO was the most common etiology of OJ. The majority (56%) of OJ cases were caused by BBO (choledocholithiasis 50% and BBS 6%) whereas MBO-associated OJ was caused by Ca HOP, distal CCA, and hilar CCA in 18%, 8%, and 6% cases, respectively.[10]

A study from Western India prospectively evaluated the etiology of OJ by MRCP and 50, 29, and 21 patients had OJ, BBO, and MBO, respectively. Benign biliary stricture (BBS) (32%) and GBC (24%) were the most common etiology of BBO and MBO, respectively. Other causes of OJ were choledocholithiasis (12 cases), CCA (6 cases), periampullary carcinoma (2 cases), metastatic deposits, and choledochal cysts (1 case each).[11] A study published in 2019 by Wardha showed that benign obstruction was more common among 35 patients with surgical OJ (66%). The gender ratio was 1.05 and the BBO was due to the following etiologies: choledocholithiasis (40.00%), BBS (14.29%), choledochal cyst (2.86%), and hydatid cyst in CBD (8.57%). The etiology of MBO in descending order of frequency was hilar CCA (17.14%), periampullary mass (11.43%), and distal CCA (5.71%). So, choledocholithiasis and CCA were the most common etiologies of BBO and MBO, respectively.[12]

A study from central India (Madhya Pradesh) showed that among the patients with OJ, malignant etiology outnumbered benign etiology (68 vs 32%). The gender ratio was 0.66:1. Periampullary carcinoma and GBC (32 cases each) were the commonest causes of MBO and choledocholithiasis (28%) was the commonest cause of BBO.[13]

A couple of published studies on the etiology of OJ from this region showed that MBO (Ca HOP) is the dominant cause.[4,13] Contrary to the above studies, our study revealed that BBO (choledocholithiasis) was the predominant cause of OJ. Also, the chief attribute of MBO to OJ was GBC (21%), and not Ca HOP (3.4%). Half of the cases with MBO were due to GBC. Cholelithiasis is a definite risk factor for GBC. Choledocholithiasis and GBC are commonly associated with cholelithiasis. One of the possible causes of the high incidence of GBC in Odisha is aflatoxin exposure, the use of adulterated mustard oil, and the use of water heavily contaminated with nickel, chromium, and cadmium.[14] Common adulterants in mustard oil in Odisha are argemone oil and castor oil.[15] Sanguinarine and diethyl nitrosamine are found in argemone and are carcinogenic.[16] Also, the incidence of GBC is higher in north, northeast, and east India compared to south and west India.[17,18] In the view of BBO-associated OJ, choledocholithiasis, and biliary stricture were the cause in > 50% of our patients. We found that the number of cases with choledocholithiasis was far greater than the BBS.

Our study observed AC in 203 (26.2%) patients (Table 3). A total of 29% and 25% of BBO and MBO cases had AC respectively. In patients with AC, BBO was more common than MBO (65 vs 35%) (Table 4). The commonest cause of AC was choledocholithiasis (50%). A significant proportion of patients ($n = 30$; 14.77%) with BBS also had AC. Similarly, 35% of patients with AC had underlying MBO; GBC was the foremost cause of AC due to MBO (16%) while Ca HOP was the least common cause of AC due to MBO. A prospective study published in South India (2021) showed that among the patients with AC choledocholithiasis (54.3%), BBS (28.6%), and malignancy (17.1%) were the commonest etiology. Moderate-to-severe presentation was the most common in patients with AC due to MBO (75%). The proportion of patients with mild or moderate-to-severe cholangitis was almost equal in AC due to benign etiology.[19] Another study in South India (2011) by Sahu et al. found that choledocholithiasis was the predominant cause (62%) of AC, followed by malignant

Table 5: Etiology of obstructive jaundice (OJ) in various studies across India

Region	*Study*	*Overall, the most common cause of OJ*	*The most common cause of BBO*	*The most common cause of MBO*	*Gender ratio (male:female)*
North-east	Bhutia et al. (2021)[3]	Choledocholithiasis	Choledocholithiasis	Ca GB	0.35:1
East	Sarangi et al. (2019)[4]	Ca HOP		Ca HOP	1.02
	Behera S (2023)[5]	Choledocholithiasis	Choledocholithiasis	Ca HOP	0.8:1
South	Umeshchandra and Maitra (2015)[6]	Choledocholithiasis	Choledocholithiasis	Ca HOP	1.3: 1
North	Sharma and Ahuja (1999)[7]	Ca GB	Choledocholithiasis	Ca GB	1.18:1
	Verma et al. (2010)[8]	Ca HOP		Ca HOP	1.29
	Khan (2019)[11]	Choledocholithiasis		Ca HOP	1.25:1
	Yadav et al. (2022)[9]	Choledocholithiasis		Ca HOP	0.72:1
West	Attri et al. (2016)[10]	BBS	BBS	Ca GB	1.2:1
	Tripathi et al. (2019)[12]	Choledocholithiasis	Choledocholithiasis	CCA	1.05:1
Central	Shukla et al. (2018)[13]	Periampullary Ca and Ca GB	Choledocholithiasis	Periampullary Ca and Ca GB	0.66:1

BBO, benign biliary obstruction; BBS, benign biliary stricture; CCA, cholangiocarcinoma; Ca HOP, carcinoma head of the pancreas; GBC, carcinoma gallbladder; MBO, malignant biliary obstruction; OJ, obstructive jaundice

obstruction (30%) and benign bile duct stricture (9%).[20] In 2006, a study published in North India observed the etiology of AC in elderly and nonelderly patients. The majority of cases of AC were due to MBO (65.4%) and choledocholithiasis (84.5%) in the elderly and the nonelderly group, respectively. Periampullary carcinoma (28.8%) and GBC (27%) were the commonest malignant etiology of AC. Another etiology of AC apart from choledocholithiasis in the nonelderly group in decreasing order of frequency was postoperative biliary stricture (5.7%), hydatid cyst rupture with fistula (3.2%), rupture liver abscess with fistula (2.4%), and chronic pancreatitis (1.6%).[21]

Conclusion

Overall choledocholithiasis remains the foremost etiology of OJ. Again, the most common etiology of BBO is choledocholithiasis across India. In our study also choledocholithiasis was the most common cause of OJ and AC. The most common cause of OJ due to MBO across India is either GBC or the Ca HOP. In our study, GBC was the most common MBO causing OJ and AC. Although two previous studies from our region showed Ca HOP was the most common cause of OJ, our study differed from these two.

Further Research

A prospective multicenter study for etiological spectrum OJ is an unmet need. A study of risk factors for cholelithiasis, choledocholithiasis, and GBC would like to create more awareness for this disease. Most of the patients with malignant OJ remain unresectable at the time of presentation, early referral of these cases to centers equipped with advanced therapeutic biliary drainage procedures like endoscopic ultrasound-guided biliary drainage (EUS BD) may be beneficial to these patients and will help to decrease morbidity. Also, patients with MBO need long-term therapy after biliary drainage imposing a high financial burden on the patient and their family. Biliary drainage in these patients may be repeated if needed. Increased financial input, the use of health insurance policies, and awareness among caregivers may lead to more effective management of these cases.

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