

EFFECTIVENESS OF ERCP IN OBSTRUCTIVE JAUNDICE – A TERTIORY CENTRE STUDY

Sr. no	Name	Email	Mob no.	Designation	Address
1.	Ashish B. Jatale (Author)	jataleashish@gmail.com	8087918146	Junior resident Dept. Of General Surgery	Dept. Of General Surgery T.N.M.C. & BYL Nair Hospital Mumbai Central, Mumbai 400008
2.	Sanjana Brahimpur	Sanjanasi711@gmail.com	9972671479	Junior resident Dept. Of General Surgery	Dept. Of General Surgery T.N.M.C. & BYL Nair Hospital Mumbai Central, Mumbai 400008
3.	Sagar R. Ambre	sagarmssurgery@gmail.com	8407967145	Assistant Professor Dept. Of General Surgery	Dept. Of General Surgery T.N.M.C. & BYL Nair Hospital Mumbai Central, Mumbai 400008
4.	Jayashri Pandya (Coauthor)	smruti63@hotmail.com	9833774575	Professor, Head of Unit Dept. Of General Surgery	B 101 Gokul Monarch Thakur Complex Kandivali East Mumbai 400101

Abstract

Background: Jaundice is a condition in which the skin, whites of the eyes and mucous membranes turn yellow because of a high level of bilirubin. Jaundice has many causes, including hepatitis, gallstones and tumors. Most patients who present

for Endoscopic Retrograde Cholangiopancreatography (ERCP) have previously undergone non-invasive diagnostic testing (e.g. computed tomography [CT], magnetic resonance cholangiopancreatography [MRCP], or ultrasonography [US]) that revealed an abnormality which required intervention with ERCP. Although a multitude of therapeutic ERCP maneuvers are known, the most common are biliary or pancreatic duct stones, malignant or benign strictures or stenosis, leaks, and tissue sampling. Complications include Pancreatitis, Cholecystitis, Hemorrhage, Perforation in 2nd part of duodenum, allergic reaction to the contrast and sedative agents.

Methods: The study included patients with obstructive jaundice proven by investigative modalities. Thorough history taking and clinical examination was done, before the procedure.

Results: A total of 250 patients were included in the present study. 73.60% of patients had benign causes for development as compared to malignant causes in 26.40% of patients. Choledocholithiasis (68.80%) is the commonest cause of obstructive jaundice followed by Periapillary carcinoma (10.40%). Success rate of ERCP for Common Bile Duct (CBD) clearance in 1st attempt was 92% and for 2nd attempt was 97%.

Conclusion: ERCP is an effective and safe method for the treatment of patients with benign and malignant biliary obstruction. ERCP with CBD stenting is used to relieve biliary obstruction in inoperable malignant cases, and sometimes pre-operatively.

Keywords: Obstructive jaundice, Choledocholithiasis, ERCP.

Introduction

Jaundice is referred to as the yellow discoloration of skin, sclera, and mucous membranes resulting from an increased level of bilirubin concentration in the body fluids. Obstructive jaundice is a common surgical problem that results from biliary obstruction, which is blockage of duct that carries bile from the liver to the gall bladder to the small intestine^[1]. Jaundice due to biliary obstruction may be caused by a heterogeneous group of diseases that include both benign and malignant conditions including choledocholithiasis, benign biliary stricture, intraoperative biliary tract injury or ligation, cholangiocarcinoma, carcinoma in the head or neck of the pancreas, primary sclerosing-cholangitis, choledochal cyst, hydatid cyst compression, or intrabiliary rupture.

The common etiologies of obstructive jaundice have been reported to vary from one center to another and from one individual to another^[2,3]. Obstructive jaundice is not a definitive diagnosis and early investigation to evaluate the etiology is important because of pathological changes (e.g. secondary biliary cirrhosis) which can occur if the obstruction is unrelieved^[4].

A variety of invasive and non-invasive diagnostic tests are available for diagnosis and to establish the etiology of obstructive jaundice^[4,5].

For general surgeons working in resource-constrained environment, the treatment of obstructed jaundice presents diagnostic and therapeutic challenges^[6,7]. In current situation, various operative procedures have been performed for obstructive jaundice, depending on the etiology. The choice of procedure depends on the experience and preference of the surgeon. Late presentation of the disease coupled with a lack of modern diagnostic and therapeutic facilities are amongst the hallmark of the disease in developing countries^[8]. Mortality and morbidity due to biliary obstruction is determined by the cause of obstruction^[9].

Aim

Aim of this study was to find the various etiological factors and evaluate their incidence causing obstructive jaundice and the efficacy of ERCP for clearance of CBD in obstructive jaundice and to assess the incidence associated with complications of the procedure.

Methodology

Observational, retrospective, prospective study conducted in tertiary hospital in city of Mumbai, India. The Study was conducted for period of 48 months.

Ethics Committee approval was taken. All adult patients who consented for the study and having obstructive jaundice were included. Medical causes for jaundice were excluded.

Study included patients with obstructive jaundice diagnosed on clinical examination and confirmed with other diagnostic modalities like USG, CT SCAN, and MRCP.

Statistical analysis

The presentation of the Categorical variables was done in the form of number and percentage (%). On the other hand, the quantitative data were presented as the means \pm SD and as median with 25th and 75th percentiles (interquartile range). The

following statistical tests were applied for the results. The association of the variables which were quantitative in nature were analyzed using Independent T-test. The association of the variables which were qualitative in nature were analyzed using Chi-Square test. If any cell had an expected value of less than 5 then Fisher's exact test was used.

The data entry was done in the Microsoft EXCEL spreadsheet and the final analysis was done with the use of Statistical Package for Social Sciences (SPSS) software, IBM manufacturer, Chicago, USA, version 21.0. For statistical significance, p value of less than 0.05 was considered statistically significant.

Results and Observation

Table 1:-Distribution of etiology in study subjects.

Etiology	Frequency	Percentage
Benign	184	73.60%
Malignant	66	26.40%
Total	250	100.00%

In the majority of 184 (73.60%) patients, the etiology was benign. The etiology was malignant in 66 out of 250 patients (26.40%) as shown in table 1.

Table 2:-Distribution of diagnosis of study subjects.

Diagnosis	Frequency	Percentage
choledocholithiasis	172	68.80%
Periampullary cancer	26	10.40%
Cholangiocarcinoma	23	9.20%
CBD Stricture	13	5.20%
Post op CBD injury	5	2.00%
Ca Gallbladder	5	2.00%
Cholelithiasis with Impacted cystic duct stone	4	1.60%
Cholelithiasis with choledochal cyst	2	0.80%

Total	250	100.00%
-------	-----	---------

In the majority of patients 172 (68.80%), the diagnosis was choledocholithiasis, followed by cholangiocarcinoma in 23 (9.20%), CBD Stricture in 13 (5.20%), Ca Gall Bladder in 5 (2.00%), Post-op CBD injury in 5 (2.00%), cholelithiasis with impacted cystic duct stone in 4 (1.60%), and cholelithiasis with choledochalcyt was present in 2 out of 250 patients (0.80%) as shown in table 2.

Table 3; CBD Clearance with ERCP in study subjects.

ERCP	Frequency	Percentage
CBD clearance was achieved in single attempt	158	88.76%
2 nd setting of ERCP require for CBD clearance	13	7.30%
CBD clearance was not achieved even after 2 nd setting considered for surgical management	7	3.93%
Total	178	100%

In our study, it is observed that success rate of ERCP for CBD clearance in 1st attempt was 158 (88.76%) and for 2nd attempt was 13 (7.30%) and 7 (3.93%) of cases were considered for other surgical management as shown in table 3.

Table 4; Distribution of post ERCP complications in study subjects.

Complication or no complication	Frequency	Percentage
No complication	245	98.00%
Complication	5	2.40%
Total	250	100.00%

Only 5 out of 250 patients (2.00%) develop complications post-ERCP. Post ERCP complications were post ERCP pancreatitis, hemorrhage, post ERCP stricture formation, duodenal perforation, and allergic reaction to sedative agents. It is shown in table 4.

Discussion

In our study of 250 patients, 73.60% of patients had benign etiology and 26.40% had malignant etiology. A study conducted by Khan ZA ⁽¹⁰⁾ reported malignant etiology in 58.71% of patients and benign etiology in 41.29% of patients. Similar results were observed in study conducted by Sharma et al where malignant cases were 75.3% and benign were 24.7% ⁽⁵⁾. Result of similar studies are shown in table 5.

Etiology	Khan ZA ⁽¹⁰⁾	Sharma et al. ⁽⁵⁾	Siddique et al. ⁽¹¹⁾	Umeshchandra Et al. ⁽¹²⁾	Gonüllü NN, Cantürk NZ et al. ⁽¹³⁾	Our study
Malignant %	58.71	75.3%	56.6%	66.7%	30.6%	26.40%
Benign %	41.29	24.7%	43.3%	33.3%	69.4%	73.60%

Table 5. Other observations from various studies

Comparison of results of incidence of various etiological factors of obstructive jaundice with other studies are as shown in table 6.

Table 6: Etiology of obstructive jaundice in comparison to other studies.

Etiologies of obstructive jaundice	Sharma et al. ⁽⁵⁾ (n=429)	Siddique et al. ⁽¹¹⁾ (n=60)	Lawalet al. ⁽¹⁴⁾ (n=50)	Chalya et al. ⁽¹⁵⁾ (n=116)	Umeshchandra et al. ⁽¹²⁾ (n=30)	Khan ZA. ⁽¹⁰⁾ (n=201)	Roslyn JJ et al. ⁽¹⁶⁾ & Chunk ⁽¹⁷⁾	Nayy
Periampullary Carcinoma	9.80%	1.66%	-	5.10%	6.67%	9.45%	-	-
Cholangio carcinoma	10.80%	11.60%	10%	6.80%	10%	15.92%	-	-
CBD Stricture	10.80%	5%	-	10.30%	3.30%	8.46%	-	-
Choledocholithiasis	-	-	-	-	-	-	-	-

Post operative CBD injury	-	-	-	-	-	-	0.4 to 0.6%
CA gall bladder	-	-	-	-	-	-	-
Cholelithiasis with impacted cystic duct stone	-	-	-	-	-	-	-
Cholelithiasis with choledochal cyst	-	-	-	-	-	-	-

Repeat ERCP

In our study of the 178 cases, 158 (88.76%) patients had clearance of CBD in their first attempt and remaining 20 (11.24%) underwent repeat ERCP. CBD clearance was achieved in 13 patients and 7 had to undergo surgical management. In a study done by Mohamed Salem, ERCP was successful for 21 of 25 patients (84.0%). In 4 patients (16%), CBD stones could not be cleared by ERCP ⁽¹⁹⁾.

A study done by Qi Wei et al. showed that ductal stone clearance was successful in 51 out of 57 patients (89%) ⁽²⁰⁾. The success rate for ERCP in achieving CBD clearance in our study is 88.30%.

Post ERCP complications

Endoscopic retrograde cholangiopancreatography (ERCP) is a procedure that is commonly used for the management of pancreaticobiliary disorders. ERCP is considered safe and effective. The post-ERCP complication rate depends on the complexity of the intervention and the individual patient status. In a prospective, 2-year study of 2,347 patients from 17 institutions, 9.8% had post-ERCP complications, with pancreatitis (5.4%) and hemorrhage (2%) being the most common ⁽²¹⁾.

In a Chinese study of 3,178 patients who underwent ERCP, the rate of complications was 7.9% ⁽²²⁾. In a British study of 4,561 patients, the complication rate was 5% ⁽²³⁾. Retrospective studies show similar post-ERCP complication rates. In a study of 16,855 patients undergoing ERCP from 1977–2006, the post-ERCP

complication rate was 6.85%.⁽²⁴⁾. In our study, out of 250 subjects who underwent ERCP, 5 patients developed complications post-ERCP (2.00%). Post-ERCP complications included post-ERCP pancreatitis, hemorrhage, post-ERCP stricture formation, duodenal perforation, and allergic reaction to sedative agents. All these complications were managed conservatively.

Conclusion

ERCP is an effective and safe method for obstructive jaundice due to benign or malignant biliary obstruction. ERCP complements MRCP. MRCP gives a road map of the biliary tree, thus therapeutic interventions are safe. Variety of pancreatic and biliary disorders can be managed, almost to the rate of 92% to 97% and does not require surgical intervention with learning curve of ERCP far behind, the complication rate is very low.

References

1. Khurram M, Durrani AA, Hasan Z, et al. Endoscopic retrograde cholangiopancreatographic evaluation of patients with obstructive jaundice. *J Coll Physicians Surg Pak* 2003; 13: 325-28.
2. Roche SP, Kobos R: Jaundice in the adult patient. *American Family Physician* 2004, 69:299-304.
3. Mehrdad M, Sayed AM, Mohammad Taghi MS: Obstructive jaundice in Iran: factors affecting early outcome. *HepatobiliaryPancreat Dis Int* 2008, 7:516-9.
4. Briggs CD, Peterson M: Investigation and management of obstructive jaundice. *Surgery* 2007, 25:74-80.
5. Sharma MP, Ahuja V: etiological spectrum of Obstructive Jaundice and the diagnostic ability of ultrasonography: A clinician's perspective. *Trop Gastroenterol* 1999, 20:167-9.
6. MohamadS , Syed AI : management of Obstructive jaundice : Experience in a tertiary care surgical unit Pakistan journal of surgery.2007,23:23-25.
7. Ahmed I, Jan AU, Ahmed R : Obstructive jaundice J Post grad Made insist. 2001,15:194/8.

8. Bekley Z, YifruA : Obstructive jaundice adult Ethiopians in a referral hospital. *Ethiop made J* 2007, 38:267/75
9. Pitiakoudis M, Mimidis, K TsarouchaAK , Papadopoulos V, Karaviannakis A, SimopoloulosC:predictive value of risk factors in a patient with obstructive Jaundice. *J int Made Res* 2004,32:633/8.
10. : Khan ZA. Clinical profile of patients with obstructive jaundice: a surgeon's perspectives. *IntSurg J* 2019;6:1876-80.
11. Siddique K, Ali Q, Mirza S, Jamil A, Ehsan A, Latif S,et al. Evaluation of the aetiological spectrum of obstructive jaundice. *J Ayub Med Coll Abbottabad*.2008Dec1;20(4):62-66.
12. Umeshchandra DG, Maitra J. Clinical study of obstructive jaundice at Basaveshwar Teaching and General Hospital, Gulbarga. *SAS J. Surg*.2015;1(3):105-18.
13. Gonüllü NN, Cantürk NZ, Utkan NZ, Yidirir C, Dülger M. Factors affecting surgical mortality and morbidity inpatients with obstructive jaundice. *Mater Med Pol* 1998;30:6-1
14. Lawal D, Oluwole S, Makanjuola D, Adekunle M. Diagnosis, management, and prognosis of obstructive jaundice in Ile-Ife, Nigeria. *West African Journal of Medicine*, 1998; 17(4):255-260
15. Chalya PL, Kanumba ES, Mchembe M. Etiological spectrum and treatment outcome of Obstructive jaundice at a University teaching Hospital in northwestern Tanzania: A diagnostic and therapeutic challenges. *BMC research notes*. 2011 Dec;4(1):1-7.
16. Roslyn JJ, Binns GS, Hughes EF, Saunders-Kirkwood K, Zinner MJ, Cates JA. Open cholecystectomy. A contemporary analysis of 42,474 patients. *Ann Surg*. 1993 Aug;218(2):129-37. doi: 10.1097/00000658-199308000-00003. PMID: 8342992; PMCID: PMC1242921
17. Chun K.Recent classification of the common bile duct injury.*Korean journal of hepato-biliary-pancreatic surgery*.2014;18(3):69-72.
18. Dr. Ali NayyefAssi ,Dr. Alaa Jamel Hassan,,Dr. Kamal Naeem The Etiological Spectrum of Obstructive Jaundice & Role of Ercp In Thi-Qar Governorate Iosr *Journal Of Pharmacy (e)*-ISSN: 2250-3013, (p)-ISSN: 2319-4219 april 2013.
19. Salem MM, Esmat ME, Hassan AM, Amer Y, Abdelaziz H, Rady M. Comparative study between laparoscopic common bile duct exploration and

endoscopic retrograde cholangiopancreatography plus laparoscopic cholecystectomy for choledocholithiasis. International Surgery Journal. 2019 Jun 29;6(7):2250-7.63.

20. Wei Q, Wang JG, Li LB, Li JD. Management of choledocholithiasis: comparison between laparoscopic common bile duct exploration and intraoperative endoscopic sphincterotomy. World Journal of Gastroenterology: WJG. 2003 Dec 15;9(12):2856.
21. Freeman ML, Nelson DB, Sherman S, et al. Complications of endoscopic biliary sphincterotomy. N Engl J Med. 1996;335(13):909-918.
22. Wang P, Li ZS, Liu F, et al. Risk factors for ERCP-related complications: a prospective multicenter study. Am J Gastroenterol. 2009;104(1):31-40.
23. Williams EJ, Taylor S, Fairclough P, et al. Risk factors for complication following ERCP; results of a large-scale, prospective multicenter study. Endoscopy. 2007;39(9):793-8
24. Andriulli A, Loperfido S, G, et al. Incidence rates of post-ERCP complications: a systematic survey of prospective studies. Am J Gastroenterol. 2007;102(8):1781-1788.

Tables

Table 1:-Distribution of etiology in study subjects.

Etiology	Frequency	Percentage
Benign	184	73.60%
Malignant	66	26.40%
Total	250	100.00%

Table 2:-Distribution of diagnosis of study subjects.

Diagnosis	Frequency	Percentage
choledocholithiasis	172	68.80%

Periampullary CA	26	10.40%
Cholangiocarcinoma	23	9.20%
CBD Stricture	13	5.20%
Post op CBD injury	5	2.00%
Ca Gallbladder	5	2.00%
Cholelithiasis with Impacted cystic duct stone	4	1.60%
Cholelithiasis with choledochal cyst	2	0.80%
Total	250	100.00%

Table 3; CBD Clearance with ERCP in study subjects.

ERCP	Frequency	Percentage
CBD clearance was achieved in single attempt	158	88.76%
2 nd setting of ERCP require for CBD clearance	13	7.30%
CBD clearance was not achieved even after 2 nd setting considered for surgical management	7	3.93%
Total	178	100%

Table 4; Distribution of post ERCP complications in study subjects.

Complication or no complication	Frequency	Percentage
No complication	245	98.00%
Complication	5	2.40%

Total	250	100.00%
-------	-----	---------

Table 5. Other observations from various studies

Etiology	Khan ZA ⁽¹⁰⁾	Sharma et al. ⁽⁵⁾	Siddique et al. ⁽¹¹⁾	Umeshchandra Et al. ⁽¹²⁾	Gonüllü NN, Cantürk NZ et al. ⁽¹³⁾	Our study
Malignant	58.71%	75.3%	56.6%	66.7%	30.6%	26.40%
Benign	41.29%	24.7%	43.3%	33.3%	69.4%	73.60%

Table 6: Etiology of obstructive jaundice in comparison to other studies.

Etiologies of obstructive jaundice	Sharma et al. ⁽⁵⁾ (n=429)	Siddique et al. ⁽¹¹⁾ (n=60)	Lawalet al. ⁽¹⁴⁾ (n=50)	Chalya et al. ⁽¹⁵⁾ (n=116)	Umeshchandra et al. ⁽¹²⁾ (n=30)	Khan ZA. ⁽¹⁰⁾ (n=201)	Roslyn JJ et al. ⁽¹⁶⁾ & Chunk ⁽¹⁷⁾	Nayy
Periampullary Carcinoma	9.80%	1.66%	-	5.10%	6.67%	9.45%	-	-
Cholangio carcinoma	10.80%	11.60%	10%	6.80%	10%	15.92%	-	-
CBD Stricture	10.80%	5%	-	10.30%	3.30%	8.46%	-	-
Choledocholithiasis	-	-	-	-	-	-	-	-
Post operative CBD injury	-	-	-	-	-	-	0.4 to 0.6%	-
CA gall bladder	-	-	-	-	-	-	-	-
Cholelithiasis with impacted cystic duct stone	-	-	-	-	-	-	-	-
Cholelithiasis with choledochal cyst	-	-	-	-	-	-	-	-