

EFFECTIVENESS OF INTRAOPERATIVE CHOLEDOCHOSCOPY: A RETROSPECTIVE RECORD BASED COMPARISON STUDY IN TERTIARY CARE CENTRE OF NORTH EAST INDIA

Rubul Das¹, Hemendra Chandra Nath², Nayan Jyoti Das¹, Yashwant Kumar Choudhary³, Deba Narayan Doley³, Neeraj Kumar Agrawal⁴

Received : 20/01/2023

Received in revised form : 25/02/2023

Accepted : 04/03/2023

Keywords:

Cholelithiasis, intraoperative cholelithiasis, common bile duct exploration, residual stones, India.

Corresponding Author:

Dr. Neeraj Kumar Agrawal,

Email: drneer80@yahoo.com

DOI:10.47009/jamp.2023.5.2.185

Source of Support: Nil,

Conflict of Interest: None declared

Int J Acad Med Pharm

2023; 5(2); 875-878



¹Assistant Professor, Department of Surgery, Jorhat Medical College and Hospital, Jorhat, Assam, India

²Associate professor, Department of Surgery, Jorhat Medical College and Hospital, Jorhat, Assam, India

³Post Graduate Trainee Third year, Department of Surgery, Jorhat Medical College and Hospital, Jorhat, Assam, India

⁴Associate professor, Department of Pharmacology, Government Autonomous Medical College, Ratlam, Madhya Pradesh, India

Abstract

Background: Intraoperative Cholelithiasis (IC) was developed into a helpful technique in the intraoperative management of patients undergoing biliary tract exploration who have difficult-to-manage cholelithiasis. This study sought to ascertain the value of IC in the laparoendoscopic management of challenging stones. **Materials and Methods:** In a cross-sectional retrospective study, the number of patients who underwent IC (24 postoperative patients) during common bile duct exploration (Group 'A') between August 30, 2020, and December 31, 2021, at the FAAMCH, Barpeta, was compared with the same number of patients who underwent CBD exploration without IC (Group 'B'). Sex and age status of patients, reasons for IC, type and number of further diagnostic or therapeutic endoscopic procedures, morbidity and mortality of the procedures, time of procedure were recorded. Data analysis was done in frequency distribution by Microsoft excel software. **Result:** The mean age of patients was almost same in group 'A' (58.4±12.63 years) and group 'B' (57.75±10.77 years). The average time of an IC was 12 minutes (range 10 to 20 minutes). There were no retained stone found in postoperative T-Tube cholangiogram in all 24 cases of group 'A' but found in 3(12.5%) patients of Group 'B'. **Conclusion:** For the treatment of cholelithiasis, a multidisciplinary approach is necessary. IC is one of the finest methods since it can find and remove retained stones with great success.

INTRODUCTION

Five to ten percent of people with biliary lithiasis and up to eighteen percent of people with biliary pancreatitis develop cholelithiasis. An approximate twenty-one to thirty two percent of stones are thought to migrate from the biliary tract on their own, and up to twenty-five to thirty six percent of such stones have the potential to clog the digestive tract and lead to cholangitis or pancreatitis. Many different treatment plans have been taken into account, including endoscopic retrograde cholangiopancreatography (ERCP) before cholecystectomy, intraoperative ERCP, and postoperative ERCP. However, access issues or the difficulties of extracting the stones could cause 5 to 10% of these surgeries to fail.

The intrahepatic biliary tract, chronic biliary tract stricture, stones that cannot be trapped in a basket, stones that are larger than 15 mm, stones that are present in patients who have had surgeries to change the continuity of the proximal digestive tract like gastrectomy or gastric bypass surgeries and stones in Mirizzi syndrome are all considered to be difficult.¹ The likelihood of minimally invasive therapy is drastically reduced by these situations. For instance, in 5 to 14% of individuals treated with laparoscopic bile system exploration, residual stones were discovered.^{1,2}

Today, IC(IC) has developed into a helpful technique in the intraoperative management of patients undergoing biliary tract exploration who have difficult-to-manage cholelithiasis.³⁻⁵ with the use of balloons and baskets, it provides direct sight of the stone and its active extraction.

Additionally, it is essential for verifying the absence of stones once the treatment is finished, confirming that there are no residual stones.^[6-9] This study sought to ascertain the value of IC in the laparoendoscopic management of challenging stones.

The design, optics, and agility of the endoscopes have undergone substantial technological advancements. Due to these qualities, Intraoperative Cholelithotomy (IC) is a useful endoscopic technique for identifying and treating biliary tract disorders.^[5,10,11]

MATERIALS AND METHODS

In a cross-sectional retrospective study, the number of patients who underwent IC (24 postoperative patients) during common bile duct exploration (Group A) between August 30, 2020, and December 31, 2021, at the FAAMCH, Barpeta, was compared with the number of patients who underwent CBD exploration without IC (Group B).

The chosen patient only possessed: 1. Patient with known CBD/CHD stone prior to surgery (USG) 2. had CBD diameter over 10 mm 3. had a T-Tube cholangiogram following the operation. Given that the gastrointestinal system is exposed during this surgery, antimicrobial medication was recommended for all patients. It was therapeutic for 5 patients who presented with an acute incident of cholecystitis and preventative for the other patients. There was joint intraoperative management. In every case, the biliary tract was visualised and stone-free biliary tree from RHD & LHD to Distal CBD up to ampulla of Vater was confirmed after CBD exploration and removal of CBD stones by Desjardins forceps, after assuming no residual stone in CBD, and after free flow of injected saline. Intraoperative rigid IC was performed using a 17 F cystoscope introduced through the anterior longitudinal choledochotomy. Cystoscopes were inserted through an epigastric port during laparoscopic procedures. In four instances, a CBD stone was discovered during a IC that had been overlooked after a simple Desjardins forceps-only.

Following CBD investigation, the choledochotomy line was closed via choledochoduodenal anastomosis, T-tube application, or primary closure.

Following investigations, the following techniques were employed to discover retained stone: a. Postoperative T-Tube cholangiogram b. Ultrasonography during review period c. MRCP (where CBD was dilated but stone not visualized).

Sex and age status of patients, reasons for IC, type and number of further diagnostic or therapeutic endoscopic procedures, morbidity and mortality of the procedures, time of procedure were recorded. Patients were promptly examined in order to monitor the problem and keep the stone.

Ethical approval

The study was approved by Institutional Ethical Committee (Approval No. FAAMC&H/P.Est./I.E.C/26Pt./2022/91).

RESULTS

The demographic and clinical baseline characteristics of the two research groups are shown in [Table1]. 24 patients had IC done. Among them, Desjardins forceps missed active stone extraction, which was done by IC in four patients without sequel 2 of whom presented with hepatic duct lithiasis. An IC typically took 12 minutes (range 10 to 20 minutes).

In all 24 instances in the study group, as shown in [Table2], there were no residual stones discovered during the postoperative T-Tube cholangiogram. Three of the 24 patients in the control group had retained calculi at the time of follow-up. In all cases, it was confirmed that there were no stones in the right and left hepatic ducts that go to the Vater's ampulla. The endoscopic surgery was without complications, and each patient's biochemical indicators gradually returned to normal. The average follow-up period lasted one fifty five days (range twenty eight to four twenty days). In the current investigation, there was no mortality associated with IC or any associated issues.

The co-morbidities found in both groups are shown in [Table3].

Table 1: Demographic and clinical baseline characteristics of the patients of both groups.

Groups	Sub-Groups	Group A (n=24) CBD exploration + Cholelithotomy	Group B (n=24) Only CBD exploration
Gender	Male	7 (29.16%)	9 (37.50%)
	Female	17 (70.83%)	15 (62.5%)
Age	Mean age (years)	58.4±12.63	57.75±10.77
Symptoms	Abdominal pain	17 (70.83%)	20 (83.33%)
	Jaundice	14 (58.33%)	18 (75.0%)
	Acute cholecystitis	5 (20.83%)	6 (25.0%)
	others	5 (20.83%)	5 (20.83%)
Leucocytes count (×10 ⁹ /L)		13.25 ± 2.88	13.05 ± 3.02

Table 2: Comparison of Retained calculi in both groups

Groups	Retained Calculi in T-Tube cholangiogramN (%)
Group A (n=24) CBD exploration + Cholelithotomy	0 (0%)
Group B (n=24) Only CBD exploration	3 (12.5%)

Table 3: Co morbidities of the patients among Two Groups.

S. No.	Co morbidity	Group A (n=24) CBD exploration + Choledochoscopy	Group B (n=24) Only CBD exploration
1	Type 2 Diabetes Mellitus	3	5
2	Hypertension	7	6
3	Obesity	13	16
4	COPD	2	4
5	Heart Disease	5	4

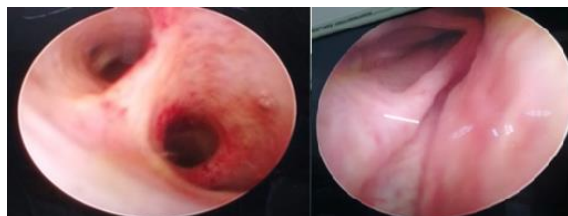


Figure 1: Intraoperative Choledochoscopy before Primary Closure of common bile duct (CBD) and to Ensure Total Ductal Clearance of CBD Stone. A) Intraoperative choledochoscopy showing no calculi in Right Hepatic Duct & Left Hepatic Duct, B) Distal CBD showing no stone

DISCUSSION

Due to the fact that IC converts a blind technique into one that allows for direct vision, lowering the retained stone rate to zero while enhancing diagnostic capability, IC has been universally regarded as a desirable tool by surgeons during biliary tract exploration.^[12-15] Due to the location, size, and features of the stones, a simple exploration of the biliary tract would not have been sufficient in the current case series to perform active stone extraction and ensure proper biliary tract cleanliness.

The most effective method for treating patients who arrive with challenging CBD stones is choledochoscopy, which has the lowest likelihood of retained stone following CBD exploration.^[15,16] Choledochoscopy, which is carried out through the cystic duct, is technically and therapeutically successful in 85 to 90% of instances. However, this method is only effective for stones under 10 mm in size that are situated in the part of the biliary tract distal to the cystic duct.^[17,18]

When a simple examination of the biliary tract would not have been sufficient due to the location, size, and features of the stones, IC was utilised in our study to perform active stone extraction and to confirm proper biliary tract cleanliness, and it was successful in all cases. According to reports, IC is the best procedure for treating instances that present with challenging stones.^[15,16] IC allows for direct viewing of the biliary channels and is helpful for both identifying and treating the majority of hepatobiliary-pancreatic system illnesses.

This method can be used for endoscopic treatments such biopsy or cytology, stone removal, balloon dilation, electrocoagulation, and stent removal or installation. Following surgical common bile duct exploration, Nagorney and Lohmuller 10 found remaining stones in 10.1% of patients. Their

research found that the IChad sensitivity, specificity, and negative predictive values of 67%, 100%, and 95%, respectively. IC is clinically helpful in the detection and treatment of choledocal stones, particularly in individuals with residual or impacted stones, according to Siddique et al,^[7] Similar to this, patients with intrabiliary rupture of hydatid cysts of the liver can benefit from choledochoscopy, 19 especially in endemic areas. The biliary system and other related ailments or issues, such as sclerosing or pyogenic cholangitis, hemobilia, malignant or benign strictures, papillary stenosis, cystic dilatation, ischemic damage, and stent occlusion, can also be diagnosed and treated with choledochoscopy.^[7,10,20,21] During operative IC technique, preferably primary closure is used for closing the choledochotomy line. The t-tube application or choledochoduodenal anastomosis reconstructions are alternatives.^[7,10,22,23]

The limitation of our study is that the sample size was a constraint, thus additional research with larger samples will be required to expand on the information provided here.

CONCLUSION

In light of the fact, we can conclude that for proper biliary system clearing, IC is a helpful procedure for the treatment of patients with CBD stones. For the treatment of choledocholithiasis, a multidisciplinary approach is necessary, and IC is one of the finest methods since it can find and remove retained stones with great success.

REFERENCES

1. Verbesey JE, Birkett DH: Common bile duct exploration for choledocholithiasis. *SurgClinNorthAm*2008 ; 88 : 1315–1328.
2. Horwood J, Akbar F, Davis K, et al: Prospective evaluation of a selective approach to cholangiography for suspected common bile duct stones. *Ann R CollSurgEngl* 2010; 92: 206–210.
3. AmericanSociety for Gastrointestinal Endoscopy - The role of endoscopy in the management of choledocholithiasis *GastrointestEndosc*, 2011;74:731-7
4. Reymond M.A., Chapuis N., D. Vala, et al. Flexible choledochoscopy: Two years of experience *HelvChir Acta*, 1993 ; 60: 81-85
5. Ming-Fang Qin, Hong-Bing Xu Combined laparoscopic and endoscopic treatment for bile duct diseases *Hepatobiliary Pancreat Dis Int*, 2004; 3: 284-287
6. Rojas O., Vargas A., Sánchez F., et al. Coledocoscopiaoperatoria. *Experienciacon 42 casos AnMedAsocMedHosp ABC* 1997; 42: 96-98
7. Siddique I, Galati J, Ankoma-Sey V, Wood RP, Ozaki C, Mansour H, et al. The role of choledochoscopy in the

- diagnosis and management of biliary tract diseases. *GastrointestEndosc* 1999;50(1):67-73.
8. Atamanalp SS, Yildiran MI, Kantarci M. Endoscopic retrograde cholangiopancreatography (ERCP): outcomes of 3136 cases over 10 years. *Turk J MedSci* 2011;41(4):615-621.
 9. Maccioni F, Martinelli M, Al Ansari N, Kagarmanova A, De Marco V, Zippi M, et al. Magnetic resonance cholangiography: past, present and future: a review. *Eur Rev Med Pharmacol Sci* 2010;14(8):721-725.
 10. Nagorney DM, Lohmuller JL. Choledochoscopy. A costminimization analysis. *Ann Surg* 1990; 211 (3):354-359.
 11. Chen YK, Pleskow DK. SpyGlass single-operator peroral cholangiopancreatography system for the diagnosis and therapy of bile-duct disorders: a clinical feasibility study. *GastrointestEndosc* 2007;65(6):832-841.
 12. Cuendis-Velázquez A, Rojano-Rodríguez ME, Morales-Chávez CE, González Angulo-Rocha A, Fernández-Castro E, Aguirre-Olmedo I, et al. Utilidad de la coledocoscopia transquirúrgica en el tratamiento de litos biliares difíciles. *Revista de Gastroenterología de México*. 2014;79:22-27.
 13. Noble H, Norton S, Thompson M. Assuring complete laparoscopic clearance of the bile duct. *J Laparoendosc Adv Surg Tech*. 2011;21:319-22.
 14. Campagnacci R, Baldoni A, Baldarelli M, et al. Is laparoscopic fiberoptic choledochoscopy for common bile duct stones a fine option or a mandatory step? *SurgEndosc*. 2010;24:547-53.
 15. Rajan KV, Kate V, Ananthakrishnan N, et al. Role of operative flexible choledochoscopy in calculous biliary tract disease. *TropGastroenterol*. 2000;21:80-83
 16. Grigoriu M, Palade R, Vasile D, et al. Indications and contribution of choledochoscopy in the diagnosis and treatment of biliary diseases. *Chirurgia*. 2003;98:167-173.
 17. Carroll B.J., Fallas M.J., Phillips E.H. Laparoscopic transcystic choledochoscopy. *SurgEndosc*, 1994; 83: 10-314
 18. Lyass S. and Phillips E.H. -Laparoscopic transcystic duct common bile duct exploration- *SurgEndosc*, 2006 ; 20 : 441-445
 19. Eleftheriadis E, Tzartinoglou E, Kotzampassi K, Aletras H. Choledochoscopy in intrabiliary rupture of hydatid cyst of the liver. *SurgEndosc* 1987;1(4):199-200.
 20. Lee KF, Chong CN, Ng D, Cheung YS, Ng W, Wong J, et al. Outcome of surgical treatment of recurrent pyogenic cholangitis: a single-centre study. *HPB* 2009;11(1):75-80.
 21. Hoffman A, Kiesslich R, Bittinger F, Galle PR, Neurath MF. Methylene blue-aided cholangioscopy in patients with biliary strictures: feasibility and outcome analysis. *Endoscopy* 2008;40(7):563-571.
 22. Jameel M, Darmas B, Baker AL. Trends towards primary closure following laparoscopic exploration of the common bile duct. *AnnRoyalCollSurgEngl* 2008;90(1):29-35.
 23. Das R, Das N, Rajbongshi S, Islam B, Singh B, Agrawal NK. Primary closure with t-tube drainage after common bile duct exploration for choledocholithiasis: a comparative study in tertiary care hospital of north east India. *International Journal of Academic Medicine and Pharmacy* 2023;5(1):624-28.