Journal Homepage: - www.journalijar.com
INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)
Article DOI: 10.21474/IJAR01/3559
DOI URL: http://dx.doi.org/10.21474/IJAR01/3559

RESEARCH ARTICLE

A VALUE OF ROUTINE INTRAOPERATIVE CHOLANGIOGRAPHY IN CHOLECYSTECTOMY

Dr. Abhinandan M. Kadiyal, Dr. Chaudhary Bharatkumar Dahyalal, Dr. Shambhav Chandra and Dr. M. N. Ghatage.

Manuscript Info

Manuscript History

Received: 02 January 2017
Final Accepted: 07 February 2017
Published: March 2017

Abstract

Laparoscopic procedure can be feasible in patients with acute cholecystitis though a dense adhesion is common cause of conversion to open. which is prevented by intraoperative cholangiography. In this study it is 2% cases benefited. Hence benefits of cholangiography are reduced because of pre-operative diagnosis by other investigations modalities. The present study conducted at Department of General surgery Dr. D. Y.Patil Hospital and research centre, Kolhapur and MGM College, Mumbai. To study A Value of Routine Intraoperative Cholangiography in Cholecystectomy .

Introduction:-

The extrahepatic biliary tree was first visualized in 1918 when Reich injected bismuth and petrolatum and defined a biliary fistula, thus opening the field for further studies of the biliary tree. Intraoperative cholangiography(1) (IOC) was introduced in the 1930s. Mirizzi recorded the first series of intraoperative cholangiography in 1932 using static films(2). It was employed inconsistently in the 1940s and 1950s, but in the 1960s and the 1970s, its use became commonplace. Later, the mobile C-arm image intensifier using a TV monitor was reported in a series by Berci and colleagues in 1978. The rationale for its routine use included: demonstration of aberrant ductal anatomy; avoidance of iatrogenic ductal injury; and detection of common duct stones. Patients with signs or symptoms of choledocholithiasis or with uncertain anatomy should undergo cholangiography. There is, however, controversy over whether IOC should be performed in those patients without signs or symptoms of choledocholithiasis and with clear anatomy. Intraoperative cholangiography adds time and cost to an operation. In addition, IOC has a false positive rate of 1-3%, leading to unnecessary biliary explorations and resulting in increased morbidity and mortality. Furthermore, the IOC can result in complications itself. This study focuses on the value of IOC in cholecystectomy and would help in proving, if at all, there is a rationale for its routine use.

In 1987, 105 years later, Philippe Mouret performed the first laparoscopic cholecystectomy (LC) in Lyon, France(3). A prospective study describing 500 laparoscopic cholecystectomies, was published by C.R. Voyles. The laparoscopic procedure was completed in 95 % of the patients, There was no mortality or bile duct injury, concluded that laparoscopic cholecystectomy was a safe procedure in the treatment of gallbladder disease(4).
The Southern Surgeons Club described 1518 laparoscopic cholecystectomies in prospective analysis, With respect to mortality, complications and length of hospital stay. A slightly higher incidence of biliary tract injury in the laparoscopic procedure is probably offset by the low incidence of other complications. Furthermore it is possibly caused by the inexperience of most surgeons starting endoscopic procedures(5).

Corresponding Author:- Dr. Abhinandan M. Kadiyal.

The aim of this study was to determine the necessity for intraoperative cholangiography (IOC) during pediatric laparoscopic cholecystectomy (LC).

The success rate of LC in cases of acute cholecystitis is slightly higher when IOUS is used as an aid to dissection. In the absence of definitive prospective data, we recommend routine use of IOUS when performing LC, particularly in patients with acute cholecystitis(7).

This study was to compare the results of laparoscopic extracorporeal ultrasound (LICU) to those of fluoroscopic intraoperative cholangiography (FIOC) during laparoscopic cholecystectomy (LC) after the initial learning curve for LICU.

Materials And Methods:-

The present study was conducted on patients admitted for surgery in the **General Surgery unit of Tertiary care hospital.** Total **of 100 Cholecystectomy elective surgeries** in the General Surgery unit in Dr. D. Y. Patil Hospital, Kolhapur and MGM College, Mumbai from **August 2010 to December 2012** were included in the study. The study included all patients irrespective of their Age, Sex, associated co-morbidities and previous surgeries. Information was collected from the patients after a Written, Valid, Informed consent. The study was **approved by IERC.**

Inclusion Criteria:-

1. All age group
2. Male and Female
3. Cholelithiasis
4. All cholecystectomy patients
5. Biliary Pancreatitis

Exclusion Criteria:

1. Cirrhosis with Ascites
2. Deranged bleeding profile

Preoperative Evaluation of a patient with gallstones Disease:-

In addition to a careful history and physical examination, preoperative testing for 90% of patients with gallstone disease(8) is minimal. An ultrasound of the right upper quadrant usually confirms the diagnosis, and the hepatic biochemical profile usually determines the likelihood that CBD stones are present and may warrant a preoperative MRCP/ERCP or an abdominal computed tomographic scan, or both, to search for the cause.

The diagnosis of biliary colic and acute cholecystitis, when the history and physical examination are less than definitive, can be made with a nuclear hepatobiliary hepato iminodiacetic acid (HIDA) scan(9). An ejection fraction of less than 50% at 30 minutes suggests poor contractile function and incomplete emptying of the gallbladder. Intravenous cholangiography, which is rarely performed in the United States, is popular in Europe for detecting CBD stones preoperatively in patients with abnormal liver function studies.

Postoperative Management:-

With advances in anaesthetic and postoperative analgesic care, early mobilization and discharge are the norm. In those patients in whom a T-tube has been placed, a cholangiogram is obtained on the 5th to 7th postoperative day

In routine cholecystectomy, no drain or nasogastric tube is required. The patient can resume fluid intake and diet when tolerated. Closed abdominal drains should be employed in those patients in whom there are concerns for the development of a postoperative collection or when the CBD has been opened. These drains should be removed within 24 to 48 hours when the volume is less than 100mL per day and there is no bile or fresh blood evident. Mild derangement of liver function tests may arise after uneventful cholecystectomy.

Observations And Results:-

There is study of total 100 cases from a Tertiary Care Hospital. In this study the mean Age is 45.41 with standard deviation is 13.76.

Table 1:- Descriptive Statistics.

Statistic	Age
Number	100
Minimum	16.00
Maximum	76.00
Mean	45.41
Std. Deviation	13.76

According to sex there are total 64 female and 36 male. Its implies that it is common in female population.

Table 2:- Sex-wise distribution of patients

Sex	Frequency	Percent
Male	36	36.0
Female	64	64.0
Total	**100**	**100.0**

Table 3:Distribution according to Clinical Presentations

Clinical Presentation	Frequency	Percent
ACUTE	31	31
Pancreatitis	3	3
CHRONIC	66	66
Total	**100**	**100**

According to clinical presentation out of 100 patients 31 (31%) were presented as acute cholecystitis, majority of them were diagnosed as acute on chronic cholecystitis on histopathology. If patient presented with in 72 hours of pain can be taken for cholecystectomy. Out of 100 patients 66 (66%) were Chronic and were diagnosed on ultrasonography with single or multiple gall bladder calculi are straight taken for cholecystectomy. 3(3%) patients had Pancreatitis who conserve, should do CECT abdomen which is normal, operated on same admission. All patients were operated electively under general anesthesia.

Table 3:- Past abdominal surgeries:

Past Abdominal Surgery	Frequency	Percent
Yes	11	11.0
No	89	89.0

Of the 100 cases 11 patients gives past history of upper abdominal surgery because its affect the treatment modalities of the surgery. Most prefer surgery for past upper abdominal surgery patient is open cholecystectomy compare to laparoscopic cholecystectomy as there is lot of adhesion while laparoscopy is perform and high chance for conversion to open cholecystectomy.

Table 4:- Comaparison of laparoscopic or open cholecystectomy

Table 4: Laparoscopic/Open cholecystectomy & cholecystostomy		
	Frequency	**Percent**
Open cholecystectomy	51	51.0%
Laparoscopic cholecystectomy	42	42.0%
Laparoscopic cholecystostomy	7	7.0%
Total	**100**	**100.0%**

Of the 100 cases study, open cholecystectomy is done in 51(51%). Laparoscopic cholecystectomy in 42(42%) and 7(7%) undergone laparoscopic cholecystostomy which after 4-6 weeks undergoes cholecystectomy after intraoperative cholangiography.

Duration of Surgery:-

The mean operation time for Laparoscopic cholecystectomy was significantly longer than for Open cholecystectomy and cholecystostomy. The distribution of operation time, among these groups is depicted in Table. The mean (range) operation time for laparoscopic cholecystectomy was 84-90 min (mean = 87.02 min), 66-77 min (mean = 72 min)

for open cholecystectomy and 31-39 min (mean = 35 min) with highly significant ($p < 0.001$).The 'F' value is 37.47. During the study period operation time for laparoscopic cholecystectomy showed a tendency to become shorter. Duration increased due to intraoperative cholangiography (about 15 min) as we became more familiar with laparoscopic IOC duration decreased..

Table 5:- Duration (in Minutes) according to Type of Surgery

Type of Surgery	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		F-Stat	Significance
					Lower Bound	Upper Bound		
Open cholecystectomy	51	71.8627	19.10395	2.67509	66.4897	77.2358	F=37.47	p < 0.001, Highly significant
Laparoscopic cholecystectomy	42	87.0238	10.59565	1.63494	83.7220	90.3256		
Laparoscopic cholecystostomy	7	35.0000	4.08248	1.54303	31.2243	38.7757		

Post operative hospital stay:

Table 6:- Hospital stay according to Type of Surgery.

Type of surgery	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		F-stat	Significance
					Lower Bound	Upper Bound		
Open cholecystectomy	51	6.1373	3.47574	.48670	5.1597	7.1148	8.188	p < 0.001, Highly significant
Laparoscopic cholecystectomy	42	4.8333	2.17431	.33550	4.1558	5.5109		
Laparoscopic cholecystostomy	7	10.2857	7.06433	2.67007	3.7523	16.8191		

Of the 100 cases, The hospital stay for open cholecystectomy range 5-7 days(mean 6.13 days), laparoscopic cholecystectomy is range 4-6 days (mean 4.83 days) and for laparoscopic cholecystostomy is 4-17 days(mean 10.29 days) with high significance $p<0.0001$ value. The 'F' value is 8.188.

Post operative stay in laparoscopic cholecystostomy is more because to see for drainage from the tube is proper or not. In open cholecystectomy operative pain is more compare to laparoscopic hence it takes more hospital stay.

Intra-operative Complications:-

Table 7: Intra operative Complications

Intra operative Complications	**Frequency**	**Percent**
Yes	2	2.0
No	98	98.0
Total	**100**	**100.0**

The incidence of intra-operative complications is only 2% of the study. There is difficulty in cholecystectomy and cholecystostomy. There are two interesting case are one which presented intraoperatively choledocho-duodenal fistula(10) and left lobe gall bladder(11). In both cases it took little longer time but surgery done without any intraoperative complications.

Benefits of Cholangiography:

Table 8:- Benefits of cholangiography.

	Frequency	**Percent**
Yes	2	2.0
No	98	98.0
Total	**100**	**100.0**

In this study only 2 (2%) cases shows the benefit of the cholangiography of which both are interval cholecystectomy which presented after 72 hours to see for the position of cystic duct in relation to CBD.

Disscussion:-

The present study including 100 cases was carried out in the department of surgery, on patients who underwent intraoperative cholangiography and cholecystectomy.

Our study was based on studying patients with pain in the right hypochondrium due to varied etiologies(12), both in males and females of all age group, who underwent the above procedure.

Acute:-

Patients who were admitted with severe acute pain in the right hypochodrium, were advised to do complete blood count, liver function test, serum amylase and serum lipase levels. These being normal and ultrasound findings showing cholelithiasis, patients were posted for cholecystectomy. Acute cases who presented in first 72 hours were taken for laparoscopic cholecystectomy. Patients presenting after 5 days were treated conservatively with intravenous antibiotics, intravenous fluids, discharged and operated after 6-8 weeks. If these patients did not settle with conservative management, they were taken up for surgery and more often underwent cholecystostomy due to dense adhesions. Our threshold for cholecystostomy was low because these patients were usually in sepsis and had medical co-morbidities.

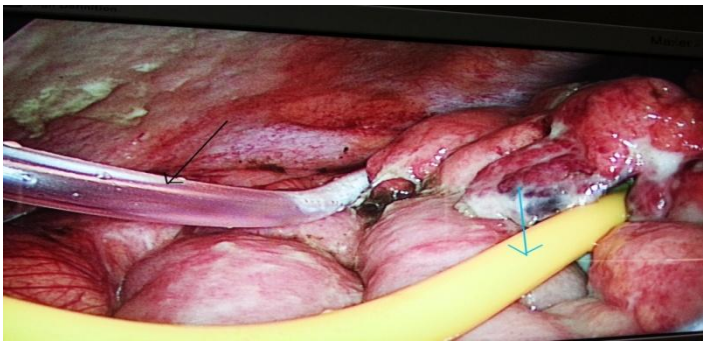

Fig 23:- Laparoscopic cholecystostomy(arrow Black- drain & Blue- cystostomy foley's drain

Biliary pancreatitis:-

In patients with cholelithiasis, pancreatitis was diagnosed with increased level of serum amylase and serum lipase(13). Patients were treated with nothing per orally, ryle's tube insertion, analgesic & somatostatin (3mg in 5% dextrose over 12 hourly for 3 days)(14)(15). If the stone was in the terminal CBD and patient was stable then endoscopic papillotomy with stenting used to be done in first 72 hours.

When pancreatic ileus(16) settled down we got CECT Abdomen to look for necrosis of any part of pancreas, fluid collection and peri-pancreatic stranding.

If only pancreatic oedema was seen, with no fluid collection or necrosis then in same admission laparoscopic cholecystectomy was advised.

Obstructive jaundice due to cholelithiasis:-

Patients who presented with obstructive jaundice due to CBD stones(17) were first taken up for ERCP with stenting after 48 hours. If the liver function test, amylase, lipase was normal then we went ahead with laparoscopic cholecystectomy in the same admission(18).

Cholangitis with choledocholithiasis:-

These patients underwent ERCP with or without naso-biliary drain and cholecystectomy was done when clinically cholangitis settled.

Symptomatic cholelithiasis(Diagnosed USG):-

Patients with recurrent right hypochondriac pain which settles without treatment

Or Murphy's sign positive were taken up for laparoscopic surgery without any further investigations apart from routine pre operative workup.

Incidental Cholelithiasis:-
Incidental cholelithiasis(19)(20) was mainly diagnosed on routine USG abdomen. Patients with less than 2.5 cm stones were adviced a HIDA Scan. If it showed more than 50% Gallbladder Ejection stones were radiolucent then dissolution therapy with ursochodolic acid was started.

Negative predictive ability of the set of criteria was 100% for patients up to 60 years of age and 97% for patients older than 60 years at the time of operation. No case of residual common bile duct calculi was present in the IOC and no-IOC groups at follow-up. (Our data strongly support a policy of performing IOC during cholecystectomy only when clinical criteria suggest the presence of common bile duct abnormalities or to clarify ductal anatomy)(17).

Since the introduction of laparoscopic cholecystectomy (LC), an increase in accidental common bile duct (CBD) injuries of up to 1.2-1.6% has been reported. In the present prospective study of 1,710 patients undergoing cholecystectomy we tested the predicative value of routine intraoperative cholangiography (IOC). The IOC was feasible in 92.4% of the cases in the LC group and in 83% of cases in the OC group and presented a complete depiction of the extrahepatic bile system in 98.3%. Anatomic variations of the bile duct system, which influenced the operative management, were found in 13.2% of cases. In 2.5% of the patients, preoperatively undetected CBD stones were also found. Method-specific complications did not occur in any of the patients. Additionally, in a controlled subgroup analysis of 163 patients, we evaluated preoperative intravenous cholangiography (IVC) and IOC. Intravenous cholangiography showed only 72.4% of the operation-relevant anatomic variations (vs. 100% by IOC); in 6.1% of the cases, there were reactions to the dye (vs. none in IOC), and in only 28.6% of the patients, CBD stones were detected (vs. 71.4% IOC). There were four bile duct injuries (0.29%) during LC and two (0.4%) during OC. All injuries were detected intraoperatively and fixed in the same setting without postoperative complications. In conclusion, we recommend the use of routine IOC during cholecystectomy. By this technique, anatomic variations of the bile duct system will be visualized and therefore accidental injuries will be avoided(18).

Conclusions:-

- In cholecystectomy if cystic duct is definitely identified then IOC is of no help in the safety of the procedure.
- IOC should be done in teaching hospitals for learning the procedure and also for safety as the operating surgeons are of limited experience.
- In very difficult cholecystectomies a cholecystogram should be done early in the procedure to delineate anatomy before definitive dissection of the calots triangle.
- Low threshold for cholecystostomy should be preferred rather than stubborn dissection which lands in disaster.
- Equipment for IOC should be kept ready and need based IOC should be practiced.

References:-

1. Piacentini F, Perri S, Pietrangeli F, Nardi M, Dalla Torre A, Nicita A, et al. Intraoperative cholangiography during laparoscopic cholecystectomy: selective or routine? Journal of Laparoendoscopic Surgery. 2003;161(3):27–33.
2. MacFadyen B V. Intraoperative cholangiography: past, present, and future. Surgical Endoscopy [Internet]. 2006;20 Suppl 2:S436–S440. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16557418
3. Litynski GS. Mouret, Dubois, and Perissat: The Laparoscopic Breakthrough in Europe (1987-1988). Europe [Internet]. Society of Laparoendoscopic Surgeons; 1999;3(2):163–7. Available from: http://www.ingentaconnect.com/content/sls/jsls/1999/00000003/00000002/art00017
4. Voyles CR, Petro AB, Meena AL, Haick AJ, Koury AM. A practical approach to laparoscopic cholecystectomy. American journal of surgery. 1991;161(3):365–70.
5. Barone JE, Lincer RM. Correction: A prospective analysis of 1518 laparoscopic cholecystectomies. [Internet]. The New England Journal of Medicine. 1991. p. 1517–8. Available from: http://www.embase.com/search/results?subaction=viewrecord&from=export&id=L21179966
6. Hauer-Jensen M, Karesen R, Nygaard K, Solheim K, Amlie EJ, Havig O, et al. Prospective randomized study of routine intraoperative cholangiography during open cholecystectomy: long-term follow-up and multivariate analysis of predictors of choledocholithiasis. [Internet]. Surger. 1993 p. 318–23. Available from: http://www.mrw.interscience.wiley.com/cochrane/clcentral/articles/316/CN-00091316/frame.html

7. Biffl WL, Moore EE, Offner PJ, Franciose RJ, Burch JM. Routine intraoperative laparoscopic ultrasonography with selective cholangiography reduces bile duct complications during laparoscopic cholecystectomy. Journal of the American College of Surgeons [Internet]. 2001;193(3):272–80. Available from: http://www.ncbi.nlm.nih.gov/pubmed/11548797
8. lippincott williams W. cholelithasis. mastery of surgery. 2007. p. 2626–82.
9. Chamarthy M, Freeman LM. Hepatobiliary scan findings in chronic cholecystitis. Clinical Nuclear Medicine [Internet]. 2010;35(4):244–51. Available from: http://www.ncbi.nlm.nih.gov/pubmed/20305411
10. Chaudhary A, Bhan A, Malik N, Dilawari JB, Khanna SK. Choledochoduodenal fistula due to tuberculosis. Indian journal of gastroenterology official journal of the Indian Society of Gastroenterology. 1989. p. 293–4.
11. Reddy PK, Subramanian RV, Yuvaraja S. Laparoscopic Cholecystectomy for Left-sided Gallbladder (Sinistroposition). JSLS Journal of the Society of Laparoendoscopic Surgeons Society of Laparoendoscopic Surgeons. Society of Laparoendoscopic Surgeons; 2005;9(3):356–7.
12. Bel FJ, Aparisi L, García-Tell G, Roselló J V, Rodrigo JM. Biliary drainage in the diagnosis of microlithiasis. Value in acute idiopathic pancreatitis and in persistent pain in the right hypochondrium. Revista espanola de enfermedades digestivas organo oficial de la Sociedad Espanola de Patologia Digestiva. 1994;85(5):343–7.
13. Vasil'ev I V, Zhivaeva NS. Cholelithiasis and biliary pancreatitis: pathogenetic and clinical aspects. Eksperimentalnaia i klinicheskaia gastroenterologiia Experimental clinical gastroenterology. 2008;(7):9–17.
14. Garai I, Letoha V, Julesz J, Gáspar L, Tóth S, László F. Use of somatostatin in the therapy of acute pancreatitis. Minerva Chirurgica. 1987;128(17):34–8.
15. Yaffe MR, Gutenberger JE. Chronic pancreatitis and pancreas divisum in an infant: diagnosed by endoscopic retrograde cholangiopancreatography and treated with somatostatin analog. Journal of Pediatric Gastroenterology and Nutrition. 1989. p. 108–11.
16. Frick TW, Schretzenmaier M, Hoffmann R, Largiadèr F. Obstructive ileus and acute pancreatitis. Zeitschrift fur Gastroenterologie. 1990. p. 206–7.
17. lippincott williams W. choledocholithiasis. mastery of surgery. 2007. p. 2683–708.
18. Rijna H, Borgstein PJ, Meuwissen SG, De Brauw LM, Wildenborg NP, Cuesta MA. Selective preoperative endoscopic retrograde cholangiopancreatography in laparoscopic biliary surgery. The British journal of surgery. 1995;82(8):1130–3.
19. Morad Y, Ziv N, Merlob P. Incidental diagnosis of asymptomatic neonatal cholelithiasis: case report and literature review. J Perinatol. 1995;15(4):314–7.
20. Thompson JS, Philben VJ, Hodgson PE. Operative management of incidental cholelithiasis. American journal of surgery. 1984;148(6):821–4.