

# A Five Years Review Intra-Operative Cholangiogram

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## ABSTRACT

**Background:** Intra-operative cholangiogram is often performed to detect concurrent common bile duct stones in cholecystectomy patients. Routine cholangiogram add to cost and exposes patients to unnecessary exploration of common bile duct due to frequent false positive results. Thus, there is need of better indicators for cholangiogram in order to minimize unnecessary procedure and its morbidity.

**Methods:** A retrospective analysis of patients undergoing intra-operative cholangiogram during open or laparoscopic cholecystectomy was done at Patan Hospital from Oct 1, 2005 to Sep 31, 2009. Indications and outcome of cholangiogram were analyzed together with findings of common bile duct exploration.

**Results:** A total of 68 (2.8%, 68/2400) intra-operative cholangiogram were done in 2400 cholecystectomy patients during five years period. Eight (11.8%, 8/68) patients had abnormal findings. Two (3%, 2/68) patients with abnormal cholangiogram had stones in common bile duct. There was no mortality in this series.

**Conclusions:** Existing indications of intra-operative cholangiogram detects only small percentage of patients with bile duct stones and has high false positive results. This unnecessarily increases bile duct exploration, cost and morbidity. Thus, there is need to redefine indications for intra-operative cholangiogram.

**Keywords:** biliary pancreatitis, cholecystectomy, common bile duct, intra-operative cholangiogram.

## INTRODUCTION

Intra-operative cholangiogram (IOC) remains useful means to detect common bile duct (CBD) stones ever since the pioneer work by Mirrizi.<sup>1</sup> However, the controversy surrounding IOC is ever increasing, first in open cholecystectomy (OC) and then more after the introduction of laparoscopic cholecystectomy (LC). The debate is mainly on the issue of appropriate indications of IOC. The incidence of CBD stones in patients undergoing elective cholecystectomy is 3-15% and may be higher when suspected by ultrasonography or liver function tests.<sup>2-9</sup>

A possible future complication is the main reason for current practice of removing CBD stones. However,

it is probable that stones remain silent or pass spontaneously.<sup>10,11</sup> Routine IOC is costly and increases morbidity, including increased CBD exploration. Prediction of stones prior to surgery for appropriate selection of patient is important to increase the yield of IOC,<sup>12-16</sup> and decrease unnecessary explorations, complications and cost.<sup>17-19</sup>

Aim of this retrospective study was to analyze the indications and outcome of IOC. Based on this study we further aim to optimize the existing practice of selecting patients for IOC to minimize unnecessary procedure and associated morbidity.

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## METHODS

A retrospective cross sectional study was conducted in the department of Surgery, Patan Hospital from October, 2005 to September, 2009. This was a five year retrospective review of operation room register and charts of cholecystectomy patients who had IOC during open or laparoscopic cholecystectomy at Patan Hospital. Indications of IOC were studied. Interpretations of IOC and exploration of CBD with subsequent findings were analyzed. Approval for the chart review was obtained from the department and hospital authority. The statistical analyses were done using Microsoft Excel 2007.

## RESULTS

During five years from 2005 to 2009, 2400 cholecystectomies (LC 60%) were performed. Total of 68 (2.8%) patients had IOC for suspected CBD stones based on existing protocol at our institution. Female were 54, age ranging from 14 to 65 years (Table 1).

**Table 1. Indications of intraoperative cholangiogram (IOC).**

Indicators	Presentation
Clinical	Jaundice, pancreatitis
Investigation (lab, Deranged LFT, Dilated CBD USG)	>10mm, CBD stone
Per operative	Dilated cystic duct/CBD, palpable CBD stone, obscured anatomy

All IOC were done after cannulating cystic duct with infant feeding tube in case of OC and cholangiogram catheter in LC. First film was taken in right lateral head down position. Five ml of diluted iodine based contrast 'urograffin' (20 ml of 76% contrast diluted in equal volume of normal saline) was used. Second film was taken after repositioning the patient in head up and left lateral position.

Eight (11.8%, 8/68) IOC were positive. Three had filling defects and five no passage of contrast into duodenum. On exploration, 2 (25%, 2/8) had stones in CBD. One patient with stone had filling defect and history of jaundice, while another had no passage of contrast into duodenum and deranged liver function test (LFT). Overall, yield of stone was 3% (2/68) in selected patients (Table 2). Completion cholangiogram through T-tube was normal in all cases. There was no procedure related mortality in this series.

**Table 2. Indications and findings of IOC.**

Indications	No	Abnormal IOC*	Stone on exploration†
History of jaundice	17	3	1
History of pancreatitis	35	3	0
Deranged LFT	16	2	1
Total	68	8	2

\*Abnormal IOC, 11.2% (8/68) with filling defects or passage of contrast into duodenum

† Yield of stone 3% (2 out of 68 IOC)

## DISCUSSION

In both OC and LC, cholangiogram is helpful to detect choledocholithiasis and delineate biliary tract anatomy. We do not practice routine IOC at our institute. Benefit of routine IOC is controversial and is offset by increase in cost, radiation exposure and low yield of concurrent CBD stone. Even in selective cases, out of eight (11.2%, 8/68) positive findings only two (3%, 2/68) had CBD stones on exploration in present study. In other words, there was 75% (6/8) false positive finding based traditional indication of cholangiogram. To eliminate possible cause of pseudo obstruction due to spasm of Oddi, at our institute we give Hyoscine bromide 10 mg intravenously before repeating IOC when there is no passage of dye in absence of obvious obstruction in CBD.

Our current protocol of performing IOC (Table 1) is consistent with the traditional observation of pre-operative clinical, biochemical and sonographic findings.<sup>14,20,21</sup> In a review of 264 patients, a score more than 3 (out of 11) had significant risk of CBD stones.<sup>22</sup>

Routine cholangiogram to detect and remove asymptomatic bile duct stones is not always necessary as stones may remain silent or pass spontaneously.<sup>23</sup> CBD exploration based on IOC alone may result in unnecessary intervention in over 50% of patients, like in our study of six negative explorations out of eight.

In randomized controlled study of cholecystectomy patients without symptoms of CBD stones, 'routine IOC' detected 6-12% ductal stones, meaning 'no IOC' group could have similar percentage of missed stones but none developed symptom in 3-5 years of follow-up.<sup>24,25</sup>

In a study of selective cholangiogram in 600 symptomatic gallstones patients, 107 had ERCP based on pre operative evaluation. In patients with static or increasing symptom of pancreatitis, ERCP revealed stone in 50% but in none

of those with resolving or resolved symptoms. Biliary colic with abnormal LFTs but no jaundice did not have stone on ERCP when USG was normal, whereas 60% had stones if USG was abnormal. Furthermore, in patients with resolved jaundice and normal LFTs at the time of ERCP, only 10% had stone compared to 29% with abnormal LFTs.<sup>26</sup> In our study, none of 35 patients with history of pancreatitis and normal LFT had abnormal IOC (Table 2). Similarly, none of the two patients with positive explorations had history of pancreatitis. This shows past history of pancreatitis alone has almost nil chance of finding CBD stones at time of exploration, probably because the sludge or small stones causing pancreatitis pass out spontaneously. Recently, pre-operative magnetic resonance cholangiopancreatography (MRCP) in suspected bile duct stone has shown promising results and may avoid use of invasive ERCP.<sup>27</sup>

Based on our findings and reported studies, we believe that existing protocol to select patients for IOC leads to far too many unnecessary cholangiogram, especially the 'history' of pancreatitis. High false positive findings of IOC further leads to unnecessary exploration of bile duct. Thus, there is need of further prospective study to re-define the existing indications of IOC.

## CONCLUSIONS

Existing indications of intra-operative cholangiogram detects only small percentage of patients with true bile duct stones. This unnecessarily expose patient to cholangiogram and common bile duct exploration. History of pancreatitis is a poor indicator of cholangiogram in absence of normal LFT and USG findings.

## REFERENCES

1. Mirrizzi PL. Operative cholangiography. *Surg Gynecol Obstet.* 1937;65:702-10.
2. Clayton ESJ, Connor S, Alexakis N, Leandros E. Meta-analysis of endoscopy and surgery versus surgery alone for common bile duct stones with the gallbladder in situ. *Br J Surg.* 2006;93:1185-91.
3. Velanovich V, Morton JM, McDonald M, Orlando R III, Maupin G, Traverso LW. Analysis of the SAGES outcomes initiative registry. *Surg Endosc.* 2006;20:43-50.
4. Barkun AN, Barkun JS, Fried GM, et al. Useful predictors of bile duct stones in patients undergoing laparoscopic cholecystectomy. *Ann Surg.* 1994;220:32-9.
5. Houdart R, Perniceni T, Darne B, et al. Predicting common bile duct lithiasis: determination and prospective validation of a model predicting low risk. *Am J Surg.* 1995;170:38-43.
6. Ming-Hsun Yang, Tien-Hua Chen, Shin-E Wang, Yi-Fang Tsai, Cheng-Hsi Su, Chew-Wun Wu, et al. Biochemical predictors for absence of common bile duct stones in patients undergoing laparoscopic cholecystectomy. *Surg Endosc.* 2008;22:1620-4.
7. Hamouda AH, Goh W, Mahmud S, Khan M, Nassar AHM. Intra-operative cholangiography facilitates simple transcystic clearance of ductal stones in units without expertise for laparoscopic bile duct surgery. *Surg Endosc.* 2007;21:955-9.
8. Fitzgibbons RJ Jr, Gardner GC. Laparoscopic surgery and the common bile duct. *World J Surg.* 2001;25:1317-24.
9. Tranter S, Thompson M. Spontaneous passage of bile duct stones: frequency of occurrence and relation to clinical presentation. *Ann R Coll Surg Engl.* 2003;85:174-7.
10. Martin DF. Do asymptomatic bile duct stones need to be removed? *Gastrointest Endosc.* 1997;46(6):587-9.
11. Caddy GR, Kirby J, Kirk SJ, Allen MJ, Moorehead RJ, Tham TC. Natural history of Asymptomatic Bile Duct stones at time of cholecystectomy. *Ulster Med J.* 2005;74(2):108-112.
12. Onken JE, Brazer SR, Eisen GM, et al. Predicting the presence of choledocholithiasis in patients with symptomatic cholelithiasis. *Am J Gastroenterol.* 1996;91:762-7.
13. Wu SC, Chen FC, Lo CJ. Selective intra-operative cholangiography and single-stage management of common bile duct stone in laparoscopic cholecystectomy. *World J Surg.* 2005;29:1402-8.
14. Abboud PC, Malet PF, Berlin JA, et al. Predictors of common bile duct stones prior to choelcystectomy: a metaanalysis. *Gastrointest Endosc.* 1996;44:450-9.
15. Kama NA, Atli M, Doganay M, et al. Practical recommendations for the prediction and management of common bile duct stones in patients with gallstones. *Surg Endosc.* 2001;15:942-5.
16. Prat F, Meduri B, Ducot B, et al. Prediction of common bile duct stones by noninvasive tests. *Ann Surg.* 1999;229:362-8.
17. Snow LL, Weinstein LS, Hannon JK, Lane DR. Evaluation of operative cholangiography in 2043 patients undergoing laparoscopic cholecystectomy: a case for the selective operative cholangiogram. *Surg Endosc.* 2001;15:14-20.
18. Rosseland AR, Glomsaker TB. Asymptomatic common bile duct stones. *Eur J Gastroenterol Hepatol.* 2000;12(11):1171-3.
19. Wilson TG, Hall JC, Watts JM. Is operative cholangiography always necessary? *Br J Surg.* 1986;73:637-40.
20. Kim KH, Kim W, Lee HI, Sung CK. Prediction of choledocholithiasis : its validation in laparoscopic cholecystectomy. *Hepatogastroenterology.* 1997;44:1574-9.

21. Sheen AJ, Asthana S, Al-Mukhtar A, Attia M, Toogood GJ. Preoperative determinants of common bile duct stones during laparoscopic cholecystectomy. *Int J Clin Pract.* 2008 Nov;62(11):1715-9.
22. Xiao-Dong Sun, Xiao-Yan Cai, Jun-Da Li, Xiu-Jun Cai, Yi-Ping Mu, Jin-Min Wu. Prospective study of scoring system in selective intra-operative cholangiography during laparoscopic cholecystectomy. *World J Gastroenterol.* 2003;9(4):865-7.
23. Collins C, Maguire D, Ireland A, Fitzgerald E, O'Sullivan GC. A prospective study of common bile duct calculi in patients undergoing laparoscopic cholecystectomy: natural history of choledocholithiasis revisited. *Ann Surg.* 2004;239:28-33.
24. Murison MS, Gartell PC, McGinn FR. Does selective peroperative cholangiography result in missed common bile duct stones? *JR Coll Surg Edinb.* 1993;38(4):220-4.
25. Caddy GR, Kirby J, Kirk SJ, Allen MJ, Moorehead RJ, Tham TC. Natural history of Asymptomatic Bile Duct stones at time of cholecystectomy. *Ulster Med J.* 2005;74(2):108-12.
26. Charfare H, Cheslyn-Curtis S. Selective cholangiography in 600 patients undergoing cholecystectomy with 5-year follow-up for residual bile duct stones. *Ann R Coll Surg Engl.* 2003 May;85(3):167-73.
27. Jendresen MB, Thorboll JE, Adamsen S, Nielsen H, Gronvall S, Hart-Hansen O. Preoperative routine magnetic resonance cholangiopancreatography before laparoscopic cholecystectomy: a prospective study. *Eur J Surg.* 2002;168:690-4.