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THE EFFECTIVENESS OF INTRA-OPERATIVE CHOLANGIOGRAM (IOC) IN DETERMINING RESIDUAL CBD STONES. DOES IT AFFECT HOW INDIVIDUALS WITH ACUTE BILIARY PANCREATITIS ARE TREATED?

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Abstract

Background: *In the settings of acute pancreatitis associated with gallstones, the use of standard management calls for cholecystectomy once the initial symptoms have abated. An intraoperative cholangiography is performed with laparoscopic cholecystectomy to identify stones in CBD and biliary tree anatomy. Little evidence is available on the use of intraoperative cholangiography (IOC) in patients with Gallstone Pancreatitis. While performing this study, the main aim was to determine the role of IOC in detecting residual common bile duct (CBD) stones in patients undergoing cholecystectomy for acute gallstone pancreatitis (GP).*

Methods: *This retrospective observational study was conducted after obtaining approval from the hospital administration. The hospital medical records of all patients who underwent cholecystectomy and IOC during the same admission period at the Department of Surgery, Liaquat National Hospital, and Medical College, from July 2015 to June 2018 were reviewed to assess the frequency of CBD stones after an acute event of GP.*

Results: *After a thorough evaluation of 345 patients, 66 patients satisfied our inclusion criteria, with a mean age of 47±14 years. More than half of the patients were females (n=40, 60.6%). All patients had undergone successful IOC. Out of 66, 11(16.7%) were found to have CBD stones on IOC, and postoperative ERCP was done for all 11 patients, which revealed CBD stones. The frequency of CBD stones was 10.6% (7/66). 4 patients were not included in determining frequency as they had raised biochemistry levels (serum liver function tests).*

Conclusion: *The current study revealed that people with gallstone pancreatitis are more likely to have CBD stones on IOC than those with just symptomatic gallstones without pancreatitis. So, the IOC can alter postoperative management and should be considered in all patients undergoing cholecystectomy for gallstone pancreatitis.*

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INTRODUCTION

Among patients diagnosed with pancreatitis, acute biliary pancreatitis accounts for 40%, and the main etiology remains cholelithiasis. Acute biliary pancreatitis has a self-limiting course but may result in significant morbidity or even mortality[2]. The exact pathophysiology of this remains unexplained; however, it may result from the passage of the stones to the common bile duct (CBD) directly from the gallbladder by getting obstructed at the ampulla of Vater[1]. Thus management lies in the proper clearance of CBD and the removal of gallbladder[2].

The cholecystectomy remains the gold standard treatment for biliary pancreatitis; nonetheless, most surgeons have generally preferred delayed surgery especially in acute setting [3]. Patients who recovered from the first attack of acute gallstone pancreatitis have a 30-fold higher risk of developing subsequent attacks in later life[4].

Performing laparoscopic cholecystectomy 6-8 weeks after the episode of complicated acute biliary pancreatitis may help to reduce both the inflammation and conversion rate as well[6]. However, for mild attacks of Acute Biliary Pancreatitis (ABP), early intervention during the same hospital course may reduce morbidity rates and expenses[5].

Several studies have shown that ABP results from the passage of small stones (<5mm)[7]. These stones are not routinely picked up on ultrasound till they cause biliary tract obstruction. Some may even pass through during the acute attack. Therefore, unless the patient undergoes preoperative ERCP/EUS or IOC, it is difficult to pick up these stones.

With the advent of modern technologies, Intraoperative ultrasonography for detecting CBD stones and gallstones is considered one of the most sensitive imaging modalities. It has got direct contact with the target organ, thus helping in providing a better image[15]. The sensitivity of Intraoperative Ultrasonography for identifying CBD stones was calculated to be 81 percent, while Intraoperative Cholangiography had a sensitivity of 65.4 percent. [16]. However, lack of expertise limited its role in our practices. As far as Intraoperative Cholangiography is concerned, it is a source of the real-time image of the biliary tree anatomy for the surgeon, thus helping in identifying and reducing the overall incidence of iatrogenic injury[17].

Retained stones in CBD after cholecystectomy can cause serious complications post-operatively [18, 19, 20]. There is a lack of literature on residual stones incidence after an attack of acute gallstone pancreatitis. This study aims to determine the frequency of residual stones after an episode of Acute Gallstone Pancreatitis and review the impact on postoperative management once such stones are detected.

Patient selection and methods:

This retrospective observational study was conducted after formal acceptance from the research and ethical committee of the hospital registration number. Medical records and workup of all the patients who underwent laparoscopic cholecystectomy for ABP at one of the tertiary care hospital (Liaquat National Hospital and Medical College) in Karachi, Pakistan, between July 2015 to June 2018 were reviewed through Electronic Medical Records (EMR)system and manually too. This review included all the patients who underwent laparoscopic cholecystectomy with IOC during the same hospital admission. Patients below 18 years or more than 75 years of age, those with a history of jaundice or non-gallstone pancreatitis, those with a history of acute or chronic cholecystitis, patients with no record available, and those who had a preoperative ERCP done were excluded from the final data set.

According to the ATLANTA classification, the following criteria were used to diagnose acute gallstone pancreatitis: acute epigastric pain, a threefold increase in serum lipase, and an ultrasound confirming gallstones. Abnormal preoperative ultrasound was defined as one with a CBD diameter of greater than 10mm or with a stone in CBD.

The hospital audit was reviewed, and it was found that 345 intraoperative cholangiograms were done along with laparoscopic cholecystectomy during the time mentioned earlier. Demography, laboratory, radiology, operational results, and the number of days preceding surgery were all examined in the data.

The presence of CBD stones as identified by the abnormal IOC with the finding of stone(s) on postoperative ERCP were evaluated for all the patients who met our inclusion criteria. The

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binominal (exact) distribution test was used and the confidence interval calculated to be 95%.

The Intraoperative Cholangiogram was performed with the clearance of adhesions at Calot's triangle. Once the cystic duct was identified, we placed a clip across a cystic duct-gall bladder junction and constructing a partial anterior ductotomy with much care not to transect the duct entirely. Bile usually started to flow out of it. We used to milk the duct proximally to dislodge any impacted stone or debris.4 Fr urethral catheter was then introduced into the cystic duct and secured by clamping with a cholangiography fixation forceps. Initially, saline was introduced for detecting any possible leakage or resistance and then contrast was introduced after confirmation. Images were obtained with the help of the C-arm and the flow of contrast within the system was observed.

Statistical Analysis:

The statistical package for social sciences (SPSS) version 25 was used to analyse the data. For quantitative variables, mean and standard deviation were computed and for qualitative variables, frequency and percentage were calculated.

Results:

During the specified period, a total of 345 laparoscopic cholecystectomies were done. Out of these, 66 patients were included in our study as per our inclusion criteria and reviewed accordingly. 26 (39%) males and 40 (61%) females were included in our study with a mean age of 47 ± 14 years. Age Description showed that most of the patients were in between 31-50 years (Table no 1).

		IOC		Total
		FILLING DEFECT PRESENT	NO FILLING DEFECT	
AGE_GROUP	18-30 years	2 (3%)	3 (4.5%)	5
	31-50 years	8 (12.1%)	48 (72.7%)	56
	51-75 years	1 (1.5%)	4 (6%)	5
Total		11 (16.6%)	55 (83.3%)	66

Table no 1. Age description of patients who were diagnosed to have abnormal IOC

Pain was present among all the patients and is found to be the primary presenting symptom. Diabetes and hypertension were found to be the most common co-morbidities.

Among 66 patients who fulfil the inclusion criteria, 11 (16.6%) patients had filling defects on IOC. Out of 66, 11(16.7%) were found to have CBD stones on IOC and postoperative ERCP was done for all 11 patients which revealed CBD stones. The incidence of CBD stone is 10.6% (7/66) for patients with normal preoperative ultrasonography and biochemistry levels. 4 patients were not included in determining incidence as they had raised biochemistry levels (serum liver function tests).

Table no 2. Preoperative biochemical and radiologic workup of patients recovering from an acute episode of gallstone pancreatitis

No. of Patients	Preoperative CBD diameter on U/S	Preoperative LFT's	Postoperative ERCP findings
7	Normal	Normal	+ stones
4	Normal	Raised	+ stones

CBD, common bile duct; US, ultrasonography; ERCP, Endoscopic retrograde cholangiopancreatography.

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Discussion:

Pancreatitis due to gallstones accounts for more than 40% of all patients who presented to us with a diagnosis of acute pancreatitis. Once the acute condition resolves, the management lies with the removal of the gallbladder and clearance of CBD stones.). We performed IOC during Laparoscopic Cholecystectomy, however abnormal IOC indicates single/multiple filling defects which maintain their anatomical position despite flushing the CBD with saline irrigation or positional change. No dilatation of CBD was observed. Their preoperative ultrasound was also within normal limits Recent studies have demonstrated that individuals with normal preoperative biochemistry and imaging workup who had a cholecystectomy and IOC had a 4.6 percent likelihood of having asymptomatic CBD stones in patients with symptomatic gallstones. The likely hood of CBD stones in patients with gallstone pancreatitis was observed to be 10.6%, which is approximately more than two times the incidence in the general population. Therefore, it has been found that CBD stones are twice as common in individuals recovering from acute gallstone pancreatitis who have normal preoperative biochemistry and imaging than in the general population.

In the past, the timing of surgery remains a major debatable issue. The risk of recurrent pancreatitis and complications associated with pancreatitis increases markedly as the time duration between the acute attack and surgical excision of the gallbladder increases[9]. therefore, early intervention in terms of gallbladder removal after an acute attack of mild to moderate gallstone pancreatitis has become the accepted treatment modality[10].In addition to the excision of the gallbladder, the eradication of residual CBD stones also needs to be addressed for the treatment of gallstone pancreatitis. In the era of an open cholecystectomy, surgeons used to perform IOC or possible CBD exploratory as mandatory.

With the emergence of minimally invasive procedures, ERCP was initially considered a gold standard method for addressing biliary tree pathologies. With recent research, It has been found that when the time interval between an acute episode and cholecystectomy increases, the likelihood of detecting CBD stones following biliary pancreatitis decreases. According to one research, The frequency of CBD stones in patients with GP decreased four times the value at admission. Therefore, selective preoperative ERCP followed by laparoscopic cholecystectomy with or without IOC is the safest method for treating mild acute gallstone pancreatitis[11,12], but it is not the case as the time duration between the admission and surgical intervention was not uniform. The American Society for Gastrointestinal Endoscopy (ASGE) advises IOC for all patients with acute gallstone pancreatitis to assess Choledocholithiasis. [13.] IOC allows real-time identification of Common Bile Duct stones, therefore can be addressed during the surgery or immediately after it. The same is the case with iatrogenic injuries that can be recognized with IOC and can be corrected at the same time which results in better outcomes[17].

According to a review of the literature, the occurrence of missed CBD stones ranges from 2.8 percent to 5.8% in over 5000 laparoscopic cholecystectomies carried out with IOC on patients with normal preoperative biochemistry and imaging[14]. According to our findings, patients with acute gallstone pancreatitis who had a laparoscopic cholecystectomy during the same hospital stay had a 10.6% chance of developing CBD stones. As a result, we concluded that an acute bout of gallstone pancreatitis may enhance the likelihood of CBD stones in patients with normal preoperative biochemistry and imaging.

Direct comparison was not possible as there is no control group, this might be a potential weakness of our study. Sex, age and other demographics have not been identified as risk factors for having CBD stones in previous studies. As a conclusion, in our study, adding historical control from the literature did not reduce the strength of our results.

Our approach strongly supports using judicious IOC in patients who have recovered adequately after an attack of gallstone pancreatitis, with the risk of remaining stones being eliminated if the patient continues asymptomatic. The likelihood of residual CBD stones cannot be utterly ruled out, however, IOC can be utilized as a reference method. Despite a normal IOC, patients who have prolonged symptoms following laparoscopic cholecystectomy frequently have an ERCP or Magnetic Resonance Cholangio-pancreatography.

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Conclusion:

The current study revealed that people with gallstone pancreatitis are more likely to have CBD stones on IOC than those with just symptomatic gallstones without pancreatitis. So, the IOC can alter postoperative management and should be considered in all patients undergoing cholecystectomy for gallstone pancreatitis.

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