Original Article

ERCP in Gall Stone Pancreatitis

# Prevalence of Common Bile Duct Stones on Endoscopic Retrograde Cholangiopancreatography in Gallstone Pancreatitis with Deranged Liver Function

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## ABSTRACT

**Objective:** To determine the frequency of CBD stone on ERCP in gall stone pancreatitis with deranged liver function. If decrease frequency of CBD stone found then recommendations can be made to reduce the unnecessary ERCP and it's procedure related complications like perforation and hemorrhage.

**Study Design:** Single center, non-probability consecutive, cross sectional study

**Place and Duration of Study:** This study was conducted at the Department of Gastroenterology, Liaquat National Hospital& Medical College, Karachi from May to November 2016.

**Materials and Methods:** Total 227 patients with deranged liver function test, serum amylase level of greater than 300 U/l, upper abdominal pain and gallstones on the trans-abdominal ultrasonography, were included. All patients were undergone ERCP. Descriptive statistics of the data was computed.

**Results:** There were 149 male and 78 female patients. Overall, raised total bilirubin was 62.6%, raised alkaline phosphate was 33.5%, and raised gamma GT was 40.5% patients. CBD stone in ERCP was found in 26.0% patients. Significant association of raised total bilirubin, raised alkaline phosphate, raised gamma GT, and serum amylase with CBD stone in ERCP was observed.

**Conclusion:** Patients with gallstone pancreatitis and deranged liver function test had increased risk of CBD stones. ERCP is the gold-standard for evaluation of morphological changes in the pancreas.

**Key Words:** Common Bile Duct Stones, ERCP, Gallstone Pancreatitis, Deranged Liver Function

**Citation of article: Kalwar HA, Furqan M, Awan RH, Shaikh H, Shaikh SS, Mujtaba G. Prevalence of Common Bile Duct Stones on Endoscopic Retrograde Cholangiopancreatography in Gallstone Pancreatitis with Deranged Liver Function. Med Forum 2020;31(1):58-62.**

## INTRODUCTION

In adult population, the percentage of occurrence of gallstones ranges from 6%-10% [1]. It has been indicated that 3%-14.7% of patients with gallstones are found to be with concurrent common bile duct (CBD) stones [2].For the management of gallstones "Gold Standard" is laparoscopic cholecystectomy (LC) but no agreement for treatment is there of CBD stones. In the age of open surgery, here the treatment is straight-forward; there is greater probability for the high mortality and morbidity if open cholecystectomy is to be conducted with open CBD exploration. With the arrival of minimal invasive and noninvasive techniques, choice of pre-operative ERCP tailed by LC arose as acceptable treatment.

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Received: June, 2019
Accepted: November, 2019
Printed: January, 2020

Main drawbacks of ERCP are that it is the procedure which is performed in two stages and is there are life threatening complications in it i.e. bleeding, pancreatitis and duodenal perforation[2, 3].

It has been reported that more than 230,000 patients were provided the treatment for acute pancreatitis at hospitals of the United States in 2005 [4].Recent literatureindicates an growth in the occurrence of acute pancreatitis, and at some places, higher rate of occurrence have been projected substantially in the comparison of occurrence that are previously reported, whereas, case-fatalities have remained unchanging since the period of 1970 [5]. Growth in the occurrence of acute pancreatitis may be caused because of increasing occurrence of obesity, a risk factor for the growth of gallstones and gallstone pancreatitis [6].

Heavy financial load on the health care system and noteworthy physiologic stress on the patient is conferred by the acute pancreatitis. It is indicated by the research that the average cost of the hospitalization for acute pancreatitis was estimated to be $9870 [7]. It has been also indicated that acute pancreatitis has been made responsible in United States for $ 2.2 billion as the expenditure on healthcare per year. The mean

duration of patients to stay at the hospital having acute pancreatitis is around 5 to 6 days [5, 8].

The part of liver in the body is to perform the various function i.e. biochemical, excretory and synthetic functions etc. global functions of liver can be detected by the single biochemical test. Series of tests are often employed by all of the laboratories in order to detect and manage the diseases of liver these tests are known as the "Liver function tests"[9].

# MATERIALS AND METHODS

This single center, non probability consecutive, cross sectional study was conducted from 31st May 2016 to 30th November 2016. Study population in the inclusion criteria was either gender with age of 18 to 65 years, who were presented with gallstone pancreatitis with deranged liver function test of duration 1 to 7 days at Liaquat National Hospital and Medical College, Karachi. Acute gallstone pancreatitis` diagnosis was grounded on the existence of pain in upper abdomen, a serum amylase level of >300 U/l (25-100 U/l), and gallstones on the transabdominal ultrasonography, deranged LFTs (as mentioned in operational definitions) on admission were included in the study. Patient was undergone ERCP & was used as a therapeutic and diagnostic tool as well. Informed written consent was taken before enrolment. Exclusion criteria was followed strictly to avoid confounding variables.

**Statistical analysis:** Data analysis was carried out in the statistical package for social sciences (SPSS) version 17. Frequencies and percentages were computed for categorical variables like gender, CBD stones, raised total bilirubin, raised alkaline phosphate and raised Gamma GT. Values were presented as mean standard deviation for continuous variables like age, duration of gallstone pancreatitis, and serum amylase. Effect modifier like age, gender, serum amylase, raised total bilirubin, raised alkaline phosphate raised Gamma GT and duration of Gall stone pancreatitis were controlled through stratification. For post stratification Chi-Square test was applied. Confidence interval was kept to be 95% and the level of significance was kept to be 5%.

# RESULTS

Total 227 patients of either gender, age 18 to 65 years with gallstone pancreatitis and deranged liver function test of duration 1 to 7 days were included in the study to determine the frequency of CBD stones detected on ERCP. Descriptive statistics were calculated. Stratification was done to see the effect of modifiers on outcome. Post stratification chi square test was applied considering $p \leq 0.05$ as significant.

There were 149 male and 78 female patients. The frequency distribution is presented in Table-2.

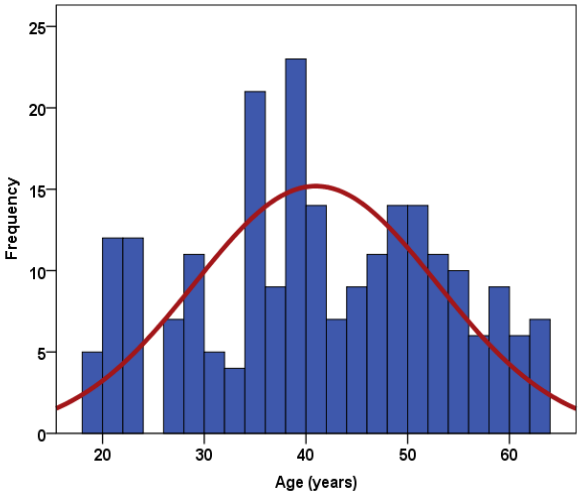
The mean age of study subjects was 40.96±11.92 years, mean serum amylase was 1012.97±251.81 U/l& the mean duration of gall stone pancreatitis was 2.58±0.85 days. The distribution of age is presented in Graph-1. The descriptive statistics of age, serum amylase &duration of gall stone pancreatitis is presented in Table-1.

The results showed that in all 227 patients, raised total bilirubin was found in 62.6% patients, raised alkaline phosphate was found in 33.5% patients, and raised gamma GT detected about 40.5% among the patients, as shown in table-2.

The final outcome i.e. CBD stone in ERCP was found about 26.0% among the patients, as shown in Table-2

The descriptive statistics of age, serum amylase, and duration of gall stone pancreatitis according to the CBD in ERCP were calculated. The results of descriptive statistics are presented in Table-3.

The results showed that significant association of serum amylase (P=0.002) with CBD stone in ERCP was observed. No significant association of age, gender and duration of gall stone pancreatitis was observed with CBD stone in ERCP. In table-3 and table-4 the detail of results is present.




**Graph No.1: Histogram presenting distribution of age (years) (n=227)**

**Table No.1: Descriptive statistics of age, serum amylase, duration (days) of gall stone pancreatitis (n=227)**

| | Age (years) | Serum amylase (U/l) | Duration of gallstone pancreatitis(days) |
|---|---|---|---|
| Mean ±SD | 40.96± 11.92 | 1012.97± 251.81 | 2.58±0.85 |
| 95%CI (LB – UB) | 39.41 – 42.52 | 980.04 – 1045.91 | 2.47 – 2.69 |
| Median (IQR) | 40.00 (17) | 1047.00 (189) | 3.00 (1) |
| Range | 44 | 1762 | 5 |
| Minimum | 19 | 473 | 1 |
| Maximum | 63 | 2235 | 6 |

**Table No.2: Frequency distribution of gender, overall raised total bilirubin, overall raised alkaline phosphate, overall raised gamma GT, CBD stones on ERCP) (n=227)**

| Gender | Frequency (n=227) | Percentage (%) | |
|---|---|---|---|
| Male | 149 | 65.6% | |
| Female | 78 | 34.4% | |
| Total | 227 | 100% | |
| Variable | Yes | No | Total |
| Over all raised total bilirubin | 142(62.6%) | 85(37.4%) | 227(100%) |
| Over all raised alkaline phosphate | 76(33.5%) | 151(66.5%) | 227(100%) |
| Over all raised gamma GT | 92(40.5%) | 135(59.5%) | 227(100%) |
| CBD stones on ERCP | 59(26%) | 168(74%) | 227(100%) |

**Table No.3: Descriptive statistics of age, serum amylase, duration of gall stone pancreatitis according to CBD stone in ERCP (n=227)**

| | Age | | Serum amylase | | Duration of gallstone pancreatitis | |
|---|---|---|---|---|---|---|
| | YES (n=59) | NO (n=168) | YES (n=59) | NO (n=168) | YES (n=59) | NO (n=168) |
| Mean ±SD | 43.83± 13.09 | 39.96± 11.35 | 1123.95± 295.67 | 974.00± 222.64 | 2.60± 0.85 | 2.60± 0.85 |
| 95% CI (LB – UB) | 40.42 – 47.24 | 38.23 – 41.69 | 1046.90 – 1201.00 | 940.00 – 1007.91 | 2.47 – 2.73 | 2.47 – 2.73 |
| Median (IQR) | 46.00 (19) | 39.00 (17) | 1080.00 (112) | 1036.00 (200) | 3.00 (1) | 3.00 (1) |
| Range | 44 | 44 | 1597 | 1627 | 5 | 5 |
| Minimum | 19 | 19 | 638 | 473 | 1 | 1 |
| Maximum | 63 | 63 | 2235 | 2100 | 6 | 6 |

**Table No.4: Frequency and association of CBD stone in ERCP according to gender (n=227)**

| | CBD IN ERCP | | | P-value |
|---|---|---|---|---|
| | YES (n=59) | NO (n=168) | TOTAL | |
| Male (n=149) | 35 | 114 | 149 | 0.235** |
| Female (n=78) | 24 | 54 | 78 | |
| TOTAL | 59 | 168 | 227 | |

# DISCUSSION

It's known from centuries that the pancreatitis can be caused by gallstones by the blockage of ampulla of vater. The biliary pancreatitis resulted because of gallstones temporary obstruction, then they passed freely into the duodenum. The more problematic suffering for patients will be there because of gallstone pancreatitis, whom having persistent ampullary or bile duct stone. The harshness of biliary pancreatitis and risk of cholangitis could be decreased by removal of persistent stones.[10]the study from Saudi Arabia has underlined gallstone as 68.5% for causing acute pancreatitis.[11] whereas the occurrence of pancreatitis in USA is reported about 40% in all cases.[12]

The removal of any CBD stone is considered as practicing treatment for gallstone pancreatitis which is followed by cholecystectomy which resist further occurrence of acute gallstone pancreatitis. If surgery delayed in case of patients recovering from the initial attack of gallstones pancreatitis would have higher risk for next attack up to 30-fold in general population.[13] while having index admission in hospital the performance of cholecystectomy should be considered standard of care.[14] the biliary duck assessment and clearance should be remained as a subject of conversation between clinicians before assessing cholecystectomy. The tools for bile duct should be adapted or optional for its evaluation and clearance before cholecystectomy are serial LET, MRCP, EUS, repetitive or selected preoperative ERCP and intraoperative cholangiogram (IOC).[12, 15]the bile duct stone is most commonly found among the most of patient which is included normally in the history of gallstone pancreatitis.[16]

In Al-Qahtaniet al study[17] the selection of patients done for preoperative ERCP assist by using tool like LFT. A study has shown which was conducted by a team of surgeons that the early unbalanced LETS results in an acceptable indication for the ERCP intervention prior to laparoscopic cholecystectomy.

LFT was used as the tool for assessment for the selection of patients for preoperative ERCP, in the research conducted by Al-Qahtaniet al [17]. Initial unbalanced LFTs were considered by some surgical teams as an acceptable marker for ERCP interference former to laparoscopic cholecystectomy. Patients of group A were submitted to ERCP grounded on the day of their admission unbalanced LFTs. In only eight patients, endoscopic retrograde cholangiopan creatography was therapeutic (stone n=5, sludge n=3,); whereas, six patients (5%) had complications associated with ERCP. Where ERCP was late until repeat LFTs in the patients of group B, outcomes were available, only eight patients (5%) who continued to have unbalanced LFTs were referred to ERCP and in all patients it was therapeutic (stone n=5, sludge n=3).

There was no problems associated with ERCP in the patients. Whereas, 3 patients on whom preoperative ERCP was not conducted, were presented later with complications associated with recurring stone within the period of two years. Therefore, this research has indicated that by the use of LFT as anaverage in the selection of preoperative ERCP was significantly decreased the complications and number of unnecessary

ERCP. Furthermore, it indicates that by omission of ERCP in those patients whose LFT quickly enhanced towards normal, the long term complication risk due to missed stone is slight. In our surgical department, the marker for preoperative ERCP grounded on initial unbalanced LFTs is no longer exercised[17].

It has been demonstrated by intraoperative cholangiogram that the unsuspected CBD stones` occurrence ranges from 2.8-5.8% in those patients havingimaging and normal preoperative LFT [18]. It has been concluded by Shayan et al. that occurrence of stones of bile duct in those patients who are improving from mild to moderate acute gallstone pancreatitis with imaging and normal preoperative LFT is not found to be significantly higher (7.6%) in the comparison of those patients experiencing laparoscopic cholecystectomy for symptomatic cholelithiasis[12]. Quite similar rate of stone of bile duct, in the patients who are experiencing cholecystectomy for symptomatic cholelithiasis or gallstone pancreatitis has been described as well [19].

In a research, the missed stone occurrence in patients having normalized preoperative LFTs was found to be low (2%). In the research conducted by Ito et al. [20], the occurrence of recurring acute pancreatitis because of retained CBD stones in those patients who did not experience preoperative ERCP or IOC during surgery was found to be 8%.

In the investigation which was conducted by Al-Qahtanietet al only 3 patients (2%) without preoperative ERCP developed events of bilio-pancreas because of missed CBD stones.

The rate of complication of ERCP with ES as reported in another study was 4.95% with the rate of mortality is equal to 0.12% [21].Whereas, no mortality was found in this study.Therefore, a repetitive preoperative ERCP in patients could be safely skipped who wereimproving from biliary pancreatitis if their initial unbalanced liver functions returnednear to normal or normal in the period of three to four days from the beginning of disease. The tenacity of CBD stones in acute gallstone pancreatitis did not contribute to continuing or pancreatic inflammation worsening [21,22]. A research conducted by Al-Qahtani et al, [17], in which all patients with continuousgreater LFT after the duration of 72 hours that experienced ERCP were indicated to suffer from either stones or sludge. Local of systemic complications were developed by none of them.

In case of ECRP indications of these patients the use of advanced tools could be helpful. The rate in conversation of open surgery would be increased by routine IOC because of limited experience in survey of laparoscopic CBD. Moreover, the unimportant CBD exploration could be leaded by wrong positive IOC. The re-evaluation of bilio-pancreatic symptoms which developed in patients afterward will be done by MRCP or ERCP even after a normal IOC. The improvement from moderate gallstone pancreatitis in case of patients done easily in cholecystectomy without IOC.

# CONCLUSION

Patients with gallstone pancreatitis and deranged liver function test had increased risk of CBD stones. ERCP is the gold-standard for evaluation of morphological changes in the pancreas.

**Author's Contribution:**

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|---|---|
| Concept & Design of Study: | Hamid Ali Kalwar |
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| Revisiting Critically: | Hamid Ali Kalwar, Muhammad Furqan |
| Final Approval of version: | Hamid Ali Kalwar |

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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