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OUTCOME OF GALL BLADDER *IN SITU* AFTER ENDOSCOPIC COMMON BILE DUCT STONE REMOVAL: A SINGLE INSTITUTIONAL EXPERIENCE

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ABSTRACT

After endoscopic CBD stone removal physicians always recommend prophylactic cholecystectomy even in the absence of GB stones to prevent further complications; our aim was to study the outcome of the in situ gall bladder in elderly patients aged ≥ 70 years after endoscopic common bile duct stone removal and to assess the value of adding Prophylactic cholecystectomy. A total of 574 patients who underwent successful endoscopic CBD stone removal at the endoscopy unit of the Medical Research Institute hospital, Alexandria University from January 2012 to July 2015 were analyzed retrospectively and 235 patients were enrolled in study after application of the exclusion criteria. After endoscopic CBD stone removal 76 (32.3%) patients underwent subsequent cholecystectomy and 159 (67.7%) patients did not. During our study period, of the 76 patients, 34 (44.7%) patients had open cholecystectomy while 42 (55.3%) patients had laparoscopic cholecystectomy with an average time of 30 days between ERCP and cholecystectomy ranging between 7.0 – 135.0 days. GB in situ was not associated with recurrence of CBD stones after CBD stone removal in elderly patients aged ≥ 70 years even in the presence of GB stones so there was no proven value of adding prophylactic cholecystectomy.

Keywords: *Cholecystectomy, Endoscopic Retrograde Cholangiopancreatography (ERCP), Elderly, Stone Extraction, Prophylactic*

INTRODUCTION

Choledocholithiasis has been defined over years as the presence or formation of gallstones in the common bile duct (CBD), which is caused by either primary stones that originated from the bile duct itself or by secondary stones that migrated from the gallbladder (GB) leading to variety of complications such as obstructive jaundice more commonly, cholangitis, or pancreatitis (Cui *et al.*, 2013).

Over recent years' endoscopic technology has evolved making endoscopic common bile duct stone removal the gold standard in managing common bile duct stones since the first endoscopic sphincterotomy done in 1974 (Classen and Demling, 1974; Kawai *et al.*, 1974).

After endoscopic CBD stone removal physicians always recommend prophylactic cholecystectomy even in the absence of GB stones to prevent further complications such as acute Cholecystitis, recurrent CBD stones, or cholangitis despite the fact that management of gall bladder after endoscopic stone removal remains a matter of debate (Tsujino *et al.*, 2009; Lee *et al.*, 2006).

The main options in managing concomitant CBD stones and the GB stones include selective preoperative endoscopic retrograde cholangiopancreatography (ERCP), postoperative ERCP, open explorations, and laparoscopic common bile duct exploration (LCBDE) (Williams and Vellacot, 2002; Berci and Morgenstern, 1994).

The strategy of single-stage cholecystectomy and bile duct exploration as the primary treatment of bile duct stones was advocated by many authors in the last decade and it has been found to be superior to the two-stage operation (Bansal *et al.*, 2010; Enochsson *et al.*, 2004; Collins *et al.*, 2004).

Although, ERCP has been proven to be a safe and effective option for extracting CBD stones in most cases, it also has some devastating adverse effects as it may induce various postoperative complications, including bleeding, perforation or pancreatitis (Wang *et al.*, 2009; Andriulli *et al.*, 2007; Suissa *et al.*, 2005), and it can also lead to the disruption of the intact sphincter of Oddi (Freeman, 1998; Frimberger,

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1998). Currently, as the laparoscopic technique progresses many centers now prefer the single-stage approach.

The aging of the population leads to an increasing prevalence of comorbid conditions such as cardiovascular disease, diabetes mellitus, and pulmonary diseases. Gall bladder stones (cholelithiasis) are also a common disease for elderly people. Common bile duct (CBD) stone is one of the most common complications in cholelithiasis and occurs in 10% to 15% of the patients (Ponsky *et al.*, 2000; Hungness and Soper, 2006).

The advancements of endoscopic retrograde cholangiopancreatography (ERCP) with endoscopic sphincterotomy (ES) dramatically reduced their morbidity and mortality in elderly patients (Tranter Thompson, 2002).

In the elderly population the risk of presenting with biliary complications in case of in situ gall bladder is increased (Magnuson *et al.*, 1997) such as acute cholecystitis in 40% of the patients older than 65 years, bile duct stones in 21%; and gallstone pancreatitis in 19% (Sandler *et al.*, 1987).

Similar increased risks are noted in the elderly patients as regards complications of laparoscopic cholecystectomy in about 17.5–26.7% of patients older than 65 years (Lo *et al.*, 1996).

The increased rate of complications for elective surgery in elderly patients is about 21.2% compared with 44.8% for emergency surgery (Lo *et al.*, 1996).

Our aim was to study the outcome of the in situ gall bladder in elderly patients aged ≥ 70 years after endoscopic common bile duct stone removal and to assess the value of adding Prophylactic cholecystectomy.

MATERIALS AND METHODS

A total of 574 patients who underwent successful endoscopic CBD stone removal at the endoscopy unit of the Medical Research Institute hospital, Alexandria University from January 2012 to July 2015 were analyzed retrospectively.

Endoscopic CBD stone removal was done. In all cases, all endoscopic retrograde cholangiopancreatography (ERCP) procedures were performed by using side viewing endoscope Olympus® TJF-145, Japan. Stones were extracted by using retrieval baskets and/or balloon catheters after endoscopic sphincterotomy (ES) in all patients.

Endoscopic crushing technique was done if stones were too large to be extracted. If stones were too large to be extracted in the same ERCP session biliary stent was inserted in the CBD to ensure free flow of bile till next session of ERCP to fragment the stone. After successful endoscopic removal of CBD stones in patients with an intact GB, cholecystectomy was recommended to all patients if possible based on their decision or the decision of the referring physician.

Patients were excluded from the study if they had a history of previous cholecystectomy (197 patients), if they had a concomitant pancreatic or biliary malignancies (19 patients), their age less than 70 years (89 patients), and insufficient follow-up of less than at least 6 months (34 patients).

A total of 235 patients with an intact GB at the time of endoscopic CBD stone removal were enrolled in this study.

Patients were divided into 2 groups, the first one with gall bladder in situ, and the second one is the cholecystectomy group.

Diagnosis of GB stones was made by ultrasonography which was performed on all patients. Follow-up evaluations were conducted using chart reviews and a personal interview at the outpatient clinic or by phone calls whatever possible.

Patients' demographics were studied. The presence of GB stones whether single, multiple or absence of stones, biliary complications as recurrent jaundice, pancreatitis, cholangitis or Cholecystitis, time between ERCP and cholecystectomy and its type whether open or laparoscopic and time and cause of death (if applicable) were collected.

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Statistical Analysis

Statistical analysis was performed using SPSS for Windows (SPSS, Inc., Chicago, IL, USA). Qualitative data were described using number and percent and was compared using Chi square test, while normally quantitative data was expressed in mean \pm SD and was compared using student t-test and was considered statistically significant at $p \leq 0.05$.

RESULTS AND DISCUSSION

Results

As regards demographic characteristics of all patients, the age of patients that did not undergo subsequent cholecystectomy were 73.67 ± 6.49 years compared to the group that underwent subsequent cholecystectomy which were 72.25 ± 5.32 years with no statistical difference between both groups as shown in table I.

As regards gender of the patients there was no statistical difference between both groups Table I.

Table I: Showing Demographics of Patients

	Cholecystectomy		P Value
	No (n = 159)	Yes (n = 76)	
Age (Years)	73.67 ± 6.49	72.25 ± 5.32	0.099
Sex			
Male	85 (53.5%)	43 (56.6%)	0.653
Female	74 (46.5%)	33 (43.4%)	

* Statistically significant at $p \leq 0.05$

The ultrasound examination of all patients as regards the presence of stones in the gall bladder shows that there was no statistical difference between both groups as shown in table II.

Table II: Showing Ultrasound Findings of all Patients

US Gall Bladder	Cholecystectomy		P Value
	No (n=159)	Yes (n=76)	
Free	65 (40.9%)	24 (31.6%)	0.388
Multiple Stones	54 (34.0%)	30 (39.5%)	
Single Stone	40 (25.2%)	22 (28.9%)	

* Statistically significant at $p \leq 0.05$

Biliary stents were inserted in patients with difficult stone extraction with a statistically significant difference between both groups as in the group which did not undergo cholecystectomy 39 (24.5%) patients had biliary stent inserted while in the cholecystectomy group 38 (50.0%) patients had biliary stents with a P value of <0.001 *.

After endoscopic CBD stone removal 76 (32.3%) patients underwent subsequent cholecystectomy and 159 (67.7%) patients did not.

During our study period, of the 76 patients, 34 (44.7%) patients had open cholecystectomy while 42 (55.3%) patients had laparoscopic cholecystectomy with an average time of 30 days between ERCP and cholecystectomy ranging between 7.0 – 135.0 days.

As regards the co morbidity encountered in all patients they are summarized in table III.

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As regards hospitalization after cholecystectomy there was a statistically significant difference featuring that patients who had laparoscopic cholecystectomy stayed in hospital less than patients who had open cholecystectomy as shown in table IV.

Table III: Showing Co Morbidities of all Patients

Comorbidity	Cholecystectomy		P
	No (n = 159)	Yes (n = 76)	
Free	65 (40.9%)	25 (32.9%)	0.051
Diabetes Mellitus	28 (17.6%)	27 (35.5%)	
Hypertension	22 (13.8%)	8 (10.5%)	
Ischemic Heart Diseases	25 (15.7%)	13 (17.1%)	
Shistosomal Hepatic Fibrosis	6 (3.8%)	0 (0.0%)	
Chronic Renal Failure	10 (6.3%)	3 (3.9%)	
Heart Failure	3 (1.9%)	0 (0.0%)	

* Statistically significant at $p \leq 0.05$

Table IV: Relation between Type of Cholecystectomy and Hospitalization Days

	Open	Laparoscopic	P Value
Number of patients	33	42	
Hospitalization days	3.82 ± 1.29	2.33 ± 0.95	<0.001*

*Statistically significant at $p \leq 0.05$

As regards the post-operative complications in the cholecystectomy group there were no complications in 71(93.4%) patients, 3 (3.9%) patients had cholangitis, and 2 (2.6%) patients had pancreatitis while one (1.31%) patient had cardiac arrest immediately post-operative.

Cholecystitis was encountered in 29(18.2%) patients with intact gall bladder out of the 159 patients who did not undergo cholecystectomy with no statistical difference as regards relation between Cholecystitis and number of gall bladder stones as shown in table V.

Table V: Relation between Cholecystitis and US Gall Bladder

US Gall Bladder	Cholecystitis		p
	No (n = 206)	Yes (n =29)	
Free	75 (36.4%)	14 (8.3%)	0.366
MS	74 (35.9%)	10 (34.5%)	
SS	57 (27.7%)	5 (17.2%)	

*: Statistically significant at $p \leq 0.05$

During follow up of all cases, 17 (10.7%) patients died of unrelated conditions in the gall bladder in situ group and 4 (5.3%) patients died of unrelated conditions in the cholecystectomy group with no statistically significant difference.

Discussion

Despite huge improvement of endoscopic and laparoscopic techniques in last decades cholecystectomy after endoscopic CBD stone extraction remains a matter of debate. In our research we tried to focus on natural course of in situ GB after endoscopic CBD stone extraction and necessity of its removal.

The rate of cholecystectomy after CBD stone extraction and or sphincterotomy was in the range of 4.8–22 % in various studies (Hill *et al.*, 1991; Kullman *et al.*, 1991; Kwon *et al.*, 2001). The incidence of recurrent biliary symptoms after endoscopic sphincterotomy was shown to be about 10 % in many

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retrospective and nonrandomized studies (Hammarstrom *et al.*, 1996; Neoptolemos *et al.*, 1984; Welbourn *et al.*, 1995). The recurrent biliary symptoms in our research was irrelevant as only 3 (3.9%) patients of the cholecystectomy group developed medical type of jaundice because of hepatitis c virus.

Acute Cholecystitis remains a matter of concern for all surgeons and endoscopists in patients with GB in situ after endoscopic sphincterotomy, especially in patients with gall stones owing to its increased risk because of dysfunction of the sphincter of oddi leading to biliary infection secondary to reflux of duodenal contents into the bile duct increasing the risk of ascending infection of the GB.

In our research Cholecystitis was encountered in 29(18.2%) patients with intact gall bladder and this coincides with previous studies ranging between 19 and 22 % (Tanaka *et al.*, 1998; Yi, 2000).

In our study there was no statistical difference between number of stones in the gall bladder and development of acute Cholecystitis.

Parker *et al.*, (1997), in his review of 168 geriatric patients concluded that a high degree of awareness is essential for correct diagnosis of acute cholecystitis in geriatric patients.

The recurrence rate of CBD stones after endoscopic sphincterotomy was reported to be in the range of 6.5–17.4 % in patients with GB in situ (Kang *et al.*, 2000; Kang *et al.*, 1999; Park *et al.*, 1999) and recurrent CBD stones are encountered either symptomatically or asymptotically within several years after cholecystectomy.

Tsujino *et al.*, (2009) concluded that patients with in-situ gallbladder stones were at a high risk for bile duct stone recurrence, whereas the patients without gallbladder stones had favorable outcomes. This finding is similar to those obtained in other studies (Boerma *et al.*, 2002; Lau *et al.*, 2006).

In this study, there was no recurrence of CBD stones and no relation between presence of stones in GB in situ and recurrence of CBD stones over the period of the study and this may be explained by the short period of the study.

In summary, GB in situ was not associated with recurrence of CBD stones after CBD stone removal even in the presence of GB stones so there was no proven value of adding prophylactic cholecystectomy.

As regards the relatively low incidence of Cholecystitis a wait-and-see policy may be recommended for patients with GB in situ in elderly patients, taking into account close observation of patients with GB stones due to the increased risk of developing Cholecystitis

Owing to the complex nature of the geriatric population there is no proved evidence of how to deal with elderly patients with retained gall bladder after endoscopic CBD stone extraction rendering the choice for the patients' free will even if proven wrong.

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