

## Retrospective Study Minimally Invasive Management of Postoperative Lithiasis of the Common Bile Duct

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### Rezumat

#### *Studiu retrospectiv asupra managementului miniinvaziv al litiazei postoperatorii a căii biliare principale*

**Introducere:** Litiiza postoperatorie a căii biliare principale (CBP) ocupă un loc însemnat în patologia bilio-pancreatică, atât prin frecvența mare, cât și prin problemele de diagnostic și tratament pe care le ridică.

**Material și metodă:** Bazându-ne pe o experiență, care s-a desfășurat într-o perioadă de cinci ani (2008-2012), evaluată retrospectiv, totalizând 51 de pacienți cu litiază postoperatorie a CBP, am încercat să formulăm câteva recomandări în tratamentul acestei patologii. Acestea au fost ghidate de opțiunile terapeutice alternative existente și de ideile vehiculate în literatura de specialitate, privind rezultatele înregistrate de fiecare manieră de tratament.

**Rezultate:** Rata de clearance a CBP a fost de 93,6%, morbiditatea de 10,65% și mortalitatea de 0%, acestea îndreptându-ne să apreciem eficiența tratamentului miniinvaziv, ca fiind maximă în tratamentul acestei patologii.

**Concluzii:** Tratamentul endoscopic al litiazei postoperatorii a CBP s-a dovedit a fi posibil, eficient și credem că este bine a se folosi de principiu, chirurgia deschisă rămânând rezervată doar eșecurilor sau contraindicațiilor tratamentului miniinvaziv.

**Cuvinte cheie:** litiază coledociană, ERCP, sfincterotomie endoscopică

### Abstract

**Introduction:** Postoperative common bile duct (CBD) lithiasis holds a significant place in the bilio-pancreatic pathology, both due to its high frequency as well as to the diagnostic and treatment issues it triggers.

**Material and Methods:** Based on a 5-year experience (2008-2012), assessed retrospectively, totalling 51 patients with postoperative lithiasis of CBD, we tried to elaborate on several recommendations for the treatment of this pathology. The recommendations were guided by the existing alternative therapeutic options and by the ideas in the literature regarding the results achieved by every manner of treatment.

**Results:** The rate of clearance of the CBD was of 93.6%, the morbidity rate was of 10.65% and the mortality rate was of 0%, which entitles us to deem the effectiveness of the minimally invasive treatment as maximum in the treatment of this pathology.

**Conclusions:** The endoscopic treatment of postoperative lithiasis of the CBD proved to be possible, efficient and we believe it good to be used as a principle; open surgery should be the solution in case of failures or of contraindications to minimally invasive treatment

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**Key words:** choledochal lithiasis, ERCP, endoscopic sphincterotomy

**Introduction**

The treatment of postoperative lithiasis of the common bile duct (CBD) (residual or de novo, post-cholecystectomy) is controversial. There are many criteria for choosing one of the treatment modalities: endoscopic, minimally invasive surgery (laparoscopic) or open surgery. (1)

The first exploration of the CBD was performed successfully by Thornton in 1889. It was shortly followed by the communication of Courvoisier and Kehr's personal experience (1890), who were the ones who first mounted an external T-formed drainage in the CBD. Intraoperative cholangiography was first practiced by Mirizzi in 1931. (2,3) With the advent of endoscopic retrograde cholangiopancreatography (ERCP) and of endoscopic sphincterotomy (ES) in the 1970s, this method has gradually become the treatment of choice for the management of choledocholithiasis.

The next revolution in biliary surgery has emerged as a result of the introduction of laparoscopic surgery in 1989. (4,5) Laparoscopic choledochotomy proved to have satisfying results. (6,7,8,9,10) Unfortunately, the laparoscopic approach of the CBD is not technically simple, and sometimes it is impossible or even contraindicated (e.g., in case of hepatic pediculitis satellite to acute cholecystitis).

For the patient with CBD lithiasis treatment options can thus be diverse; still, up to this day there is no ideal approach, a fact strongly influenced by the significant variety and multitude of intra- and postoperative complications.

Choosing a particular process depends to a great extent on the experience and preference of the clinician who initially assesses the patient; however, the final decision is heavily influenced by local technical and anaesthetic possibilities.

By means of our study's case law and experience, we intend to emphasize the importance of ERCP – the minimally invasive endoscopic manner which should be the first choice in the treatment of this pathology.

**Material and Method**

We aimed to analyse minimally invasive treatment as the first choice of treatment of postoperative lithiasis of the CBD by means of a retrospective, observational study, on a group consisting of 51 patients hospitalized and treated in the I<sup>st</sup> Surgical Clinic of the Emergency University Hospital Bucharest during the period 2008-2012.

All the above-mentioned 51 patients were diagnosed and selected based on the following criteria of postoperative choledochal lithiasis: clinical, biochemical and ultrasound.

The first treatment of choice was minimally invasive endoscopic treatment (ERCP). Information was statistically analysed using MS Excel 2010 and EpiInfo 3.5.4; the results are presented as tables, graphs and dedicated statistical tests.

Parametric tests were used for variables with normal distribution, reporting the average and the standard deviation, and nonparametric tests for the rest, reporting the median and standard error of the average.

p < 0.05 was considered statistically significant.

**Results**

During the period 2008-2012, we analysed a group of 51 patients admitted with the diagnosis of postoperative choledochal lithiasis.

By analysing the distribution of cases by age group we did not notice significant differences in incidence between different decades. (Fig. 1)

Distribution of patients by sex revealed a total of 31 female cases (60.8%) and 20 male cases (39.2%). (Fig. 2)

As it can be seen, the female gender was prevalent (60.8%).

Out of the total of 51 cases, 44 (86%) were resolved endoscopically and 7 (14%) by open surgery. So the majority were cases resolved in a minimally invasive manner (86%). (Fig. 3)

In the 7 observations, the failure of ERCP was due to:

- gritted CBD, choledochal clearance was considered impossible or unsafe endoscopically and thus the solution chosen was open surgery - 3 cases;
- gastric resection with history of GJ anastomosis, which did not allow the intubation maneuver of the duodenum - 2 cases;
- technical problems (no instruments or defective instruments) - 2 cases.

Clinical forms of manifestation of postoperative CBD lithiasis were:

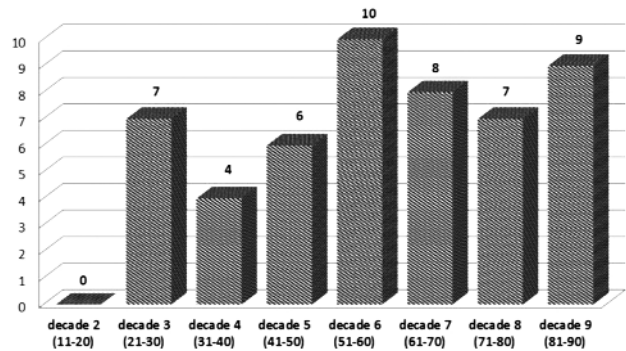


Figure 1. Distribution by age of patients with postoperative lithiasis of MBD

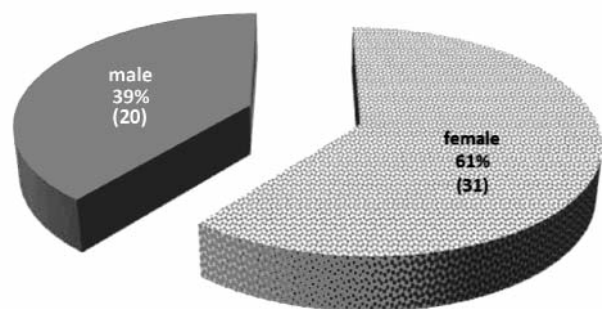
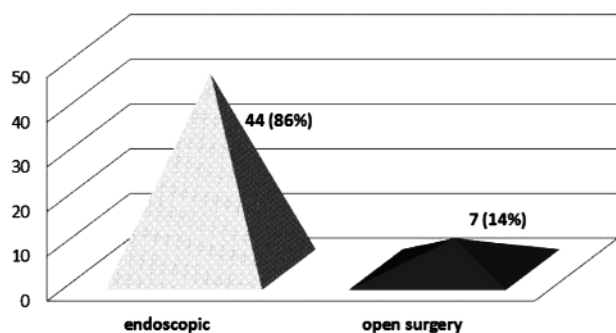


Figure 2. Distribution by gender of patients with postoperative lithiasis of MBD



**Figure 3.** The way of solving postoperative lithiasis of MBD

- a. simple, painful form – 3 cases (5.9%);
- b. complicated forms were the most frequent – 48 cases (94.1%), accompanied by jaundice, acute pancreatitis and cholangitis, namely (Fig. 4):
  - accompanied by mechanical jaundice – 38 (79.2%);
  - accompanied by acute pancreatitis of lithiasic cause – 6 (12.5%);
  - accompanied by acute cholangitis – 4 (8.3%).

Mechanical jaundice proved to be the most common clinical manifestation of postoperative lithiasis of CBD (79.2%).

The intraoperative cholangiography that was always performed confirmed postoperative lithiasis of the CBD in all analysed cases. The average size of the main bile duct was 1.12 cm, with a maximum of 2.5 cm.

In what concerns the shape of the Vater papilla, the following aspects stood out:

- a. forced – 15 ill people (29.4%);
- b. stenosed – 10 patients (19.6%);
- c. fibrotic – 5 cases (9.8%).

Depending on the type of CBD lithiasis, after the intraoperative cholangiography, two situations were noted: (Fig. 5)

- a. unique lithiasis – 28 cases (59.6%);
- b. multiple lithiasis – 19 cases (40.4%).

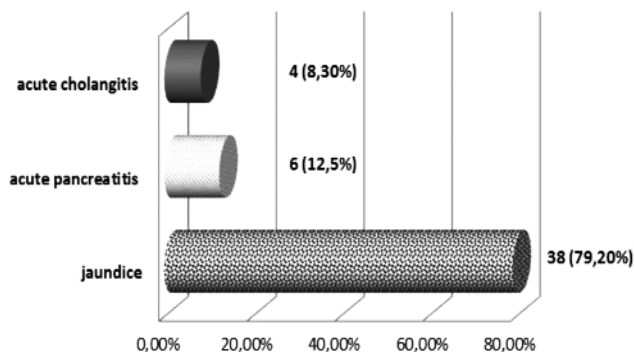
Papillotomy was necessary in the majority of cases (43 cases - 92.1%). It was done by:

- a. “precut” technique with “knife” papillotom – 24 cases (55.8%);
- b. standard technique – 10 cases (23.3%);
- c. guide wire technique – 9 cases (20.9%).

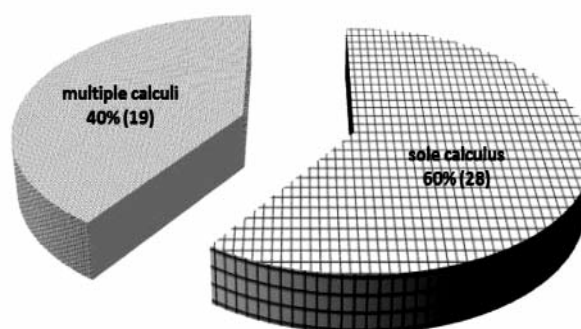
In 44 of the patients (93.6%) with postoperative lithiasis of the CBD, confirmed as a result of cholangiography, the extraction of stones was a success.

Out of the extracted calculi, in 28 patients (63.6%) the calculi were unique, whereas in 16 patients (36.4%) the calculi were multiple.

Lithotripsy was necessary in a number of ten cases (22.7%) out of the total extractions. Out of these, seven patients had unique calculi, and three cases had multiple calculi.



**Figure 4.** Complicated clinical forms of postoperative lithiasis of MBD



**Figure 5.** Number of calculi in postoperative lithiasis of MBD

Regarding the macroscopic aspect of bile, the following were found:

1. bile with normal aspect – 29 cases (61.7%);
2. biliary sludge – 10 cases (21.3%);
3. dim bile (cholangitis) – 4 cases (8.5%);
4. purulent bile – 4 cases (8.5%).

Lavage and postoperative control of CBD emptiness were performed routinely.

Postoperative complications of endoscopic maneuvers were:

- a) intraoperative - bleeding occurred after papillotomy in 3 cases (6.4%), successfully resolved during surgery;
- b) postoperative - acute pancreatitis was the most common complication. In the study group, this occurred at a rate of 4.25% (2 patients) and had only biochemical manifestations (slight increase in enzyme values) without clinical manifestations.

Mortality was not registered in the study group.

The average length of hospital stay was of 2.3 days, and in case of patients with acute pancreatitis, after endoscopic manoeuvres, the hospital stay was of 4.1 days, until the normalization of the biochemical values.

## Discussions

The literature on the treatment of lithiasis of the CBD after

cholecystectomy, unlike the literature on mixed cholecysto-choledochal lithiasis turned out to be relatively poorer in what regards information.

Our study analysed in a retrospective manner the results obtained from the use of endoscopic therapy of first choice in postoperative CBD lithiasis. In Romania, addressing CBD through open surgery remains a prevalent approach. Kehr drainage of CBD or biliary-digestive derivations are commonly used. (11) The first and most accurate explanation is the lack of appropriate technical equipment (endoscopic) and of specialists trained to perform such minimally invasive interventions.

It is known that patients over 70-80 years register a high mortality rate in case of open exploration of the CBD; this mortality rate can be of 4-10%, which may even reach 20% if this therapeutic approach is practiced in emergency (12,13,14,15). This contrasts sharply with data from studies on minimally invasive treatment of CBD lithiasis where advanced age and comorbidities do not seem to have a major impact on complication rates and mortality (16,17, 18,19).

Regarding the CBD laparoscopic approach, studies have revealed morbidity rates between 2 and 17% with a mortality of 1-5% (20). A Cochrane review (21) of several randomized studies showed that these results are comparable to those achieved by ERCP with no clear differences in terms of morbidity and mortality. It should however be noted that there was a preoperative selection of patients who underwent a laparoscopic approach of postoperative CBD lithiasis.

Our study revealed a CBD clearance rate of 93.6%, with morbidity rate of 10.65% and mortality rate of 0%, data that allow us to state that endoscopic approach of postoperative CBD lithiasis should be the first therapeutic intent. It must be added that the laparoscopic approach on a scarred abdomen (previous cholecystectomy) can sometimes trigger technical difficulty problems. On the other hand, approaching CBD by open surgery is accompanied by increased rates of postoperative morbidity and mortality, as well as a much longer duration of hospitalization.

## Conclusions

1. Although it is most often the surgeon who performs the initial assessment of the patient, it is our belief that the final decision regarding the management of patients with CBD postoperative lithiasis ought to be taken in a multidisciplinary team (surgeon, endoscopist, anesthesiologist).
2. Endoscopic treatment (ERCP) in cases of postoperative CBD lithiasis should be used as first intent treatment.
3. The success of ERCP requires low rates of morbidity and mortality, a reduced number of days of hospitalization and a short period to social reintegration.
4. Treatment by means of conventional surgery (open) of postoperative CBD lithiasis should remain reserved for the failures of interventional endoscopy.
5. Laparoscopic surgery can be performed only in

surgical centres with large experience in this field and very good technical equipment.

6. We emphasize the importance and the need to equip in the future several hospitals with advanced therapeutic endoscopic equipment, as well as to train a sufficient number of specialists. The existence of centres of excellence in interventional endoscopy is required, but unfortunately it still remains a desideratum, given the widespread frequency of biliary pathology.
7. The minimally invasive treatment (endoscopic) of postoperative CBD lithiasis has shown to be useful, possible and beneficial. ERCP was required, being recommended as first choice therapy in postoperative CBD lithiasis. In our study group (51 patients) the success of the procedure was of 93.6%, with 10.65% morbidity rate and zero mortality.

## Authors contribution

All authors had equal scientific contributions.

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