Chirurgia (2013) 108: 774-779
No. 6, November - December
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Minimally Invasive Treatment of Cholecysto-choledochal Lithiasis - "Rendez-vous" Technique

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Rezumat

Tratamentul miniinvaziv al litiazei colecisto-coledociene – tehnica "Rendez-vous"

Introducere: Studiul, ale cărui rezultate le prezentăm în această lucrare, încearcă să dea un răspuns nuanțat la întrebarea:"Care este tratamentul cel mai indicat, cel mai corect și având costul cel mai redus în litiaza mixtă colecisto-coledocienă (LMCC)?"
Material și metodă: Bazându-ne pe o experiență de cinci ani (2008-2012), evaluată retrospectiv, pe 143 de pacienți cu LMCC, încercăm să formulăm răspunsuri la câteva dintre întrebările pe care ni le-am pus încă de la începutul experienței noastre. Răspunsurile au fost ghidate de opțiunile terapeutice alternative, într-o patologie pentru care nu există un standard de aur, în ceea ce privește rezolvarea.
Rezultate: Având în vedere că alegerea perioadei de desfășurare a studiului a fost aleatorie și că introducerea pacienților a fost consecutivă, este asigurată reprezentativitatea rezultatelor pentru orice alt pacient diagnosticat cu această patologie, internat într-o clinică de aceeași specialitate, dimensiune și dotare cu cea prezentată.
Concluzii: Lucrarea analizează rezultatele într-o manieră comparativă cu alte studii, în ceea ce privește alte opțiuni terapeutice sau cu aceeași atitudine, desfășurate în alte centre de chirurgie minim-invazivă din lume, concluziile finale fiind încurajatoare pentru succesiunea terapeutică practicată de noi.

Cuvinte cheie: litiază mixtă colecisto-coledociană, ERCP, colangiografie intraoperatorie

Abstract

Introduction: In our paper we present the results of a study that was meant to provide a complex answer to the question: "Which is the most appropriate, most correct and least expensive treatment for mixt cholecysto-choledochal lithiasis (MCCL)?"
Material and Methods: Based on a five year experience (2008-2012), analysed retrospectively, during which 143 patients with MCCL were treated, we are trying to find answers to some of the questions that we have asked ourselves from the very beginning of this period. The answers were guided by alternative therapeutic options, for a pathology that does not have a "gold standard", with respect to the solutions available.
Results: Given the fact that the period during which the study was conducted was chosen randomly and that the patients were included consecutively, the representativeness of the results is ensured for any other patient diagnosed with this pathology and admitted to a clinic with the same specialty, dimensions and equipment as the one presented.
Conclusions: This paper compares the results of our study to those of others, in terms of different or similar approach therapeutic options, developed in other minimally invasive surgery centres in the world, the final conclusions being encouraging for the therapeutic sequence that we practice.

Key words: mixt cholecysto-choledochal lithiasis, ERCP, intraoperative cholagiography

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Introduction

The management of mixt cholecysto-choledochal lithiasis (MCCL) has suffered important changes over the last two decades.

While laparoscopic cholecystectomy(LC) has become the gold standard in treating gallstones eversince 1990, the treatment of MCCL remains a challenge, as an agreement has yet to be reached on this subject at this point due to the multitude of efficient approach options, such as open surgery, laparoscopy and endoscopic-laparoscopy, be it sequential or simultaneous. (1,2,3,4)

In our country, the controversies regarding the treatment of MCCL are strongly influenced by ethical and socio-economic factors as well, minimally invasive techniques being unfortunately unavailable for the majority of county hospital surgical clinics, and even for some hospitals which are university centres.

The choice for a certain procedure usually depends on the surgeon's preferences, on his/her experience and on the local technical possibilities.

A classic approach interferes with a fast recuperation period and annuls the benefits of a short hospitalization period.

LC, intraoperative cholagiography (IOC) and laparoscopic exploration of the main bile duct (MBD) in order to remove lithiasis of the MBD seems to be the most economical of treatment options, with a shorter hospital stay and a smaller rate of complications. Unfortunately, a laparoscopic approach of the MBD is not technically facile. (4,5,6,7)

Another treatment alternative is that of a two-step approach: LC with IOC, combined with ERCP. If lithiasis of the MBD is observed during the IOC, an ERCP can be performed postoperatively. Unfortunately, it has a failure rate of 4-10%. In this case, in order to perform a new operation (exploration of the MBD), an ERCP with sphinterotomy can be performed preoperatively as well, followed by LC. This sequence has the advantage of offering the surgeon the possibility of visualizing the MBD, and in case of ERCP failure, of approaching the MBD (in a classical of laparoscopic manner).

This therapeutic series (preoperative ERCP followed by LC) is spread among the centres benefiting from a well-prepared team of endoscopists. The technique bears two disadvantages:

1) the possibility of calculi migration from the gallbladder into the MBD between ERCP and the moment of LC.
2) false negative results at ERCP. (8)

This disadvantage can be foreseen by performing a LC immediately after the ERCP, under the same anaesthesia.

Both the two-step approach, including ERCP and endos-copic sphincterotomy (ES) before, during or after LC, and the laparoscopic exploration of the MBD have demonstrated similar efficiency and associated morbidity rate to other randomized multiple control studies. (9,10,11,12,13,14,15,16,17)

Material and Method

The object of our work was to analyse minimally invasive treatment ("Rendez-vous" technique) in MCCL in a retrospective-observational study conducted on a group of 143 patients admitted to and treated by the Ist surgical Clinic of the Bucharest Emergency University Hospital, between 2008-2012.

All 143 patients included in the study group were selected based on clinical, biochemical and ultrasound criteria for choledochal lithiasis, or were diagnosed preoperatively by ultrasound and/or CT exam.

The treatment elected was desired to be a minimally invasive one, in a sequence of ERCP followed under the same anaesthesia by LC. The choice was based on multiple reasons:

- The possibility of conversion to classic approach under the same general anaesthesia in case of endoscopic failure;
- ERCP performed under general anaesthesia, with clearly superior endoscopic comfort compared to vigil sedation;
- Treating the affliction by putting the patient under anaesthesia only once;
- Significantly diminishing the hospital stay costs, by reducing the hospitalization time and the expenses related to anaesthetic drugs. (18)

This information was statistically processed with MS Excel 2010 and EpiInfo 3.5.4 programs, the results being presented as tables, chart representations and appropriate statistical tests.

For normal distribution variables parametric tests were used, reporting the average and the standard deviation, and for all other variables non-parametric tests were employed, reporting the median and the median standard error.

A p value <0.05 was considered to be statistically significant.

Given the retrospective descriptive nature of the study, emphasis was placed on descriptive methods of statistical analysis.

Results

Between 2008-2012, a group of 143 patients, admitted under the diagnosis of obstructive jaundice caused by lithiasis and treated by a minimally invasive procedure, were analysed.

Based on the analysis of age distribution by decades, it resulted that the prevalence of the disease increases with age, decades 6 and 7 being the most affected (38%). (*Fig. 1*)

Age range was between 17 and 86 years, with an average value of 55 years, median=56 and standard deviation stdev=18.5.

Gender distribution revealed a number of 95 cases among the female sex (66.4%) and 48 male cases (33.6%). (*Fig. 2*)

As can be noticed, there is a female gender predominance (66.4%).

Out of the total 143 cases, 79.7% (114) were minimally invasively approached and 20.3% (29) were treated by classic surgery. The minimally invasively treated cases are predominant. (*Fig. 3*)

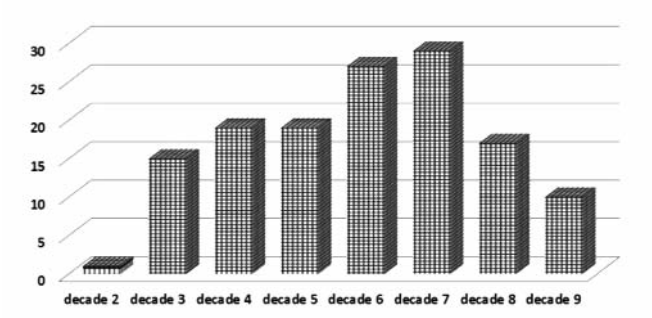


Figure 1. *Age distribution by decades*

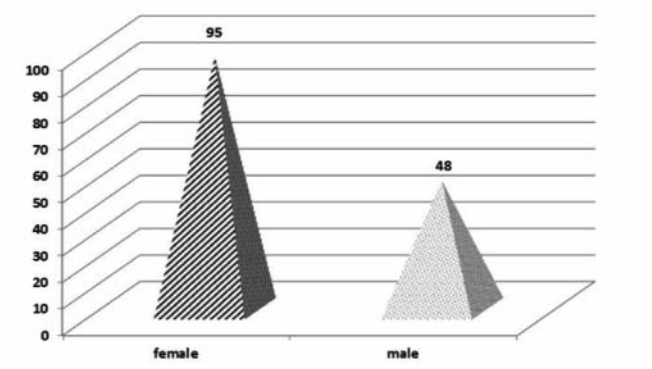


Figure 2. *Gender distribution*

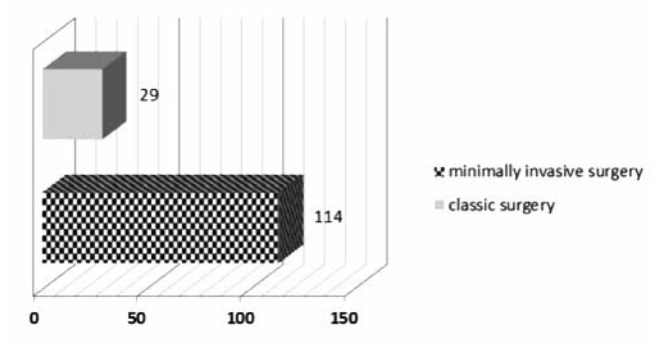


Figure 3. *The way the cases were solved*

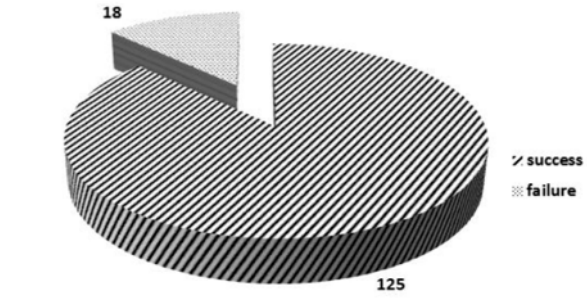


Figure 4. *The success of ERCP*

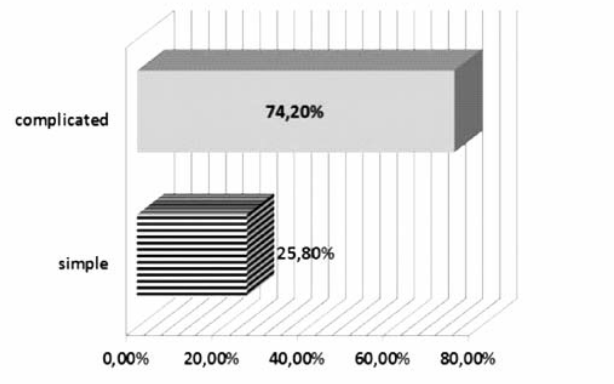


Figure 5. *The clinical forms of MBD lithiasis manifested*

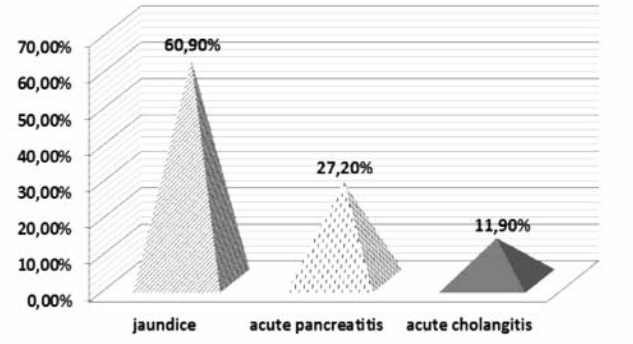


Figure 6. *Complicated forms of MCCL*

The endoscopic manoeuvre (ERCP) was successful in the majority of cases (87.4% - 125 patients) of the 143 included in the study (*Fig. 4*).

Failure of miniinvasive therapy in the 29 observed cases (20.3%) was caused by:

a. endoscopic failures - 18 cases,
b. laparoscopic conversions to classic surgery – a number of 11 conversions was registered, due to modifications inherent to gangrenous acute cholecystitis (plastron) (19).

Causes for ERCP failure:

- Gritted MBD, clearance being impossible to achieve via the endoscopic approach, requiring conversion to classic surgery – 9 cases.
- Duodenal diverticula next to the Vater papilla, which made it impossible to identify and/or cannulate the papilla – 5 cases.
- Oesophageal stenosis (impossible to perform endoscopy) – 1 case
- Technical issues (lack of instruments or defective instruments) – 3 cases.

The clinical forms of MBD lithiasis manifested were (*Fig. 5*):

a. simple form, painful, with no other accompanying events – 25.8%;
b. complicated form, accompanied by obstructive jaundice, pancreatitis or cholangitis – 74.2%, out of which (*Fig. 6*):

- accompanied by obstructive jaundice – 60.9%;
- accompanied by acute pancreatitis caused by microlithiasis – 27.2%;
- accompanied by cholangitis – 11,9%.

MBD lithiasis was accompanied in 74% of cases by acute cholecystitis and in 26% of cases by chronic cholecystitis. (*Fig. 7*)

Intraoperative cholangiography performed revealed the following information:

a. The preoperative diagnosis of choledochal lithiasis set by imaging techniques was confirmed by cholangiography in 70.15% of cases (94).In 29.85% (31) of patients IOC did not detect any lithiasis material in the MBD. (*Fig. 8*);
b. Highlighting the MBD morphology:
   - IOC detected a dilated choledochus (> 1 cm) in 46.8% of cases
   - average choledochal size was 1 cm, with a maximum of 2.7 cm, a median of 0.90 anda 0.40 standard deviation.

With regard to the aspect of the Vater papilla, the following were noticed:

a. strained – 51patients (35.7%);
b. fibrotic – 28 (19.6%);
c. stenosed – 7 (4.9%).

Depending on the type of MBD lithiasis, IOC revealed three situations:

a. sole calculus – 39 cases (41.5%), with an average diameter of 0.76 cm, a 0.70 cm median and a 0.44 standard deviation;
b. multiple calculi – 49 de cases (52.1%);
c. microlithiasis – 6 cases (6.4%).

Papillotomy was practiced in the majority of cases (90.9%). This was performed by:

a. standard technique– 20%;
b. wireguide technique – 13%;
c. "pre-cut" technique with a "knife" papillotome – 67%.

In 89.7% of the patients suffering from MCCL, confirmed by ERCP, the calculi were successfully extracted. (*Fig. 9*)

53% of the calculi extracted, in cases with MCCL, were single calculi, while 47% of cases presented with multiple calculi.

Lithotripsy was used in nine cases (11.4%of all extractions).

Three cases presented with a sole calculus, while six cases involved multiple calculi.

In terms of macroscopic aspect of the bile, four situations were noted: (*Fig. 10*)

1. bile with normal aspect – 96 cases (76.9%);
2. sludge –11 cases (9%);
3. turbid bile (cholangitis) – 10 cases (7.7%);
4. purulent bile – 8 cases (6.4%).

Lavage and postoperative depletion control of the MBD were routinely performed (98.7% of cases).

With regard to post-ERCP complications, these were:

1. intraoperative – during endoscopic manoeuvres:

a. haemorrhages – small bleeds due to papillotomy,

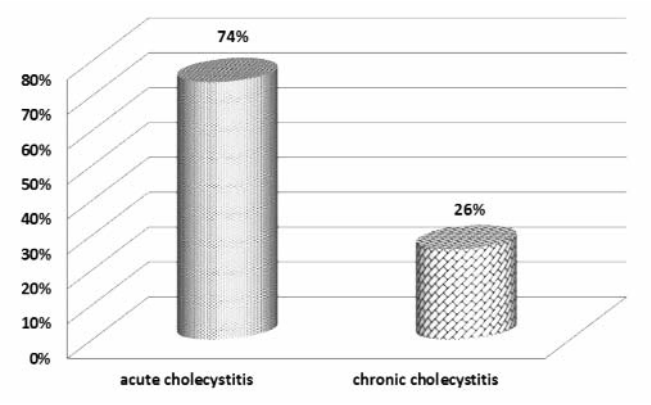


Figure 7. *Clinical form of gallstones that accompanied MCCL*

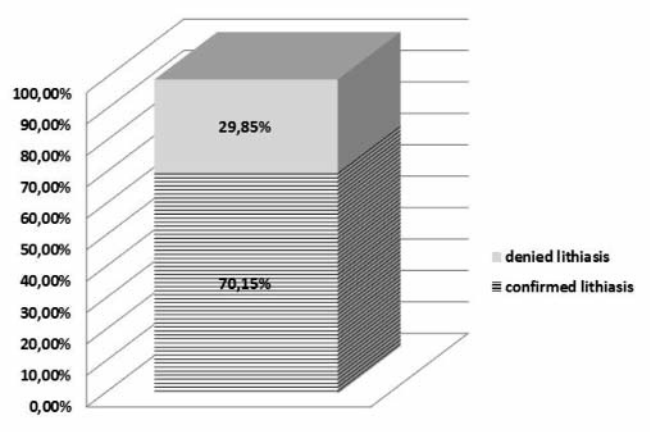


Figure 8. *The confirmation of MBD lithiasis through IOC*

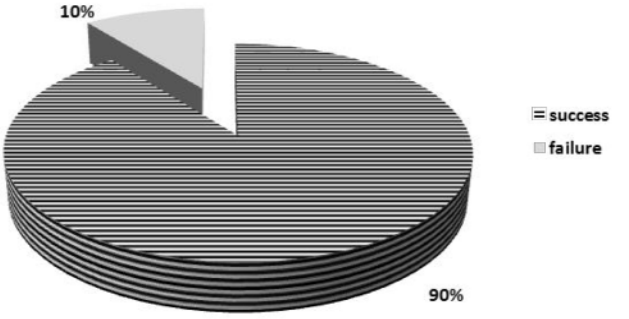


Figure 9. *The success of calculi extraction from MBD through ERCP*

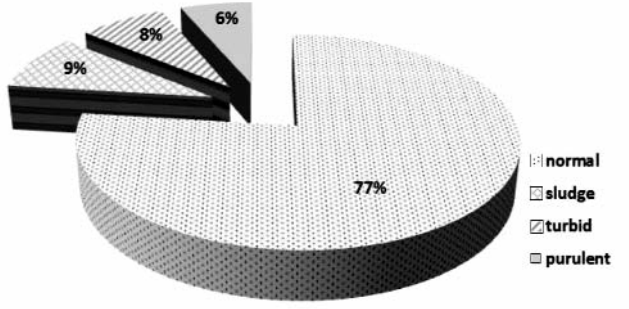


Figure 10. *Aspect of the bile in the moment of ERCP*

which were stopped during the intervention.

b. perforations – none.

2. postoperative – acute pancreatitis was the most frequent complication due to endoscopic manoeuvres, of cannulation and injection of the pancreatic duct. In the studied group, this occurred in 2.4% of cases (3 patients) and presented only with biochemical manifestations (slight value increase of biochemical markers), without any clinical manifestations.

Mortality in the studied group was 0.7% (1 death due to the severity of the associated pathology).

Discussions

Our study analyses in a retrospective, linear and descriptive manner the result obtained after performing the "Rendez-vous" technique as treatment for MCCL. We attempted to highlight the advantages and limitations of this technique, at the same time comparing it to other methods of treatment for this disease.

In terms of morbidity and mortality rates, hospital stay, costs and MBD clearance, our study showed similar results to these available in the medical literature. (1,7,15,16,20)

Out of our result, we would like to note a 89.7% clearance of the MBD, a 2.4% morbidity and 0.7% mortality rate, a hospitalization period of 4.8 days (18), which are all values comparable with those in the literature. Hospital stay costs however are difficult to quantify given our Romanian health system.

The novelty brought by our surgical approach and, implicitly, by our study is that of performing LC under the same anaesthesia, immediately after performing ERCP. The main objection raised by other authors against this association is the fact that sometimes the LC is rendered more difficult to the air insufflation of the digestive tube during endoscopic manoeuvres. In our experience, only two cases presented with air levels in the small bowel and colon at the moment of trocar introduction, determining the surgeon not to go through with the LC. This was performed separately after 48 hours, under normal conditions.Insistent air aspiration from the duodenum and stomach after ERCP was mandatory and allowed avoidance of air dilatation of the digestive tube.

The majority of studies mentioning this therapeutic sequence (ERCP followed by LC) report a period of time between the two procedures, ranging from a few days to several weeks. Endoscopic treatment of MBD lithiasis, followed after 4-6 weeks by LC, has equal success rates with the method of LC followed by laparoscopic exploration of the MBD. (21) In our study the success rate was 86.7%, comparable with other studies. (15,16,20)

On the other hand, the incidence rate of residual lithiasis (remaining or newly migrated) in the MBD after ERCP performed preoperatively, in a group of 227 patients was 12.9% (8).Another study notes a percentage as high as 20% of patients that developed biliary complication after ERCP performed as a sole therapeutic method. (22)

We consider that performing LC immediately after ERCP is the main advantage of the approach suggested by us in the treatment of patients suffering from MCCL.

In lack of an expert opinion of biliary laparoscopy (23), which is reserved only for centres with great experience in this domain, endoscopic exploration of the MBD followed by laparoscopic approach of the biliary lithiasis seems to us the best and most logical option. This must be based on the local possibilities and the degree of experience of the surgical team.

Conclusions

1. Exploration by ERCP, performed as a first step before laparoscopic cholecystectomy, under the same anaesthesia, in cases presented with MCCL was accompanied by real benefits for the patient, quantified in the small number of hospitalization days and short period before social reintegration.
2. Preoperative ERCP exploration does not modify greatly the technical conditions for performing laparoscopic cholecystectomy.
3. Classic surgical approach of MCCL remains an option reserved for cases with large calculi, gritted choledochus or impossible to approach endoscopically due to various local anatomical reasons (diverticula, gastric resections), as well as for patients with inflammatory modifications of the gallbladder, that do not allow a laparoscopic approach. (24)
4. The "Rendez-vous"technique proves to be useful, reproducible, presenting no major risks, effective, and bearing all the advantages of miniinvasive surgery.
5. Although initial evaluation was as always performed by a surgeon, we consider that the experience of the surgeon-endoscopist team in the case of the pathology analysed in our study was the decisive factor for the favourable result obtained, even more so as the endoscopist is also a practitioner of general surgery, with vast experience in biliary surgery.

Acknowledgements

This paper is supported by the Sectoral Operational Programme Human Resources Development (SOP HRD) 2007-2013, financed from the European Social Fund and by the Romanian Government under the contract number POSDRU/107/1.5/S/82839.

Authors contribution

All authors had equal scientific contributions.

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