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Which differences do elderly patients present in single-stage treatment for cholecysto-choledocholithiasis?

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ABSTRACT

Patients with symptomatic gallstones present common bile duct stones in approximately 10% of cases. It is possible to resolve both gallbladder and bile duct stones with a single procedure. The aim of this study is to determine the effectiveness of a single stage procedure for gallbladder and bile duct stones in the elderly patients and to expose the differences between the various techniques. From January 2008 to December 2013, we treated 1540 patients with gallbladder stones. In 152 cases, we also found bile duct stones. 150 of these were treated in a single stage procedure. We divided our patients into 2 groups: Group A was younger than 65 (104 patients); Group B was 65 or older (46 patients). We retrospectively compared sex, ASA score, conversion rate, success rate, post-operative complications, hospital stay, and treatment method. We had no intra-operative mortality. 1 patient in Group B, heart condition (ASA 4), died with multiple organ failure (MOF) 10 days after his operation. ASA score: 3.5 ± 0.5 in A vs 2 ± 0.9 in B ($P 0.001$), post-operative complications 6% in A vs 18.1% in B ($P 0.0325$) and hospital stay 4.1 ± 2.3 in A vs 9.5 ± 5.5 in B ($P 0.0001$) were significantly higher in Group B. No differences were found in term of success rate: 94% in A vs 90% in B ($P 0.4944$). The procedure used to obtain the clearance of the bile duct showed a different success rate across the two groups: for the patients under 65 years old, trans-cystic clearance (TC-CBDE) was successful in 90% of cases, and only 51% for those older than 65, where we had to recall 49% for laparo-endoscopic rendez-vous (RV-IOERC) ($P 0.0014$). In conclusion, single stage treatment is safe and effective also to elderly patients. The methods used in patients being younger than 65 years old is what appeared to be significantly different.

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1. Introduction

The incidence of gallbladder stones increases with age and after 65 between 12 and 20% of the population show symptoms that require surgical intervention [1]. Generally the elderly patient

shows more advanced symptoms which coexist with other pathologies [2]. For these patients, the probability of contemporaneous bile duct stones is higher and it is essential to select the appropriate treatment.

While laparoscopic cholecystectomy (CL) is accepted as the treatment of choice for simple gallbladder stones [3], the preferred treatment in the 10% of cases in which common bile duct stones are also present is still debated [4–6]. During the first decades of the era of laparoscopic treatment of common bile duct stones, treatment was almost entirely endoscopic and Retrograde Cholangiopancreatography (ERCP) was proposed pre- or post-cholecystectomy [7]. Despite the good results obtained, several issues did present drawbacks: the number of unnecessary stages (10%) [8]; a non-negligible complication rate between 0.8 and 11.1% [9]; a mortality rate between 0.1 and 3.3% [10].

The development of laparoscopic techniques also demonstrated that it was possible to resolve both gallbladder and bile duct stones

Abbreviations: ASA, American society of anesthesiologists; MOF, multiple organ failure; TC-CBDE, trans-cystic common bile duct extraction; RV-IOERC, rendezvous-intraoperative endoscopic retrograde cholangiopancreatography; ERCP, endoscopic retrograde cholangiopancreatography; CL, laparoscopic cholecystectomy; CBD, common bile duct.

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with a single stage procedure [11]. Therefore, the current treatment options to address the gallbladder and common bile duct stones are two: treatment in either one or two stages. Several studies have shown that both methods are equivalent in terms of efficacy, morbidity, and mortality [12].

But it is now accepted that treatment with a single stage lowers costs and is generally more accepted by the patient, who undergoes fewer hospital admissions [13]. Therefore treatment in a single stage permits the resolution of pre-operatively unsuspected common bile duct stones [14].

The aim of this study is to determine the effectiveness of a single stage procedure for gallbladder and bile duct stones in the elderly patients and to expose the differences between the various techniques.

2. Methods

From January 2008 to December 2013, we treated 1540 patients with gallbladder stones. In 152 cases, we also found bile duct stones. 150 of these were treated in a single stage procedure. Of these patients, 46 were 65 years old or older. We employed a flow cart to treat the gallbladder and bile duct stones together, in which we assess the degree of complexity of the methods (Fig. 1). Firstly, we attempted a trans-cystic clearance (TC-CBDE) and, if this failed, we performed a laparo-endoscopic procedure (RV-IOERC). We divided our patients into 2 groups: Group A was younger than 65 (104 patients); Group B was 65 or older (46 patients). We retrospectively analyzed each group on the basis of sex, ASA score, conversion rate, success rate, post-operative complications, hospital stay, and treatment method.

Continuous variables were compared using the Mann–Whitney *U* test. Categorical variables were compared using the Fisher exact probability test or the chi-square test, when appropriate. Differences with a *P* value of less than 0.05 were considered statistically significant. Analysis was performed with Graphpad Quickcalcs or Graphpad Prism version 5.

3. Results

We had no intra-operative mortality. 1 patient in Group B, heart condition (ASA 4), died with multiple organ failure (MOF) 10 days after his operation.

The results showed no significant differences between the two groups regarding sex. However, the ASA score was significantly higher for patients older than 65 (3.5 ± 0.5) than for those under 65 (2 ± 0.9) (*P* 0.001) (Table 1).

The conversion rate was similar across the two groups: 3.8% (4 patients) and 4.3% (2 patients) respectively. The causes of the conversions were: local inflammation (3 patients); indistinct anatomy (2 patients); impossibility of obtaining an adequate clearance (3 patients). The success rate of the single stage method was not deferred for the patients older than 65, obtaining a complete resolution in 90% of cases compared to 94% for those younger than 65.

The rate of complication was higher in Group B (18.1%) compared to Group A (6%) (*P* 0.0325). It is noticeable how the rate of a specific complication, bile leakage, was the same, while the rate of general complication was much higher (Table 2).

Table 1
Variables Group A and Group B.

Variables	Group A (<65 aa) 104 pt	Group B (>65 aa) 46 pt	<i>P</i>
Gender (male)	49 (47%)	26 (57%)	0.3761
ASA score, mean ± DS	2.0 ± 0.9	3.5 ± 0.5	0.001
Conversion rate	4 (3.8%)	2 (4.3%)	1.0000
Success rate	94 (94.0%)	40 (90.0%)	0.4944
Complications	6 (6.0%)	8 (18.1%)	0.0325
Hospital stay (days), mean ± DS	4.1 ± 2.3	9.5 ± 5.5	0.0001
Treatment	TC-CBDE 90% (90 pt)	TC-CBDE 51% (29 pt) RV-IOERC 49% (15 pt)	0.0014

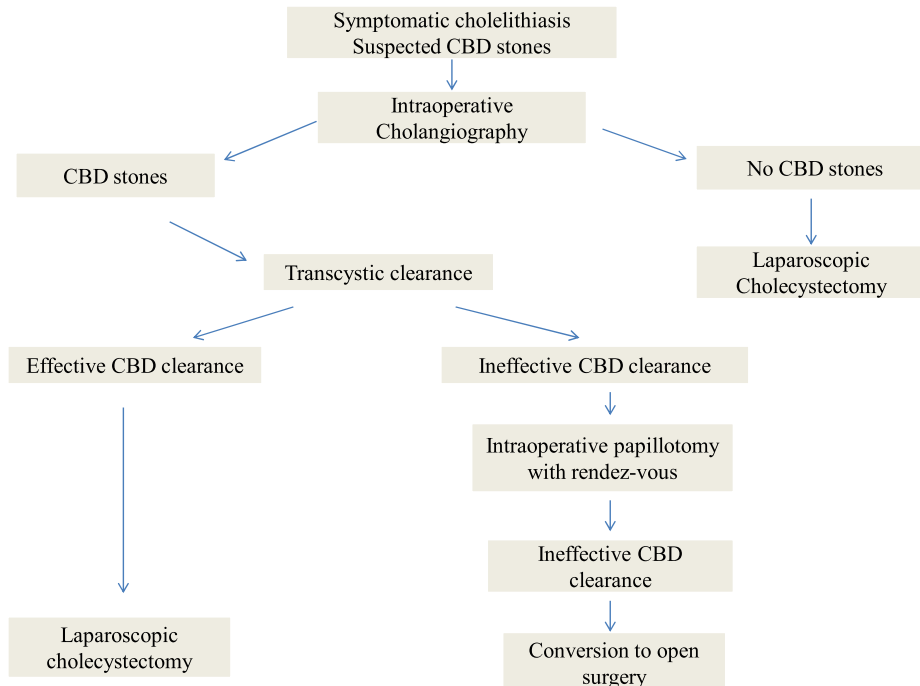


Fig. 1. Flow chart in the treatment of cholecysto-choledocholithiasis.

Table 2
Complications.

Group A 104 pt	Group B 46 pt	
3 Bile leakages	1 Bile Leakage	1 Renal failure
2 Wound infections	1 Wound infection	2 Pneumonia
1 Pleural effusion	2 Pleural effusion	1 M.O.F.

The hospital stay was significantly longer for those patients aged 65 or older ($P < 0.0001$).

The procedure used to obtain the clearance of the bile duct showed a different success rate across the two groups: for the patients under 65, trans-cystic clearance was successful in 90% of cases, and only 51% for those older than 65, where we had to recall 49% for RV-IOERC ($P < 0.0014$).

4. Discussion

Bile stones are one of the most frequently occurring pathologies in the elderly and can occur both in the simple case of gallbladder stones but also with the additional presence of bile duct stones.

The elderly patient generally presents a more compromised clinical condition and in the past, surgical intervention was not advisable. With the development of laparoscopic and minimally invasive techniques it has been established that age no longer represents a contraindication and even complex cases have been treated with good results [13].

Once a diagnosis of gallbladder and bile duct stones has been made, the treatment must be selected.

Several possibilities are available, especially since it has been reported that even laparoscopically, it is possible to obtain complete clearance. For many years the treatment of choice was a sequential two-steps procedures in which clearance of CBD was done with ERCP and then CL. This is still perhaps the most followed method and can give good results even for very elderly patients [14]. But the high rates for non-negligible increase in major complications and mortality must be kept in mind [15]. The advances in laparoscopic techniques have made it possible to treat gallbladder and bile duct stones in a single step. In recent years this method has gained greater consensus.

The advantages are a reduction in cost and better patient compliance [16].

Trans-cystic clearance is certainly the simplest approach and can be used in the vast majority of cases [17]. It has clear directions regarding size and number of stones and requires a good laparoscopic technique, with a minimum of organization [18]. It gives good results even in cases of concomitant acute cholecystitis [19]. There are two options available in cases in which trans cystic clearance can not be performed: direct access to the common bile duct and RV-IOERC.

In our investigation, we used as a first approach a trans-cystic procedure and, in case of failure, the RV-IOERC [20].

The RV-IOERC is a method that requires the most organization and is therefore rarely used [21]. The advantage is obtained mainly in the sequential treatment because the success rate is greater and the number of complications is reduced [22]. A close cooperation between surgeon and endoscopist is absolutely necessary [23]. It has a relative contraindication for the destruction of the Oddi's sphincter just in young patients.

We compared 2 groups of patients treated with a single stage procedure for gallbladder and bile duct stones. The groups were divided by age: younger and older than 65 respectively.

The presence of comorbidity in patients older than 65 was shown in an ASA score significantly higher than the younger group

but this did not affect their rate of conversion. However, the percentage of specific complications (bile leakage) did not differ, while the majority of general complications determined a longer hospital stay. Elderly patients present a more significant pre-operative risk, but this does not represent a higher specific surgical risk [24].

Neither the success rate has shown differences between the two groups, with a similar biliary clearance percentage (94% and 90% respectively). The methods used in patients being younger than 65 years old is what appeared to be significantly different. The TC-CBDE has been possible in 90% of the cases rather than the 51% that was possible in group B.

Often, surgical treatment does not represent the first choice for treatment of bile duct stones, but it has been shown that waiting can result in a higher incidence of emergency treatment and greater post-operative morbidity [25].

Trans-cystic clearance is certainly the most natural method to clear the bile duct. In the vast majority of cases, common bile duct stones were caused by a migration of stones from the gallbladder and therefore they can be removed via the same physiological route. Studies reported a rate of about 2/3 of the cases of common bile duct stones resolved by trans-cystic approach [26].

The factors which contributed to failure were related to local inflammation, anatomical variations, small friable cystic duct or to the large number of stones [27].

The clearance of the bile duct by RV-IOERC is a method that was reported to be particularly successful. Several studies, however, demonstrated a superiority of this method in terms of intra-operative success and cost compared to the methods that require two stages [28].

Often, in elderly patients, with the long duration of the symptoms, the clinical stage is more advanced with an increase in number and diameter of the stones.

Also the local inflammation is more accentuated. Our results show a clear difference between groups A and B: in patients younger than 65, the trans-cystic clearance was achieved in 90% of cases compared with 51% in group B.

This demonstrates that for elderly patients, gallbladder and bile duct stones represent a more complex pathology.

In conclusion, one stage treatment can be justifiably recommended also to elderly patients, showing excellent results and a rate of specific complication that does not differ from the younger patients group. Although, for the elderly patients, it is less likely to obtain a clearance of the bile duct just with the trans-cystic approach.

Ethical approval

No ethical approval was necessary.

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Author contribution

Bove A.:conception and design the study; drafting the article, final approval of the version to be submitted.

Di Renzo R.M.: interpretation of data, revising the article.

Palone G.: interpretation of data, final approval of the version to be submitted.

D'Addetta V.:acquisition and interpretation of data.

Caldararo F.: acquisition and analysis of data.

Antonopulos C: acquisition and interpretation of data.

Panaccio P.:analysis and interpretation of data.

Chiarini S: interpretation of data, final approval of the version to be submitted.

Bongarzoni G.: revising the article, final approval of the version to be submitted.

Conflicts of interest

All Authors have no conflict of interests.

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