



and Other Interventional Techniques

Routine laparoscopic cholecystectomy after endoscopic sphincterotomy for choledocholithiasis in octogenarians: is it worth the risk?

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Abstract

Background: No unanimous consensus has been reached as to the need for routine laparoscopic cholecystectomy (LC) after endoscopic sphincterotomy (ES) for choledocholithiasis in very elderly patients, who are considered as high-risk subjects for surgery.

Methods: From 1991 through 1997, 170 patients were referred to undergo preoperative ES and routine LC for common bile duct (CBD) stones. The results for 27 patients (age 80 years or older) were compared with those achieved for younger patients. Successively, in a retrospective case-control study, the results for the selected patients were compared with those for 27 very elderly patients who underwent endoscopic retrograde cholangiopancreatography (ERCP), but did not receive LC. The mean follow-up period was 126 months.

Results: Octogenarians showed longer surgery time (79 vs 51 min) and postoperative hospital stay (2.8 vs 1.2 days), as well as more early low-grade complications (15% vs 3%), whereas there were no differences in conversion rate or serious complications. Recurrent symptoms or complications developed in 48% of octogenarians not undergoing routine LC, and 30% finally needed surgery. One patient in the control group died after emergency cholecystectomy for acute cholecystitis. The results of surgery were significantly poorer for the control group.

Conclusions: Although a “wait-and-see” policy allowed two-thirds of LCs to be avoided in octogenarians, biliary-related events developed for every second patient, often requiring delayed surgery, with poorer results. Sequential treatment (ES followed by elective LC) is a safe procedure for octogenarians, and should be con-

sidered as a standard, definitive treatment for cholecystocholedocholithiasis even after the age of 80 years.

Key words: Cholecystectomy — Complications — Laparoscopy — Octogenarians — Sphincterotomy

In the past two decades, endoscopic sphincterotomy (ES) has been widely accepted as the standard procedure for the treatment of common bile duct (CBD) stones. Conversely, the need for a routine cholecystectomy after ES, both in the general population [12, 20] and for elderly patients [11] still is being debated. Although the recent dramatic shift from the traditional open approach to the laparoscopic approach has been followed by a considerable reduction in morbidity associated with surgery, several authors [5, 13, 25, 27, 29] still are reluctant to perform cholecystectomy routinely after ES. They have adopted an expectant and restrictive policy, thus avoiding up to 90% of unnecessary laparoscopic cholecystectomies (LCs).

The recognition of the elderly and the very elderly as a definite class of patients, consequent to the increasing mean age of the general population in western countries, has led to further debate as to the most appropriate management of gallbladder stones after ES in the elderly, whose age is considered a risk factor for surgery. Whereas findings show ES to be very effective and safe for very elderly patients [19, 28], LC is followed by worse results [2, 4, 9, 31] in the elderly than in the general population. Therefore, a routine “wait-and-see” attitude after an ES for cholecystocholedocholithiasis for patients older than 80 years has been suggested recently [13, 23].

Since the early 1990s, ES and routine, early-scheduled, elective LC have been carried out as a standard protocol [26] in one center for all patients with CBD stones, regardless of age. Considering that reports as to the long-term results of the sequential treatment (LC

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Table 1. Russell's classification of surgical complications

Grade 1	Not life threatening, no lasting disability, hospital stay not extended more than twice the mean hospitalization within the same patient group
Grade 2	Potentially life threatening, but without residual disability Grade 2a: Invasive procedure not required, but hospital stay extended more than twice the mean hospitalization within the same patient group Grade 2b: Invasive procedures required
Group 3	Residual disability
Group 4	Death because of complications

after ES) in the very elderly population are not available for evaluating the feasibility, effectiveness, and safety of this procedure, which may justify a less aggressive approach for patients older than 80 years, this study evaluated the short- and long-term results (mean follow-up period, 10 years) of the policy for octogenarians. These results are compared with both the outcome of the sequential treatment for a younger population (age 79 years or less) and the results of a wait-and-see policy for octogenarians (ES alone with LC only when needed).

Patients and methods

From January 1991 through December 1997, 170 consecutive patients underwent ES for cholecystocholedocholithiasis at the local Division of Gastroenterology according to our protocol. As previously reported [26], all the patients then were referred for early LC, whether they had gallbladder stones or not. The only criterion for exclusion from LC was an American Society of Anesthesiology (ASA) 4 class of risk. Laparoscopic cholecystectomy was scheduled as soon as possible after ES, that is, after the diagnostic workup of the biliary tree was completed and after the general condition and surgical risk of the patient was evaluated. At discharge, patients were instructed to notify a physician of our team as to any clinical symptoms or signs or any laboratory or imaging data observed: any pain to the abdomen or the back, dyspepsia, jaundice, or fever. Follow-up examinations were scheduled at 6 months and 2 years after surgery. In November/December 2005, all the patients were interviewed, or, alternatively, the patients' families and/or family physicians were contacted. Deceased patients' death certificates, postmortem examinations, or both were reviewed. Surgical complications were classified according to Russell [24] (Table 1). The patients were divided into two groups: group 1 (80 years old or older) and group 2 (79 years old or younger), and the recorded parameters were compared between the two groups.

A total of 160 patients (94%) underwent LC after ES. Among the 10 patients (6%) excluded from the study, three patients were ASA 4, three had refused surgery, one had myocardial infarction 3 days after ES, two had undergone open cholecystectomy for previous superior abdomen surgery, and one had undergone LC and laparoscopic appendectomy during the same procedure (Figure 1). Although the last three patients actually had undergone a sequential treatment, they were excluded from the analysis to allow for a comparison between homogeneous procedures.

Successively, in a retrospective case-control study, the selected 27 very elderly patients undergoing endoscopic retrograde cholangiopancreatography (ERCP) and routine LC were matched with the same number of very elderly patients (paired by age with a 3-year tolerance, sex, health status, and ASA score) who had undergone ERCP for CBD clearance in the same environment during the same period, but did not receive routine elective LC (group 3). To reconstruct the history of the group 3 patients, the charts of the Division of Gastroenterology and Department of Surgery were reviewed, as well as deceased patients' death certificates, postmortem examinations or both. Where possible, the patients were interviewed, or, alternatively, the patients' families or family physicians were contacted.

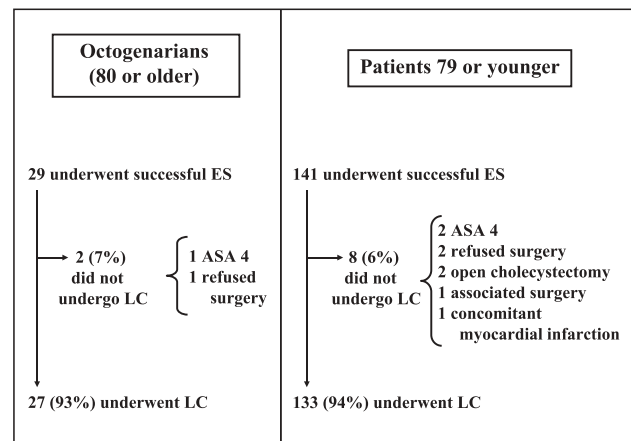


Fig. 1. Patients undergoing sequential treatment: endoscopic sphincterotomy followed by laparoscopic cholecystectomy. ES, endoscopic sphincterotomy; LC, laparoscopic cholecystectomy.

Statistical analysis

Analysis of variance (*F*-test) was performed (with $\alpha = 0.05$) for statistical evaluation of the differences between the means in the two groups. Chi-square was calculated (with $\alpha = 0.05$) for the statistical evaluation of the differences between the percentage frequencies.

Results

The mean follow-up period was 126 months (range, 89–158 months).

Part 1. Sequential treatment (ERCP and routine LC): octogenarians (group 1) versus patients 79 years old and younger (group 2)

The results are reported in Table 2.

Gender

There were 106 women and 54 men, with no difference between the two groups.

ASA class

The ASA 1 patients numbered 107 (10 in group 1, 97 in group 2), the ASA 2 patients numbered 39 (10 and 29, respectively), and the ASA 3 patients numbered 14 (7 and 7, respectively). The ASA 3 patients were significantly more numerous in group 1 ($p < 0.05$).

Delay of surgery

The mean delay of surgery was 7.7 days (range, 1–49 days) after ES. Some patients underwent surgery very shortly after ES, whereas most procedures (126 patients, 79%) were performed 5 to 10 days after ES because the operating schedule was filled weekly. Long delays between ES and LC were mostly attributable to the evaluation of high

Table 2. Results of sequential treatment (endoscopic sphincterotomy followed by laparoscopic cholecystectomy) for octogenarians and the younger population

	80 or older (mean 84; range, 80–96)	79 or younger (mean 53; range, 19–79)	<i>p</i> Value
<i>N</i>	27	133	—
Sex (M/F)	9/18	45/88	NS
Health status: <i>n</i> (%)			
ASA 1–2	20	126	< 0.05
ASA 3	7 (26)	7 (6)	
Delay of surgery: days (range)	8.1 (1–31)	7.6 (1–49)	NS
Duration of surgery: min (range)	79 (31–171)	51 (26–147)	< 0.05
Conversions: <i>n</i> (%)	4 (14)	10 (7)	NS
Postoperative stay: days (range)	2.8 (1–6)	1.2 (1–11)	< 0.05
Complications related to surgery: <i>n</i> (%)			
Early: Grade 1–2	4 (15)	4 (3)	< 0.05
	Urine retention (2), pain, persistent vomiting	Reoperation (bleeding), suspected pulmonary embolism, pneumonia, pain	
Grade 3–4	—	—	NS
Late: Grade 1–2	1 (3)	2 (1)	
	Abdominal hernia	Granuloma, abdominal hernia	NS
Grade 3–4	—	—	NS
Mortality (biliary related)	—	—	NS
Further endoscopic procedures	1 (3)	2 (1)	NS

NS, not significant; ASA, American Society of Anesthesiology

surgical risk (ASA 3 had an average delay of 17.2 days), unclear biliary features at ES, or abnormal liver laboratory tests needing further preoperative evaluation.

Duration of surgery and conversions

The mean operation time was 56 min (range, 26–171 min) overall, but was significantly longer for octogenarians (79 vs 51 min; $p < 0.05$). The overall conversion rate was 8% and not significantly different between the two groups (14% vs 7%). Even if converted procedures are excluded, the mean operating time still was significantly longer for octogenarians (70 vs 48 min; $p < 0.05$).

Postoperative stay and early complications

The mean postoperative stay was 1.6 days, but was significantly longer for group 1 (2.8 vs 1.2 days; $p < 0.05$). Three patients in group 1 and three patients in group 2 had grade 2 complications, which prolonged their hospital stay. One patient in group 2 reported intraabdominal bleeding from a port site requiring emergency reoperation performed laparoscopically.

Late complications

Three patients had grade 2 complications (one in group 1, two in group 2). All three underwent reoperation. The two patients with ventral hernias underwent laparoscopy.

Mortality and cause of death

No early or late surgery-related mortality was observed in either group. By the last follow-up evaluation in

December 2005, 55% (15/27) of the patients in group 1 and 23% (31/133) in group 2 had died.

Further endoscopic procedures

One patient in group 1 and two patients in group 2 needed further endoscopic procedures. An 84-year-old man had adenocarcinoma of the pancreas 35 months after LC, which was treated by biliary stent. The patient died 8 months later. Two female patients in group 2 experienced jaundice 6 weeks and 7 months after surgery, respectively. The one patient had residual CBD stones, and the other had cholangitis. Both were re-treated successfully by endoscopy.

Part 2. Octogenarians: Sequential treatment (ERCP and routine LC) (group 1) versus wait-and-see policy (ERCP alone) (group 3)

The results are reported in Tables 3 and 4.

Recurrence of biliary events

The patients in group 3 had a significantly higher rate of symptom/complication recurrence than those in group 1 (48% vs 10%; $p < 0.05$), with colicky abdominal pain and dyspepsia as the most frequent disorder.

Mortality

No mortality was recorded for group 1, whereas one patient died in group 2 after emergency cholecystectomy for acute cholecystitis (see later).

Table 3. Results of sequential treatment (endoscopic sphincterotomy followed by laparoscopic cholecystectomy) and wait and see policy (endoscopic sphincterotomy alone) for octogenarians (case-control comparison)

	ES + routine LC (27 patients)	ES alone (27 patients)	<i>p</i> Value
Sex (M/F)	9/18	9/18	NS
ASA 3 patients: <i>n</i> (%)	7 (26)	7 (26)	NS
Mean age: <i>n</i> (range)	84.1 (80–96)	84.5 (80–98)	NS
Patients with recurrent biliary events: <i>n</i> (%)	3 (10) ^a	13 (48) ^a	< 0.05
Symptoms/complications:			
Colicky pain	1	8	
Dyspepsia	3	6	
Acute cholecystitis	—	3	
Jaundice/cholangitis	—	3	
Acute pancreatitis (mild)	—	1	
Patients needing further endoscopic procedures: <i>n</i> (%)	1 (3)	8 (30) ^b	< 0.05
Patients finally undergoing surgery: <i>n</i> (%)	All	8 (30)	< 0.05
Mortality (biliary-related): <i>n</i> (%)	—	1 (3)	NS

ES, endoscopic sphincterotomy; LC, laparoscopic cholecystectomy; NS, not significant; ASA, American Society of Anesthesiology

^a One or more symptoms/complications were allowed

^b One patient needed two procedures (biliary stent positioning for biliary leak on postoperative day 3 and its recovery on day 23)

Table 4. Results of laparoscopic cholecystectomy performed routinely as an elective procedure shortly after endoscopic sphincterotomy (sequential treatment: case group) and performed when strictly needed (wait and see: control group)

	ES + routine LC	ES alone (LC when needed)	<i>p</i> Value
No. of LCs: <i>n</i> (%)	27/27 (100%)	8/27 (30%)	< 0.05
Sex (M/F)	9/18	3/5	NS
ASA 3: <i>n</i> (%)	7 (26)	3 (37) ^a	NS
Duration of surgery: min (range)	79 (31–171)	121 (36–198)	< 0.05
Conversions to laparotomy: <i>n</i> (%)	4 (14)	3 (37)	NS
Mean postoperative stay per patient: days (range)	2.8 (1–7)	5.1 (1–21)	< 0.05
Complications (surgery-related): <i>n</i> (%)			
Early: Grade 1–2	5 (18)	5 (62)	< 0.05
	4 (15)	4 (50)	NS
	Urine retention (2), unexplained abdominal pain, persistent vomiting	Biliary leakage (requiring postoperative stent positioning), respiratory failure, atrial fibrillation, urine retention	
Grade 3–4	—	1 (12)	NS
		Death (CHF)	
Late: Grade 1–2	1 (3)	—	NS
	Abdominal hernia	—	
Grade 3–4	—	—	NS

ES, endoscopic sphincterotomy; LC, laparoscopic cholecystectomy; NS, not significant; ASA, American Society of Anesthesiology; CHF, congestive heart failure

^a One patient passed from ASA 2 to ASA 3 during the interval between endoscopic retrograde cholangiopancreatography and surgery

Hospital stay

Because of elective LC, the group 1 patients had a cumulative hospital stay of 76 days (74 days in a surgical unit, 2 days in the intensive care unit [ICU]), and did not need any further hospitalization after discharge from surgery. Overall, the group 3 patients were hospitalized because of biliary-related diseases for 55 days during follow-up care after ES: 41 days because of delayed/emergency LC (28 in a surgical unit, 13 in the ICU), and 14 days because of nonsurgical biliary events.

Further endoscopic procedures

Eight patients in group 3 needed a total of nine endoscopic procedures after CBD clearance had been accomplished. The reasons for repeat endoscopic ret-

rograde cholangiopancreatography were biliary stent positioning for early biliary leak on postoperative day 3 and its recovery 3 weeks later (2 procedures), abnormal ultrasound features in two cases (dilated CBD, suspected cephalopancreatic mass), jaundice/cholangitis (3 cases), acute pancreatitis, and elevated serum liver enzymes (aspartate aminotransferase, alanine aminotransferase, total bilirubin). One endoscopic procedure was necessary in group 1 (jaundice caused by cephalopancreatic cancer, as previously described).

Elective LC (group 1) versus delayed/emergency LC (group 3)

Eight patients in group 3 underwent delayed LC. In three cases, LC was an emergency procedure because of

acute cholecystitis (2 LCs were converted to open procedures). The results of surgery were significantly poorer in group 3 than in group 1 (Table 4). The operating time in group 3 was 50% longer than in group 1 (121 vs 79 min), and conversions to open procedure were more numerous. The group 3 patients needed a postoperative stay almost twice as long as the group 1 patients (5.1 vs 2.8 days), and spent 13 days in ICU overall, as compared with 2 days for the group 1 patients.

Five patients (62%) in group 3 had postoperative complications associated with LC, as compared with five patients (15%) in group 1. No mortality was observed in group 1. In group 3, a 93-year-old ASA 3 female patient died on postoperative day 1 of congestive heart failure after converted cholecystectomy for sepsis attributable to acute cholecystitis. No other severe complications related to surgery were observed in either group. By the last follow-up assessment in December 2005, 55% (15/27) of the patients in group 1 and 48% (13/27) of the patients in group 3 had died.

Discussion

The role of surgery after successful ES for CBD stones remains controversial. Although it is traditionally considered an indication for cholecystectomy, several authors challenge the routine use of surgery after endoscopically accomplished CBD clearance [5, 13, 25, 27, 29]. The rationale of this conservative attitude is that ES alone, besides treating choledocholithiasis, may prevent (or reduce) biliary complaints in a relevant number of cases [5, 21, 25]; it still is unclear whether cholecystectomy may reduce biliary symptoms [13, 21, 25, 34]; and ES can easily be repeated in the case of recurrent CBD stones [13, 21, 24]. Therefore, many authors prefer to reserve LC only for patients experiencing untreatable, recurrent biliary symptoms or acute cholecystitis.

Advocates of a nonroutine surgical approach after successful ES [21, 25, 29] report recurrent biliary symptoms in less than one-half (11–37%) of patients with gallbladder *in situ*, acute pancreatitis in a very small percentage of cases (0–0.5%), and a 9% to 31% rate of recurrent CBD stones (responsive to endoscopic retreatment). Thus, the need for cholecystectomy is limited, involving up to only one-third (15–33%) of patients, and only 5% to 6% undergo an emergency procedure for acute cholecystitis. On the basis of their results, these authors challenge the routine use of LC after ES, whereas others [20, 27], in former and recent times, have proposed a routine wait-and-see policy for this class of patients, with surgery performed only when needed.

The need to avoid useless surgical procedures is considered even more important for the elderly, who are considered to be high-risk subjects for surgery. In fact, in the past decade, LC for the very elderly is reportedly characterized by a longer surgery time, a higher conversion rate, a longer hospital stay, and higher morbidity [2, 4, 9, 31]. The mean mortality rate for LC, as reported by national surveys exceeding 10,000 patients

[18, 35], is almost 10 times higher for octogenarians than for the general population (1.8% vs 0.2%). These data are confirmed by a review of the English language literature (Table 5) [1, 2, 4, 8, 9, 15, 22, 30, 31, 33], which reports an overall mortality rate of 2% for LC in the very elderly, approaching 10% in some series [15, 30, 33]. In view of this consideration, a regular follow-up evaluation of very elderly patients after ES has been suggested [13, 23], with cholecystectomy performed only when strictly needed.

As compared with the data of the literature, our results for octogenarians are only partially expected. Although globally worse than the results obtained for the younger population (longer surgery time, longer hospital stay, more early/low-grade complications), the outcome for our very elderly patients is more favorable than that reported by others. Although the total number of patients treated ($n = 27$) was too small for general conclusions to be drawn regarding infrequent events (e.g., mortality), it is noteworthy that octogenarians, who underwent LC in worse general condition than the younger population (ASA 3 patients were significantly more numerous, 26% vs 6%), had no high-grade complications or death. As compared with a wait-and-see policy, elective LC significantly reduced the recurrence of biliary-related events and the need for further endoscopic procedures in octogenarians, with no mortality and at a reasonable cost in terms of postoperative morbidity and hospital stay. Moreover, early scheduled elective LC allowed us to avoid delayed or emergency surgery, which had poorer results for the very elderly.

Although feared as a potentially life-threatening procedure for octogenarians, LC may not be the only factor responsible for such poor results reported by other authors. The common policy of physicians and surgeons to defer surgery for very elderly patients, following the Latin saying “*primum non nocere*,” inevitably biases the studies on the feasibility of surgery for this class of patients. As already noted [9, 33], very elderly patients more frequently undergo emergency/urgency surgery in significantly poorer general condition (in terms of ASA score), and more often present with a history of biliary disorders related to gallbladder stones (e.g., repeated acute cholecystitis, pancreatitis) or procedures on the CBD (e.g., ES). A conservative approach, with surgery often delayed, may play a consistent role in the poor results obtained with laparoscopy used for very elderly patients. This latter hypothesis seems to be confirmed by our findings (Table 4). Although a wait-and-see policy allowed us to avoid 70% of LCs and to reduce hospital stay, the results of surgery for patients undergoing delayed/emergency LC were significantly poorer than those achieved with elective procedures in group 1 (longer operating time, higher conversion rate, more postoperative complications, longer postoperative stay, more frequent need for ICU support).

Delayed LC, as reported by the only two randomized studies [3, 14] that examined the need for cholecystectomy after ERCP in younger patients (general population [3] and patients 60 to 90 years of age [14]), is

Table 5. Mortality of laparoscopic cholecystectomy in the very elderly (English literature)

Reference	Source (First author)	No. of patients 80 years old or older (or older than 75 ^a)	Overall mortality n (%)	Mortality excluding patients with acute cholecystitis and/or severe comorbid diseases (ASA 4)
8	Firilas et al. ^a Surg Endosc 1996	61	—	—
30	Tagle et al. Surg Endosc 1997	20	2	—
22	Pessaux et al. ^a Surg Endosc 2000	102	1	1? (pulmonary embolus) ^b
4	Brunt et al. Surg Endosc 2001	70	2	—
33	Uecker et al. Am Surg 2001	44	4	—
2	Bingener et al. Arch Surg 2003	49	1	—
9	Hazzan et al. Arch Surg 2003	67	—	—
1	Arthur et al. Ann R Coll Surg Engl 2003	79	1	—
31	Tambyraja et al. World J Surg 2004	117	1	—
15	Majeski ^a Am J Surg 2004	35	2	—
	Total (10 articles)	644	13 (2)	1?

^a Articles reporting series of patients 75 years old or older

^b General conditions of the patient and status of the gallbladder not reported

associated with the strikingly high conversion rate of 50% to 55%. But, in contrast to the findings of the cited authors, who report the same operative time, postoperative complications, and length of hospital stay for delayed surgery as for elective procedures in the general population, interestingly, the results for octogenarians in terms of all outcome measures (not only conversion rate) are poorer after delayed LC than after elective LC. Therefore, it may be argued that for octogenarians, delaying surgery not only implies a technically more demanding procedure, but also significantly affects the outcome for the patient.

In particular, emergency LC for acute cholecystitis is reportedly followed by poorer outcomes than elective procedures in the general population [6, 35]. Both its relevance and careful patient selection, as key features in the case of elderly patients, are evident in the recent literature (Table 5). Although the mean mortality rate for LC in octogenarians is 2%, this value drops to virtually 0%, except for patients presenting in an emergency situation (acute cholecystitis) or with severe concomitant diseases (ASA 4). Similarly, analyzing a series of elderly patients undergoing traditional cholecystectomy in the early 1980s, Huber et al. [10] compared elective and emergency procedures and, noting a dramatic increase in surgical mortality (from 2% to 14%), advocated elective cholecystectomy for elderly patients before acute complications develop. This was confirmed by the data of Maxwell et al. [17] showing that surgery performed before the appearance of comorbid conditions that increase the surgical and anesthetic risks may result in improved outcomes for the elderly at lower costs. Very recently, Makela et al. [16] maintained that acute cholecystitis should be considered even currently as a potentially life-threatening condition for elderly patients. Analyzing the outcome from 1988 to 2002 for 218 patients older than 75 years affected by acute cholecystitis, these authors found a 7% mortality rate, with only a slight decrease (from 8% to 6%) and no reduction in postoperative morbidity over the past two decades, although the treatment options have changed greatly since the late 1980s. Interestingly, deteriorating general conditions, such as underlying respiratory diseases and malnutrition, were

independent predictors of mortality among very elderly patients with acute cholecystitis [16].

On the other hand, in a series of 81 consecutive patients older than 80 years treated with an expectant policy after ES, Pring et al. [23] described a very low readmittance rate attributable to further biliary symptoms (11%), and thus recommended a routine wait-and-see policy for this class of patients. However, although Pring and colleagues actually avoided almost 90% of unnecessary cholecystectomies, all the readmitted patients presented with very serious conditions, leading to death in three cases (biliary-related mortality of 3.7%). It seems likely that some of these patients would have benefited from gallbladder removal before the onset of complications.

The physiologic reserves of very elderly patients are limited and may become insufficient in the case of complications [2]. Delaying surgery for elderly patients may involve not performing a low-morbidity, elective LC for an otherwise healthy octogenarian, but performing delayed/emergency surgery for an even older patient with deteriorating general conditions and possibly systemic sepsis caused by acute cholecystitis. In such a situation, the procedure will be technically more demanding, and results of surgery will be poorer.

Because, unfortunately, no risk factor has been associated with the future development of acute cholecystitis, potentially allowing a selection of the patients who ultimately will need surgery [25], and because acute cholecystitis is generally reported to occur within the first year after ERCP [11, 14, 21], we and other authors [14] believe that LC should be performed promptly to gain maximal efficacy in preventing cholecystitis. The recent finding of an increased conversion rate for LC if performed more than 2 weeks after ES seems to confirm the need for an “early” rather than a “late” scheduling of LC to maximize the advantages of laparoscopy [7] and to avoid the complications of gallstones.

Targarona et al. [32] showed in 1996 that elective open cholecystectomy (and potentially open CBD exploration) for elderly or high-risk patients is preferable to endoscopic sphincterotomy alone (with the gallbladder left *in situ*) as a definitive treatment for bile duct stones. A decade later, this statement is further rein-

forced by our results. Although this study may be criticized as a retrospective analysis involving a relatively small number of patients, we did not find any significant difference in serious complications or treatment-related deaths between octogenarians and the general population. As compared with a wait-and-see policy, the sequential treatment of cholecystocholedocholithiasis dramatically reduces recurrent biliary events and the need for further endoscopic procedures in the very elderly. Moreover, the evident advantage of an expectant treatment for octogenarians of avoiding most LCs is at least counterbalanced by the poorer results of surgery when performed as a delayed/emergency procedure.

Although prospective randomized studies investigating very elderly patients are needed to confirm our findings, we propose the sequential treatment (ES followed by early LC) as the standard, definitive minimally invasive treatment for cholecystocholedocholithiasis even after the age of 80 years.

Finally, patient selection for laparoscopic cholecystectomy based on age seems to be obsolete, and the ASA score probably would better define patients' health status and operative risk.

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