

Research Article

The Comparison of Percutaneous Cholecystostomy and Delayed Cholecystectomy in Management of Patients with Complicated Cholecystitis and High Asa Scores

Edip Erdal Yılmaz¹, MD, Zübeyir Bozdağ², Murat Kapan², Ahmet Türkoglu², Taner Çiftçi³, Zülfü Arikanoglu², Metehan Gümüş²

¹ Department of General Surgery, Diyarbakir Gazi Yasargil Education and Research Hospital, Diyarbakir, Turkey

² Department of General Surgery, School of Medicine, Dicle University, Diyarbakir, Turkey

³ Department of Anesthesia, School of Medicine, Trakya University, Edirne, Turkey

Correspondent Address: MD. Edip Erdal Yılmaz,

Diyarbakir Gazi Yaşargil Education and Research Hospital, Department of General Surgery, Diyarbakir, 21400, Turkey

Fax: +90 412 2580060

Abstract:

Background: The results of fifty-eight patients with complicated cholecystitis and high ASA scores treated with percutaneous cholecystostomy or delayed cholecystectomy were analyzed retrospectively.

Material and Methods: The patients were divided into two groups according to the surgical interventions as percutaneous cholecystostomy (n:28) and delayed cholecystectomy group (n:30). In group 1, percutaneous cholecystostomy was performed in a single session in 25 patients and repeated twice in 3 patients due to catheter dislocation. Fifteen and 13 patients had ASA III and ASA IV respectively in this group.

Results: Laparoscopic and open cholecystectomy was performed in 18 and 8 patients respectively in the second group. The 4 of laparoscopic cholecystectomies were converted to open surgery. All patients had ASA III in this group.

Conclusion: Percutaneous cholecystostomy is a safe practice in patients with high ASA scores, most notably in ASA 4 patients and in patients with complicated acute cholecystitis. Delayed cholecystectomy can be performed in ASA 3 patients.

Key words: cholecystitis, morbidity, cholecystostomy.

Background

Acute cholecystitis (AC) is one of the most common causes of emergency admission in surgical practice. It is a common disease. AC can result in complications such as pericholecystic abscess, gangrene, empyema, perforation, peritonitis, and sepsis. The proportion rate is higher in older patients with gallbladder (GB) diseases and in patients with accompanying systemic diseases. It has been reported that cause high rates of morbidity (20-30%) and mortality (6-30%) about to emergency acute cholecystitis. Early cholecystostomy is the preferred practice for the standard treatment of AC within the first 72 hours. Generally, the conservative treatment is the first choice after the 72 hour period.

That's why, patients with AC are usually treated with moderate practices inclusive fluid and antibiotherapy, additionally surgical intervention is delayed for six to eight weeks [1-7]. Percutaneous cholecystostomy (PC), guided by imaging methods, is an alternative treatment option for patients with acute or complicated cholecystitis, which requires urgent treatment, and provides a low complication rate along with a high achievement rate. PC can be made even at the bedside of patients inappropriate to accept conservative

treatment. It also plays a great part in the decompression of the inflamed GB and in providing the most ideal situations for elective cholecystostomy through treating the comorbid systemic diseases [6-10].

This retrospective study is aimed to compare the results of delayed cholecystectomy and percutaneous transhepatic cholecystostomy in patients with high-risk AC who were admitted after 72 hours or complicated cholecystitis.

Materials and Methods

The data of the 58 patients admitted between January 2010 to March 2015, who were diagnosed with AC, were reviewed retrospectively. Only patients who were 60 years and older in age, possessed American Society of Anaesthesiologists (ASA) scores of III or IV, and admitted to the hospital after 72 hours of onset of symptoms or with complicated cholecystitis were included in the study. The patients less than 60 years of age, and those who had no history of systemic diseases or malignancy were except that the study. Included patients were divided into two groups; Group 1: PC treatment group (n=28), Group 2: Delayed cholecystectomy treatment group (n=30). Age, gender, medical history, introduction to systemic

diseases, clinical, laboratory parameters, radiological evidences, ASA scores, hospital stays, surgical interventions and their outcomes, complications, mortality rates, the biochemical parameters at admission and on the 3rd day, PC/operation-about to morbidity and mortality were saved.

The diagnosis of acute cholecystitis was based on clinical (Jaundice, right upper quadrant pain and palpable mass), laboratory (increased white blood cell (WBC), positive C-Reactive protein (CRP), liver function tests and increased bilirubin) and radiological (gallstone, GB wall thickening and pericholecystic fluid) evidences. As soon as diagnosed with AC, oral intake was interrupted while intravenous fluid and antibiotherapy were administered.

PC was performed to using the Seldinger technique through the transhepatic route with local anaesthesia under USG (ultrasonography) and fluoroscopy guidance by the same interventional radiologist. With the patient lying in the supine position, an 18-gauge needle was placed in the GB using the transhepatic route under the guidance of USG. GB aspiration was performed and the samples were obtained for microbiological analysis. The needle was removed and the guide-wire was inserted into the GB under the guidance of fluoroscopy. The route was then dilated using 6F and 10F dilators. Eventually, 10F locking pigtail catheter was inserted into the GB. Catheter localization was checked by injecting 5 cc contrast, after which the technique was completed. The catheter was then flushed with 10 ml of serum physiologic every 24 hours. Furthermore, on the third day of the PC, a cholecystogram was performed to check the site of the catheter, look for gallstones, and to evaluate the situations of cystic and choledochal ducts. The procedural success was evaluated through the clinical and laboratory parameters obtained in the 72nd hours following PC. Clinical response was defined as the relief of symptoms, decrease in WBC values (to below 25% or 10.000/mm³), and the normalization of inflammatory and laboratory parameters. Laparoscopic cholecystectomy (LC) was performed on the patients whose general situation recovered and whose systemic situation was improving. Conversion to open surgery was required for the patients with severe adhesions, as detected by LC or inadequate anatomic exploration. The catheter was removed from the rest of the patients, who underwent PC alone, in the 4th week when the cystic duct and choledoch were patent in the cholecystogram. The mortalities that occurred during the first 30 days after PC application was saved as hospital mortalities.

Statistical methods

SPSS software (version 11.5; SPSS Inc, Chicago, IL) was used for the analysis of the statistical data. Descriptive statistics were used to identify the data. The quantitative parameters were evaluated using the Student T test, while the changes in the parameters were evaluated using the Wilcoxon signed ranks test. $p < 0.05$ was considered to be statistically significant.

Results

The male to female ratio was 9 to 19 in Group 1, and 11 to 19 in Group 2. Mean age was 74.5 ± 8.6 (61-88) years for group 1, 72.23 ± 6.8 (61-83) for Group 2. All the patients in both groups had comorbid diseases. Among these, cardiovascular and pulmonary diseases were the most common (Table 1).

Comorbid diseases	Group 1 n (%)	Group 2 n (%)
Cardiovascular disease	24(85.7%)	23(76.6%)
Hypertension	18(64.3%)	19(63.3%)
Coronary artery disease	20(71.4%)	4(13.3%)
Heart failure	6(21.4%)	0
Pulmonary disease	13 (46.4%)	10(33.3%)
+COPD	8(28.6%)	10(33.3%)
Diabetes Mellitus	2(7.1%)	10(33.3%)
Cerebrovascular disease	13 (46.4%)	0

Five (17.9%) patients in Group 1 had received endoscopic retrograde cholangiopancreatography (ERCP) due to the presence of gallstones in the common bile duct. There was no patient who had a gallstone in the common bile duct in group 2. In group 1 however, right upper quadrant pain was detected in all patients, while 3 of them (10.7%) had palpable mass and 6 (21.4%) of them had clinical jaundice. In group 2, right upper quadrant pain was reported in all patients, while 2 of them (6.7%) had clinical jaundice, and no one had palpable mass. Elevated WBC levels were observed in 25 (89.2%) patients in Group 1, and in 15 (50%) patients in Group 2. Additionally, elevated liver functional test and CRP levels were determined in 7 (25%) and 25 (98.3%) patients in group 1, as well as in 13 (43%) and 24 (80%) patients in group 2, respectively (Table 2). Diagnosis of patients with acute cholecystitis depended on clinical, laboratory, and radiological findings. USG was also performed with all patients for diagnostic purposes. While 24 (85.7%) patients received Computed Tomography (CT) and 6 (21.4%) received Magnetic Resonance Cholangiopancreatography (MRCP) in Group 1, 12 (40%) patients received CT and 4 (13.3%) patients received MRCP in Group 2. Common radiological findings between both groups were GB wall thickening, gallstones, and pericholecystic fluid. Additionally, 6 (21.4%) patients of Group 1 had gallstones in the common bile duct, 3 (10.7%) patients had empyema of the GB, and 2 (7.1%) patients had pericholecystic abscess. Only 1 (3.3%) patient of Group 2 had gallstones in the common bile duct while 1 (3.3%) patient had empyema of the GB, and 1 (3.3%) patient had pericholecystic abscess. Fifteen (53.6%) patients of Group 1 were assessed as ASA III and 13 (46.4%) as ASA IV, while all patients in Group 2 were assessed as ASA III.

PC was performed within the first 48 hours of the onset of symptoms in Group 1 patients. The

Edip Erdal Yılmaz et.al / The Comparison of Percutaneous Cholecystostomy and Delayed Cholecystectomy in Management of Patients with Complicated Cholecystitis and High Asa Scores

procedure was completed at a single session in 25 (89.3%) patients while 3 (10.7%) patients received it twice due to catheter dislocation. Five (17.9%) patients had their stone extraction completed under the guidance of ERCP after 72 hours following PC. Positive differences observed between the laboratory tests obtained on the 3rd days and prior to the PC are listed in Table 2. Immediate open cholecystectomy was performed in 5 (17.9%) patients due to PC-related liver hematoma (n=1, 3.6%), persistent symptoms (n=1, 3.6%), and (n=3, 10.7%) perforation of GB or pericholecystic abscess following PC. The remaining 9 of 23 patients underwent laparotomy after an interval period of 10 to 60 days. 3 patients underwent t-tube choledochotomy in addition to open cholecystectomy. 6 patients underwent LC, however conversion to open surgery was required in two cases due to a failure to provide adequate anatomical exploration as well as severe adhesions. In the remaining 8 (28.6%) patients who underwent PC alone, the catheter was removed in the 4th week

when the cystic duct and choledoch were patent in the cholecystogram. Mean hospital stay was 10.67± 5.86 (1-24) days for Group 1.

18 patients in Group 2 were treated with LC (60%), 8 (27%) patients with open cholecystectomy, and 4 (13.3%) of them were converted to the open surgery. The average time of the surgery was 5.3 days (0-8 days). Drains were used in all patients and lasted an average of 2.57 days (1-4 days). One of the patients had postoperative pneumonia, but no one had any complications related with the surgery. Mean hospital stay was 7.24 ± 3.87 days for Group 2.

Improvement in laboratory results and clinical symptoms (Table 2) were observed after 3 days

following the procedures (surgery / pc).

Table 2. The results of biochemical examinations before and after 72 hours of the procedure.

Parameters	Before		P Value*	After 72 hours		P Value*	P Value*	P Value*
	Group 1	Group 2	Before Group 1 vs Group 2	Group 1	Group 2	After Group 1 vs Group 2	Group 1 Before vs After	Group 2 Before vs After
WBC (K/uL)	13.83±4.60	16.11±6.09 6	NS	9.42±3.58	9.91±3.64	NS	0.001	<0.001
CRP (mg/dl)	10.41±8.23	14.71±9.11	NS	4.99±5.72	8.16±7.68	NS	0.001	<0.001
ALT (U/L)	85.00±92.30	52.18±61.7 8	NS	128.87±55. 69	31.46±20.22	NS	0.025	0.041
AST (U/L)	72.70±66.627	54.86±48.7 3	NS	50.53±40.9 6	34.82±15.84	0.028	0.012	0.025
ALP (U/L)	150.50±160.37	154.75±166 .32	NS	44.17±27.5 5	132.61±109.92	NS	NS	NS
GGT (U/L)	156.90±171.27	119.22±129 .45	NS	98.60±48.4 4	123.46±105.50	NS	0.021	NS
T.BIL (mg/dl)	0.8767±.55	2.28±3.33	NS	100.67±90. 79	1.14±0.89	NS	NS	0.05
D.BIL (mg/dl)	0.40±.31	1.47±2.55	0.037	0.70±0.33	0.64±.57	0.019	NS	NS

No mortality related to operation and/or PC was observed in any of the groups. One mortality (3.5%) occurred within the first 30 days in Group 1, on which an open cholecystectomy was performed to the patient on the 22nd day of PC. In addition, the patient died at the postoperative 2nd day due to the pulmonary thromboembolism. The causes of death were unrelated to PC.

Discussion

AC is more prevalent in older patients with an incidence rate

of 50-70% among all patients [2]. Elective cholecystectomy following the “cool down” period is recommended for patients with complications or for those with a delayed diagnosis (after 72 hours). However, more than 20% of the patients were found to be irresponsive to this treatment [5]. In addition, conservative practices may promote complications including empyema, gangrene, perforation, pericholecystic abscess, peritonitis, and sepsis [11]. For a patient with delayed diagnosis, emergency surgery may be preferred if it is a low

risk case (ASA I-II) Additionally, PC followed by an elective surgery may be preferred for high risk patients [5]. PC is used as an alternative to cholecystectomy and surgical cholecystectomy in high-risk patients [12,13]. It can also be used as a bridge therapy providing an interval for elective cholecystectomy [2,14,15]. In addition to treatment of the AC, PC can also be used in decompressing the GBs, treating cholangitis, removing biliary obstructions, and visualizing the bile ducts [16]. However, PC is not a completely safe procedure without complications. Early complications such as haemorrhage, liver hematoma and late complications like catheter dislocation, abdominal wall abscess arising from PC are reported [4,7,18,19]. The most common late complication is catheter dislocation [20]. Major and minor complication rates following PC are noted to be 3-8% and 4-13%, respectively [4]. Kiviniemi et al. [21] detected a complication rate of 26% while only 3% of these patients required emergency surgery.

Early complication was reported to be 28.5% in our study: PC-related liver hematoma (n=1, 3.6%), persistent symptoms (n=1, 3.6%), perforation of GB, or pericholecystic abscess (n=3, 10.7%), and catheter dislocation (n=3, 1.7%). Re-catheterization was performed in three patients with catheter dislocation while the others (n=5, 17.9%) underwent emergency surgery.

The treatment of patients with AC, after establishing the clinical improvement with PC, is controversial [22]. Although it removes the cause of the patients' complaint, PC is not a definitive treatment for a significant portion of the cases. The recurrence rate of AC is reported to be 25% [23]. Therefore, elective cholecystectomy would be more suitable for patients when surgical intervention is possible [24]. In our study, general conditions recovered in 25 patients after PC: 20 of them (71.4%) underwent cholecystectomy as they presented no surgical risk, while 8 of them with high surgical risk received no surgical intervention, as they were detected with patent cystic duct and bile ducts. Mortality was observed in a patient in this group, although the cause was not related to PC. The ASA levels of the PC group were found to be significantly higher. The second group was composed of ASA III patients and no mortality was observed. The complication rate was found to be similar in both groups. The rate of treatments converting from laparoscopy to open surgery is reported to be 14% in delayed surgeries, and it is much higher than the one in elective cholecystectomy (1.9%). This ratio indicates an increase in elderly patients with AC depending on the number of attacks [2, 25]. Eldar et al. [26] reported that the rate could rise up to 39% in elderly patients. The rate of conversion was revealed to be 33.3% in Group 1. This high rate was mainly attributed to the advanced ages of the patients and the severe adhesions resulting from previous attacks. Change of operation to open surgery was 18.2% in Group 2, which is significantly lower than Group 1. Inadequate anatomical exploration (2 patients) and severe adhesion (2 patients) were cited as reasons for change of operation from laparoscopy to open surgery.

The success rate of ERCP in removing the obstructions of the common bile duct in AC patients is 70%. For the elderly age group, sphincterectomy, additionally, conveys the risk of mortality (0.2%) and morbidity (2.4%). Premedication for ERCP in high-risk patients may result in complications including hypoventilation and arrest as well. Therefore, PC can provide an interval for the preparation of essential conditions for ERCP [27]. PC was used as an alternative treatment in providing the interval for ERCP and surgical procedure, and as a definitive treatment in the patients. In group 2, no patient required ERCP.

There is no significant difference of mortality or morbidity between ASA III and IV patients who received PC or emergency cholecystectomy. However, initial hospitalization was significantly longer in the PC group, and re-hospitalization was required for definitive surgery. Additionally, the number of ASA IV patients was also significantly higher in the PC group. Thus, emergency surgery may be recommended over PC for patients with ASA III levels.

The clinical response is very important in patients with AC who had previously received treatment, especially with conservative treatment. Spira et al. [28] reported that clinical resolution was achieved in 58.7% for the 24th hour and as 95.7% for the 72nd hour. Other studies reported it as between 52% and 100% [29,30,31,32]. PC was successfully performed at a single session in 90.9% of our patients. Clinical improvement was achieved in 81.8% of our patients within 72 hours. Significant clinical improvement was seen within 72 hours in the patients in Group 2.

Post-operative mortality in the first month is reported to be 0-25% [3,18] in the literature, which is mainly associated with severe comorbid diseases rather than acute cholecystitis [5, 19, 29]. The mortality rate directly arising from PC was reported to be 0-4.5% [6]. The rate in our study was revealed as 1/28(3.6%), which resulted from reasons unrelated to PC. There was no mortality in group 2.

The limitations of the study are low number of patients, retrospective character of the study, and also the biased selection of the patients' treatment.

Conclusion

The treatment of complicated cholecystitis in patients who are admitted to the hospital after 72 hours is still controversial. We conclude that delayed cholecystectomy can be performed, if general conditions are suitable, especially in ASA 3 patients. PC is a safe practice in high-risk AC patients, especially in ASA 4 patients and in the patients with complicated acute cholecystitis, and can also be performed with low mortality and morbidity. Randomized controlled trials are needed to compare the efficacy of both treatments.

References

1. Sneider EB, Lewis J, Friedrich A, et al. Timing and choice of intervention influences outcome in acute cholecystitis: a

prospective study. *Surg Laparosc Endosc Percutan Tech* 2014; 24: 414-9.

2. Kapan M, Onder A, Tekbas G, et al. Percutaneous cholecystostomy in high-risk elderly patients with acute cholecystitis: a lifesaving option. *Am J Hosp Palliat Care* 2013; 30: 167-71.

3. Koti RS, Davidson CJ, Davidson BR. Surgical management of acute cholecystitis. *Langenbecks Arch Surg* 2015; 400: 403-19.

4. Akyürek N, Salman B, Yüksel O, et al. Management of acute calculous cholecystitis in high-risk patients: percutaneous cholecystostomy followed by early laparoscopic cholecystectomy. *Surg Laparosc Endosc Percutan Tech* 2005; 15: 315-20.

5. Yüksel O, Salman B, Yılmaz U, et al. Timing of laparoscopic cholecystectomy for subacute calculous cholecystitis: early or interval-a prospective study. *J Hepatobiliary Pancreat Surg* 2006; 13: 421-6.

6. Cheng WC, Chiu YC, Chuang CH, et al. Assessing clinical outcomes of patients with acute calculous cholecystitis in addition to the Tokyo grading: a retrospective study. *Kaohsiung J Med Sci* 2014; 30: 459-65.

7. Macri A, Scuderi G, Saladino E, et al. Acute gallstone cholecystitis in the elderly: treatment with emergency ultrasonographic percutaneous cholecystostomy and interval laparoscopic cholecystectomy. *Surg Endosc* 2006; 20: 88-91.

8. Yun SS, Hwang DW, Kim SW, et al. Better treatment strategies for patients with acute cholecystitis and American Society of Anaesthesiologists classification 3 or greater. *Yonsei Med J* 2010; 51: 540-5.

9. Nasim S, Khan S, Alvi R, et al. Emerging indications for percutaneous cholecystostomy for the management of acute cholecystitis-a retrospective review. *Int J Surg* 2011; 9: 456-9.

10. Karakayali FY, Akdur A, Kirnap M, et al. Emergency cholecystectomy vs percutaneous cholecystostomy plus delayed cholecystectomy for patients with acute cholecystitis. *Hepatobiliary Pancreat Dis Int* 2014; 13: 316-22.

11. Lai PB, Kwong KH, Leung KL, et al. Randomised trial of early versus delayed laparoscopic cholecystectomy for acute cholecystitis. *Br J Surg* 1998; 85: 764-7.

12. Gervais DA, Mueller PR, [Venkatesan AM](#). Percutaneous cholecystostomy. *Semin Intervent Radiol* 1996; 23: 35-43.

13. Van Overhagen H, Meyers H, Tilanus HW, et al. Percutaneous cholecystostomy for patients with acute cholecystitis and an increased surgical risk. *Cardiovasc Intervent Radiol* 1996; 19: 72-6.

14. Macri A, Scuderi G, Saladino E, et al. Acute gallstone cholecystitis in the elderly: treatment with emergency ultrasonographic percutaneous cholecystostomy and interval laparoscopic cholecystectomy. *Surg Endosc* 2006; 20: 88-91.

15. Koebrugge B, van Leuken M, Ernst MF, et al. Percutaneous cholecystostomy in critically ill patients with a cholecystitis: a safe option. *Dig Surg* 2010; 27: 417-421.

16. Akinci D, Akhan O, Ozmen M, Peynircioğlu B, Ozkan O. Outcomes of percutaneous cholecystostomy in patients with high surgical risk. *Tani Girisim Radyol* 2004; 10: 323-7.

17. Akhan O, Akinci D, Ozmen MN. Percutaneous cholecystostomy. *Eur J Radiol* 2002; 43: 229-36.

18. Ginat D, Saad WE. Cholecystostomy and transcholecystic biliary access. *Tech Vasc Interv Radiol* 2008; 11: 2-13.

19. Byrne MF, Suhocki P, Mitchell RM, et al. Percutaneous cholecystostomy in patients with acute cholecystitis: experience of 45 patients at a US referral center. *J Am Coll Surg* 2003; 197: 206-11.

20. Teoh WM, Cade RJ, Banting SW, et al. Percutaneous cholecystostomy in the management of acute cholecystitis. *ANZ J Surg* 2005; 75: 396-8.

21. Kiviniemi H, Ma'kela' JT, Autio R, et al. Percutaneous cholecystostomy in acute cholecystitis in high-risk patients: an analysis of 69 patients. *Int Surg* 1998; 83: 299-302.

22. Byrne MF, Suhocki P, Mitchell RM, et al. Percutaneous cholecystostomy in patients with acute cholecystitis: experience of 45 patients at a US referral center. *J Am CollSurg* 2003; 197: 206-11.

23. Welschbillig -Meunier K, Pessaux P, Lebigot J, et al. Percutaneous cholecystostomy for high risk patients with acute cholecystitis. *Surg Endosc* 2005; 19: 1256-9.

24. Melin MM, Sarr MG, Bender CE, et al. Percutaneous cholecystostomy: a valuable technique in high-risk patients with presumed acute cholecystitis. *Br J Surg* 1995; 82: 1274-7.

25. Pessaux P, Tuech JJ, Rouge C, et al. Laparoscopic cholecystectomy in acute cholecystitis. A prospective comparative study in patients with acute vs. chronic cholecystitis. *Surg Endosc* 2000; 14: 358-61.

26. Eldar S, Eitan A, Bickel A, et al. The impact of patient delay and physician delay on the outcome of laparoscopic cholecystectomy for acute cholecystitis. *Am J Surg* 1999; 178: 303-7.

27. Shitrit AB, Braverman D. Interval percutaneous cholecystostomy is effective for decompression of the common bile duct in high-risk elderly patients prior to endoscopic retrograde cholangiopancreatography. *Gerontology* 2008; 54: 144-7.

28. Spira RM, Nissan A, Zamir O, et al. Percutaneous transhepatic cholecystostomy and delayed laparoscopic cholecystectomy in critically ill patients with acute calculus cholecystitis. *Am J Surg* 2002; 183: 62-6.

29. Griniatsos J, Petrou A, Pappas P, et al. Percutaneous

cholecystostomy without interval cholecystectomy as definitive treatment of acute cholecystitis in elderly and critically ill patients. *South Med J* 2008; 101: 586-90.

30. Winbladh A, Gullstrand P, Svanvik J, et al. Systematic review of cholecystostomy as a treatment option in acute cholecystitis. *HPB* 2009; 11: 183-93.

31. Sosna J, Kruskal JB, Copel L, et al. US-guided percutaneous cholecystostomy: features predicting culture-positive bile and clinical outcome. *Radiology* 2004; 230: 785-91.

32. Kortram K, de Vries Reilingh TS, Wiezer MJ, et al. Percutaneous drainage for acute calculous cholecystitis. *Surg Endosc* 2011; 25: 3642-6.

33. Melloul E, Denys A, Demartines N, et al. Percutaneous drainage versus emergency cholecystectomy for the treatment of acute cholecystitis in critically ill patients: does it matter? *World J Surg* 2011; 35: 826-33.