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ORIGINAL ARTICLE

Acute cholecystitis in elderly patients: A case for early cholecystectomy

C.S. Loozen*, B. van Ramshorst, H.C. van Santvoort, D. Boerma

Department of Surgery, St. Antonius Hospital, Koekoekslaan 1, Postbus 2500, 3430 EM Nieuwegein, The Netherlands

KEYWORDS
Acute cholecystitis;
Early cholecystectomy;
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Summary
Background: Recent advances in laparoscopic techniques and perioperative care have changed the indications for surgery in elderly patients. Consequently, the willingness to offer early surgery for acute cholecystitis continues to increase. This study aims to assess the perioperative outcome of early cholecystectomy for acute calculous cholecystitis in elderly patients.
Patients and methods: All consecutive patients treated by early cholecystectomy for acute calculous cholecystitis in a major teaching hospital, between January 2002 and November 2016, were retrospectively analyzed. The outcome of elderly patients ($\geq$ 75 years) was compared to that of all others. Conversion rate, 30 days morbidity, 30 days mortality and length of hospital stay were assessed.
Results: Early cholecystectomy for acute calculous cholecystitis was performed in 703 patients: 121 (17%) aged $\geq$ 75 years and 582 (83%) aged < 75 years. Significantly more elderly patients had an ASA score $\geq$ 3 (37% vs. 8%, $P < 0.001$). Morbidity was higher in the elderly group (17% vs. 8%, $P < 0.004$), mainly attributable to the high incidence of cystic stump leakage in this group; a complication that no longer occurred after changing the technique of ligation of the cystic stump. The cardiopulmonary complication rate (4% vs. 3%, $P = 0.35$) as well as mortality did not significantly differ (3% vs. 1%, $P = 0.07$). The conversion rate was higher in the elderly group (18% vs. 5%, $P < 0.001$) and the median postoperative length of hospital stay was longer (5.0 vs. 3.0 days, $P < 0.001$).
Conclusion: Early laparoscopic cholecystectomy is a treatment well suited to elderly patients with mild and moderate acute cholecystitis.

Introduction

Acute cholecystitis is a common condition that accounts for approximately one-third of all emergency admissions to surgical wards [1]. More than 90% of the cases are associated with cholelithiasis [2]; a condition that affects 10% to 15% of the general population [3—5]. Previous studies showed that the development of gallstones and

* Corresponding author.
E-mail address: c.loozen@antoniusziekenhuis.nl (C.S. Loozen).

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acute cholecystitis is strongly related to age [4,6,7]. As the global population ages, the number of patients presenting with acute cholecystitis is expected to rise. While early cholecystectomy has been firmly established as the procedure of choice for acute cholecystitis in young and fit patients [8,9], controversy exists in the surgical management of elderly [10–13]. Due to comorbidities and reduced physiological reserves, elderly are thought to be at risk for increased perioperative morbidity and mortality. Many clinicians esteem elderly patients to be better off with percutaneous catheter drainage, as it avoids any surgery related complications. This, however, is not substantiated by clinical evidence. In fact, literature shows that the 30 days mortality of percutaneous drainage is higher than that of cholecystectomy [14]. Recent advances in laparoscopic techniques and perioperative care have changed the indications for surgery in elderly patients in general. As a result, the willingness to offer early surgery for acute cholecystitis continues to increase. The present study aims to assess the perioperative outcome of early cholecystectomy for acute calculous cholecystitis in elderly patients ($\geq$ 75 years). The outcome is compared to that in younger patients, operated by the same group of surgeons during the same time period.

Patients and methods

All consecutive patients treated by early cholecystectomy for acute calculous cholecystitis in a large teaching hospital, between January 2002 and November 2016, were retrospectively identified from a prospectively collected database. All patients had been admitted through the emergency department and were operated on during the same admission. Before data collection, approval was obtained from the Institutional Review Board of the St. Antonius Hospital in Nieuwegein, the Netherlands.

Diagnosis

Acute cholecystitis had been diagnosed according to the criteria of the Tokyo Guidelines [15]. Patients had to meet the following inclusion criteria: (1) local sign of inflammation including Murphy's sign or right upper quadrant pain, (2) systemic signs of inflammation including fever (body temperature > 38.3 °C), elevated C-reactive protein (> 3 mg/dL) and/or elevated white blood cell count (higher than the upper limit of normal), (3) imaging findings characteristic of acute cholecystitis. Patients who did not meet all three inclusion criteria as well as patients with acalculous cholecystitis were excluded. The severity of acute cholecystitis was graded as mild (grade I), moderate (grade II) or severe (grade III) according to the severity assessment criteria of the Tokyo Guidelines [15].

Data collection

The following data were collected from medical charts: age, sex, body-mass index (BMI), laboratory data (i.e. white blood cell count and C-reactive protein), time since onset of symptoms and the severity of acute cholecystitis according to the Tokyo Guidelines [15]. The risk of perioperative morbidity was assessed according to the American Society of Anesthesiologists (ASA) classification. Associated medical conditions including ischemic heart disease, chronic obstructive pulmonary disease, diabetes mellitus (type I and II), chronic renal failure and previous abdominal surgery were derived from the medical records of the patients.

Surgical procedure

Cholecystectomy was performed laparoscopically using the standard four-port technique. If the treating surgeon considered a laparoscopic approach to be contraindicated, an open procedure was adopted from the outset. Routine intraoperative cholangiography was not employed. Specific aspects of the surgical procedure such as the approach, the duration, the need for conversion and the occurrence of intraoperative complications were collected from the surgical reports. Patients received a single dose of antibiotic prophylaxis before surgery. Whether or not antibiotic therapy was postoperatively continued was dependent on the preference of the attending surgeon.

Outcome parameters

The outcome parameters to be assessed were need for conversion, operating time, 30 days morbidity (including intraoperative complications), 30 days mortality and postoperative length of hospital stay. Complications were assessed according to Clavien-Dindo classification [16].

Statistical analysis

Statistical analysis was carried out using SPSS version 22.0 (SPSS, Inc., Chicago, IL, USA). The Chi^2 test, or where appropriate the Fisher exact test, was used for univariable analysis of categorical data. The Mann-Whitney U-test was used to assess continues variables. All tests were two sided; a P value of < 0.05 was considered to be statistically significant. Categorical data were described as frequencies (%) and continuous data as mean ($\pm$ SD) or median (range).

Results

Patient characteristics and operative details

A total of 5654 consecutive patients underwent a cholecystectomy during the study period. The aforementioned criteria for acute calculous cholecystitis were met in 703 patients: 121 (17%) aged $\geq$ 75 years and 582 (83%) aged < 75 years. The baseline characteristics of the elderly and non-elderly patients are depicted in Table 1. Elderly patients were more likely to have cardiovascular disease (28% vs. 11%, $P < 0.001$), pulmonary disease (23% vs. 7%, $P < 0.001$) and diabetes (19% vs. 11%, $P = 0.02$). Significantly more elderly patients had an ASA score $\geq$ 3 (37% vs. 8%, $P < 0.001$). The severity of cholecystitis did not significantly differ between the two groups ($P = 0.82$). The median duration from onset of symptoms in both groups was 2 days ($P = 0.07$). In the elderly and non-elderly group, patients were treated by attempted laparoscopic cholecystectomy in 98% and 99%, respectively. Primary open cholecystectomy was performed in three patients in both groups.

Perioperative outcome

Data on the perioperative outcomes are summarized in Table 2. Perioperative morbidity was higher in the elderly group (17% vs. 8%, $P = 0.004$) whereas the cardiopulmonary complication rate (4% vs. 3%, $P = 0.35$) as well as mortality

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