

Clinical Science

# An acute care surgery dilemma: emergent laparoscopic cholecystectomy in patients on aspirin therapy



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## Abstract

**BACKGROUND:** The current literature regarding hemorrhagic complications in patients on long-term antiplatelet therapy undergoing emergent laparoscopic cholecystectomy is limited. The aim of our study was to describe hemorrhagic complications in patients on prehospital aspirin (ASP) therapy undergoing emergent cholecystectomy.

**METHODS:** We performed a 1-year retrospective analysis of our prospectively maintained acute care surgery database. The 2 groups (ASP group vs No ASP group) were matched in a 1:1 ratio for age, sex, previous abdominal surgeries, and comorbidities. Primary outcome measures were intraoperative hemorrhage, postoperative anemia, need for blood transfusion, and conversion to open cholecystectomy. Intraoperative hemorrhage was defined as intraoperative blood loss of  $\geq 100$  mL; postoperative anemia was defined by  $\geq 2$  g/dL drop in hemoglobin.

**RESULTS:** A total of 112 (ASP: 56, no ASP: 56) patients were included in the analysis. The mean age was  $65.9 \pm 10$  years, and 50% were male. There was no difference in age ( $P = .9$ ), sex ( $P = .9$ ), and comorbidities ( $P = .7$ ) between the 2 groups. There was no difference in intraoperative blood loss  $>100$  mL ( $P = .5$ ), postoperative anemia ( $P = .8$ ), blood transfusion requirement ( $P = .9$ ), and conversion to open surgery ( $P = .7$ ) between patients on American Society of Anesthesiologists therapy and patients not on American Society of Anesthesiologists therapy.

**CONCLUSIONS:** Emergent laparoscopic cholecystectomy is a safe procedure in patients on long-term ASP. Prehospital use of ASP as an independent factor should not be used to delay emergent cholecystectomy.

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Acute cholecystitis is the most common cause for emergency hospitalization among elderly patients in the United States.<sup>1</sup> Cholecystectomy accounts for one third of all surgeries performed in elderly patients.<sup>1</sup> Early laparoscopic cholecystectomy is the established standard of care; however, this is commonly delayed in elderly patients because of their complex medication history and associated comorbidities.<sup>2-9</sup> Although the beneficial effects of anti-platelet and anti-coagulation therapy in patients with cardiovascular and cerebrovascular diseases are well established, the impact of these medications in patients undergoing emergent surgery still remains unclear.<sup>10,11</sup>

Aspirin therapy (ASP) has a lifespan of 7 to 10 days and is known to inhibit platelet function. This inhibitory effect is associated with higher hemorrhagic complications and intraoperative blood transfusion in patients undergoing emergent surgery.<sup>12</sup> Given these high perioperative risks, clinicians routinely stop the ASP and delay the procedure. However, on the other side, delay in emergent cholecystectomy is known to be associated with increased postoperative complications, longer hospital length of stay, and higher hospital costs.<sup>2,6</sup> Additionally, there is a lack of evidence-based guidelines to define the optimal timing of cholecystectomy in patients on ASP with acute cholecystitis. As a result, clinicians face a challenging dilemma deciding the optimal management plan for patients on anti-platelet therapy with acute cholecystitis.

The aim of our study was to evaluate outcomes in patients on prehospital ASP undergoing emergent cholecystectomy. We hypothesized that patients on ASP have higher hemorrhagic complications when undergoing emergent cholecystectomy.

## Methods

We performed a 1-year (2010 to 2011) retrospective analysis of a prospectively collected acute care surgery database of all patients undergoing emergent cholecystectomy at our level 1 trauma center. Patients with age  $\geq 65$  years on daily ASP with acute cholecystitis undergoing emergent laparoscopic cholecystectomy were included.

The following data points were recorded: demographic data including age and sex, vital signs on presentation to the emergency department, which included systolic blood pressure, heart rate, temperature, physical examination findings, body mass index (BMI), medication history, comorbidities, laboratory parameters, which included white blood cell count, liver function tests, and platelet count and platelet transfusion, results of ultrasonography, time to operating room, operative intervention details, American Society of Anesthesiologists (ASA) score, blood transfusion requirement, hospital and intensive care unit (ICU) length of stay, in-hospital complications, and in-hospital mortality. The decision to transfuse platelets was at the discretion of the attending surgeon.

Patients were diagnosed with acute cholecystitis based on the Tokyo guidelines using clinical findings such as right upper quadrant pain, tenderness, fever, leukocytosis, and a confirmatory ultrasonography test with findings of thickened gall bladder wall, presence of gall bladder stone, positive ultrasonographic Murphy's sign, or positive pericholecystic fluid.<sup>4</sup> The ultrasonography results were reviewed by the on-call radiologist and confirmed by a single investigator.

We then stratified patients into 2 groups: patients on ASP and patients without ASP. The patients in the 2 groups were matched in a 1:1 ratio using propensity scoring for the following factors: age, sex, previous abdominal surgeries, comorbidities, BMI, and ASA score.

Propensity score matching helps to control for the inherent selection bias in an observational study. A propensity score denotes the conditional probability of that individual to receive a certain treatment (ASP). We generated a propensity score for each patient based on all the confounding factors using a logistic regression model. Patients on anti-platelet therapy were then matched with patients not on any anti-platelet therapy based on their propensity scores.

The primary outcome measures were development of intraoperative hemorrhage and conversion to open surgery. The secondary outcome measures were hospital and ICU length of stay, in-hospital complications, and mortality. We defined intraoperative hemorrhage based on intraoperative blood loss of  $>100$  mL, development of postoperative anemia ( $\geq 2$  g/dL drop in hemoglobin postoperatively), or need for intraoperative or postoperative blood transfusion. Blood transfusion was defined as the units of packed red blood cells the patients received. In-hospital complications were defined as infectious complications (sepsis, pneumonia, urinary tract infections) and hematologic complications (deep venous thrombosis, disseminated intravascular coagulation).

Data are reported as mean  $\pm$  standard deviation for continuous descriptive variables, median [range] for ordinal descriptive variables, and as proportions for categorical variables. We performed Mann-Whitney *U* and Student *t* test to explore for differences in the 2 groups (patients in anti-platelet therapy versus patients not on antiplatelet therapy) for continuous variables. We used chi-square test to identify differences in outcomes between the 2 groups for categorical variables. For our study, we considered *P* value of .05 or less as statistically significant. All statistical analyses were performed using SPSS version 20 (SPSS, Inc, Chicago, IL).

This study was approved by the institutional review board at the University of Arizona, College of Medicine.

## Results

A total of 306 patients undergoing emergent laparoscopic cholecystectomy were reviewed, of which 112 (ASP: 56 and no ASP: 56) patients were included. The

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