Preoperative conversion from a laparoscopic to an exploratory laparotomy cholecystectomy

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Introduction: Acute cholecystitis (AC) with cholelithiasis is commonly presented as right upper quadrant pain with radiation to the scapula. A lethal complication before any surgical intervention in a patient with AC is sepsis.

Presentation of Case: We present a rare case of a patient who had AC complicated with sepsis. Patient was surgically prepared for a laparoscopic cholecystectomy but later changed to an exploratory laparotomy cholecystectomy due to complaints of preoperative diffuse abdominal pain and concerns of intra-abdominal sepsis. A central line for antibiotics, metronidazole, and vancomycin, was placed during surgery to treat his sepsis. Patient had an uneventful postoperative recovery.

Discussion: Surgical solutions should be discussed during preoperative work-up with any changes in potential signs of sepsis and abdominal pain. Laparoscopic cholecystectomy is a less invasive procedure but carries a risk with potential intraoperative complications in treating gangrenous cholecystitis with biliary sludge; therefore exploratory laparotomy should be discussed as a potential intervention.

Conclusion: Conversion to an exploratory laparotomy seems inevitable when concerns of complications arise before surgery to reduce morbidity and mortality. Severe peritonitis with a gangrenous gallbladder posed an increased risk for a laparoscopic procedure and therefore a conversion to an exploratory laparotomy was initiated.

Keywords: Sepsis, Pre-operative conversion, Open cholecystectomy, peritonitis, Laparoscopic cholecystectomy

Acute cholecystitis (AC) is correlated with fever, leukocytosis, right upper quadrant pain, abdominal tenderness and distention, nausea, and vomiting. A typical surgical intervention would consist of laparoscopic cholecystectomy but as with this presentation of sepsis due to necrotic and gangrenous gallbladder with biliary sludge and cholelithiasis, patient had to undergo an exploratory laparotomy due to consequential multiorgan sepsis during a laparoscopic procedure\textsuperscript{[1]}. To avoid certain complications from laparoscopic cholecystectomy (LC) in this septic patient, such as biliary leakage, peritonitis, IVC compression, and changes in respiratory functions, an urgent exploratory laparotomy, cholecystectomy was performed\textsuperscript{[3]}. These factors necessitate the need of a conversion from LC to an open cholecystectomy.

Case presentation

A 70-year-old African American man, with history of diabetes mellitus, asthma, and hepatitis B, presented to the emergency department with complaints of vomiting, nonbloody watery diarrhea, and significant abdominal pain localized in the right upper quadrant. The patient’s symptoms started with nonbloody diarrhea that lasted 3 days and resolved in 2 days, with 5 episodes per day. He also stated that he had 4 episodes of vomiting since admission. Physical examination showed a normal appearing patient in no acute distress, alert, and oriented. However, patient had a low-grade fever, 98.9°F and tachycardia, 103/min on admission.

Laboratory work

Initial laboratory testing showed leukocytosis $16.1 \times 10^3/\mu l$ on admission, which escalated to $18.3 \times 10^3/\mu l$ before surgery and was decreased postsurgery at $13.5 \times 10^3/\mu l$. Electrolytes, hemoglobin, hematocrit, liver function tests, and lipase were all within normal range. As patient demonstrated leukocytosis, low-grade fever, and tachycardia he met the SIRS criteria of sepsis. The source of sepsis was infectious cholecystitis. A computed tomography of the abdomen and pelvis provided evidence of cholecystitis with cholelithiasis and nodular hepatic cirrhosis (Fig. 1).

Management and treatment

Patient during preoperative check exhibited physical signs of diffused abdominal tenderness and distention with no localized right upper quadrant pain. Because of severe peritonitis and abnormal laboratories, the route of treatment was switched with a rather more invasive exploratory laparotomy. Thus, the initial plan to conduct a LC was altered to an exploratory laparotomy,
cholecystectomy with successful postoperative recovery with a wound vacuum over the abdominal incision. A central line was placed for antibiotics to treat the sepsis. The work has been reported in line with the SCARE criteria[3].

Discussion
AC is a common diagnosis in patients with biliary tract disease leading to a successful surgical treatment with low mortality[4]. But, complicated cases of AC due to perforation or gangrene have a high mortality[4]. Especially, acalculous cholecystitis cases have a mortality rate between 20% and 50% if left untreated[4]. AC with complicated cholelithiasis has a high incidence rate as it occupies a large population with it being the leading cause of gastrointestinal disease in the United States.

Risk factors of AC with cholelithiasis include increasing age, females, socio-economic backgrounds, genetics, ethnicity, and family history[5]. In addition, risk factors that contribute to biliary sludge are primarily due to certain drugs such as ceftriaxone, thiazides, octreotide, and fasting or total parenteral nutrition[5]. All these factors contribute to the development of AC with cholelithiasis. But complications can uproot the urgency of surgical interventions. These complications include perforation, abscess formation, and sepsis.

Sepsis is a harmful complication that can concurrently increase the likelihood of adenocarcinoma of the gallbladder. Statistics configured that up to 16.6% of untreated septic patients with prior aseptic cholelithiasic cholecystitis developed gallbladder carcinoma[6]. Intra-abdominal sepsis is a key differential when treating patients, as it is impactful through distention and tenderness of the abdomen. Elderly patients with deteriorating signs of intra-abdominal sepsis can present physical signs of distention and tenderness of the abdomen, due to inflammatory or infectious process[7]. In elderly patients, above the age of 65, 12% of cases subjected to intra-abdominal sepsis were due to cholecystitis and cholangitis as compared with only 2% of cases below the age of 65[8]. Therefore, the urgency to treat these cases via a selective medium of surgery is keen to the betterment of possible outcomes.

Exploratory laparotomy, cholecystectomy in patients is quite uncommon. LC’s are credited to 94% of the cases, as they are the treatment of choice for patients[9]. Exploratory laparotomies are particularly designated for serious and emergent cases, with a conversion rate of 3.16% from LC[9]. Most cases from data collected suggest patients who had prior upper abdominal surgeries to have high conversion rates, but none suggest for first time patients.

Suggestive of laparoscopic interventions intraoperative in patients who are aseptic can lead to complications of multiorgan failure and pericholecystitis leading to gallbladder perforation and leakage of contents into the peritoneal cavity. Therefore, the adaptability to use an exploratory method should be evidently suggested as contraindications of complications from laparoscopic procedures can rather deteriorate the patients with aseptic cholelithiasic cholecystitis. In addition, factors such as population and medical facilities should be taken into consideration with timing of the operation[10].

Conclusion
The importance of detecting early signs of complications from a preexisting AC preoperatively can help navigate a different surgical plan. The need to convert from a laparoscopic to an exploratory procedure can benefit the outcome and reduce the likelihood of intraoperative complications, especially in senile patients with preexisting medical conditions. Patients who have severe peritonitis and a gangrenous gallbladder should be inevitably sought into the operating room for an exploratory laparotomy to reduce the incidence of any complication that can be caused by a laparoscopic procedure.

Literature currently enables most to conduct a laparoscopic procedure as complications and recovery time is variably low, but in cases as above, the need for a more sufficient and efficient procedure is more defined given demographics. Diagnostic laparoscopy has been indicative of higher risks for complications.
in sicker patients especially with those who have shown signs of peritonitis conducive to multiple organ failure resultant of sepsis[11]. Therefore evidence of these cases should promote exploratory laparotomy procedures to eliminate complications resultant in comorbid patients overall.

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