ROBOTIC CHOLECYSTECTOMY AS A NOVEL BAILOUT ALTERNATIVE TO LAPAROSCOPIC CHOLECYSTECTOMY

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Introduction: Laparoscopic cholecystectomy has transformed gallbladder disease management, offering minimally invasive benefits, shorter hospital length of stays (LOS), decreased postoperative pain, and faster recovery. However, conversion to open cholecystectomy has remained a useful bail-out option for challenging cases. Robotic-assisted cholecystectomy has emerged as a promising surgical tool. However, its role as a potential bailout strategy during laparoscopy remains underexplored. This case report highlights two laparoscopic cholecystectomy cases that were converted to robotic-assisted cases as a novel bail-out approach.

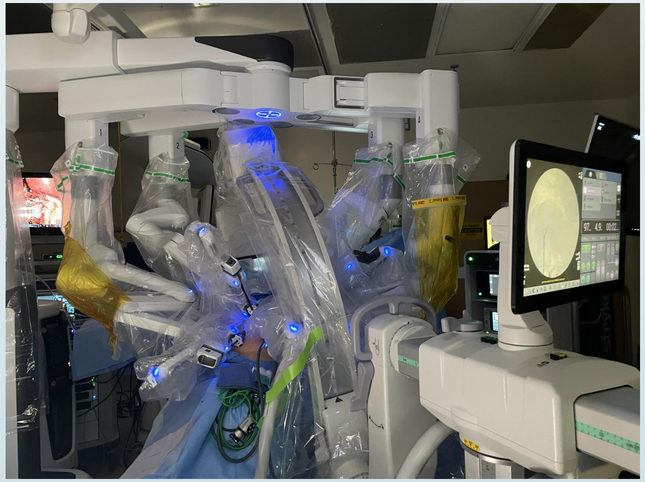


Figure 5. Intra-operative cholangiogram using C-arm between robotic arms

Case 1

A 28-year-old female presented to the emergency department of an ACS EGS-VP hospital with abdominal pain. She had a history of morbid obesity, BMI 33, and was recently discharged from an outside hospital after treatment for an aspergilloma with an Eloesser flap, now post operative day twenty-two. The patient presented with 3 days of RUQ pain, nausea and vomiting with no prior history of biliary colic.

Her exam was significant for RUQ abdominal tenderness and a positive Murphy's sign. The right posterior dry Eloesser flap was clean without signs of infection. Her labs were significant for a leukocytosis of 15.7 x 10^3/µL. Ultrasound findings were consistent with hepatomegaly and acute cholecystitis.

The patient proceeded with a laparoscopic cholecystectomy. Intraoperatively, the gallbladder was seen to be necrotic with extension onto the cystic duct [Figure 1] and backup was called for assistance. A decision was made to convert the case to a robotic-assisted laparoscopic cholecystectomy to allow for finer dissection and visualization. The laparoscopic ports were replaced with the robotic ports and the DaVinci robot was docked. The cystic duct was dissected proximally and clipped right at the take off from the common bile duct. [Figure 2]

There were no post operative complications. The patient was discharged on post operative day 3. She was seen in clinic postoperatively, recovering well.



Figure 1. Gangrenous gallbladder wall and cystic duct dissected off gallbladder fossa

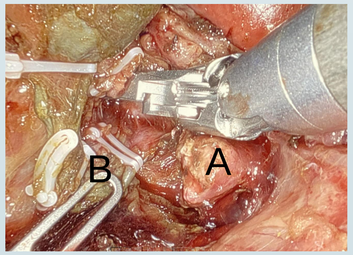


Figure 2. Hilum dissection
- A: common bile duct
- B: doubly clipped cystic duct adjacent to CBD

Case 2

A 48-year-old female presented to the emergency department with 3 days of right upper quadrant and epigastric abdominal pain, and emesis. She had a history of obesity, BMI 42, and hypertension. On physical exam, her vital signs were stable and she had severe right upper quadrant tenderness. Her labs were significant for a leukocytosis to 14.5 x10^3µL, total bilirubin 1.6 mg/dL, and lipase >30,000 U/L and her ultrasound was significant for cholelithiasis, gallbladder wall thickening, and common bile duct measuring 3mm. Her presentation was consistent with acute cholecystitis and gallstone pancreatitis with concern for choledocholithiasis.

GI was consulted and an EGD and EUS were performed, negative for choledocholithiasis. After resolution of her pancreatitis symptoms, she proceeded to the operating room for a laparoscopic cholecystectomy. Intraoperatively, there were complex, dense adhesion within the cystic triangle. Backup was called for assistance.

During further dissection a tubular structure was torn with immediate bile drainage. The anatomy was difficult to identify and there was concern for a common bile duct injury. The case was then converted to a robotic-assisted laparoscopic cholecystectomy. The laparoscopic port sites were converted to robotic ports and the DaVinci robot was docked. [Figure 5] With further dissection the tubular structure was identified as the cystic duct. This was confirmed with cholangiogram. [Figure 5]. The cystic duct was then dissected back to its origin and ligated.

There were no post operative complications. The patient was discharged on post operative day 3. She was seen in clinic postoperatively, recovering well.

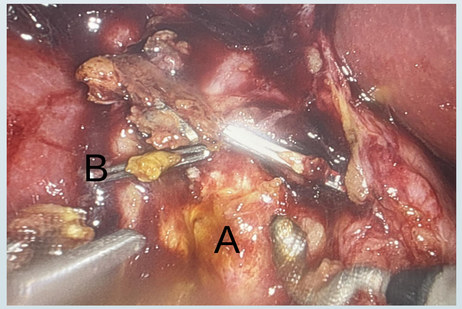


Figure 3. Area with concern for bile duct injury.
- A: origin of aberrant tubular structure
- B: aberrant tubular structure

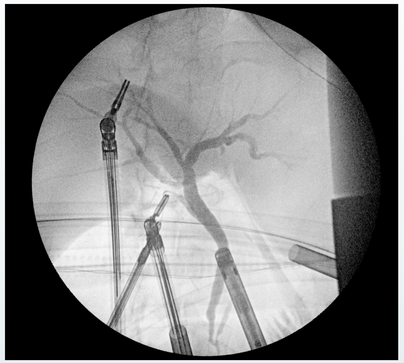


Figure 4. Cholangiogram revealing normal biliary anatomy with good filling of intra- and extra- hepatic ducts without filling defects

Discussion

These cases illustrate an alternative bailout option for difficult cholecystectomies that would have otherwise resulted in open cholecystectomy. Advantages to this option are not just limited to the clinical benefits we have already described. (1) Decreased post-operative LOS will optimize hospitals' diagnosis related group (DRG) metrics, and even lead to net cost savings. Future studies with larger sample sizes would adjudicate the financial advantages to this proposed option. These cases presented here offer new possibilities for the robotics platform as this technology continues to evolve and expand in emergency general surgery.

Acknowledgements

Shah AA, Bhatti UF, Petrosyan M, Washington G, Nizam W, Williams M, Tran D, Cornwell EE 3rd, Fullum TM. The heavy price of conversion from laparoscopic to open procedures for emergent cholecystectomies. Am J Surg. 2019 Apr;217(4):732-738. doi: 10.1016/j.amjsurg.2018.12.038. Epub 2018 Dec 21. PMID: 30638727.