Robotic Assisted Laparoscopic Enterolithotomy for Gallstone Ileus

Julianne E. Pilla, MD[1]; Assal Nasir[2]; Bisher Nasir [3]; Shashank Thyarala, MD[1]; Omer Nasir, MD[1]
[1]Nazareth Hospital Trinity Health; [2]Ohio Heritage College of Osteopathic Medicine; [3]Rowan-Virtua College of Osteopathic Medicine

Introduction & Case Presentation

Gallstone ileus is reported to cause 1- 4% of small bowel obstructions (SBO).[1] This case report describes a robotic assisted laparoscopic approach for enterolithotomy in management of gallstone ileus for an elderly comorbid female with delayed presentation of mechanical SBO. Diagnosis of gallstone ileus was made after visualization of pneumobilia and a radiopaque foreign object on cross sectional imaging (Figure 1).

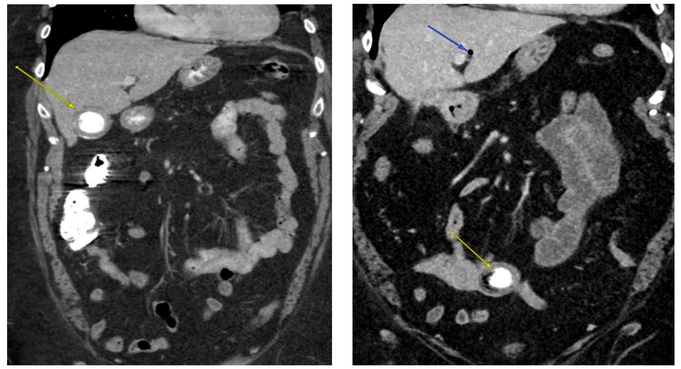


Figure 1. (Left) Computed tomography of abdomen and pelvis (CTAP) prior to presentation. Yellow arrow: Gallstone. (Right) CTAP upon presentation. Blue arrow: Pneumobilia. Yellow Arrow: 2cm rounded foreign body in small bowel.

Operative Technique

- Abdominal access obtained via direct optical entry using a bladeless 5-mm Optiview trocar at Palmer's point. 8-mm trocar placed at the level of the umbilicus in the left abdomen, followed by another 8-mm trocar in the suprapubic area just to the left of midline. Initial 5-mm Palmer's point trocar was upsized to 8-mm trocar. Patient was then placed in Trendelenburg with right side up. The da Vinci Xi Surgical System was deployed for docking on patient's left, the 8mm port at the level of the umbilicus docked in arm 3, laparoscope inserted, and operative site targeting completed. The following instruments were then inserted: a Fenestrated Bipolar Forceps™ in arm 2, and a Cadiere Forceps in arm 4 (Figure 2).
- The tenia coli at the cecum was identified and starting at the ileocecal valve the "hand over hand" technique was used to gently run the small bowel proximally, making sure to grasp mesenteric fat rather the bowel wall itself. The distal ileum appeared decompressed and viable. Area of firm prominence noted at the level of the proximal ileum with apparent luminal obstruction and proximal dilatation, without evidence of ischemia. Additional 5mm trocar was placed in the left flank for suction/irrigation.

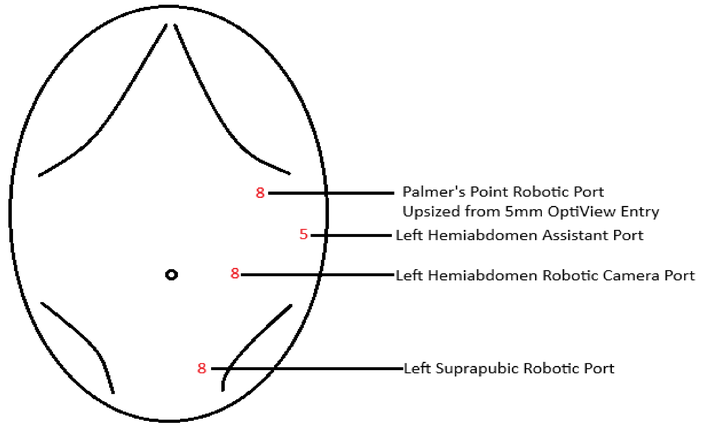
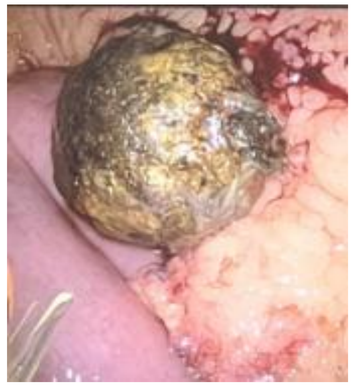


Figure 2. Port Placement. Three "8" mm Robotic ports: #1 at Palmer's point (upsized from initial 5mm OptiView entry), #2 left hemiabdomen at level of the umbilicus (Robotic Camera port), #3 left suprapubic area. One "5" mm assistant port in left hemiabdomen.

- Monopolar scissors were exchanged into arm 4 and a 3-cm longitudinal enterolithotomy created over the area of prominence on the ileum. A 3-cm gallstone was identified upon creation of the enterolithotomy, which was exteriorized from the small bowel for later removal (Figure 3). Small bowel contents controlled with suction, without gross spillage.
- The enterotomy was closed with a series of 3-0 undyed vicryl interrupted full-thickness sutures in a transverse fashion to maintain luminal patency, making sure to avoid the posterior bowel wall, followed by a layer of imbricating 3-0 vicryl undyed interrupted sutures. This repair was then reinforced with a pedicled omental flap fixed in place with interrupted 3-0 undyed vicryl suture taking serosal bites of small bowel anchoring the omental patch all-around the repaired enterotomy, concluding the repair. The extracted obturating gallstone was placed into an Endocatch bag and removed from the LUQ port site after extension of the fascial defect and skin incision to accommodate the stone. The stone was passed off of the field for pathology. LUQ port site fascial edges were controlled with Kocher clamps and approximated with one interrupted dyed 0 Vicryl suture on UR-6 needle, and three interrupted dyed 0 Vicryl fascial sutures using Carter Thompson suture passer under direct visualization. Local anesthesia was administered, and incisions were closed in standard fashion.



Final Diagnosis
Gallstone, extraction: Gallstone (gross examination only).

Figure 3. Intra-operative picture of extracted foreign body, and final pathology report.

Discussion

The patient was discharged on day 4 after tolerating a soft diet with full return of bowel function, without complications and with limited pain. Gallstone ileus is reported to be the cause of small bowel obstruction in age >65 in up to 25% of cases.[2] The minimally invasive robotic assisted approach described allowed for adequate visualization, decreased operative time, decreased post operative pain, avoidance of contamination, and optimal range of motion when running the bowel proximal from the ileocecal valve and to the level of the obturating stone.

Conclusion

This technique describes an ideal approach to the minimally invasive management of gallstone ileus.

References

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2. Ravikumar R, Williams JG. The operative management of gallstone ileus. Ann R Coll Surg Engl. 2010 May;92(4):279-81. doi: 10.1308/003588410X12664192076377. PMID: 20501012; PMCID: PMC3025194.