

# Bowel Injury in Laparoscopic Cholecystectomy- A Surgical Challenge

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*Received: 18<sup>th</sup> July, 2024; Revised: 15<sup>th</sup> August, 2024; Accepted: 03<sup>rd</sup> September, 2024; Available Online: 25<sup>th</sup> September, 2024*

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## ABSTRACT

Due to its minimally invasive nature and positive outcomes, laparoscopic cholecystectomy has become the gold standard for the surgical care of gallbladder illnesses such as cholelithiasis and cholecystitis. Despite its widespread adoption and overall safety, complications can still occur. One such complication, albeit rare, is bowel injury, which can lead to significant morbidity and potentially life-threatening conditions if not promptly recognized and managed. Bowel injuries during laparoscopic cholecystectomy can arise from various mechanisms, including direct trauma from surgical instruments, thermal injury from electrocautery devices, or as a consequence of extensive adhesiolysis. The clinical presentation of bowel injury may vary, ranging from immediate recognition intraoperatively to delayed symptoms postoperatively, such as abdominal pain, peritonitis, or sepsis. Given the potentially severe outcomes, surgeons must maintain a high index of suspicion and be prepared to address these injuries promptly. In this case report, we describe a rare instance of a small bowel injury sustained during laparoscopic cholecystectomy in a 31-year-old male. We detail the intraoperative identification and management of the injury, the subsequent post-operative complications, and the successful surgical interventions that led to the patient's recovery. This case underscores the importance of early detection and prompt intervention in managing bowel injuries during laparoscopic procedures and contributes to the existing knowledge on this critical issue.

**Keywords:** Laparoscopic cholecystectomy, Extra-biliary complications, Trocar injury, Bowel injury.

Journal of Surgery Archives (2024);

**How to cite this article:** Shiva, Bhatt H, Anand A, Kumar A, Gaurav K, Ansari N, Sonkar AA, Bowel Injury in Laparoscopic Cholecystectomy- A Surgical Challenge. Journal of Surgery Archives. 2024;2(2):36-37.

**Source of support:** Nil.

**Conflict of interest:** None

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## INTRODUCTION

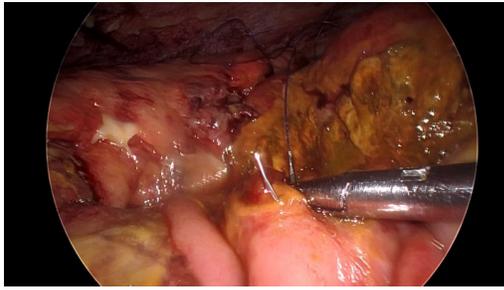
Laparoscopy cholecystectomy (LC) is the standard of care for gallstone disease due to shorter hospital stays, less post-operative pain, better cosmesis, faster recovery, and early return to work. Bowel injuries during laparoscopic cholecystectomy can arise from various mechanisms, including direct trauma from surgical instruments, thermal injury from electrocautery devices, or as a consequence of extensive adhesiolysis. It is associated with an overall biliary and extra-biliary complication rate of 3 to 7%.<sup>1</sup> Bowel injury is a rare and fatal complication reported in 0.07 to 0.7% of the cases, carrying a mortality rate of 2.5 to 5%.<sup>2,3</sup> It can occur while gaining access or as a result of electrothermal injury, with an incidence of 0.16 and 0.07%, respectively.<sup>2,3</sup> Injuries to both small and large bowel have been reported. Bowel injuries during laparoscopic cholecystectomy are uncommon. However, their clinical significance is profound, as delayed diagnosis and management can lead to peritonitis, sepsis, and multiorgan failure. Early identification of such injuries is challenging due to the often subtle and non-specific nature of initial symptoms, which may contribute to delays in appropriate treatment.

## Case Report

An obese male aged 31 years old, a chronic smoker, an alcoholic, and a daily wage laborer with no comorbidities were planned for elective standard four-port laparoscopic cholecystectomy for symptomatic gallstone disease after proper preoperative evaluation. Ultrasonography revealed a distended gall bladder with multiple calculi, the largest measuring 12 mm with normal wall thickness, normal liver parenchyma, cystic duct, common bile duct, and pancreas. Intraoperatively, dense adhesions obscured most of the gall bladder, consistent with Parkland grade 5. Laparoscopic cholecystectomy was completed after achieving a critical view of safety, along with a sub-hepatic drain placement. On the second post-operative day, the patient complained of severe pain in the abdomen and increased bilious output from the drain (300 mL in 24 hours). On examination, the patient was conscious and oriented, with pulse rate, temperature, and blood pressure of 128 beats/min, 100.2F, and 122/70 mm hg. Abdominal examination revealed generalized distension, tenderness, guarding, and rigidity. Laboratory tests revealed a raised white blood cell count (20-200 cells/ $\mu$ L). Chest and

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**Figure 1:** Primary repair of bowel perforation due to trocar injury

abdominal radiographs and abdominal ultrasonography were non-specific. Emergency diagnostic laparoscopy was done, which revealed a 1 × 1 cm small bowel perforation approximately 4 feet distal to the duodeno-jejunal junction, for which laparoscopic primary repair was done (Figure 1). The post-operative period was uneventful and the patient was discharged on post-operative day 10. On follow-up, the patient is doing well with no complications and the histopathology is consistent with the features of chronic cholecystitis. The usual clinical presentation of fever and non-specific pain in the abdomen should raise a suspicion of bowel injury along with other differentials of post-operative fever.

## DISCUSSION

LC is regarded as the gold standard for the treatment of symptomatic gallstones and other gallbladder-related. Despite its widespread adoption and general safety, this procedure is not without risks, and, complications, though infrequent, can range from minor issues to severe, life-threatening conditions. It is associated with biliary and extra-biliary complications leading to conversions, readmissions, re-explorations, high morbidity and mortality. The extra-biliary complications occur with almost the same frequency but are underreported. Extra-biliary complications can be access-related or procedure-related and range from surgical site infection, minor port site bleeding, subcapsular liver hematoma, bleeding from liver bed, spillage of stones in the peritoneal cavity to fatal diaphragmatic injury, small or large bowel injuries, vascular injuries requiring conversion to open or a redo surgery.<sup>4,5</sup> Access-related bowel injuries can be caused by Veress needle (39.8%), primary trocar (37.9%), or secondary trocar (22%) and are usually present in the immediate post-operative period.<sup>3</sup> On the other hand, electrothermal bowel injury can be a contact injury, conduction injury, or a result of capacitive coupling and often present late as a result of delayed perforation secondary to ischemic necrosis.<sup>2</sup> The usual clinical presentation of fever and non-specific pain in the abdomen should raise a suspicion of bowel injury along with other differentials of post-operative fever. Amongst the bowel injuries, the duodenum is the most commonly injured part, occurring in 0.05 to 0.14% of the cases with a mortality ranging from 8 to 75%.<sup>6</sup> Injuries to the transverse colon, jejunum, and ileum have also been reported with variable incidence.<sup>7</sup> The management options include

early detection, laparoscopic repair, exploratory laparotomy with resection and anastomosis, pyloric exclusion or creation of stoma depending on the location of the perforation, patient's factor, local contamination and surgeon's experience.<sup>1,8</sup> The various methods used to minimize access-related injuries are a closed method, open method, shielded disposable trocars, optical Veress needle, optical trocars, radially expanding trocars, and a trocar-less reusable, visual access cannula.<sup>3</sup> The burn-related injuries can be minimized with the use of ultrasonic energy devices.<sup>2</sup>

## CONCLUSION

In conclusion, complications can occur even in the best of hands and it is vital that these are recognized promptly and immediately addressed. Bowel injuries, though infrequent during laparoscopic cholecystectomy, can result in severe complications if not promptly identified and managed. This case emphasizes the critical need for heightened vigilance and thorough intraoperative assessment to detect such injuries early. The successful outcome in this patient was attributed to timely recognition, immediate surgical intervention, and careful post-operative monitoring. The usual clinical presentation of fever and non-specific pain in the abdomen should raise a suspicion of bowel injury along with other differentials of post-operative fever.

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