

Laparoscopic cholecystectomy: We can still be safer

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Since its introduction more than 25 years ago, laparoscopy has become the approach of choice for cholecystectomy. Despite ongoing advances in surgical technique and experience with specialized equipment, intra-operative injuries still occur.

Understanding the circumstances under which these injuries occur and their contributing factors may help improve surgical safety. As a result, the CMPA reviewed 53 of its medical-legal cases involving intra-operative injuries sustained during cholecystectomy. All of the cases closed between 2008 and 2012 and involved complications from laparoscopic (n=50) or open (n=3) procedures. The most frequent complications were biliary tract injuries (83%), intestinal injuries (23%), and vascular or hemorrhagic injuries (8%). Some cases involved more than one complication. Thirty-one patients died or experienced serious harm as a result of their injury.

Biliary tract injury

What happened?

During a laparoscopic cholecystectomy for symptomatic cholelithiasis, a surgeon encounters bleeding and places multiple hemoclips, some close to the common bile duct (CBD). The patient is admitted overnight due to nausea and discharged the next day.

After discharge, the patient experiences decreased appetite, abdominal pain, and ongoing nausea; she also vomits all fluid intake. Five days after the operation, she presents at the emergency department (ED) and says her urine has been dark for 48 hours.

The ED physician reviews the dictated operative report, but sees no mention of anything unusual. He notes jaundice and elevated liver function tests. An endoscopic retrograde cholangio-pancreatography (ERCP) demonstrates narrowing of the CBD with a high-grade stricture at the level of the cystic duct. The patient is treated with a biliary stent, and her liver function returns to normal.

What did peer experts say about this case?

The surgical experts were critical of the number of hemoclips used (as identified during the ERCP study) as well as their application so close to the CBD. This indicated substandard surgical technique. Furthermore, the operative report did not reflect the difficulties encountered during the procedure.

Overview

Our review identified 44 cases involving biliary tract complications; two-thirds (68%) had unfavourable legal outcomes. Peer experts noted that the majority of cases involved an anatomical misidentification. In most cases, there was a complete ligation or transection of the CBD or hepatic duct. In other cases, the injury to the duct was less severe, leading to a bile leak, stricture, or fistula.

Experts reviewing these cases expressed concerns about:

- a lack of an informed consent discussion that addresses the risks of bile duct injury
- failures in converting to an open approach or performing intra-operative cholangiography when unsure of anatomy or experiencing difficulty

- inappropriate delays in post-operative investigation and intervention in symptomatic patients
- incomplete discharge instructions leading to delays in patients seeking care.

In some cases, peer experts emphasized the importance of achieving a “critical view of safety”¹ to identify structures within the triangle of Calot and minimize the risk of bile duct injury.

Intestinal injury

What happened?

Following a seemingly uneventful laparoscopic cholecystectomy, a patient is kept in hospital overnight for control of nausea. The surgeon is going on vacation, so he transfers care of the patient to another surgeon.

Over the next couple of days, the patient develops an ileus and increased abdominal distension and discomfort. Investigations show no biliary tract abnormalities but do confirm distended loops of small bowel and a sub-hepatic fluid collection. The ileus persists, and the surgical team attributes it to a hematoma, noting there is significant abdominal wall ecchymosis.

One week after the operation, the original surgeon returns and realizes the patient's condition is not improving. He reviews the previous investigations, is suspicious of peritoneal irritation on physical examination, and orders a CT scan for the next morning. The scan shows a right paracolic fluid collection that is interpreted as a potential hematoma collection. Purulent material is drained percutaneously the same day and antibiotics are started.

On the 17th day after the operation, the patient develops a fever and elevated white blood cell count. A CT scan shows a new fluid collection in the gallbladder bed and pararectal area. Percutaneous drainage is contemplated, but the patient becomes septic and is taken to the operating room for a laparotomy, which demonstrates a perforated terminal ileum and peritonitis. Following extensive bowel resection and primary anastomosis, the patient is left with partially controlled diarrhea.

What did peer experts say about this case?

Surgical experts noted that the laparoscopy was done according to standard and intestinal injury is an inherent risk of such surgery. They also agreed that percutaneous drainage of the abscess was appropriate. They did state, however, that the laparotomy should have been done sooner because the etiology of the abscess was not established, and the patient continued to have an ileus.

Overview

Our review identified 12 cases in which patients developed intestinal complications following cholecystectomy; half of these cases had unfavourable legal outcomes. All patients underwent a laparoscopic approach, and most of the complications were from direct trauma to the small bowel, as opposed to devascularization injuries.

Injury was often caused by a trocar, cautery, or other instrument. However, in some cases, the mechanism of injury was difficult to determine, since there was often significant inflammatory response by the time the site was visually examined.

Experts reviewing care in these cases were often critical of the surgical technique, as well as failure to recognize a bowel injury earlier in the post-operative period, and failure to investigate other reasons for peritonitis when a biliary tract injury was ruled out.

Vascular and hemorrhagic injuries

Four cases in the review involved vascular injuries, mainly at the liver bed. Surgical experts reviewing these cases stated that significant bleeding as a complication of laparoscopic surgery is rare, and usually presents in one of two different clinical patterns. The patient can become hemodynamically unstable immediately following the peritoneal access technique or during the dissection. A more subtle presentation with signs of ileus and decreasing hemoglobin over time can also occur in the first few hours post-operatively, demonstrating a "silent" hemorrhage. The main criticism in these cases was the delay in recognizing the vascular injury.

The bottom line

- An informed consent discussion for laparoscopic cholecystectomy should not leave the patient with the impression that it is a minor procedure without the possibility of significant complications.
- The symptoms and signs of post-operative complications of cholecystectomy (usually related to biliary tract or intestinal injuries) may be non-specific initially and develop hours to days after the surgery. Discharge instructions alerting patients to possible symptoms of complications may prompt them to seek early attention.
- Family or emergency physicians often face the challenge of assessing patients post-operatively with early and non-specific symptoms of a complication. They should communicate directly with the surgical team for further assessment of any suspicion of intra-operative injury.

Additional reading

- ["Shining a light on the medical-legal risks of laparoscopic surgery"](#)
- [CMPA Good Practices Guide](#), see the section on reducing risk in surgery in the "Managing Risk" domain

References

1. Madani A, Watanabe Y, Feldman LS, et al. Expert Intraoperative Judgment and Decision-making: Defining the Cognitive Competencies for Safe Laparoscopic Cholecystectomy. *J Am Coll Surg* [Internet]. 2015 Nov [cited 2018 March 26]; 221(5):931-40. Available from: <https://www.ncbi.nlm.nih.gov/pubmed/26292647> doi: 10.1016/j.jamcollsurg.2015.07.450

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