A Population Based Study on Mishaps During Laparoscopic Cholecystectomy in Qatar: 10 Years Experience

Hussein A.A., Allam H., Kassem H., Sholeik N.
Departments of Surgery, Radiology and Anesthesia, Hamad Medical Corporation, Doha, Qatar

Abstract:
In order to determine the national incidence of adverse events following laparoscopic cholecystectomy (LC) the records were reviewed retrospectively of 4861 patients who underwent LC over a period of ten years (1993-2003).

The most serious non-biliary complication was trocar injury of major vessels in three cases. Other non-biliary complications included duodenal perforation during dissection of the Calot’s triangle, small bowel injury while inserting the umbilical port and trocar site hernia. Adverse biliary events included common bile duct injury, common hepatic duct injury, bile leakage from the cystic duct and one instance of the migration of an endoloop into the common bile duct. Conversion to open cholecystectomy was required in 109 cases.

Although LC may be associated with various adverse sequelae, these are rare and should not deter surgeons and patients.

Keywords: Laparoscopic cholecystectomy (LC), common bile duct (CBD), common hepatic duct (CHD), biliary and non-biliary adverse events.

Introduction:
A population-based study removes the influence of many factors, including surgical training and experience, the size of the institution, the quality of the equipment, case selection and volume, and it determines more accurately the outcome of a procedure in general use. Ours is a teaching hospital, and the procedure was performed by different surgeons and, at times, by the residents under supervision. The increased incidence of bile duct injury during laparoscopic cholecystectomy (LC) is well known. However, non-biliary complications can be equally morbid and life threatening.

Methods:
The health records of 4861 patients who underwent LC for symptomatic gall stones from 1993 to 2003 were reviewed for biliary and non-biliary complications and their management.

Results:
The records were reviewed of 3478 (71.6%) female patients and 1383 (28.4%) male patients with a mean age of 40.8 years (range 19-72). The proportion of patients undergoing laparoscopic surgery increased from 11% in 1993 to 92% in 2003. Over the same period the length of post-operative inpatient stay decreased from 6.9 days to 2.7 days. In 2003 96.3% of electively admitted patients were operated upon by a laparoscopic technique. Amongst patients admitted on an emergency basis, women below 50 years of age were more often operated upon by laparoscopic technique than were older women and men.

The overall rate of conversion to open surgery was 6.2%. The major risk factors for conversion included male sex, obesity, and acute cholecystitis. Concurrent choledoco-lithiasis, and cholecystitis were associated with a conversion rate of 22%. Length of stay (LOS) was reduced for laparoscopic operations but conversion added three to four days. The incidence of significant non-biliary complications was 1.4% of all LCs attempted.

The most common non-biliary complication was duodenal perforation in eight cases during dissection of a difficult Calot’s triangle due to adhesions or distorted anatomy. The most serious complication was trocar injury of a major vessel; twice of the external iliac artery and once of the internal iliac artery. Other non-biliary complications included small bowel injury while inserting the umbilical port (seven cases), and trocar site hernia (29 cases). Three patients who developed major arterial injuries while inserting trocars required re-operation and insertion of a vascular graft.

In 4368 cases, pneumoperitoneum was created using a Veress needle, and in 493 cases, by an open technique of trocar insertion. The data revealed no significant differences in the complication rates using either technique.

Eight cases of CBD injury were detected intra-operatively during LC, giving an overall incidence of 0.17%. Of these, six cases of lateral injury to the CBD required repair (one case primarily, five cases over T-tube) and two cases of CBD transection required Roux-en-Y hepatico-jejunostomy. Two other patients presented postoperatively with biliary peritonitis that re-
quired laparotomy. They underwent Roux-en-Y hepatico-jejunostomy for a type III biliary stricture. There were two cases of CHD injury discovered intra-operatively that required conversion to open and Roux-en-Y hepatico-jejunostomy.

Most cases of bile leak from the cystic duct were due to retained stones in the CBD (11 cases), which were managed by ERCP sphincterotomy, stone retrieval and stenting. Fifteen cases of bile leak from the cystic duct were due to slipped cystic duct clips or endoloop. These cases were managed by CBD stenting through ERCP. There was one case of CBD obstruction by migrating vicryl endoloop 10 months after LC. None of the patients in this series had combined biliary and non-biliary complications.

Discussion:

The incidence of non-biliary complications was 1.4%, compared to 0.5 in another study on a smaller group of patients. Trocar injuries to the intestine or major vessels were the most serious. The insertion of the first trocar is often considered the most dangerous step in laparoscopic surgery, with a complication rate as high as 1.1\(^\text{5,6}\)\%. Bowel injury occurs during insertion of the first trocar in approximately 0.1\% of patients, and is more common in the presence of adhesions in patients with previous intra-abdominal surgery\(^\text{6}\). Such injury to the intestine may range from insufflation injuries that may not require further intervention, to those that may require exteriorization of the injured segment of bowel through the umbilical port for closure, or conversion to a formal laparotomy. Trocar-related complications may be minimized by the use of an open technique to create pneumo-peritoneum, insertion of the secondary ports under vision, positioning the patient in a Trendelenburg position, elevation of the abdominal wall prior to trocar insertion, and direction of the Veress needle towards the pelvis\(^\text{5,6}\). In our experience, although the open method of trocar insertion is safe as it provides access to the abdomen under direct vision\(^\text{5}\) there was no statistically significant difference in the incidence of non-biliary complications between cases done by the closed method and those done by the open method.

During LC the incidence of major retroperitoneal vessel injury is reportedly 0.05\%, with injury to the abdominal aorta, iliac vessels and inferior vena cava being common\(^\text{1}\). In our series the incidence of major vascular injuries during LC was 0.07\%. The surgeon’s inexperience, improper positioning of the patient, failure to elevate the abdominal wall, incorrect direction of insertion of the trocar, inadequate pneumoperitoneum, failure to rotate the trocar during insertion, forceful thrust, inability to recognize anatomical landmarks, extreme thinness, skeletal deformity and previous abdominal surgery have all been implicated\(^\text{4,5}\). It must be remembered that retroperitoneal bleeding may not present with visible blood, and that the high intrabdominal pressure secondary to the pneumoperitoneum decreases venous return, which in turn may reduce arterial bleeding. Therefore sudden unexplained hemodynamic instability occurring shortly after needle insertion should alert the operating team to the possibility of a vascular injury even in the absence of any visible bleeding\(^\text{4}\).

The incidence of biliary complications was 0.35\% which is comparable with the incidence reported in other studies (0.5\%-0.7\%)\(^\text{3,8}\). The incidence of biliary injuries seems to be marginally higher after LC than after open cholecystectomy although a decrease in the incidence of such injuries has been reported recently\(^\text{2}\). The presence of extensive adhesions in the Calot’s triangle, abnormal anatomy, severe acute cholecystitis, emphysematous cholecystitis, an inexperienced surgeon have been all implicated in biliary injuries during LC. Surgical reconstruction for delayed detected bile duct injuries in the early postoperative phase is associated with a higher risk of complications compared with elective repair after 6-8 weeks.

Conclusion:

Although LC may be associated with some adverse events, these are uncommon and have not deterred surgeons or patients.

References: