

Videolaparocholecystectomy: Casuistry of 1000 Cases

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ABSTRACT

Despite the ongoing evolution in the medical treatment of biliary pathology, the standard of treatment for gallstones remains cholecystectomy. There are no alternative treatments that have shown the same efficacy as surgery. Current alternative treatments have shown high recurrence and failure rates. Cholecystectomy remains the gold standard for management of gallstones.

The surgical access of laparoscopic cholecystectomy accomplished by Mouret in 1987 allows for a reduction in operative trauma, hospital stay, postoperative pain and convalescence. These factors permit a faster return to normal activities. Today, laparoscopic cholecystectomy is performed in almost all medical centers around the world; however, the procedure is not free of complications.

The objective of this study was to analyze our first 1000 cases of laparoscopic cholecystectomy, giving emphasis to the morbidity and mortality of the procedure.

Key Words: Laparoscopic cholecystectomy.

MATERIALS AND METHODS

The first 1000 cases of laparoscopic cholecystectomy performed between January 1992 and July 1997 by the surgical staff of the São Rafael hospital in Salvador, Bahia, Brazil were analyzed retrospectively. There was no selection criteria among patients. These cases represent the first 1000 patients submitted to laparoscopic cholecystectomy in this hospital.

Laparoscopic technique followed that of the European school. A Veress needle was inserted via the umbilicus as a closed technique in the majority of cases. Pneumoperitoneum was induced and maintained by an automatic CO₂ insufflator maintaining endoabdominal pressure less than 15 mm Hg. An open or Hasson technique was used to establish pneumoperitoneum in cases with previous surgery, abdominal distention or difficulties with percutaneous insertion of the Veress needle.

The first trocar was placed at the umbilicus (10 mm) and the others were inserted under direct vision in the epigastrium (5 mm), mesogastrium (10 mm) and right flank (5 mm). A 25° laparoscopic optic was used to provide all-around vision.

Intraoperative cholangiography was indicated in patients with anatomic variations, jaundice, biliary dilatation, acute pancreatitis or an increase in liver enzymes when endoscopic retrograde cholangiopancreatography (ERCP) could not be performed preoperatively. Cholangiographic technique included introduction of a long intravenous catheter needle in the right hypochondrium, catheterization of the cystic duct, and fixation of the catheter with metal clips.

The following data were generated: age, gender, previous surgery, surgical risk, clinical symptoms, laboratory evaluation, intraoperative findings and procedures, morbidity and mortality, conversion to open technique, operative time, and hospital stay.

RESULTS

The authors retrospectively analyzed the first 1000 patients operated by laparoscopic cholecystectomy in our hospital. The minimum age was 13 years, and the maximum age was 90 years, with an average age of 47.4 years.

Characteristic	Value
N	1000 patients
Age	13 - 90 (mean 47.4)
Male	213 (21.3%)
Female	787 (78.7%)
Previous surgery	481 (48.1%)
Upper abdomen surgery	21 (2.1%)
Difficult access due to adhesion	6 (0.6%)
ASA 1	604 (60.4%)
ASA 2	362 (36.2%)
ASA 3	32 (3.2%)
ASA 4	2 (0.2%)
Subhepatic drainage	145 (14.5%)
Leukocytosis	151 (15.1%)
Positive culture	74 (7.4%)
Cholangiography	51 (5.1%)
Choledocholithiasis	3 (0.3%)
Mean operative time	86 minutes
Intraoperative complications	13 (1.3%)
Conversion to open technique	21 (2.1%)
Postoperative complications	37 (3.7%)
Mortality	1 (0.1%)
Hospital stay	2.17 days

There were 213 males (21.3%) and 787 females (78.7%) (**Table 1**).

A history of previous abdominal surgery was found in 48.1% of the patients (481). Twenty-one (2.1%) of these patients had upper abdominal surgery. In six cases it was impossible to access the gallbladder due to adhesions, and the surgery was completed by a conventional approach (**Table 1**).

The criteria used for operative risk evaluation was established by the American Society of Anaesthesiology (ASA). Thirty-six (3.6%) patients had high surgical risk (III, IV and V ASA); meanwhile, 966 (96.6%) patients were at a lower surgical risk (I and II ASA) (**Table 1**).

A total of 145 (14.5%) patients required subhepatic drainage (**Table 1**). This was performed in cases where the dissection between gallbladder and liver was difficult, leading to question if there were accessory bile ducts or postoperative hemorrhage. The drain, generally, was removed on the first postoperative day.

Characteristic	Value
Right superior quadrant pain	594 (59.4%)
Fever	89 (8.9%)
Palpable gallbladder	29 (2.9%)
Leukocytosis	151 (15.1%)
Shift to left	18 (1.8%)

Bacteria	Value
<i>Klebsiella</i>	16 (21.6%)
<i>Escherichia coli</i>	15 (20.3%)
<i>Enterobacter sp</i>	13 (17.6%)
<i>Citrobacter</i>	5 (6.8%)
<i>Bastonete gram positive</i>	5 (6.8%)
<i>Salmonella sp.</i>	3 (4.1%)
<i>Serratia marcencens</i>	3 (4.1%)
<i>Pseudomonas</i>	3 (4.1%)
<i>Acinetobacter</i>	3 (4.1%)
<i>Bastonete gram negative</i>	2 (2.7%)
<i>Aerococcus</i>	1 (1.3%)
<i>Bifido bacterium</i>	1 (1.3%)
<i>Cândida</i>	1 (1.3%)
<i>Proteus</i>	1 (1.3%)
<i>S. epidermidis</i>	1 (1.3%)
<i>Staphylococcus</i>	1 (1.3%)
Total	74 (7.4%)

The most common complaint was right hypochondrium pain (**Table 2**), present in 594 (59.4%) of the patients. Inflammation signs, such as fever and leukocytosis, were present in 89 (8.9%) and 151 (15.1%) patients, respectively. A total of 18 (1.8%) patients with leukocytosis presented with a left shift; nevertheless, 35.8% had no abnormal physical signs.

Culture of the bile was obtained systematically by aspiration of the gallbladder during or after extraction from the abdominal cavity. Seventy-four (7.4%) of the bile cultures were positive for at least one bacteria (**Table 3**).

Patients with suspected choledocholithiasis were submitted to ERCP prior to surgery. When it was not achievable,

Table 4.
Intraoperative complications - analysis of 1000 cases.

Intraoperative complication	Value
Cystic duct lesion	3 (0.3%)
Cystic artery lesion	2 (0.2%)
Liver parenchyma lesion	2 (0.2%)
Duodenal lesion	2 (0.2%)
Pneumo-omentum	1 (0.1%)
Gallbladder rupture	1 (0.1%)
Common hepatic duct lesion	1 (0.1%)
Large bowel perforation	1 (0.1%)
Total	13 (1.3%)

Table 5.
Causes of conversion to open technique
- analysis of 1000 cases.

Cause	Value
Anatomic variation	9 (42.8%)
Adhesion	6 (28.6%)
Cholecystoduodenal fistula	2 (9.5%)
Hypertension	2 (9.5%)
CO ₂ retention	1 (4.8%)
Common hepatic duct lesion	1 (4.8%)
Total	21 (2.1%)

intraoperative laparoscopic cholangiography was performed. Cholangiography was also obtained in cases where the anatomy was obscure. Fifty-one patients (5.1%) had cholangiography, and choledocholithiasis was found in three patients (0.3%) (**Table 1**). Two patients were submitted to laparotomy plus common bile duct exploration. In our last patient with choledocholithiasis we performed choledochotomy and common duct exploration by laparoscopic means. In all of the patients, a T-tube was placed and removed after two weeks.

The mean time of surgery was 86 minutes. Thirteen (1.3%) patients had intraoperative complications (**Table 4**), with 0.1% (one patient) of mortality due to pulmonary embolism.

Conversion was required in 21 patients (2.1%). **Table 5** outlines the causes of conversion to open technique. Postoperative complications occurred in 37 patients (3.7%) (**Table 6**). The average hospital stay was 2.17 days. **Table 7** outlines the histological aspects of the gallbladders removed.

Table 6.
Postoperative complications - analysis of 1000 cases.

Postoperative complications	Value
Atelectasis	13 (35.2%)
Respiratory infection	5 (13.5%)
Choleperitoneum	5 (13.5%)
Residual choledocholithiasis	4 (10.8%)
Bilis leak	2 (5.4%)
Wound infection	2 (5.4%)
Subhepatic hematoma	1 (2.7%)
Respiratory insufficiency	1 (2.7%)
Subphrenic collection	1 (2.7%)
Perforated ulcer	1 (2.7%)
Pulmonary embolism	1 (2.7%)
Death	1 (2.7%)
Total	37 (3.7%)

Table 7.
Histological aspects of the gallbladders
- analysis of 1000 cases.

Histology	Value
Chronic cholecystitis	813 (81.3%)
Acute cholecystitis	148 (14.8%)
Gallstone	8 (0.8%)
Gallbladder adenocarcinoma	7 (0.7%)
Sub-acute cholecystitis	7 (0.7%)
Scleroatrophic gallbladder	6 (0.6%)
Gallbladder polyp	5 (0.5%)
Common duct Fibroxantoma	1 (0.1%)
Normal gallbladder	5 (0.5%)

DISCUSSION

There are limitations imposed by a retrospective study. This analysis was based on a standard procedure performed at one center contributing as a serial report with a significant N for a study with this characteristic.

There is consensus in the literature that laparoscopic cholecystectomy is the procedure of choice in the treatment of gallbladder stones with a low rate of conversion (2.1% in our casuistry). Intraoperative complications were: cystic duct lesion (3 cases - 0.3%) managed by putting the clip below it; cystic artery lesion (2 cases - 0.2%), also managed by the use of a clip after identification of the bleeding vessel; and liver parenchyma lesion in two patients (0.2%) solved by electrocoagulation.

There were two duodenal injuries (0.2%): the first occurred during its traction with a suction device, and the second was due to contact with the unprotected tip of the electrocautery. Both cases were diagnosed postoperatively and were treated by laparotomy and primary suture of the lesions. They had no further complications.

An injury of the large bowel occurred during placement of the first trocar. The patient had no abdominal scars or distention. The diagnosis was made when the camera passed into the lumen of the large bowel. This complication was managed by placing two other trocars and extracting the injured large bowel out of the abdominal cavity through the umbilicus, with the aid of an intestinal clamp. After suture repair, the large bowel was reintroduced into the abdominal cavity and a 20 mm trocar was placed in the umbilicus to complete the cholecystectomy by laparoscopic means.

Pneumo-omentum occurred in one patient (0.1%) and was treated with conservative measures. Gallbladder rupture occurred in one patient (0.1%) and was managed with copious peritoneal lavage with no further complications.

A common hepatic duct injury was encountered in one patient (0.1%) who had a scleroatrophic gallbladder. The treatment involved an end-to-end choledochocholostomy anastomosis.

One death occurred in a 24-year-old female patient who developed a bile peritonitis in the postoperative period due to leakage from a duct of Luschka. The patient developed sepsis and was submitted to laparotomy at which time biliary peritonitis was found. The duct was identified and closed. The patient was sent to ICU where she remained for five days. One day before anticipated hospital discharge she developed clinical symptoms of pulmonary embolism and died.

The conversion rate was 2.1% due to: nine anatomical variations (42.8% of the total conversions), six adhesions (28.6%), two cholecystoduodenal fistulas (9.5%); two hypertension (9.5%); one common hepatic duct injury (4.8%); and one CO₂ retention (4.8%).

Management of the Postoperative Complications:

Atelectasis was treated with respiratory physiotherapy, respiratory infection by respiratory physiotherapy and antibiotics. Bile peritonitis was managed by laparotomy, lavage and drainage in the first two cases. The remaining three cases were treated by re-laparoscopy, and in one of these cases we were able to identify the bile duct on the liver parenchyma that was sutured.

Bile leak occurred in two patients, and in both cases the drain was left in place until the leak stopped. One sub-hepatic hematoma and subphrenic collection was treated with a conservative non-operative approach, with good results. Respiratory insufficiency occurred in one patient with chronic obstructive pulmonary disease (COPD). Wound infection occurred in two patients, both of whom were operated on for acute cholecystitis. In these two cases the gallbladder touched the abdominal wall during its withdrawal.

Four residual stones were found. All of these patients were submitted to ERCP with successful extraction of the stones. One patient, who had no history of peptic ulcer disease, experienced a perforated duodenal ulcer on the first postoperative day. This patient was treated by laparotomy with suture of the perforation.

CONCLUSION

Laparoscopic cholecystectomy has been found to be a safe method with a low rate of morbidity and mortality and is comparable to traditional cholecystectomy. Many advantages are realized with the laparoscopic method such as a reduction in operative trauma, hospital stay, postoperative pain and convalescence period allowing a faster return to normal activities. Our data are consistent with the reported literature.

Bibliography:

- Cheslyn S. New trends in gallstone management. *Br J Surg.* 1991;2(78):143-149.
- Clair DG. Routine cholangiography is not warranted during laparoscopic cholecystectomy. *Arch Surg.* 1993;5(128):551-555.
- Croce E. La videolaparocolecistectomia: trattamento ideale della litiasi biliare? *Chirurgia.* 1991;4:290-294.
- Deziel DJ. Complications of laparoscopic cholecystectomy: a national survey of 4,292 hospitals and an analysis of 77,604 cases. *Am J Surg.* 1993;1(165):5-14.
- Farello G. Videolaparoscopic cholecystectomy: technique and results. *Endosurgery.* 1993;1:5-14.
- Geber A. A requiem for the routine operative cholangiogram. *Surgery.* 1986;10(163):363-364.
- Grace PA. Reduced postoperative hospitalization after laparoscopic cholecystectomy. *Br J Surg.* 1991;2(78):160-162.
- Larson GM. Laparoscopic cholecystectomy in high-risk patients. *Surg Endosc.* 1993;7:377-379.
- Lee VS. Complications of laparoscopic cholecystectomy. *Am J Surg.* 1993;4(165):527-531.
- Pasquale MD. Selective vs. routine use of intraoperative cholangiography. *Arch Surg.* 1989;9(124):1041-1042.

Perissat J. Laparoscopic cholecystectomy: the European experience. *Am J Surg.* 1993;4(165):444-449.

Phillips EH. Routine versus selective intraoperative cholangiography. *Am J Surg.* 1993;4(165):505-507.

Ress AM. Spectrum and management of major complications of laparoscopic cholecystectomy. *Am J Surg.* 1993;6(165):655-662.

Soper NJ. Laparoscopic cholecystectomy: a promising new "branch" in the algorithm of gallstone management. *Surgery.* 1991;3:342-344.

The Southern Surgeons Club, A Prospective Analysis of 1518 Laparoscopic Cholecystectomies. *N Engl J Med.* 1991;4(324) No. 16.