

**UNIVERSITY OF MEDICINE AND PHARMACY OF CRAIOVA
DOCTORAL SCHOOL**



DOCTORAL THESIS – SUMMARY

**LAPAROSCOPIC CHOLECYSTECTOMY: DIFFICULTIES,
INCIDENTS, ACCIDENTS**

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Key words: laparoscopic cholecystectomy, conversion, iatrogenic lesion, biliragy

GENERAL PART

THE PURPOSE OF THE WORK

This thesis aims to approach two sensitive notions of laparoscopic cholecystectomy, concepts that are much debated and in a continuously dynamic regarding their definition

and interpretation: difficult laparoscopic cholecystectomy and conversion of laparoscopic cholecystectomy.

Another purpose of the thesis is to compare the results with other statistical studies, some of which confirm the ideas presented, others that are inconsistent.

The general part is structured in VIII chapters.

Chapter I includes anatomical notions of extrahepatic bile ducts, insisting on their vascularization and innervation, as well as on the congenital variants and abnormalities of the gallbladder, the cystic duct, the adjacent liver channels, the main biliary duct, the right liver artery and the cystic artery. The surgical importance of these theoretical elements is underlined.

Chapter II deals with morphopathological changes in the various anatomoclinic forms of lithiasic cholecystitis (acute and chronic) and alithiasic. The morphopathological rhythm of cholecystitis on the adjacent viscera is presented succinctly

Chapter III presents systematized indications and contraindications of laparoscopic cholecystectomy, among which:

Indications: uncomplicated asymptomatic or symptomatic vesicular lithiasis (ideal indication), acute cholecystitis in the first days of onset, chronic cholecystitis, acute pancreatitis in the first days of onset, mixed lithiasis (gallbladder and choledoc), polyps and vesicular cholesterolosis.

Absolute contraindications include: those of general anesthesia, destructive forms of cholecystitis, acute colangitis, biliary or bilio-digestive fistulae or equivalences, PA, gallbladder carcinoma, liver cirrhosis or blood disorders; as well as relative contraindications: pyocholecystitis, porcelain vesicle, immunosuppression and hypercorticism, malignant diseases of intraabdominal organs.

Chapter IV presents in detail the classification of difficult laparoscopic cholecystectomy as well as the elements that allow its classification: preoperative exploration, intraoperative exploration, importance and indication of intraoperative colangiography.

Chapter V presents theoretical incidents and accidents in laparoscopic cholecystectomy: incidents produced during inadequate handling of work instruments,

incidents during dissection of Calot triangle elements or dissection of the gallbladder from the liver bed, lesions of adjacent organs or elements of the hepatic pedicle.

Chapter VI analyzes the reasons and the moment in which the conversion is performed in laparoscopic cholecystectomy, discussing the two types of it: the deliberate and the necessity one.

Chapter VII presents the immediate, early and late complications of laparoscopic cholecystectomy, local and general, specific and non-specific.

Immediate / early complications: specific localities: bilirubin, choleperitoneum and early mechanical stroke; nonspecific - haemorrhage, postoperative peritonitis, subhepatic abscesses; general: postoperative pain, thrombo-embolic disease, cardiorespiratory complications, acute postoperative pancreatitis, etc.

Late complications: mechanical jaundice, residual lithiasis of the main biliary tract, cystic stump lithiasis, postoperative events at the level of parietal breaches.

Chapter VIII deals with ways to repair extrahepatic bile lesions produced during laparoscopic cholecystectomy.

THE SPECIAL PART

Introduction

It represents the personal contribution being a statistical study that refers to the history of laparoscopic cholecystectomy from its beginnings (2001) in the IV-th General Surgery Clinic from Craiova.

Material and method

The study includes all patients undergoing laparoscopic cholecystectomy operated in the General Surgery Clinic of the C.F. from Craiova for a period of 15 years, between 01 January 2001 and 31 December 2015.

This is a retrospective study in which patient data were analyzed (including anamnesis, clinical examination and paraclinical examinations), operative protocols and histopathological bulletins of the examined parts. The data obtained were entered into Excel files where they were processed statistically. The same Excel program allowed secondary statistical processing of the information - descriptive analysis of the whole batch

with different parameters, with their graphical representation, calculating the Pearson correlation coefficient, using commands such as Pivot Tables, Chart, Data analysis and Functions-Statistical.

Of the statistical indicators used to characterize the numerical data, we refer to the arithmetic mean, the standard deviation and the coefficient of variation, and for comparing the numerical parameters we used Student's Test t and the Chi square test.

The distribution of laparoscopic and convert cholecystectomies, gender distribution and age groups, distribution of cases according to the size of the calculi, the appearance of the main biliary tract, according to the forms of acute cholecystitis as well as of the forms of scleroatrophic cholecystitis, the number of cases with adherent pericholistic process, the cholecystic approach in laparoscopic cholecystectomy, and the number of difficult laparoscopic cholecystectomies compared to the total number are presented.

Given the importance of conversion, a separate chapter is represented by its distribution over the years, the moment of conversion, the relationship between it and the anatomoclinic forms of cholecystitis, as well as its relation to the age of the patients.

Difficult laparoscopic cholecystectomy

Being one of the goals of this thesis, the notion of a difficult cholecystectomy is debated, underlining the dynamic way in which this notion evolved, depending on the abilities of the laparoscopic surgeon and the technological means. The difference between laparoscopic cholecystectomy and difficult laparoscopic surgery is emphasized, the latter taking into account the difficulties of approaching the peritoneal cavity, obesity, previous interventions on the abdomen, elements related to the patient's organic tars, etc. The preoperative criteria are presented in detail and intraoperative, which allow the classification of laparoscopic cholecystectomy in the notion of difficult cholecystectomy.

There are presented ways of solving a difficult laparoscopic cholecystectomy, insisting on the importance of choosing the operative moment as an element that can reduce the difficulty of cholecystectomy as well as the notions of operative technique and tactics.

Incomplete cholecystectomy and the anterograde approach of cholecystectomy are highlighted as useful ways to solve a difficult cholecystectomy

The next paragraph refers to incidents and accidents during difficult cholecystectomy, with insistence on cases of major biliary tract injuries. Commenting on the difficult cholecystectomy results, the importance of morphopathological changes adjacent to lithiasis cholecystitis, cholecystic inflammatory process (acute phlegmonous, gangrenous, sclero-atrophic cholecystitis, Hartmann pouch) is underlined by subtotal and anterograde cholecystectomy as ways of solving.

Conversion of laparoscopic cholecystectomy

Of the 3594 cases laparoscopic cholecystectomy in its anterograde, retrograde or bipolar variants, 139 resulted in conversion to a classical, deliberate or necessary operation. Conditions requiring conversion were represented by anatomopathological modifications of the cholecisto-coledociene region characterizing the stage of the disease, iatrogenic lesions or coexisting lesions, but which could not be resolved laparoscopically.

The conditions that required the conversion were as follows:

- Intense adherence process involving the duodenum, the transverse colon, great omentum, whose extremely difficult dissection would have resulted in lesions: 16 cases;
- acute gangrenous cholecystitis with pericolectic abscess and intense hepatic pediculitis: 4 cases;
- Chronic sclerotrophic cholecystitis with hepatic pediculitis: 3 cases;
- equivalence of bilio-biliary fistulae or bilio-digestive fistula undiagnosed before the intervention: 4 cases;
- Bleeding wound in the diaphragmatic face of the right hepatic lobe produced at the introduction of the epigastric trocar: 1 case;
- liver tumor unknown prior to surgery: 1 case;
- lesion of the iliac vessels (incomplete cross section) at the introduction of the optic trocar: 1 case;
- vascular lesion in the gastro-colic ligament: 1 case;
- surprise element - malignant tumor on the base of the mesenter not observed in preoperative explorations and with non-specific symptoms - 1 case.

Of the 139 conversions, in 117 cases it was done deliberately as follows: 28 in the first 30 minutes, 14 between 30-60 minutes, 56 between 60-90 minutes and all over 90 minutes. The conversion was made in 22 cases, most of them between 60 and 90 minutes, most of them being lesions produced during surgery.

In the first years, the conversion rate was higher, this being inversely proportional to the level of training of surgeons at the beginning of surgery since this new technique was introduced in our clinic in 2000 with the purchase of the first laparoscopy kit. Subsequently, surgeons' performance grew, and they managed to solve difficult cases of laparoscopic cholecystectomy without recording incidents and intraoperative accidents or postoperative complications. The approach pathway - most frequently (112 cases - 80.57%), the conversion was made by a right subcostal incision, the lesions being cantonized subhepatic, and their resolution could be achieved without approaching the rest of the peritoneal cavity. In 27 cases, the conversion was performed through a prolonged intraoperative xiflo-umbilical medial laparotomy.

In the personal considerations, there are analyzed the involvement of the surgeon, the patient, the adequate equipment, the surgical team and the anesthesia team, factors that are involved in the decision to convert. To the moment of conversion is dedicated a special place, the conversion being made initially after visualization of the gallbladder lesion, after producing iatrogenic lesions (gallbladder, vessels, viscera) or after an unsuccessful attempt at laparoscopic cholecystectomy.

Extrahepatic bile duct lesions

There were 13 cases of extrahepatic bile duct lesions at 3594 (0.36%). We divided the cases according to Strassberg classification - Soper and we obtained:

- Minor injuries, corresponding to type A: 2 cases;

- Major injuries, 11 cases, of which 5 belong to type D and 6 belong to type E. In this category, 6 injuries were represented by punctual lesions of the main bile duct (one of which became a complete lesion of CBP in attempt to be repaired) and 6 were complete lesions (section or obstruction) of the common bile duct .

The conditions in which the injuries occurred were represented by anatomopathological changes of the cholecystic, of the pedicle and of the adjacent viscera, secondary to the stage of suffering:

- 8 cases of intense adherence process involving supramezolic organs: the liver, duodenum, stomach, epiploon, transverse colon;

- 6 cases of an important hepatic pediculitis process that did not allow to highlight the main biliary tract;

- 1 case of chronic sclerotrophic cholecystitis, with partially intrahepatic biliary vesicle and hepatic pediculitis;

- 1 case of subhepatic bleeding that was controlled by passing a transfixing thread.

Of these lesions, 6 were discovered intraoperatively. Good postoperative results show the importance of intraoperative recognition of biliary tract lesions and, of course, the importance of conversion. Given the small number of cases of injuries, it was chosen to briefly present each one, taking into account the way of production, recognition and repair. The moment of solving the major biliary pathway lesions remains a subject of discussion, but the hepaticojejunoanastomosis in Y a la Roux is the choice of the first intention of surgeons to repair the major lesions of the bile ducts and this is due to its advantages: low rate of postoperative complications and the highest rate of success (1,2,3)

Discussions

In this chapter are presented, comparatively to other statistics, the results obtained in difficult laparoscopic cholecystectomy, in its conversion, as well as iatrogenic biliary tract lesions. Overall, the results are often comparable to other statistics.

Conclusions

Laparoscopic cholecystectomy, in the way it was imposed and expanded, in that it is easily reproducible, by changing the indications to the present form, by immediate and long-term results, continues to be even more than the "gold standard" some skeptics considered it exaggerated.

Difficult laparoscopic cholecystectomy, conversion and bile duct injuries continue to represent the most discussed problems of laparoscopic cholecystectomy, but a more

accurate fitting of these notions has now been achieved; the current attitude has considerably reduced the number of conversions and attempts to standardize ways to repair extrahepatic bile ducts lesions

Difficult laparoscopic cholecystectomy, after a period of uncertainty, appears as a well-defined entity and very close to the classical one.

The morphopathological changes of the collector and adjacent to him create the premises of the difficulties, incidents and accidents during the laparoscopic cholecystectomy.

The reduction of the risk of difficult laparoscopic cholecystectomy can be done preoperatively by choosing an optimal operator moment (when possible), by improving the laparoscopic skills of the surgeons and by endowing with modern technology.

Incomplete cholecystectomy (at the level of infundibulocystic or posterior wall) and antegrade cholecystectomy are prudent and valuable technical solutions for difficult cholecystectomy.

Conversion remains a solution designed to bridge the technological deficiencies and laparoscopic surgeon's abilities. The moment of conversion is believed to belong to the surgeon who is due to properly assess his potential. In the future, it is likely that conversion will remain the solution only for major bile duct injuries lesions, as a laparoscopically well-trained surgeon and an up-to-date technological endowment can reproduce almost all the classic surgery gestures.

Accidents recorded in laparoscopic cholecystectomy are not always associated with laparoscopic cholecystectomy; sometimes they are not related to the difficulty of cholecystectomy (accidents occurring during trocars introduction, "ordinary" cholecystectomies, bilio-vascular malformations, etc.). The prognosis of accidents is conditioned by their intraoperative recognition, the technical solution chosen and the accuracy of the repair gesture.

Main bile duct lesion is the most specific accident during cholecystectomy; repair solutions are conditioned by the extent of the lesion and the moment of recognition. For punctual lesions recognized intraoperatively transcystic drainage doubled by subhepatic "guard" drainage we believe is the solution to be chosen. For sections of the main bile duct, biliodigestive anastomosis (preferably Roux-en-Y hepaticojejunoanastomosis) or

terminal end-to-end anastomosis protected by a Kehr tube would be a way to solve. The operating moment is conditional upon the moment of the lesion recognition. If the lesion has not been recognized intraoperatively and is possible, we believe it would be best that the repair of the lesion should be at distance from the time it was produced.

Bibliography

- 1 Richardson MC, Bell G, Fullarton GM. (1996) Incidence and nature of bile duct injuries following laparoscopic cholecystectomy: an audit of 5913 cases. West of Scotland Laparoscopic Cholecystectomy Audit Group. Br J Surg 83:1356–1360.
- 2 Russell JC, Walsh SJ, Mattie AS, Lynch JT. (1996) Bile duct injuries, 1989–1993. A statewide experience. Connecticut laparoscopic cholecystectomy registry. Arch Surg 131:382–388.
- 3 Targarona EM, Marco C, Balagué C, Rodriguez J, Cugat E, Hoyuela C et al. (1998) How, when, and why bile duct injury occurs. A comparison between open and laparoscopic cholecystectomy. Surg Endosc 12:322–326.