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DOCTORAL THESIS

ABSTRACT

ADVANTAGES OF LAPAROSCOPIC SURGERY IN CHRONIC PATIENTS AND
SURGICAL EMERGENCIES

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CONSTANȚA

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Keywords: laparoscopy, laparoscopic surgery, hepatic hydatid cyst, laparoscopic cholecystectomy, hiatal hernia, perforated peptic ulcer, laparoscopic appendectomy, colon, rectum, laparoscopic hysteropexy

INTRODUCTION

Minimally invasive surgery or laparoscopic surgery is a modern surgical procedure that has revolutionized the medical field.

The main aim of this study was to demonstrate the advantages of laparoscopic surgery in different pathologies by comparing with conventional surgery in terms of duration of surgery, postoperative pain, postoperative complications, analgesia requirements, hospitalization time and financial data.

The current study is conducted prospectively over a period of 6 years, 01.01.2017-31.12.2022, performed on a group of 6833 patients of which 4984 patients underwent laparoscopic surgery for various pathologies, elective or emergency, in the General Surgery I Clinic of the County Emergency Hospital "St. Apostol Apostol Andrei" Constanta.

Each chapter described in the thesis is followed in terms of pre-, intra- and postoperative data in order to analyze the results of the laparoscopic approach compared with the results of the classic approach.

GENERAL PART

The general part of the thesis provides information on the history of laparoscopic surgery, the anatomy of the organs studied, indications and contraindications for laparoscopic surgery, preoperative evaluation, operative steps, intraoperative incidents and accidents, and postoperative complications.

The evolution of laparoscopic surgery marks a significant milestone in the medical field, offering us a fascinating journey from the first laparoscopic cholecystectomy which was the most significant impetus for the development of laparoscopy..

In current medical practice, laparoscopy is recognized as a diagnostic and therapeutic method, due to the benefits it has brought to the postoperative course of patients.

By the end of the 20th century, laparoscopy had reached a high degree of accuracy and was sometimes considered of equal value to laparotomy, becoming a symbol of the borderline between conservative and aggressive, surgical means of investigation. In comparing the two procedures, the advantages are clearly in favor of diagnostic laparoscopy: the operation is minimal, there is no discomfort for the patient, the incision is 1 cm, no dressings are required, discharge can be done after one day, and the risk of mortality is significantly lower than in the classic approach.

Laparoscopic surgical intervention is used in various pathologies and can be applied both in chronic patients and in abdominal emergencies. Compared to the classical approach, the laparoscopic approach has the advantage of directly exploring, visualizing and identifying the cause of abdominal lesions, collecting fluid for cytological and bacteriological examination and performing biopsies.

- a) In chronic patients, laparoscopy may be diagnostically and therapeutically useful for the following conditions:
 - liver diseases :
 - liver cirrhosis – laparoscopically, the macro- or micronodular appearance and volume of the liver can be appreciated. Hepatomegaly due to edema may be present if the liver disease is at an early stage. In an advanced stage, the liver is atrophic (hard consistency, the anterior border has an irregular contour and is sharp) due to the diminishing edema and fibrosis process.
 - hepatic steatosis - compared to the atrophic liver in cirrhosis, the liver is friable, enlarged in size, soft in consistency and with a rounded anterior border.
 - cholestatic liver - the liver is enlarged in volume with a smooth surface and a greenish appearance in intrahepatic cholestasis and in obstructive jaundice, the surface is irregular, nodular and the liver takes on a brownish color.
 - benign liver tumors - hemangioma (vascular, purplish-colored tumor formation of various sizes), hamartoma (well demarcated, single, hard, tumor formation).

- primary or secondary malignant liver tumors..
- serous hepatic cyst or biliary cyst, may be single or multiple, non-parasitic.
- hepatic hydatid cyst.
- gallbladder disorders - laparoscopy may reveal tumor formations, inflammatory lesions or abnormalities of shape or position.
- disorders of the supramesocolic organs:
 - abdominal esophagus - to highlight abdominal esophageal disorders it is necessary to expose the left subhepatic space by elevating the left hepatic lobe with a retractor and distal traction of the subcardial region of the stomach, and may reveal a hiatal hernia or neoplastic lesions.
 - stomach - in case of gastric disorders, the first intention is to perform upper digestive endoscopy to identify chronic ulcerative lesions, pyloric stenosis or neoplastic process.
 - spleen - laparoscopy can reveal serous or hydatid cysts, splenomegaly which can occur in various diseases: hemolytic anemia, Hodgkin's disease, liver cirrhosis with portal hypertension.
- disorders of the submesocolic organs:
 - colon and rectum: tumor formations.
 - diseases of the ovaries (cystic, tumor formations), uterus (fibroid, uterine cancer).
- b) In acute patients, laparoscopy has the advantage of providing an accurate diagnosis when clinical examination and paraclinical investigations are not conclusive and offers the possibility of minimally invasive treatment.
 - In acute non-traumatic surgical abdomen, laparoscopy is recommended in:
 - right iliac fossa pain syndrome - laparoscopy is indicated in case of an unclear diagnosis, when the clinical and paraclinical examination is elusive, in patients with a high degree of obesity or in female patients (clinical signs are similar to those of gynecological disorders). The causes of such a syndrome may be: acute appendicitis, right ovarian cyst (twisted, eclatic), ovarian tumor formation.
 - acute cholecystitis;
 - perforated duodenal ulcer;
 - bowel occlusion with recent debut, laparoscopy can pinpoint the location and the mechanism of occlusion (adhesions, tumor).

Hemodynamically unstable patients, evisceration, generalized peritonitis, hemorrhagic shock are contraindications for laparoscopic surgery.

As long as surgical indications, surgical caution and correct technique are followed, laparoscopic surgery offers a number of definite advantages:

- a. The patients' pain complaints are much reduced compared to patients operated via the classical approach. This is explained by :
 - the absence of large incisions of the abdominal wall and, of course, by the absence of brutal maneuvers with retractors during the operation;

- there is also no post-operative stress on sutures;
 - short duration of postoperative ileus.
- b. Postoperative mobilization is early, the patient is mobilized a few hours after surgery, as abdominal wall injuries do not force the patient to prolonged rest and do not create discomfort on movement. This also helps reduce the duration of postoperative ileus and the risk of thromboembolic events.
 - c. The postoperative ileus is of short duration (12-36 hours), so that patients resume oral nutrition shortly after surgery and prolonged infusions are not necessary as in classical surgery.
 - d. The risk of evisceration is excluded, and wound suppuration is quite exceptional, of low intensity and short duration.
 - e. Aesthetic damage is minimal, which is particularly important considering that a large percentage of patients are female. Multiple small incisions of 10-15 mm are cosmetically preferable to the large incisions practiced in conventional surgery.
 - f. The risk of eventration is minimal. The possibility of hernia sites exists only in cases in which one of the trocar implantation points has been widened in order to remove the various organs (cholecyst with large stones, spleen, etc.).
 - g. The incidence of postoperative adhesions is extremely low.
 - h. The hospitalization period is very short.
 - i. Socio-professional reintegration is rapid.
 - j. Hospitalization costs are lower in the laparoscopic approach compared to the conventional approach by reducing the need for analgesic medication and antibiotic therapy, the length of hospitalization and postoperative complications.

PERSONAL CONTRIBUTION

PURPOSE AND OBJECTIVES

The main objective of the PhD thesis is to demonstrate the advantages of laparoscopic surgery by performing a comparative analysis between the laparoscopic and the classic approach, both in surgical emergencies and in the chronically ill.

The study argues the advantages of laparoscopy by comparing pre-, intra- and postoperative data.

MATERIAL AND METHOD

The current study was conducted prospectively, over a period of 6 years 01.01.2017-31.12.2022, which considered a total of 6833 patients of which 4984 patients underwent laparoscopic surgery for various pathologies, in emergency or elective, in the County Emergency Hospital "St. Apostol Apostol Andrei" Constanta.

The main purpose of this study was to demonstrate the advantages of laparoscopic surgery in different pathologies in comparison with conventional surgery in terms of duration of surgery, postoperative pain, postoperative complications, analgesia requirements, hospitalization time and financial data.

To perform this study, we used patient observation files, operative protocols, statistical data taken from the Hippocrate program, which provided information on demographic data (age, sex, background), associated comorbidities, surgical history, nature of surgery (classic or laparoscopic) and its duration and postoperative data (length of hospitalization, financial data).

Patients were divided into two groups according to the surgical approach, laparoscopic or classic. So out of the total number of 6833 patients, 4984 patients were approached laparoscopically and 1849 patients were approached classically.

RESULTS

Out of the total number of patients, 4984 patients were approached laparoscopically for different pathologies, as emergency or elective, representing 72.42% and 1899 patients were approached classically, representing 27.58%.

Evaluating each pathology studied in the thesis, we found that the age of the patients approached laparoscopically ranged from 16 to 93 years compared to the age of the patients approached by the classic approach which ranged from 17 to 96 years.

The main elements that I followed in the thesis from a preoperative point of view were: the mode of presentation of the patients (emergency department or outpatient), associated symptoms, investigations performed and associated comorbidities. The postoperative outcome of patients may be influenced by the presence of comorbidities in terms of morbidity and mortality: major cardiovascular diseases, pulmonary diseases may cause systemic complications in patients requiring major surgery and obesity and diabetes mellitus have an increased risk for parietal suppuration or postoperative evisceration.

In terms of operative data, the two groups, laparoscopic and classic, were statistically followed up in terms of surgical interventions, operative time, presence or absence of peritonitis and conversion rate.

Considering surgical emergencies, the laparoscopic approach was preferred over the classic approach because minimally invasive surgery allows a complete and thorough exploration of the entire peritoneal cavity and also allows the treatment of different associated pathologies by using the same surgical access.

Generalizing, we found in the study that the mean operative time was less compared to the classic approach except for appendiceal pathology, colon and rectum, spleen, where the operative time was higher in laparoscopic approach compared to classic approach.

By studying the postoperative data, we noted statistically significant differences in favor of laparoscopic approach in postoperative pain, early mobilization, postoperative ileus and postoperative complications between laparoscopic and classic approaches.

Compared to the classic approach, laparoscopy has the advantage of a shorter hospitalization, which results in lower expenses in terms of days of hospitalization, food, medicines and sanitary materials used.

CONCLUSIONS

1. The evolution of laparoscopic surgery marks a significant milestone in the medical field, offering us a fascinating journey from its primitive beginnings to its current status as the preferred surgical method for many surgical procedures. Technology will always advance and thus the future of laparoscopic surgery will be even more promising.
2. From a statistical point of view, I can say that laparoscopic surgery is feasible and safe.
3. Minimally invasive surgery has the advantage of visualizing the entire abdominal cavity through high-definition cameras, providing greatly magnified images of areas of surgical interest. This allows complex surgeries to be performed with greater precision. In the classic approach, although the visualization is direct, it may not provide the same level of detail and magnification as in laparoscopic surgery.
4. In the laparoscopic approach, the operating surgeon has visual feedback only through the laparoscope, direct palpation of the viscera is not possible.
5. An advantage of laparoscopy is the minimal damage to the abdominal wall compared with the classic approach. Instead of large incisions about 12-15 cm long, laparoscopy requires four small incisions of about 1 cm. Laparoscopically, patients benefit from small, aesthetic scars, early postoperative mobilization, and are at low risk of parietal suppuration and late postoperative complications such as parietal defects.
6. Postoperative ileus in the laparoscopic approach is of short duration, this advantage being due to minimal tissue trauma.
7. In the laparoscopic approach, trauma to the peritoneum is minimal compared to the classic approach and may result in decreased adhesion formation.
8. Out of the total number of patients, 72.94% of patients undergoing laparoscopic approach were both chronic patients and surgical emergencies.
9. In cases of hydatid pathologies, elective laparoscopic approach can be successfully performed, the risk of dissemination and contamination is low by administering preoperative Albendazole drug treatment and circumferential isolation of the hepatic hydatid cyst with intraoperative betadine-soaked gauze. A big advantage of laparoscopy is that we can examine the inside of the cystic cavity, the image being two or three times bigger, thus having the possibility to highlight and remove debris from the proligerous membrane or we can observe a bilio cystic communication, which can be approached laparoscopically by applying an "x" wire or a clip. Of the total number of patients, 10 patients from the emergency department were approached laparoscopically and four patients were converted.
10. Cholecystectomy performed laparoscopically both electively and in emergency surgery is a gold standard surgical procedure.
11. In hiatal hernia, laparoscopic surgery is safe and feasible in order to close the hernia defect and prevent recurrence and postoperative complications and significant long-term relief of the symptoms of this pathology.
12. According to the study, minimally invasive surgery is as effective as conventional surgery, but has the potential to improve patients' recovery time.
13. Laparoscopic splenectomy has only been performed electively, the most common indication is immune thrombocytopenic purpura. In acute, traumatic cases with active bleeding the laparoscopic approach is contraindicated.

14. Compared to the classic approach, laparoscopy has the advantage of a shorter hospitalization, which results in lower costs in terms of days of hospitalization, food and drugs used.