MODERN MANAGEMENT IN SURGICAL TREATMENT OF COLON CANCER

PHD THESIS

ABSTRACT

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CRAIOVA 2011
INTRODUCTION

Colon cancer is an important public health issue it’s incidence ranking 4th in the world among all cancers. The incidence is higher in developed countries like USA, Western and Northern Europe, Australia, New Zealand. Lately, there is an increase in the incidence of colon cancer both in developed countries and in Eastern Europe, Romania included. This is due to the change in population’s diet and lifestyle that have become similar to the western population.

The higher incidence of colon cancer can be explained by the rapid development of diagnosis tools, by increased accessibility to diagnosis centers and by a better health education of the population.

Technical progress applied in surgery included vascular sealing tools and mechanical sutures. The use of these tools became a routine leading to shorter operative time and lower morbidity and mortality rates. Also, it contributed to widening the surgical approach to advanced colon cancer, with multivisceral resections for locally advanced cancer and resection of metastasis for metastatic cancer.

For emergency surgery in colon cancer the surgical approach is more aggressive with extended colon resection in bowel obstruction and/or peritonitis, or two staged interventions with initial decompression of the colon followed by colic resection in second stage.

Although the progress in surgery and anesthesia are the result of clinical and scientific research, they have been influenced by management policies of reducing costs and hospital stay. A new concept emerged – fast track surgery or ERAS (Early Rehabilitation After Surgery). The aim of this concept is to optimize the perioperative management of the patient in order to reduce morbidity, to accelerate patient’s recovery after surgery and, not less important, to reduce hospital stay and costs.

Fast track surgery implies the combination of preoperative education of the patient, new techniques in anesthesia, analgesia and surgery that aim to reduce organism’s response to surgical stress, attenuation of pain and discomfort and an aggressive postoperative rehabilitation including early oral nutrition and rapid mobilization. This way fast track surgery can shorten the time needed for postoperative recovery, can reduce hospital stay and can lower morbidity and mortality.

Key words: colon, cancer, multivisceral resection, emergency surgery, fast track surgery.
STUDY’S AIM AND OBJECTIVES

The aim of this research is to reevaluate the surgical treatment of colon cancer taking into consideration the progress of the past 9 years in concept and technological advances. The objectives of the study were:

- The analysis of the concepts and results of emergency surgical treatment of colon cancer
- The analysis of the results of elective treatment of colon cancer
- A comparative study of modern and traditional methods of perioperative management

MATERIAL AND METHOD

1. Study of conceptual evolution of surgical treatment in colon cancer

We did a retrospective and prospective study of the colon cancer patients admitted in The 1st Surgical Clinic of The County Clinical Emergency Hospital of Craiova between 2001 and 2009. A study group was formed by applying just one selection criteria: the diagnosis of colon cancer or recto-sigmoid junction cancer.

The study group was divided in two subgroups:

- The group of patients with colon cancer that underwent emergency surgery – group A
- The group of patients with colon cancer that underwent elective surgery – group B

We created a study protocol for observing and analyzing each patient following patient history, clinical and imaging data, treatment and postoperative outcome. The following parameters were analyzed:

- Demographic data
- Annual number of cases
- Tumor topography
- Surgical history and co morbidities
- Clinical, biological and imaging diagnosis
- Distribution of complicated/uncomplicated forms of disease
- Surgical treatment: emergency or elective, radical or palliative, resections or internal/external diversions
- Postoperative morbidity and mortality

2. Study of fast track surgery in colon cancer

We did a comparative case-matched study between two groups of patients:
- Fast track group – patients with colon cancer that underwent perioperative fast track protocol (at least 8 measures)
- Traditional group – matched cases control group

For the two groups we compared: duration until bowel movement, duration of hospital stay, hospital costs, postoperative morbidity and mortality.

RESULTS

The study group had 319 colon cancer patients. We selected the two subgroups:
- Group A – 105 patients that underwent emergency surgery
- Group B – 210 patients that underwent elective surgery.

The annual distribution of cases showed an increase in the number of cases from 22-25 cases/year in 2001-2003 to 55 cases in 2009.

There were 128 cases with complicated colon cancer (40.1%) and 191 cases with uncomplicated colon cancer (59.9%).

The annual distribution of complicated and uncomplicated forms showed a higher percentage of uncomplicated cases in the last years of the study. (Fig. 23)
The emergency treatment of complicated colon cancer included one stage or two staged interventions. There were 105 patients that underwent emergency surgery, 84 cases with left colon cancer and 21 cases with right colon cancer.

For the left colon there were 10 one stage interventions (11.9%) and 74 two staged interventions (88.1%). Postoperative morbidity was higher for one stage interventions compared to two staged ones. We had 70% wound infections for one stage and 36.5% for two staged operations. The rate of fistula was 50% for one stage and 2.2% for two staged interventions. Mortality was 30% for one stage surgery and 5.4% for two staged surgery.

For left colon there were 11 one stage interventions (52.4%) and 10 two staged interventions (47.6%). There were 63.6% wound infections for one stage surgery and 40% for two staged interventions. The rate of fistula was 18.1% for one stage surgery and 0 for two staged operations. Mortality was 9.1% for one stage and 0 for two staged surgery.

The elective treatment was applied to 210 patients. There were:

- Right colectomy – 65 cases (31%)
- Left colectomy – 64 cases (30.4%)
- Rectosigmoidectomy – 27 cases (12.8%)
- Segmental colectomy – 40 cases (19%)
- Hartmann operation – 1 case (0.4%)
- Subtotal colectomy – 4 cases (1.9%)
- Total colectomy – 4 cases (1.9%)
- Internal diversions – 2 cases (0.9%)
- External diversions – 3 cases (1.4%)

We analyzed the surgical approach in locally advanced colon cancer. There were 79 patients with locally advanced colon cancer (T4) (25% of cases). 49 patients (57%) underwent major surgical interventions with multivisceral resections of the colon tumor and the organ or part of invaded organ.

Postoperative morbidity for these cases was higher than the uncomplicated cases morbidity. There were 35.5% wound infections, 17.7% fistulas, 6.6% peritonitis, 31.1% general complications and 8.8% mortality.

Over the 9 years of study we found an increase in the annual number of multivisceral resections with percentages varying from 37.5% at the beginning of the study (2001) to over
80% of locally advanced cases in the last two years. Despite the higher morbidity the tendency is to perform multivisceral resections rather than diversions or dissection of tumor adhesions.

**The fast track study**

We analyzed a group of 36 patients that underwent perioperative fast track protocol. The measures applied were:

- Discussion with patient – all of the patients received explanations and were asked to cooperate in order to obtain a fast postoperative recovery
- Mechanical bowel preparation was performed for 15 patients (41.7%)
- Normal diet the day before surgery – 61.1%
- Ingestion of rich carbohydrate liquids 2-3 hours before surgery – 55.5%
- Short acting and rapid installing anesthetics – 100%
- Epidural anesthesia – 50%
- Restrictive volume of fluids during surgery – 58.3%
- Maintaining normotermia – 94.4%
- O2 therapy – 75%
- Non-opioid analgesia – 80.5%
- Peritoneal drainage – we used it for all 36 patients
- Removing NG tube immediately after surgery – 94.4%. Only 3 patients needed reinstalling of the NG tube, representing 8.8%
- Early oral feeding – 88.8% of patients
- Early active mobilization – 86.1%

All patients in the study received a minimum of 8 measures of the fast track protocol.

We compared the duration until the first bowel movement, duration of hospital stay, costs and postoperative morbidity between the fast track group and a traditional group of patient selected from all cancer colon patients creating a case matched control group.

We found that for the fast track group, the medium duration until the first bowel movement was 48 hours compared to 67.33 hours for the traditional group. There was a significant difference between the two groups.

The medium duration of the postoperative hospital stay was 6.5 days for the fast track group and 12.9 for the traditional group, also a significant difference between the two groups.

The costs were 33.3% lower for the fast track group compared to the traditional group.
Also, postoperative morbidity was lower in the fast track group when compared to the traditional group.

CONCLUSIONS

1. Colon cancer incidence in our country has a tendency to rise in the past years; this fact has been demonstrated by our study that has recorded an increase in the annual number of colon cancer cases.

2. Although diagnosis tools are more advanced, colon cancer still has a late diagnosis, 72% of cases being stage III and IV and only 28% of cases being stage I and II

3. Multivisceral resections are a therapeutic option for locally advanced colon cancer, but biological, general and lesion status have to be considered. Our study showed a tendency of rise for the annual rate of multivisceral resections for locally advanced cancer.

4. In complicated left colon cancer we prefer two staged interventions because they are associated with lower morbidity and mortality in comparison with one stage procedures. For complicated right colon cancer, although possible for a higher number of cases, one stage procedures are followed by higher morbidity compared to two staged procedures.

5. Fast track protocol is a modern approach of colon cancer surgery that implies the optimization of perioperative management of patient in order to decrease morbidity, to accelerate patient’s recovery after surgery and to reduce hospital stay and costs.

6. In our study the rate of appliance for the fast track protocol was 41.8%. The other 58.2% did not meet the selection criteria.

7. The measures that had the highest rate of appliance were:

   - Discussion with patient – 100%
   - No premedication – 100%
   - Short acting and rapid installing anesthetics – 100%
   - Maintaining normotermia – 94.4%
   - O2 therapy – 75%
   - Non-opioid analgesia – 80.5%
   - Removing NG tube immediately after surgery – 94.4%
   - Early removing of urinary catheter – 91.6%
8. The measures that were least applied were:

- Absence of mechanical bowel preparation – 58.3%
- Probiotics – 0%
- Normal diet the day before surgery – 61.1%
- Ingestion of rich carbohydrate liquids 2-3 hours before surgery – 55.5%
- Epidural anesthesia – 50%
- Restrictive volume of fluids during surgery – 58.3%
- Minimally invasive approach (laparoscopy) – 0%
- Absence of peritoneal drainage – 0%

9. The results of our study justify the use of fast track protocol in colon cancer surgery:

- The decrease in the duration until the first bowel movement by 28.7% in the fast track group compared to the traditional group
- The decrease in the duration of postoperative hospital stay by 49.6% in the fast track group compared to the traditional group
- 33.3% lower costs for the fast track group compared to the traditional group
- Lower morbidity in the fast track group compared to the traditional group

10. Fast track approach in colon cancer surgery is superior to traditional approach, not only by lowering costs and hospital stay but by a faster patient’s recovery and lower morbidity rates.
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Aprilie 2010 – Depunerea Tezei de Doctorat
Octombrie 2010 – Susținere și promovare Examen de Specialitate
Din Februarie 2011: Medic Specialist Chirurg

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