GEORGE EMIL PALADE" UNIVERSITY OF MEDICINE, PHARMACY, SCIENCE, AND TECHNOLOGY OF TÂRGU MUREȘ
DOCTORAL SCHOOL OF MEDICINE AND PHARMACY

Summary of Phd thesis

Title: **Study of risk factors involved in the occurrence of postoperative complications and prognostic factors in colorectal cancer**

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INTRODUCTION

Colorectal cancer is an important public health problem with national and international epidemiological interest. Beside the increased global incidence, a decrease in mortality has been observed due to screening, adequate treatment and a decrease in the prevalence of risk factors. The multidisciplinary management is essential during the adequate treatment of the disease. This management is currently approved and applied in many medical centers. The multidisciplinary approach is aimed for proper staging and adequate preoperative preparation, choosing an appropriate surgical technique, performing neoadjuvant or adjuvant chemo-radiotherapy. Implementation of this approach results in improved overall survival. The number and severity of complications are also closely related to the preoperative status of the patients. In general, the complications are divided into two categories: intraoperative and postoperative. Postoperative complications occur in approximately 20% of the cases after curative interventions associated with radical lymphadenectomy. These are directly influenced by the preoperative status of the patient as well as by certain particularities of surgical technique and post-operative treatment.

GENERAL METHODOLOGY

The aim of the thesis was to analize the risk factors and postoperative complications, but also the follow up of the patients with colorectal cancer and postoperative survival after radical resections. The studies during this project were carried out between 2018 and 2021 at the Surgery Clinic, Mureș County Clinical Hospital, Târgu Mureș in partnership with the "George Emil Palade" University of Medicine, Pharmacy, Science and Technology of Târgu Mureș. The implementation of the research was possible with a multidisciplinary team formed by surgeons, radiologists and pathologists.

1. **Psoas muscle index determined by computed tomography, a new prognostic factor of postoperative complications in colorectal cancer**

Sarcopenia is a recognized prognostic factor for both complications and survival in cancer patients. The present study aimed to examine the relationship of sarcopenia measured by psoas muscle index on computer tomography scans and the presence of postoperative complications in colorectal cancer surgery. In a prospective study we recorded data from 51 patients who underwent colorectal cancer surgery in the Mures County Clinical Hospital, Romania. Total psoas muscle area and psoas density were measured at the level of L3 for further index

calculation. General characteristics and laboratory analyses were also assessed to obtain more information about patient status. Short-term postoperative complications were scored according to the Clavien-Dindo classification.

2. Stenosis of mechanical colorectal anastomosis – risk factors and treatment

The aim of this study was to highlight the incidence of anastomotic stenoses in mechanical colorectal anastomosis associated with colorectal cancer, as well as the risk factors and treatment options. We performed a retrospective evaluation of 203 patients who underwent mechanical colorectal anastomosis associated with colorectal cancer. Several factors related to the patients were analyzed as the tumor and the treatment applied. A telephone survey was used, and symptomatic patients were examined endoscopically.

3. Stoma Related Complications: A Single-Center Experience and Literature Review

The creation of an abdominal stoma is a common procedure performed by surgeons as a part of the treatment for benign and malignant conditions in general surgery. Stoma formation is simple but sometimes the associated postoperative complications have an impact on patient's physical and psychological state. The majority of complications do not require reoperation, but when is indicated we have to assess the most appropriate option for the patient. We conducted a retrospective study in a single surgical center, the Department of Surgery, Mureș County Hospital, Târgu Mureș, Romania, using data from patients who have been admitted under elective conditions for stoma-related complications between 2005 and 2019. All data were extracted from the electronic database and clinical files of patients that had undergone surgical interventions.

4. An overview of five-year survival in rectal cancer in relation to lymph node status

Lymph node metastasis is regarded as an important prognostic factor for predicting disease recurrence and survival in patients with colorectal cancer. Several studies suggest that the lymph node ratio has a greater importance in survival than the number of metastatic lymph nodes. The scope of this study is to examine the 5-year survival of rectal cancer patients, examining several prognostic factors with emphasis on lymph node status. A retrospective study was conducted at single surgical clinic from Romania, using data from patients who have been treated for rectal cancer between January 2009 and December 2014. Patient present status and regarding the multimodal treatment was assessed through telephonic method, data was extracted from the electronic database of the clinic and histopathological reports.

5. The impact of sarcopenia on postoperative outcome in colorectal cancer surgery

The last study focused on analyzing the importance and impact of sarcopenia on the occurrence of complications. Malnutrition-induced sarcopenia predicts poorer clinical outcomes for people with cancer. Postoperative complications such as wound infection, anastomotic leak (AL), and cardiorespiratory events are the most frequent and devastating postoperative complications in colorectal cancer surgery and are frequently associated with malnutrition. We reviewed the recent available literature to assess the relationship between the patient nutritional status and this significant issue in colorectal surgery. The PubMed database was searched for publications. The included studies were original articles, prospective and randomized trials, clinical, systematic reviews and meta-analyses. The information was structured in a narrative review form.

GENERAL CONCLUSIONS

In our single center prospective study the PMI influence on the postoperative outcome is an important factor in colorectal surgery and appears to be a good overall predictor. A lower PMI is directly associated with a low or high grade of complication by Clavien-Dindo classification. Perioperative inflammatory and nutritional status evidenced by serum CRP and albumin level influences the presence of postoperative complications. Clinicians can use this method to identify patients who might benefit from additional interventions to reduce the complication occurrence and to improve prognosis.

Colorectal anastomotic stenosis is a late postoperative complication which influences the patient’s life quality. By being aware of the prognostic factors of this complication, we would be able to take preventive measures. Our results suggest that age under 60 years, obesity, tumor complication by perforation and protective ileostomy

could be statistically significant factors for anastomotic stenoses. Surgical treatment must be reserved for refractory cases, and redo-anastomosis could be affected by greater risks than in the initial surgery.

Stoma formation is a common surgical procedure associated with significant morbidity. Typically the complications appear in the elderly, conservative treatment is essential but some of the late complications require a surgical solution like parastomal hernia, stoma stenosis, stoma prolapse, and parastomal infection. Parastomal incisional hernias are the most common complications, frequently associated with comorbidities and prolonged hospitalization.

The 5-year survival of rectal cancer varies between 61,6% and 70,9% and is increasing due to the novel surgical techniques and treatment. Our 5-year survival of 63,9% is similar and it can be improved by distant disease treatment and earlier diagnosis. In our study, the survival of rectal cancer patients was significantly influenced by the patient's age, N stage, T stage, LNR, type of surgery, vascular invasion, and metastases. Also, the LNR proved to be an independent prognostic factor for survival. It is considered that it would be useful to implement a probability calculator tool to obtain a more accurate prediction of survival, which can be very useful in daily medical practice. The follow-up procedure could be improved upon by centralizing patient data from all interactions with healthcare professionals and facilities, in a database accessible only to medical professionals and students, improving not only the quality of information gathered but also on the quantity.

While most of the studies point toward a higher prevalence of postoperative complications, a few studies show a significantly increased mortality rate among patients with sarcopenia. When anastomotic leak as a specific postoperative complication was assessed, there is no significant difference between sarcopenic and non-sarcopenic patients, but the occurrence sometimes is higher in the sarcopenic group. Additionally, adequate perioperative sarcopenia assessment can be beneficial in the early identification of the anastomotic leak to improve the postoperative outcome.There is evidence that sarcopenia is generally associated with postoperative complications, has an important influence on surgery-related infections, cardiovascular complications, prolonged hospitalization. Has been proved by several studies that is a good predictor, strong and independent prognostic factor for poor surgical and oncologic outcomes in CRC surgery.