The role of diet in colorectal cancer-retrospective study

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Abstract

Purpose:our goal was to demonstrate the importance of a healthy diet in the survival of the patients with.colorectal carcinoma. The present report was designed to evaluate how advanced colorectal neoplasm found at the moment of surgical treatment could represent a possible cause for high mortality rate and how ”adequate.food” is necessary to improve the results and prognostic of this illness.

Methods: analyzation of the location and stage of colorectal tumours; frequency of colorectal neoplasm; identification of risk factors in relation to; diet, age, grading, staging and comorbidity; evaluation of clinical and therapeutically characteristics in the cases studied.

Results: Colon cancer including the rectosigmoid junction represented 2/3 of the cases, while those of the rectum generated 1/3 from the total number of studied cases. A high percentage of these tumours could be observed in males and females up entering the fifth decade of life. Median age of the patients at time that surgical therapy was performed was 68 years. Males had a higher risk for developing colorectal carcinomas. Half of the UICC- stage I colon and rectum neoplasm had a G1-well differentiated grading;. 62% of these patients have a way of life throbbing and a daily diet consisting of pre-cooked food, mainly meat and fried potatoes. Degradation of toxins from food and their stagnation in the digestive tract that cause intestinal mucosal malignant degenerate Recidive rates increased significantly with each successive grading class. Advanced tumours were indicators for a poor oncological prognosis. T3-tumours were the most frequent form of colorectal tumours found in all age groups.

Conclusions: this location of neoplasic desease is also a result of unhealth lifestyle. Change these habits of nutrition and life associated with a diet rich in vitamins, food easily digested and absorbed in the bowel is capable to prevent cancerous lesions of this level.

Keywords: daily diet, colo-rectal neoplasm, health lifestyle

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1. Introduction

Colorectal carcinoma is one of the most frequently found solid tumours worldwide. Malignancies of the colon and rectum are first identified in the advanced UICC stages III and IV. Local and anastomotic recidives are responsible for poor prognosis and mortality. Life expectancy in the western world is increasing and as a result of this phenomenon, median age of the population is getting higher.

Statistics have demonstrated that 80 percent of patients with bowel malignancy are older than 60 years and 50 percent are septuagenarians. Colorectal cancer is considered primarily a disease of the elderly. Older patients suffer more comorbidity than younger-aged persons do and it is well known that

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comorbidity is a prognostic factor in overall survival of the patients with malign colorectal tumours .

Open surgical procedures is still used in the surgical therapy for bowel malignancy . The effectiveness of colorectal cancer treatment in the elderly is similar to that of younger patients and inadequate treatment is associated with poor survival rates. It is also well known that minimal invasive surgery has gained tremendous popularity in the last few years. The application of laparoscopic techniques to the resection of malignant colorectal tumours has been less widely accepted and is still controversial.. Some experts currently advise against minimally invasive surgery for cancer while others propose the laparoscopic colectomy as the preferred approach. At the present, there is no indication that the minimal invasive procedure is associated with worse long-term outcome.

We made a retrospective study (2001-2008) of the surgical therapy results in colorectal carcinoma out of two surgical departments: Colo-Proctologic Centre of the Meschede City, Nordhein-Westfalia County, Germany and First Surgical Department of the Timisoara County Emergency Hospital/Romania.

A total of 1084 patients with colon and rectum malignancy underwent treatment with current open devices and techniques. None of them became laparoscopic surgery.

Our study is based on previous analysis that signals high incidence of colo-rectal cancer in developed countries and in some regions of Romania, like Banat where there are some particularities related to alimentation and life style.

2. Material and methods

The study reports upon resulting data collected on open resections of colorectal neoplasm performed at the Colo-Proctologic Centre of the Meschede City, Nordhein-Westfalia County, Germany and the First Surgical Department of the Timisoara County Hospital/Romania. This review is a non-randomized, retrospective, interventional and descriptive study using medical, pathology records and operation notes.

A total of 1084 new cases of colorectal cancer were submitted during eight years between January 2001 and December 31, 2008. Information was collected from persons undergoing elective or emergency surgery for colorectal cancer.

Data included: patient demographics (age, gender, food, life-style), preoperative assessment, pathology, clinical staging, procedural details (procedure performed, time, complications) and short postoperative follow-up (length of stay, complications, alimentary diet.).

Before the operation, patients were assigned a score based on the diagnosis of malignancy, comorbidity and patient weight (ASA-Score and body-mass-index BMI). Patients underwent a standard preoperative investigation consisting of: colonoscopy, biopsy, chest radiography, abdominal ultrasound and computer tomography of the abdomen. If pulmonary metastasis were suspected, a computer tomography of the lung was added. Patients with rectal cancer received before the operation an endorectal ultrasound as well as an abdomino-pelvic nuclear magnetic resonance and an anorectal manometric investigation.

Figure:1 Colo-rectal neoplasic lesion

Figure 2: Stenosed bowel by neoplasm

The level of carcinoembryonic antigen was determined before and after surgical intervention. Resection was offered to those patients thought

preoperatively to have curable disease and to those with metastasis who were considered to benefit from palliative resection.

Mechanical bowel preparation was given if possible. Patients received a central venous and epidural catheter before surgery or alternative a PCA pump (patient controlled analgesia).

The following procedures were performed: open right hemicolectomy, transverse colectomy, left hemicolectomy, sigmoid colectomy, high anterior resection, deep/ultra deep rectal resection with protective ileostoma, abdomino-perineal extirpation of the rectum, multivisceral resection, Hartmann's procedure, palliative stoma and entero-enteric bypass anastomosis.

3. Results and discussion

From Jan.1, 2001 to Dec.31, 2008, a number of 1084 patients with primary colorectal carcinoma were admitted for surgical treatment.

Patients were diagnosed by fibro-colonoscopy and by pathological biopsy. Tumours were classified as well, moderate or poorly differentiated adenocarcinoma. Pathological TNM and UICC classification was used to classify the tumours. Finally, a total of 1084 tumour classifications resulted.

The average calculated ASA-score was 2 (range 1-4). Emergency surgery was associated with increased mortality. Mortality increased with increasing ASA III, IV versus I and II.

Patients were divided in two groups: those getting "prepared for surgery", named PFS group, those who underwent emergency surgery, named ES. A total of 820 patients, representing 76 % were included in the PFS, while 264 persons (24 %) were treated on a emergency basis, ES, namely those presenting a bowel obstruction or tumour perforation. From the reviewed patients, 44 % (n=476) were female while 56 % (n=608 cases) were male. PFS (820 cases) included 352 women (43%) and 468 men (57 %) and ES (264 patients) a number of 119 patients were found to be female (45%) while 145 were males (54%).

Males had a 1,3 times higher risk of developing colorectal cancer than females. The present analyze has shown that 6 % of the male and 4 % of the female gender developed a colorectal carcinoma in the sixth decade of life. Median age was 68 years (men: 66 years, women:

70 years / ranging from 34 to 99 years). The youngest male patient found in this study was 34 while the youngest woman 35 years old. The oldest man and woman found in the study were

95 respectively 91 years old. The age of male patients affected reached a peak between the sixth and eighth decade of life, while females were often affected in their fifth life decade. There was no relationship founded between age and comorbidity.

Preoperative health status was a important factor in overall survival of colorectal cancer patients. Increasing age was shown to be associated with higher operative mortality. Metastases also increased mortality. Colon cancer -including the rectosigmoid junction - represented 2/3 from the 1084 tumours found, generating a percentage of 73,24 % (n=794) while carcinoma of the rectum was detected in 1/3 of the cases (26,75 %; n=290). When divided into PFS and ES groups, the segmental distribution was as follows: in the elective group, colon cancer was found in 47,95 % of the cases and 25,51% was found to be rectal cancer; in the emergency group, 15,55 % patients were diagnosed with colon cancer and 5,91 % had rectal cancer.

The segmental distribution of the colon and rectal tumours studied has shown the following; cancer located at the right colon - 293 cases (27,02 %), hepatic flexure of the colon -32 cases (2,99 %), transverse colon - 65 cases (5,99 %), splenic flexure - 31 cases (2,85 %), descending colon - 49 cases (4,52 %), sigmoid colon - 270 cases (24,9 %), rectosigmoid - 58 cases (5,35 %), rectum -286 cases (26,38 %). The frequency of left colon carcinoma was significantly higher (64 %) than right colon neoplasm (30%). Rectal cancer alone was found in 286 cases, (PFS=233) and (ES=53), accounting for a total of 26,38%.

A high number of complicated neoplasms were found in the emergency group, most of which were located at the sigmoid colon and rectum levels. Studying the frequency of the tumoral grading, it was observed that 811 of the resected tumours were well and moderate differentiated adenocarcinoma (low risk group / LRG - G1 and G2), representing 74,81%, while poorly differentiated colorectal carcinoma (high risk group HRG – G3) were found in 273 of the cases (25,18 %). There were no significant gender related differences found between the LRG and HRG patients: females had 12,4 % poorly differentiated carcinoma (G3) and males had 13,06 %.

Table:1.

Frequency of the tumoral grading	Total (n)	Total (%)
LRG – G1 and G2	811	74.81
HRG - G3	273	25.18

The study of the **tumoral extension** has shown that T1-tumours with infiltration of the submucos tissue were found in 5,16 % of the cases (n=56). An infiltration of the muscular tissue was detected in 17,06 % of the patients (n=185). Advanced tumour extension with infiltration of the subserosa and non-peritonealized fat (T3) was described in 62,82 % of the cases (n=681). Advanced diseases with infiltration of adjacent organs (T4) were observed in 14,76 % of the patients (n=1601). Most colorectal carcinoma (62,82 %; n=681) had a T3-extension and only 5,16 % were early T1-tumours. Many of the colorectal T3-carcinomas were late diagnosed.

Table:2

Tumoral extension	Total (n)	Total (%)
T1 infiltration of the submucos tissue	56	5.16
T2 infiltration of the muscular tissue	185	17.06
T3 infiltration of the subserosa and non-peritonealized fat	681	62.82
T4 infiltration of adjacent organs	1601	14.76

Studying the lymphatic and metastatic dissemination it could be found that 18,78 % of the patients had a local lymphatic and 31,94 % a distal lymphatic dissemination. Metastatic dissemination was detected in 13,4 %, while penetration of the adjacent organs and peritoneal carcinomatosis was found in 7.5 % of the studied cases.

Curative intent registered during emergency surgery was dependent upon age, comorbidity and the presence of complications. These factors had limited the radical intention or the surgical act or made further diagnostic necessary. Advanced colorectal carcinoma had a increased number of local lymphatic invasions. No malign invasion of the local lymphatic nodes could be found in T1-tumours while in T3 cases, 32,14 % of the studied cases presented local and distal lymphatic metastases. The T4 category generated local and distal metastasis in a percentage of 11,66 %.

Tumoral classification was done by using the UICC criteria. A total of 194 tumours (17,89 %) could be grouped in UICC stage I , with favourable prognostics. UICC stage II was found in 339 cases, generating a percentage of 31,27 %. Many patients had T3-tumours without invasion of the local lymphatic nodes (n=782). An invasion of the local nodes was demonstrated at 203 patients (18,72%) while distant metastases were found in 145 cases (13, 37%). UICC stage III was detected in 205 (18,91 %) while stage IV in 346 patients(31,91 %) of the studied cases.

Table:3

UICC stage	Number of patients	%
I	194	17.89
II	339	31.27
III	205	18.91
IV	346	31.91

The chances that surgery would be curative in these late stages were reduced to a minimum and this correlated to a reserved overall survival prognosis. About 60 % from the total number of studied cases received surgery with curative intent. A percentage of 40 % patients with metastasic dissemination and tumoral penetration became candidates for palliative surgery. Patients undergoing palliative resections under emergency conditions appeared to have an increased hospital mortality rate.

The intraoperative complication rates (9 % palliative vs. 6% curative) and duration of the operation (average operating time in the palliative group about 175 minutes versus 155 minutes in the curative group) were almost alike.

Postoperative surgery specific complications appeared in 10,33 % of the cases. The following complications were found in the elective and emergency groups; 14 cases of intra-abdominal abscess, 21 cases of intra- or extra-abdominal bleeding, 11 cases of wound dehiscence, 38 cases of wound infection and 28 cases of anastomotic leakage.

Table:4

Postoperative surgery specific complications	Total (n)
Intra-abdominal abcess	14
Intra- or extra- abdominal bleeding	21
Wound dehiscence	11
Wound infection	38
Anastomotic leakage	28

Non specific surgery complications, corresponding to 16,70 % of cases, were recorded; 15 cases of acute achalculous cholecistitis, 5 patients with upper gastro-intestinal bleeding, 7 cases with severe cerebral vascular injuries (bleeding or infarct), 25 cases of prolonged postoperative ileuses and 28 cases of pneumonia. Postoperative pain after conventional colectomy was documented using pain scales. In addition, the use of narcotics, the occurrence of

postoperative ileuses and the duration of hospitalization was also documented.

Table:5

Non specific surgery complications	Total (n)
Acute achalculous cholecistitis	15
Upper gastro-intestinal bleeding	5
Cerebral vascular injuries (bleeding or infarct)	7
Prolonged postoperative ileuses	25
Pneumonia	28

3-4 Days after the open surgical treatment and conventional analgesia, patients were able to tolerate oral diet.The average length of the stay on the intensive care unit was 2-3 days (range 1-42 days) and after conventional colon resection they received 1.40 mg/kg/day of morphine daily, analgesic therapy over epidural catheter or PCA pump for an average of 3 days (range 1-5 days). One inconvenience of analgesic therapy over epidural catheter or PCA pump more than 3 days in large colectomy was the prolonged bowel dysfunction. When colorectal resection was associated with longer postoperative ileuses and late resumption of diet they need prolonged medication and hospitalization. Patients undergoing open colon resection had to be hospitalized for an average of 10 days (range 7-65 days). The high intraoperativ trauma resulting from conventional aboard was often made responsible for a longer period of convalescence.

The 30-day mortality was 5 %. For **good health**, the N.C.I.A.D.A (National Cancer Institute and American Diabetes Association) recommend routine consumption of high fiber foods. They suggest daily dietary fiber intake of 20 – 35 g per day. The USDA 2005 dietary guidelines recommend 5 to 9 servings of fruits and vegetables, and a minimum of 1.5 whole grain food servings per day. The number of all fiber food servings increases with age. For a person of 9 years and older, the recommended whole grain serving is 3 - 6 per day.

We recommend improving surgical outcomes in colo-rectal cancer with a daily diet based on soluble fiber and antioxidants obtained from fruits, vegetables and beverages. Eating fruits, vegetables and liquid from those presented in the following tables provide our body needs daily fiber and antioxidants to prevent disease or improve prognosis of colo-rectal cancer.

Table 6

Antioxidant Source	Antioxidant activity (estimated by three different methods)		
vegetables	FRAP *(mmolFe^{2+}/L)*	TRAP *(mmol Trolox/L)*	TEAC*(mmol Trolox/L)*
Spinach	26.94	5.79	8.49
Pepper (chili)	23.54	6.42	7.62
Pepper (chili)	23.54	6.42	7.62
Turnip tops	17.77	6.62	5.52
Mushroom	16.39	6.26	4.93
Broccoli	11.67	3.07	3.04
Radicchio	11.39	6.27	3.24

Table 7

Antioxidant Source	Antioxidant activity (estimated by three different methods)		
fruits	FRAP *(mmol Fe^{2+}/L)*	TRAP *(mmol Trolox/L)*	TEAC*(mmol Trolox/L)*
Blackberry	51.53	21.01	20.24
Redcurrant	44.86	12.14	14.05
Raspberry	43.03	10.48	16.79
Strawberry (cultivated)	22.74	8.56	10.94
Orange	20.50	5.65	8.74

3. Results and discussion

Demographics: The average age of the patients at time of surgical intervention was 68 years (males 66, females 70 years). The male gender had a higher risk of developing a colorectal carcinoma. An increase of the disease could be observed at both genders starting in the fifth decade of life. Colorectal cancer in males peaked between 60 and 79 years while the occurrence in females had a maximum in the fifth decade of life.

Epidemiology: The elderly are diagnosed late, advanced stage of cancer, because symptoms are confused with regular bowel disorders at this age and that bias due to factors related: lack of movement, therapy associated disorders, constipation secondary. A lot of specific diseases causes bowel disorders: neurological disorders, metabolic and endocrine disorders, and systemic conditions that affect organ systems. These disorders can slow the movement of stool through the colon, rectum, or anus. Aging may also affect bowel regularity, because a slower

metabolism results in less intestinal activity and muscle tone.

Table 8

Antioxidant Source	Antioxidant activity (estimated by three different methods)		
Liquid food	FRAP *(mmol Fe²⁺/L)*	TRAP *(mmol Trolox/L)*	TEAC*(mmol Trolox/L)*
Coffee (soluble)	108.56	52.37	32.48
Coffee (extracted)	96.40	59.57	30.29
Coffee (espresso, decaffeinated)	93.01	45.82	26.96
Olive (black)	39.99	18.08	14.73
Wine (Chianti, red)	31.53	14.84	11.43
Wine (Aglianico, red)	30.53	16.09	12.14
Olive (green)	24.59	14.64	10.43

Therapy: Surgical therapy remains the standard method in the treatment of colorectal cancer.

Results: in the presented review, colon cancer represented 2/3, whereas rectum cancer generated 1/3 of cases. Half of the stage I colon and rectum neoplasm had a G1-grading. Recidive rates increased significantly with each successive grading class. Well differentiated G1-carcinoma were detected in 9,4 % of the cases; moderate differentiated G2-tumours generated a percentage of 65,5 %, while less moderate G3-carcinoma were observed in 25,1 % of the cases. Studying the tumoral extension it was found, that early T1 colorectal cancer was detected in 5,21 % of the cases while the infiltration of the subseros tissue appeared in 62,83 % of the tumours. Advanced stages indicated a poor oncological prognosis as to the possibility of curative therapy. Studying only surgical procedures deployed, the abdomino-perineal rectal extirpation had the highest complication and mortality rate. But mortality rates is based by unknown or serious comorbidity in emergency surgery when postoperative complications is higher. Cardiovascular and pulmonal disease increased the immediate surgical risks. The only level of comorbidity studied was the ASA–grade.

4. Conclusions

1. The outcome after colorectal cancer surgery is multifactorial and complex.
2. Severity of illness is in direct relation with the precocious diagnosis.
3. A greater proportion of elderly patients required emergency surgery for colorectal cancer and was likely to be found in a more advanced stage of the disease.
4. Patients with advanced colorectal cancer and synchronous metastases had a poor prognosis.
5. The length of the hospital stay may impact the patient's outcome as well.
6. Quality of life is an important consideration when determining the patients' management. If quality of life is expected to be poor, this will impact any decision to proceed with surgery but this prediction is more difficult than the prediction of surgical mortality.
7. Patients presenting malignant large-bowel obstruction can be recognized as a high-risk group with significantly increased postoperative morbidity and mortality.
8. Age may influence operative mortality rates by a lot of reasons.
9. Elderly patients presenting obstruction and metastatic disease are predicted to have a mortality rate between 30 and 70 percent.
10. Good results is depending of lifestyle: improve surgical outcomes in colo-rectal cancer and can get a daily diet based on soluble fiber and antioxidants obtained from fruits, vegetables and beverages.

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