

EFFICIENCY OF SCREENING RESEARCH IN PREVENTION AND EARLY DIAGNOSTICS OF SPORADICAL COLORECTAL CANCER

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ABSTRACT

Purpose: To assess the effectiveness of screening in the prevention and early diagnosis of sporadic colorectal cancer.

Methods: The authors of the article examined 3 271 individuals aged 50-70 for the assessment of the effectiveness of screening for the prevention and early diagnosis of sporadic colorectal cancer (CRC). Men were 873 (27%), women - 2 398 (73%). The method of rapid test was used for the investigation of fecal occult blood. Colonoscopy of the terminal ileum and colon was performed in the cases of positive result. Risk factors for CRC development were revealed in 70% patients when questioning. A randomized method also selected 100 patients with negative results of fecal occult blood during the rapid test, which were examined for cancer embryonic antibodies (CEA) determination in blood and the level of fecal calprotectin.

Results: Hereditary predisposition, excessive consumption of meat products, smoking experience of more than 10 years, «sedentary» lifestyle have been identified among the food and behavioral factors of the possible development of CRC. Predisposing inflammatory bowel diseases and CRC predominated significantly after 60 years. At the same time, CRC was predominantly diagnosed in women, inflammatory diseases - In men 4 times more often.

Conclusion: The use of a test system with an assessment of fecal occult blood compared with the use of the determination of CEA and calprotectin in the diagnosis of inflammatory bowel disease has less specificity and sensitivity. Evaluation of fecal calprotectin and CEA levels will increase the degree of CRC early diagnosis.

Keywords: Colorectal cancer, calprotectin, screening, inflammatory bowel disease, cancer embryonic antibodies.

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Introduction

Colorectal cancer (CRC) is one of the common complications of chronic inflammatory bowel disease. The annual incidence of CRC reaches 1 million cases, and the annual mortality rate exceeds 500,000 according to the World Gastroenterology Organization. In connection with the increase in life expectancy and progressive aging of the population of the planet, an increase in the incidence of colorectal cancer is predicted. This tendency actualizes problem of CRC⁽¹⁻⁵⁾.

CRC ranks second in terms of mortality from malignant neoplasms among men and women. Most often CRC arises from adenomas of the colon, and in some cases in patients with genetically deter-

mined polyposis syndromes or inflammatory bowel diseases (IBD)⁽⁶⁻⁹⁾.

Despite the achievements of modern medicine in the diagnosis of inflammatory bowel diseases the assessment of its condition, in particular, detection of intestinal inflammation and its degree, is still an urgent problem in gastroenterology^(1, 2, 3). Inflammatory bowel diseases, which include ulcerative colitis (UC), Crohn's disease (CD), and others, are characterized by the presence of inflammatory-destructive processes in the intestines, recurrent course and a decrease in the quality of life of patients^(5, 10-12).

Inflammatory bowel diseases affect mostly young people and are extremely difficult to diagnose. Between the first symptoms of disease and

the time of diagnosis can take a long time, which significantly complicates the timing of the appointment of adequate therapy and adversely affects the prognosis of diseases. In this connection the need for knowledge of the pathogenesis of the main clinical forms and pathogenetic approaches to the treatment of these serious diseases is obvious^(13, 36).

According to statistics of 2014, the CRC in the structure of cancer morbidity in Kazakhstan ranked 4, and the proportion of patients with CRC was 9.0%. The death rate from this localization remains high. It occupies the third place in the structure of mortality from cancer in the Republic of Kazakhstan, and the share of deaths from CRC in 2014 was 9.7%⁽¹⁴⁻¹⁶⁾.

It should be noted that for the 5-year period from 2004 to 2008 the incidence of colorectal cancer did not exceed 1.3% and 1.4% respectively, for the period from 2009 to 2013 it increased by 28.5% and 15.2% respectively. This trend is directly related to the introduction of CRC screening from 2011 with some improvement in diagnosis^(15, 37).

CRC screening meets the screening criteria of the population, defined by Wilson and Younger in 1968^(3, 17). It is believed that the development of CRC in 50% of cases is associated with a lifestyle and long-term exposure to carcinogens⁽¹⁷⁻¹⁹⁾. The role of genetic factors as leading in the development of colorectal cancer is allocated from 5 to 20% of cases^(20, 21). The main causes of the increase in the incidence associated with risk factors for colorectal cancer are: age over 50 years, smoking, alcohol abuse, excessive red meat consumption, low intake of whole grains, fruits and vegetables, inactivity, obesity, genetic syndromes, adenomatous polyposis of the colon, inflammatory bowel disease, family history, previous breast cancer or female genital tract, type 2 diabetes^(17, 22-29). Nutrition with a high content of animal fat are the main risk factor for the development of colorectal cancer^(20, 27, 28, 29).

The dynamics of changes in the structure of the incidence of colon cancer, depending on the prevalence of the process, suggests an increase in the proportion of patients with early cancer by reducing the number of patients with a metastatic, far-reaching process. However, according to statistical data, the main increase in the number of patients with early colon cancer is due to patients with locally advanced disease (stage III)^(15, 30-33).

Improving the methods of CRC early diagnosis, the increasing the oncological alertness of physicians, the necessity to inform the public about

prevention and the possibilities of early diagnosis of colon cancer are urgent problems of modern enterology^(34, 35).

Objective

To assess the effectiveness of screening in the prevention and early diagnosis of sporadic colorectal cancer.

Materials and methods

3 271 persons aged 50 to 70 years was screened. Of these, males were 873 (27%), females - 2398 (73%). The subjects were divided by age and sex (table 1). All patients underwent examination of feces for latent blood by the rapid test method. With a positive result, colonoscopy of the terminal ileum and all parts of the colon was performed with EU-410 HI and EU-485 ZW «Fujinon» (Japan) fibroscope. The risk factors of colorectal cancer have been revealed during more detailed survey with carrying out of questioning at 70% of patients. In addition to the analyzes a randomized method was used to select 100 patients with negative occult blood feces under an express test, and CEA and the level of fecal calprotectin in the blood were determined. Patients were divided by sex and age into 2 groups, I group - 18 male patients under 60 years and 20 male patients older 60 years. II group consisted of 20 females under 60 years old and 42 females after 60 years (table 2).

Statistical analysis of the data was carried out using the MicrosoftOfficeExcel 2003 and BIostat 4.03 packages.

Results

The results of the research showed unbalanced diet with frequent eating of meat, rare food intake, as well as non-observance of the work and rest regime in 43% patients. Genetic predisposition for intestinal cancer of first-line relatives was established in 5% patients, 25% reported smoking for 15 years to 1 pack a day, 40% of patients showed obesity and sedentary lifestyle.

As figure 1 showed, CRC is predominantly registered in women than in men. In the analysis, taking into account the age range, the peak incidence of CRC in 65-68 years was noted.

Detectability of UC increases after 60 years, and the peak incidence falls on the age group of 68 years, and 2 times more often among men.(Figure 2).

Group	Age	Total	Male	Female	CRC		UC		CD		UC	
					m	f	m	f	m	f	m	f
					1	50	439	107	332	0	4	0
2	52	388	102	286	1	0	0	0	0	0	1	0
3	54	410	104	306	0	0	0	1	0	0	0	0
4	56	370	82	288	1	1	0	0	0	0	0	1
5	58	379	78	301	0	1	0	1	0	0	0	1
6	60	307	81	226	1	2	2	2	1	0	2	0
7	62	252	69	183	0	1	1	1	1	0	0	2
8	64	197	52	145	0	0	1	4	1	0	1	0
9	66	220	101	119	2	3	2	0	1	0	1	2
10	68	177	49	128	1	0	2	2	0	1	2	1
11	70	132	48	84	0	1	1	2	0	0	0	1
					6	13	9	13	4	1	7	9
The revealed pathology according to the FCS data (62)					19		22		5		16	
% of total amount (3271)					0,58%		0,67%		0,15%		0,50%	
% of pathology in structure of intestinal diseases (62)					30,9%		35,5%		8,1%		25,8%	
					62 (1,90%)							

Table 1: Patient structure and results of FCS.

Analysis	Under 60 years		After 60 years	
	Males	Females	Males	Females
Analysis	18	20	20	42
Calprotectin	Norm	Norm	Norm	2
CEA	Norm	2	2	2

Table 2: Calprotectin and CEA content.

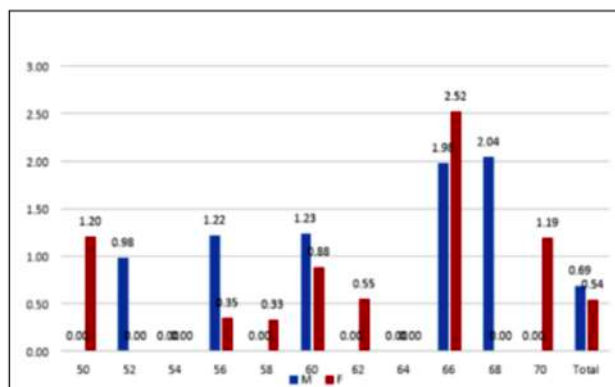


Figure 1: Frequency of colorectal cancer by age group according to colonoscopy.

It should be noted that Crohn’s disease is predominantly diagnosed in males in a 4:1 ratio. In this case, all cases were registered after 60 years (Figure 3).

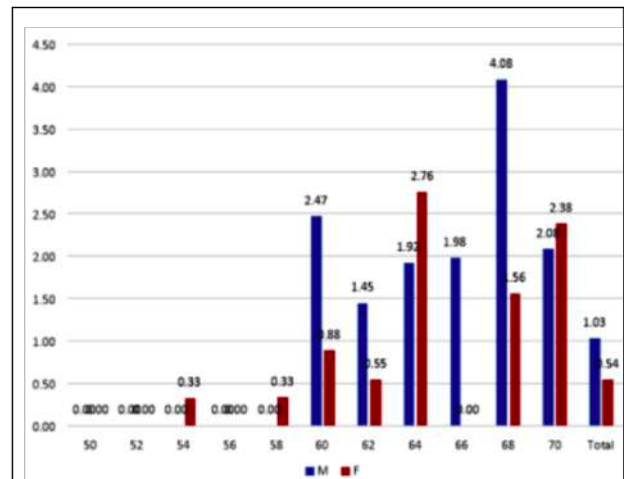


Figure 2: Detectability of ulcerative colitis by age groups according to colonoscopy.

It follows from figure 4 that the incidence of UC occurs before and after 60 years. The peak incidence falls on the recurrence group of 68 years mainly in men. According to the colonoscopy, the detection of colon diseases in men undoubtedly increases after 60 years with the peak at 68 years. The incidence of colon diseases in descending order is as follows: CUC, UC, CRC and Crohn’s disease, respectively (Figure 5).

According to figure 6, the detection of colon diseases in women is found in all groups with the peak at 66-68 years. The frequency of occurrence is dominated by UC, then chronic UC, CRC, Crohn's disease.

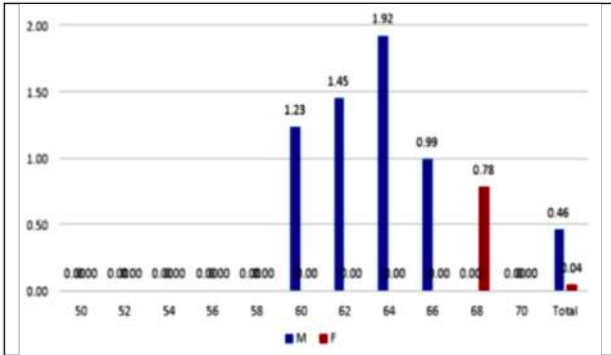


Figure 3: Frequency of Crohn's disease by age groups according to colonoscopy.

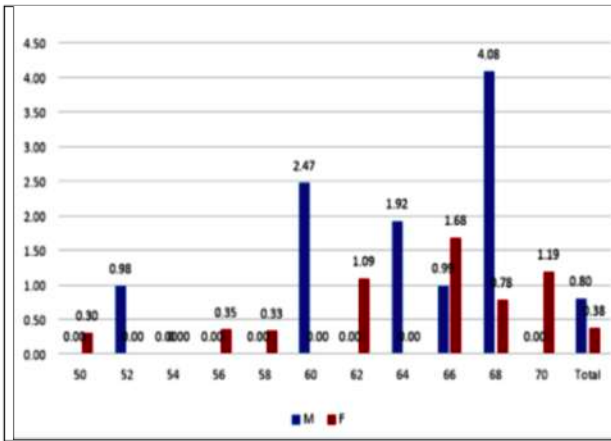


Figure 4: Detectability of ulcerative colitis by groups according to colonoscopy.

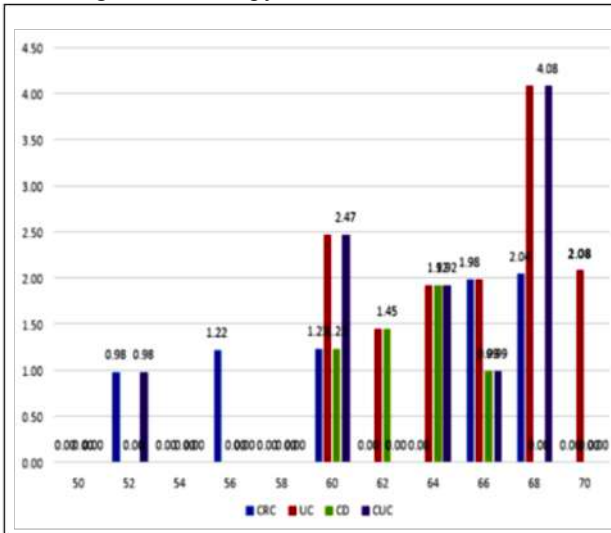


Figure 5: Detection of diseases of the large intestine in men by age groups according to the colonoscopy.

Estimation of CEA and fecal calprotectin level showed, that in the I group the level of calprotectin in 100% of cases was within the normal range, the

increase in CEA was recorded in 2 patients and CEA in 4 patients.

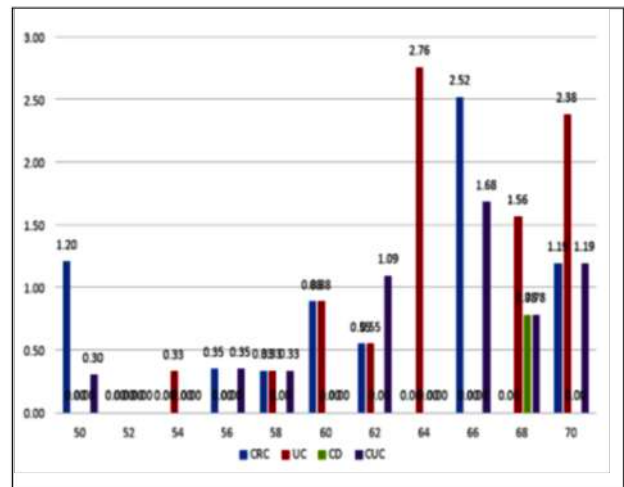


Figure 6: Detection of diseases of the large intestine in women by age groups according to the colonoscopy.

In a histological study of the biopsy material, a highly differentiated dark-celled adenocarcinoma of the sigmoid colon was diagnosed in 4% patients. Morphological in the intestinal tissue revealed many glands with polypoid growths in the form of tubules and cysts, among which are visible fused, branching glands, covered with multi-row epithelia with hypochromic-colored glands and apaplasia of cells.

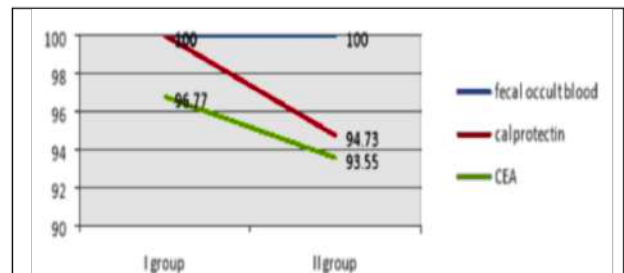


Figure 7: Comparative effectiveness of the fecal occult blood test system and CEA with calprotectin in the diagnosis of inflammatory bowel diseases.

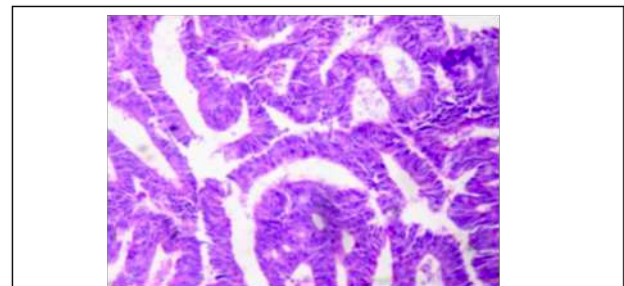


Figure 8: Rectum adenocarcinoma. Magnification x200. Dark-celled highly differentiated.

Ulcerative colitis is proved morphologically in 22 patients. Of these, 14 cases of histomorphological examination of the biopsy specimen of the large intestinal mucosa revealed a limited spread of the

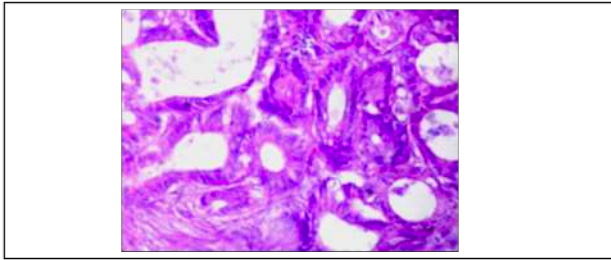


Figure 9: Sigmoid adenocarcinoma. Magnification x200. Dark-celled highly differentiated.

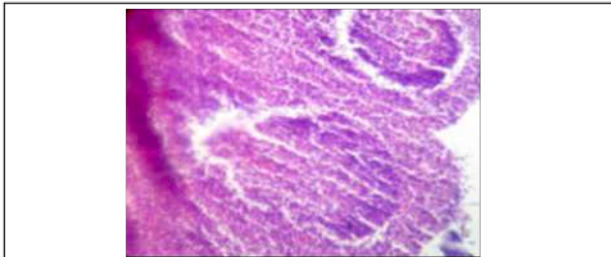


Figure 10: Ulcerative colitis of the large intestine. Magnification x200.

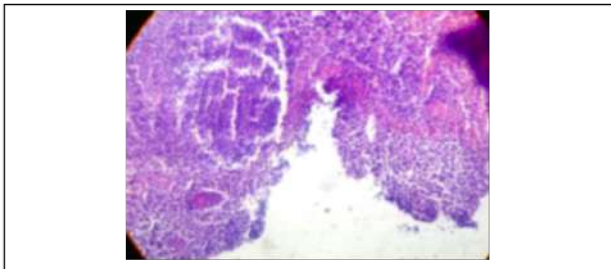


Figure 11: Ulcerative colitis of the large intestine. Magnification x200.

inflammatory infiltrate within the own plate of the mucous membrane of the large intestine. In the zone of major ulcers, the transmural character of the infiltrate is noted with the formation of crypts and abscesses. (Figure 7).

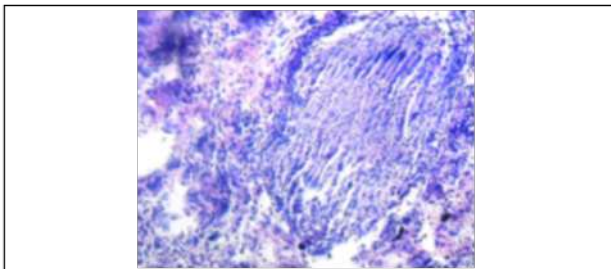


Figure 12: Crohn's disease. Magnification x200.

In the remaining figures 8-9-10-11-12-13 cases, when examining a biopsy specimen of the colon of the large intestine, an inflammatory infiltrate was revealed, spreading over all layers of the intestinal wall, typical granulomas are located in isolation. They consist of epithelioid and giant cells surrounded by a girdle of lymphocytes that do not have clear boundaries. This histological picture is similar to the

histological picture in Crohn's disease. But clinical and laboratory-instrumental data showed that Crohn's disease was detected in 5% patients.

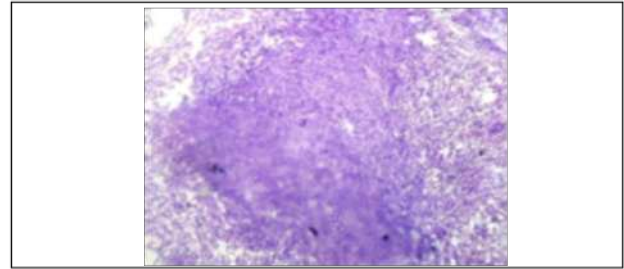


Figure 13: Crohn's disease. Magnification x200..

Conclusions

- From the food and behavioral factors of the possible development of CRC revealed hereditary predisposition, excessive use of meat products, smoking experience more than 10 years, sedentary lifestyle.

- CRC and predisposing inflammatory bowel diseases significantly prevailed after 60 years. At the same time, women are predominantly diagnosed with CRC, men - 4 times more often inflammatory diseases.

- The use of a test system with assessment of feces for latent blood compared with the use of the determination of CEA and calprotectin in the diagnosis of inflammatory bowel disease has less specificity and sensitivity.

- Estimation of levels of fecal calprotectin and CEA will allow increasing the degree of early diagnosis of CRC.

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