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Epidemiological aspects of colorectal cancer in the world and the Republic of Uzbekistan: A literature review

Relevance: GLOBOCAN 2019 reports that colorectal cancer (CRC) ranks third among mortality causes and fourth among the newly diagnosed cases in the world. CRC incidence is growing worldwide and in the Republic of Uzbekistan. Thus, in the Republic of Uzbekistan, CRC ranks 5th in the general cancer structure and 2nd in men.

The purpose of the study was to make an epidemiological assessment of global trends in colorectal cancer and CRC incidence in the Republic of Uzbekistan in 2018-2019.

Results: Global CRC incidence and mortality trends show differences depending on territories and level of economic development. Gender differences were also revealed: CRC is more often in men, with the ratio of men to women 1.25:0.8.

Conclusions: The study of the oncoepidemiological situation on CRC in the Republic of Uzbekistan showed an upward trend that determines the need for further studies of territorial differences and the search for CRC occurrence factors.

Keywords: colorectal cancer (CRC), oncoepidemiology, Republic of Uzbekistan, incidence, mortality.

Introduction: Malignant neoplasms (MN) have recently become one of the main issues in medicine. Their prevalence is growing worldwide, placing enormous physical, emotional, and financial stress on the population and the healthcare system. Unfortunately, countries with low and middle incomes are not always ready to meet these challenges.

According to Kachanov et al., an in-depth epidemiological analysis, taking into account anatomical localization and histological structure is possible only based on indicators of population registers, in which patient data are taken into account from the moment of the initial registration of cancer and until the patient's death [1]. Such registers are collected worldwide based on population cancer registers' data, making it possible to compare the incidence and mortality levels [1]. In terms of territorial coverage, registers can be regional, national, or global [2-5].

The purpose of the study was to make an epidemiological assessment of global trends in colorectal cancer (CRC) and CRC incidence in the Republic of Uzbekistan in 2018-2019.

Materials and Methods: The global CRC situation was analyzed based on GLOBOCAN data for 2019. In the Republic of Uzbekistan, we evaluated the incidence, trends, and annual average age of patients with CRC.

Results:

CRC global incidence and mortality

Global statistics evidence annual growth of cancer incidence. The World Health Organization (WHO) re-

ported about 19.3 new cancer cases during 2019 and cancer mortality of nearly 10 million, with more than 2% growth to the previous year. This was 0.5% more than the global population growth [6-7].

According to global statistics, CRC accounts for 10.2% of all cancer cases. CRC ranks 3rd in incidence after lung cancer (11.6%) and breast cancer (11.6%). In mortality, CRC also ranks 3rd (8.2%) after lung cancer (18.4%) and breast cancer (9.2%).

There are three models of the incidence and mortality dynamics in CRC:

1. Western model – persistently high or decreasing incidence rate, decreasing mortality rate, a large gap between incidence and mortality rates. This model is typical for economically developed countries;

2. Eastern Europe model – a high level of incidence and mortality; both indicators are growing and differ little from each other. This model is typical for countries with a relatively high life expectancy and level of economic development;

3. Model for the countries with low and very low levels of economic development – a low level of both incidence and mortality, both indicators are almost identical in value. This could be due to the lack of access to high-quality, timely diagnostics and treatment for cancer patients in such countries [1, 8, 9].

According to L. Lebedeva, the incidence and prevalence of colon cancer in Africa and Asia is 2-5 cases per 100,000 population [9] compared to 40-45 cases per 100,000 population in Western Europe and the United

States [10, 11]. In recent years, CRC mortality decreases in North America, New Zealand, Australia, and Northern Europe and grows in Eastern Europe by 5-15% a year [12-14].

The lifetime risk of developing colon cancer in the United States is approximately 1:20 (5%) and varies with individual risk factors [2, 4, 15].

CRC is most common in Eastern Asia, where it accounts for 39.8% of all cancer cases compared to 4.1% in Northern Europe. The highest CRC mortality is registered in Eastern Asia (36.9%), the lowest – in West Africa (1%). According to the International Agency for Research on Cancer (IARC), the highest CRC incidence is associated with the life and nutrition styles. Therefore, it remains high in North America, Japan, and Europe. Low incidence levels might be associated with untimely diagnostics and a low level of countries' economic development.

The American Cancer Society (ACS) reports the highest CRC incidence in Asia (Japan, Kuwait, and Israel) and Eastern Europe (Czech Republic, Slovenia, and Slovakia). This is due to the prevalence of risk factors (dietary habits, lifestyle, bad habits, and other predisposing factors) [2].

CRC is most common over 65 years [6, 13, 14, 16, 17]. The incidence rates grow rapidly after the age of 50, with the highest rates at the age of 55 to 75 [4, 15].

CRC incidence and mortality in the Republic of Uzbekistan

In Uzbekistan, CRC ranks 5th among all cancers, colon cancer accounting for 2.58%.

In 2019, 24 648 new cancer cases were registered in Uzbekistan, including 10511 (42.6%) cases in men and 14137 (57.4%) cases in women. The growth to 2018 was 5.4%. The prevalence of MN per 100,000 population in Uzbekistan was 74.1, or 5.4% higher than in 2018 and 29.7% higher than in 2009. By the end of 2019, the number of people with cancer was 103,063 (vs. 96,575 in 2018), or 0.3% of the national population. Of them, 59,397 (57.6%) were rural inhabitants, and 4,151 (4.0%) were below 18 y.o.

In 2019, 1,588 new CRC cases were registered in Uzbekistan, including 883 (55.6%) cases in men and 705 (44.4%) cases in women. The men to women ratio among new CRC cases was 1.25:0.8. CRC ranked 5th in the cancer incidence structure, with a prevalence of 4.8 per 100,000 population (Figure 1).

Figure 1 – Cancer incidence structure in the Republic of Uzbekistan, 2019

Notably, CRC ranks 3rd among male cancer incidence in the Republic, with the prevalence of 5.3 per 100,000 male population, second only to neoplasms of the lung and stomach. In females, its ranks 4th (4.3 per 100,000

female population) after neoplasms of the breast, cervix uteri, and ovary (Figure 2) [6, 7].

New CRC cases registered in Uzbekistan in 2019 were spread by age as follows: patients below 15

years – 0.12%, 15-17 years – 0.22%, 15-44 years – 14.3%, 45-55 years – 23.8%, 55-65 years – 28.1%, and persons over 65 years – 33.5% [6, 7]. This shows that people of working age are most susceptible to CRC incidence.

CRC localization and forms

In the US, CRC is most frequent at the age of 20-49 years and is in the Top 10 of the most common MN in men and women [2, 4, 5, 18]. In Russia, CRC occurs mainly after 50 years of age [16, 17, 19].

Figure 2 – Male and female cancer incidence structure in the Republic of Uzbekistan, 2019

Navruzov et al. distinguish three nosological forms of CRC: colon cancer, rectal cancer, and anal cancer [7]. According to GLOBOCAN, in 2019, colon cancer accounted for 59.3% of all new CRC cases, rectal cancer – 38.1%, and anal cancer – 2.6%; the mortality was divided as follows: colon cancer – 62.6%, rectal cancer – 35.2%, and anal cancer – 2.2%.

Fedorov et al. divide CRC on colon cancer and rectal cancer, with the men to women ratio of 1.21:1.00 [20].

Colon cancer and rectal cancer incidence ratios are equal to 2:1 in mature countries and 1:1 in developing countries [1, 8, 19].

By histological form, adenocarcinoma accounts for nearly 90% of CRC cases. Adenocarcinoma develops from adenomas (adenomatous polyps). Mucus-forming tumors, characterized by the most aggressive course, occur in 6-19% of cases; mucinous tumors are the least common [11, 12, 21].

CRC risk factors

According to some authors, the incidence and mortality rates are indicative of high or low levels of risk for colon cancer and predict life expectancy [4, 22].

Half of CRC cases depend on lifestyle and the impact of carcinogens; 5-20% of cases are determined by genetic factors.

The reasons for growing CRC incidence are closely related to the CRC risk factors. They include: age over 50, smoking, alcohol abuse, excessive consumption of red meat, low intake of whole grains, fruits, and vegetables, physical inactivity, obesity, genetic syndromes, adenomatous colon polyposis, inflammatory bowel disease, family history, previous breast cancer, or female genital organs, type 2 Diabetes Mellitus [23].

An increase in body height by every 5% increases the risk of developing CRC by 11% in women and 9% in men [14].

CRC course (complications, metastases, life expectancy)

Some authors name acute obstructive intestinal obstruction one of the most dangerous CRC complications. Its frequency makes 30-85.5% of other complications such as intestinal perforation during tumor disintegration – 0.4-27%, bleeding – 0.8-18%, tumor invasion into neighboring organs and tissues – 1.5-44%, and perifocal pyo-inflammatory processes – 5-35% [17, 19].

Metastasis is registered in 20-50% of primary CRC cases. They are most common in the liver, and only 10-25% of them are resectable. Metastasis in the lungs and peritoneum is less frequent [2, 4, 5].

SEER-Medicare database reports localized stages in 36-42% of cases, regional metastasis – in 34-41%, and

remote metastasis – in 17-25% of patients depending on the race and gender.

Life expectancy in CRC depends on the tumor spread and metastasis. 5-year life expectancy reaches 93% with stage I CRC, goes down to 72% with stage II, does not exceed 45% with stage III, and is only 8% with stage IV [10, 14, 18]. ACS (2016) reported a 90% 5-year survival with stages I and II, 70% - with stage III, and 13% - with stage IV [2].

Conclusion:

The conducted CRC prevalence analysis shows a steady increase in incidence and mortality depending on the location and histological structure of the tumor, gender, age, and territorial characteristics. Early CRC diagnostics remains crucial considering the share of neglected cases at establishing the diagnosis. Better early diagnostics can improve the survival and quality of life in CRC.

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ТҰЖЫРЫМ

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Әлемдегі және Өзбекстан Республикасындағы колоректалды обырдың эпидемиологиялық аспектілері: Әдеби шолу

Өзектілігі: GLOBOCAN компаниясының 2019 жылғы мәліметтеріне сәйкес, колоректалды қатерлі ісік (CRR) өлім-жітім бойынша үшінші және әлемдегі диагнозы қойылған жаңа жағдайлардың саны бойынша төртінші орында тұр. Колоректалды қатерлі ісік сырқаты бүкіл әлемде де, Өзбекстан Республикасында да тұрақты өсуін жалғастыруда. Мәселен, 2019 жылы Өзбекстанда колоректалды қатерлі ісік жалпы онкологиялық аурулар құрылымында 5-ші орында болса, ерлер арасында 2-ші орынды иеленді.

Зерттеудің мақсаты: 2018–2019 жылдары Өзбекстан Республикасында колоректалды қатерлі ісіктің және колоректалды қатерлі ісік ауруының әлемдік үрдістеріне онкоэпидемиологиялық бағалау жүргізу.

Нәтижелері: Колоректалды қатерлі ісікпен сырқаттанушылық және осы сырқаттан болатын өлім-жітімнің әлемдік үрдістері аумақтар мен экономикалық даму деңгейіне байланысты айырмашылықтарды көрсетеді. Сондай-ақ, жыныстық сипаттамалардың болуы да көрініс табады: Мысалы, колоректалды қатерлі ісік ерлер арасында жиі кездеседі, сырқаттанған ерлер мен әйелдердің қатынасы 1,25: 0,8 құрайды.

Қорытынды: Өзбекстан Республикасындағы колоректалды қатерлі ісік бойынша онкоэпидемиологиялық жағдайды зерттеу аурудың көбею тенденциясын көрсетті. Бұл аумақтық айырмашылықтарды одан әрі зерттеуді және колоректалды қатерлі ісіктің пайда болу факторларын іздеу қажеттілігін анықтайды.

Түйінді сөздер: колоректалды қатерлі ісік (КРР), онкоэпидемиология, Өзбекстан Республикасы, сырқаттанушылық, өлім-жітім.

АННОТАЦИЯ

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Эпидемиологические аспекты колоректального рака в мире и Республике Узбекистан: Обзор литературы

Актуальность: Согласно данным GLOBOCAN за 2019 год, колоректальный рак (КРР) является третьим по смертности и четвертым по количеству диагностированных новых случаев в мире. Заболеваемость КРР неуклонно растет как во всем мире, так и в Республике Узбекистан. Так, в 2019 году в Узбекистане КРР занимал 5 место в структуре общей онкологической заболеваемости и 2 место – у мужчин.

Цель исследования: провести онкоэпидемиологическую оценку мировых тенденций колоректального рака и заболеваемости КРР в Республике Узбекистан в 2018–2019 гг.

Результаты: Мировые тенденции заболеваемости и смертности от КРР демонстрируют различия в зависимости от территорий и уровня экономического развития. Показано наличие половых особенностей: КРР чаще возникает у мужчин, соотношение заболевших мужчин и женщин составляет 1,25:0,8.

Выводы: Изучение онкоэпидемиологической ситуации по КРР в Республике Узбекистан показало, что заболеваемость КРР имеет тенденцию к увеличению. Это определяет необходимость дальнейших исследований территориальных различий и поиска факторов возникновения КРР.

Ключевые слова: колоректальный рак (КРР), онкоэпидемиология, Республика Узбекистан, заболеваемость, смертность.