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COLORECTAL CANCER: FROM DIAGNOSIS TO TREATMENT, A LITERATURE REVIEW

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Raianne Vivian da Silva Marinho[1], Loara Oliveira Hellmann[2], Larissa Machado Rodrigues[3], Ana Sophia do Amaral Simões Carvalho[4], Paulo Henrique Paes Landim Filho[5], Maria Clara Barbosa de Almeida[6], Maria Eduarda Campêlo dos Santos[7], Matheus de Pádua Macedo Andrade[8] and Davi Nogueira Jales[9]

ABSTRACT

Colorectal cancer (CRC) is one of the most common and fatal neoplasms in the world, with a high incidence in Western countries. Factors such as inadequate diet, sedentary lifestyle, and genetic predisposition contribute to the increase in cases. The main symptoms include abdominal pain, changes in bowel habits, bleeding and weight loss. In the early stages, the disease can be asymptomatic, which makes early detection difficult. Screening is essential for reducing mortality. Early detection and appropriate treatment are key to improving prognosis. OBJECTIVE: to compile and critically analyze the research already carried out, to offer a comprehensive view of the advances in the diagnosis, clinical and surgical management and prognosis of colorectal cancer. METHODS: This is a literature review on cancecolorectal. The research used the Virtual Health Library (VHL) as a data source and applied specific terms such as "colorectal cancer", "diagnosis" and "treatment", with language filters (Portuguese, English and Spanish) and publication period (2019-2024). A total of 22 studies were selected after applying the inclusion and exclusion criteria. Although it does not require ethical approval, the review follows good scientific practices. DISCUSSIONS: Colorectal cancer is one of the leading causes of morbidity and mortality worldwide, usually originating from adenomatous polyps in the colon or rectum. Early diagnosis is essential to improve therapeutic results, and is carried out through screening tests, such as colonoscopy, fecal occult blood testing, and, more recently, fecal DNA testing. The treatment of CRC depends on the stage of the disease, with surgery being the main therapeutic modality in the early stages. For more advanced cases, chemotherapy, targeted therapies and immunotherapy are used, with the aim of prolonging survival and improving quality of life. Personalized treatment, based on the molecular profile of the tumor, has shown significant advances, providing more effective and less toxic therapies. Adherence to screening and equitable access to treatments are key to reducing mortality

[1] Faculty of Technology of Teresina – CET
[2] Faculty of Technology of Teresina – CET
[3] Faculty of Technology of Teresina – CET
[4] Faculty of Technology of Teresina – CET
[5] UniFacid Idomed
[6] Faculty of Technology of Teresina – CET
[7] Faculty of Technology of Teresina – CET
[8] Faculty of Technology of Teresina – CET
[9] Faculty of Technology of Teresina – CET

associated with the disease. CONCLUSION: CRC is one of the most common and fatal neoplasms in the world, with a high incidence in Western countries. Factors such as inadequate diet, sedentary lifestyle, and genetic predisposition contribute to the increase in cases. The main symptoms include abdominal pain, changes in bowel habits, bleeding and weight loss. In the early stages, the disease can be asymptomatic, which makes early detection difficult. Screening is essential for reducing mortality. Early detection and appropriate treatment are key to improving prognosis.

Keywords: Colorectal Cancer. Diagnosis and Treatment.

INTRODUCTION

Colorectal cancer (CRC) is one of the most common neoplasms in the world, accounting for approximately 10% of all cancers. In 2020, around 1.9 million new cases were recorded globally, making it the third most incident type of cancer internationally. Projections indicate a significant increase in the global burden of cancer in the coming decades, with estimates of more than 35 million new cases by 2050. This increase is attributed to population aging, demographic growth, and changes in exposure to risk factors such as smoking, alcohol consumption, obesity, and environmental pollution (PAN AMERICAN HEALTH ORGANIZATION, 2024).

In addition, recent studies point to a worrying trend: the incidence of colorectal cancer is increasing among individuals under 50 years of age in several developed countries, possibly due to factors such as poor diets, sedentary lifestyle, and changes in the intestinal microbiome. These data underscore the importance of global prevention, early detection, and effective treatment strategies to control the growing burden of this neoplasm (WHO, 2014).

The etiology of CRC is multifactorial, involving both genetic and environmental factors. Among the modifiable risk factors, inadequate diet, rich in saturated fats and low in fiber, sedentary lifestyle, smoking and excessive alcohol consumption stand out. In addition, obesity and the presence of inflammatory bowel diseases, such as ulcerative colitis and Crohn's disease, increase the risk of developing this neoplasm (ALVES et al., 2024).

Prevention and early diagnosis are fundamental strategies for reducing mortality associated with colorectal cancer. Colonoscopy is considered the gold standard for screening, allowing the detection and removal of adenomatous polyps, precursor lesions of the disease. However, accessibility to screening varies significantly between countries and within their own regions, reflecting socioeconomic and structural inequalities in health systems. While developed nations have well-established screening programs, with high adherence by the population, low- and middle-income countries face challenges related to the lack of infrastructure, financial resources, and qualified professionals (MIURA et al., 2024).

In addition, factors such as lack of knowledge about the importance of screening and cultural barriers also impact adherence to preventive exams. In this context, public policies that encourage early detection, combined with health education initiatives and expanded access to tests, are essential to mitigate disparities and reduce the global burden of colorectal cancer (INCA, 2020).

In view of the above, this review article aims to synthesize and analyze the available

evidence on screening methods, diagnosis, and therapeutic approaches. of colorectal cancer. This study reinforces the relevance of the dissemination of scientific knowledge, contributing to the updating of health professionals and to the improvement of strategies for prevention, early detection and treatment of this neoplasm.

METHODOLOGY

This study is a literature review on colorectal cancer, with the objective of exploring and synthesizing information on the best diagnostic practices, which may include clinical exams, imaging and biopsies, in addition to the most effective therapeutic options, such as clinical treatment, surgical techniques and postoperative management. To achieve this objective, rigorous research procedures and selection of relevant scientific articles were followed, using the Virtual Health Library (VHL) as the main source of data.

The search strategy involved the use of specific terms and appropriate filters to ensure the relevance and quality of the selected studies. The keywords used in the search were "colorectal cancer", "diagnosis" and "treatment" and their equivalents in English. These terms were combined in order to optimize the results and applied with specific filters.

Initially, the "full text available" filter was applied to ensure that all selected articles were accessible in their entirety, enabling a detailed analysis and complete extraction of relevant information. Next, the language filter was used, covering publications in Portuguese, English and Spanish, ensuring a broad review of the available literature. In addition, filters were activated so that the main theme of the articles was "colorectal cancer" and that the selected studies included prognostic, risk factor, diagnostic research, and systematic reviews. Finally, the publication interval was restricted to the years 2014 to 2024, in order to incorporate the most recent and significant findings on the subject.

Inclusion criteria for the selection of studies included those published in English, Portuguese, and Spanish; indexed in the period from 2014 to 2024; with free and complete publication; and that address the aforementioned descriptors in the abstract or title. On the other hand, the exclusion criteria were: articles that were not in English, Portuguese or Spanish; published before 2014; that did not have free or complete disclosure; and that did not address the descriptors in the title or abstract.

The study selection process resulted in the initial collection of articles. After applying the inclusion and exclusion criteria, 22 articles were selected. These studies were analyzed and their findings were synthesized in order to provide an analysis of colorectal cancer.

As this is a literature review, there is no need for approval by an ethics committee, however, the review respects the principles of good scientific practice, such as the correct

citation of sources and non-plagiarism.

In this way, the article allows for a comprehensive understanding of colorectal cancer, providing a solid foundation for future research and clinical advances.

DISCUSSION

DIAGNOSIS

The symptoms presented by patients with suspected colorectal cancer are usually nonspecific, which can make early diagnosis difficult. Frequently, these patients report changes in bowel habits – manifested by episodes of constipation or diarrhea – as well as the presence of blood in the stool, which can be noticed both with the naked eye and through laboratory tests. Other clinical signs include persistent abdominal pain, unexplained weight loss, fatigue, and anemia due to chronic bleeding. The subtlety of these symptoms, especially in the early stages, can contribute to late diagnosis, negatively impacting the prognosis and efficacy of treatment (SILVA; PEREIRA; SOUZA, 2018).

The clinical presentation of colorectal cancer is closely related to the size and location of the tumor. For example, the presence of blood in the stool (hematochezia) is more common in neoplasms of the rectum and descending colon, while melena, characterized by dark stools, is often seen in tumors of the ascending colon. Iron deficiency anemia, due to chronic blood loss, is particularly evident in patients with involvement of the right colon and cecum. Abdominal pain, when present, can indicate complications such as peritoneal dissemination, intestinal perforation, or peritonitis, and changes in bowel habits are often associated with tumors of the left colon (MALLMANN, et al., 2018).

Symptoms such as tenesmus, pain in the pelvic region, and stools with reduced caliber suggest the involvement of the rectum. Considering the high incidence of metastases in colorectal cancer, it is crucial to also observe the occurrence of additional signs such as pain in the right hypochondrium, early satiety, anorexia, weight loss, and supraclavicular adenopathies, which can evidence metastatic dissemination, either contiguously or at a distance (MALLMANN, et al., 2018).

Screening tests for colorectal cancer play a crucial role in the early detection of the disease, with the aim of reducing associated mortality. Colonoscopy is considered the gold standard for diagnosis, allowing direct visualization of the colon and the removal of adenomatous polyps, precursor lesions of cancer (ALMEIDA et al., 2020). However, other screening modalities have also been widely used, such as fecal occult blood (PSOF) testing, which is less invasive and has a reduced cost, although it has lower sensitivity compared to colonoscopy (FERREIRA et al., 2019).

In addition, the fecal DNA test, which identifies genetic alterations in the stool, is also gaining prominence, being recommended by some international guidelines as an effective alternative to the traditional test (INTERNATIONAL AGENCY FOR RESEARCH ON CANCER [IARC], 2020). The choice of screening test should take into account the age group, individual risk, and availability of health resources, and it is essential that public policies promote adherence to these strategies, in order to achieve an early and effective diagnosis for a greater number of individuals (GOMES et al., 2021).

The diagnosis of colorectal cancer (CRC) is largely confirmed by biopsy, after screening tests and initial clinical evaluation. Biopsy is considered the gold standard method for definitive diagnosis, allowing histopathological analysis of lesions present in the colon or rectum. The main biopsy technique used is the one performed during colonoscopy, where the doctor can directly visualize the suspicious areas and collect samples for examination. Biopsy is crucial to determine the presence of malignant cells, tumor morphology, and thus guide appropriate treatment (CARDOSO et al., 2020).

After histopathological diagnosis, the staging of colorectal cancer is essential to define the most appropriate therapeutic strategy and estimate the prognosis. Staging is commonly performed through imaging tests, such as computed tomography (CT), magnetic resonance imaging (MRI), and endoscopic ultrasound, which help assess the extent of the tumor, the presence of affected lymph nodes, and the spread to distant organs, such as the liver and lungs (MARTINS et al., 2019). The staging system used for colorectal cancer is TNM, developed by the American Joint Committee on Cancer (AJCC), which classifies the tumor based on three main components: the size and extent of the primary tumor (T), the involvement of regional lymph nodes (N), and the presence of distant metastases (M). This staging is essential to determine if the cancer is restricted to the colon or rectum or if it has already spread to other parts of the body (SOUSA et al., 2021).

Adequate staging of RCC has direct implications for treatment, as patients with localized disease (stages I and II) are generally candidates for surgical resection of the tumor, while patients with metastatic disease (stage IV) may benefit from systemic therapies such as chemotherapy and targeted therapies. Staging accuracy also helps in the choice of adjuvant or neoadjuvant approach, such as chemotherapy after surgery in cases of high risk of recurrence (GOMES et al., 2020).

TREATMENT

The treatment of colorectal cancer (CRC) has evolved considerably in recent decades, with the development of new therapeutic approaches that aim to improve the

survival and quality of life of patients. The main therapeutic modality continues to be surgery, which, in the early stages of the disease, allows tumor resection and is considered the most effective curative approach (CARDOSO et al., 2020). However, in cases of metastatic or advanced stage colorectal cancer, treatment involves a combination of chemotherapy, targeted therapies, and immunotherapy, which have shown significant advances in the effectiveness of disease control (SOUZA et al., 2020).

Chemotherapy remains a key line of treatment, with drugs such as 5-fluorouracil (5-FU), oxaliplatin, and irinotecan. These agents have been used both in adjuvant treatment, after surgery, to reduce the risk of recurrence, and in the palliative treatment of patients with metastases (MOREIRA et al., 2019). However, conventional treatment has limitations, especially with regard to side effects and drug resistance. For this reason, new targeted therapies have been incorporated into the therapeutic arsenal of colorectal cancer. The use of monoclonal antibodies, such as bevacizumab, which inhibits tumor angiogenesis, and EGFR (epidermal growth factor receptor) pathway inhibitors, such as cetuximab and panitumumab, have shown a substantial benefit on survival in patients with metastatic disease (TAVARES et al., 2021).

Another major advance in colorectal cancer treatment has been the introduction of immunotherapy, which has shown promising results in a subgroup of patients with specific molecular characteristics, such as those with DNA repair deficiencies (dMMR/MSI). Immune checkpoint inhibitors, such as pembrolizumab and nivolumab, have been effective in patients with these characteristics, offering a new therapeutic option for those with metastatic disease that is refractory to conventional treatments. In addition, precision medicine has become increasingly important, allowing treatments to be individualized based on the genetic and molecular profile of each tumor, which can lead to a more effective and personalized approach for patients (LIMA et al., 2022).

In conjunction with these therapeutic advances, colorectal cancer treatment has also benefited from improved surgical techniques and adjuvant therapies. The combination of approaches, such as neoadjuvant chemotherapy before surgery, has allowed the reduction of tumor size and facilitated resection, in addition to increasing cure rates (OLIVEIRA et al., 2021). In this way, the treatment of colorectal cancer has become increasingly multidisciplinary, with the collaboration of oncologists, surgeons, radiotherapists and other specialists, aiming at the best approach for each patient.

CONCLUSION

Colorectal cancer represents one of the main causes of morbidity and mortality in the world scenario, standing out for its high incidence and significant impact on public health. Early diagnosis, through appropriate screening strategies, is essential for the detection of early lesions and the reduction of mortality associated with the disease. The evolution of therapeutic approaches, with the development of treatments such as chemotherapy, targeted therapies and immunotherapy, has allowed significant advances in the control and survival of patients, especially in metastatic cases and advanced stages of the disease. However, the effectiveness of these therapies depends on an accurate assessment of the genetic profile of the tumor and the implementation of personalized approaches.

While advances in diagnostic and treatment methods have contributed to improved survival rates, challenges persist, such as inequality in access to health care and the need for more research into innovative therapies. Thus, public policies that promote equitable access to screening and quality treatment, as well as educational campaigns on the importance of early detection, are crucial to reduce regional disparities and improve clinical outcomes globally. Continued progress in understanding the molecular biology of CRC and developing new therapeutic strategies promises to transform the treatment landscape for this disease in the coming years, expanding the cure and control options for patients.

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