A Review of Treatment Approaches for Colorectal Cancer

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Abstract. Colorectal cancer ranks among the leading malignant tumors globally in terms of both incidence and mortality, making its prevention and treatment a major public health challenge. With advances in medical research, treatment strategies for colorectal cancer have evolved from solely surgical intervention to a personalized model centered on multidisciplinary integrated therapy (MDT). This paper aims to provide a systematic review of various treatment approaches for colorectal cancer. First, this paper outlines the epidemiological background and treatment principles of colorectal cancer, emphasizing the decisive role of clinical staging in treatment planning. Subsequently, it elaborates on three major categories of therapeutic strategies: First, local treatment modalities, including radical surgery, endoscopic minimally invasive procedures, and radiotherapy, which form the foundation for achieving local tumor control and cure; Second, systemic drug therapies encompass traditional cytotoxic chemotherapy, targeted therapies targeting specific signaling pathways, and immunotherapies that activate the body's immune system, which are crucial for controlling metastasis and improving survival. Finally, the paper explores current advances and challenges in the therapeutic landscape, including personalized treatment strategies based on molecular subtyping, the application of novel combination therapies, and strategies to overcome drug resistance. This review demonstrates that the therapeutic outcomes for colorectal cancer benefit from the organic integration of multiple approaches and continuous innovation. Looking ahead, deepening research into tumor biology, developing more highly effective and less toxic novel drugs, and further optimizing treatment sequences will be key directions for achieving precision medicine and continuously improving patient survival rates and quality of life.

Keywords: cancer, Surgical procedures, Targeted therapy, Immunotherapy.

1. Introduction

Colorectal cancer, as one of the most common digestive tract malignancies worldwide, poses an increasingly severe global public health challenge due to its high incidence and mortality rates. According to the latest statistics from the International Agency for Research on Cancer (IARC) of the World Health Organization, colorectal cancer ranks among the top malignant tumors in terms of both incidence and mortality burden. In developing countries, its incidence is showing a significant upward trend due to the Westernization of diets and population aging, making the prevention and control situations far from optimistic.

The development of colorectal cancer is a complex, multifactorial, and multistep process resulting from the long-term interaction between genetic susceptibility and environmental factors. Beyond hereditary predisposing factors such as age, family history, and Lynch syndrome, unhealthy lifestyles—including high-fat, low-fiber diets, physical inactivity, obesity, and smoking—have been confirmed as significant risk factors. In clinical practice, early-stage colorectal cancer often presents with subtle symptoms, leading to many patients being diagnosed at an advanced stage after missing the optimal treatment window. This underscores the urgency and critical importance of early screening and precise diagnosis.

Over the past two decades, treatment strategies for colorectal cancer have undergone revolutionary evolution, transitioning from a model solely reliant on surgery to a precision medicine era centered on multidisciplinary integrated treatment (MDT). Current treatment decisions heavily depend on precise clinical-pathological staging (TNM staging) and key molecular subtyping (e.g., RAS/BRAF gene status and mismatch repair function dMMR/MSI-H). Treatment options have expanded significantly, encompassing a multidimensional therapeutic framework that integrates local

approaches like curative surgery and radiotherapy with systemic strategies including chemotherapy, targeted therapy, and immunotherapy. This comprehensive approach has markedly improved survival outcomes and quality of life across all disease stages.

2. Epidemiology and Etiology of Colorectal Cancer: Disease Burden and Risk Factors

Table 1. The incidence of malignant tumors in urban areas of China in 2022 [3]

	overall			male			female		
Tumor Categories	Number of new cases (10,000)	Bid Win Rate (1/100,000)	Standard Incidence Rate (per 100,000)	Number of new cases (10,000)	Bid Win Rate (1/100,000)	Standard Incidence Rate (per 100,000)	Number of new cases (10,000)	Bid Win Rate (1/100,000)	Standard Incidence Rate (per 100,000)
All malignant tumors	482.47	208.58	201.61	253.39	212.67	209.61	229.08	208.08	197.03
Oral cancer	6.51	2.76	2.72	4.56	3.89	3.87	1.95	1.67	1.60
Nasopharyngeal carcinoma	5.10	2.53	2.36	3.67	3.61	3.39	1.44	1.44	1.33
Esophageal cancer	22.40	8.24	8.32	16.75	12.90	13.09	5.65	3.81	3.78
Gastric cancer	35.87	13.79	13.72	24.66	19.43	19.47	11.21	8.49	8.29
Colorectal cancer	51.71	20.29	20.10	30.77	24.83	24.74	20.94	15.97	15.70
Liver cancer	36.77	15.29	15.03	26.79	23.14	22.72	9.98	7.49	7.42
Gallbladder cancer	3.11	1.14	1.14	1.27	0.97	0.97	1.85	1.30	1.30
Pancreatic cancer	11.87	4.45	4.44	6.71	5.28	5.29	5.15	3.66	3.63
Throat cancer	2.95	1.14	1.16	2.72	2.15	2.19	0.23	0.17	0.17
Lung cancer	106.06	40.82	40.78	65.87	51.75	52.03	40.19	30.69	30.34
Cutaneous melanoma	0.88	0.37	0.37	0.44	0.37	0.37	0.44	0.37	0.36
Breast cancer in women	35.72	35.30	33.04	-	-	-	35.72	35.30	33.04
Cervical cancer	15.07	14.88	13.83	-	-	-	15.07	14.88	13.83
Uterine body cancer	7.77	7.03	6.84	-	-	-	7.77	7.03	6.84
Ovarian cancer	6.11	5.98	5.68	-	-	-	6.11	5.98	5.68
Prostate cancer	13.42	9.81	9.68	13.42	9.81	9.68	-	-	-
Testicular cancer	0.35	0.46	0.41	0.35	0.46	0.41	-	-	-
Renal cell carcinoma	7.37	3.17	3.13	4.73	4.14	4.08	2.64	2.23	2.21
Bladder cancer	9.29	3.48	3.44	7.32	5.70	5.67	1.97	1.41	1.39
Brain tumor	8.75	4.21	4.17	4.24	4.20	4.13	4.51	4.22	4.20
Thyroid cancer	46.61	28.85	24.64	12.49	15.81	13.25	34.12	42.48	36.51
Lymphoma	8.52	3.88	3.77	4.81	4.45	4.34	3.71	3.33	3.21
Leukemia	8.19	4.35	4.54	4.70	4.95	5.14	3.50	3.77	3.94
Other malignant tumors	32.09	13.57	13.48	17.13	14.82	14.76	14.96	12.40	12.28

Colorectal cancer is a malignant tumor occurring in the colon and rectum, also known as large intestine cancer. It ranks third in annual new cases among both men and women globally, and second in annual [1, 2]. In China, the incidence and mortality rates of colorectal cancer continue to rise. The incidence of malignant tumors in urban areas of China in 2022 is shown in table 1 below. According to the latest data from the National Cancer Center, its incidence and mortality rates rank among the highest among all malignant tumors, with higher incidence rates in urban areas than in rural areas [3]. Notably, the incidence of colorectal cancer in China is showing a trend toward younger age groups, with a lower median age of onset compared to Western countries, making its prevention and treatment more urgent. The primary and most critical step in developing individualized treatment plans is to perform precise clinical staging and pathological typing. The globally accepted standard is the TNM staging system (8th edition) jointly established by the American Joint Committee on Cancer (AJCC) and the Union for International Cancer Control (UICC) [4]. T (Tumor): Represents the depth of invasion of the primary tumor, ranging from Tis (carcinoma in situ) to T4 (involvement of visceral peritoneum or adjacent organs). N (Node): Represents regional lymph node metastasis, ranging from N0 (no lymph node metastasis) to N2 (multiple lymph node metastases). M (Metastasis): Represents distant metastasis, with M0 indicating no distant metastasis and M1 indicating distant metastasis. Combining T, N, and M information, colorectal cancer is classified into Stage I, Stage II, Stage III, and Stage IV. Staging directly determines treatment goals and preferred approaches: Stage I is early-stage, primarily managed with curative surgery; Stages II and III are locally advanced, often requiring comprehensive treatment; Stage IV is advanced-stage, primarily managed with systemic drug therapy and palliative care.

3. Primary Treatment Modalities for Colorectal Cancer

3.1. Curative surgical resection: The preferred treatment option for early-stage cancer

The clinical implementation of modern radical resection for colorectal cancer has consistently been guided by two key anatomical principles. This approach relies on thorough preoperative assessment and precise surgical technique selection, combined with advances in minimally invasive technology, to achieve a balance between tumor eradication and preservation of patient function.

Currently, two core anatomical principles exist. The first is total mesorectal excision (TME). Pioneered by Professor Heald, this approach is now recognized as the “gold standard” for mid-to-low rectal cancer surgery. Its core operative requirement involves using sharp dissection along the natural anatomical plane between the visceral and parietal fascias to respect the entire rectum as a single unit, along with its complete misery containing all surrounding lymphatic drainage tissues and adipose tissue. This approach maximizes tumor clearance while effectively preserving pelvic autonomic nerve function, significantly reducing local recurrence rates to below 10%. The second is Complete Mesocolonectomy (CME). Based on the embryological anatomy of the colonic mesentery, the CME procedure centers on two key aspects: first, ligating the central vessels at their origin; second, completely excising the mesenteric tissue covering the colon. By ensuring the integrity of the mesenteric capsule, this procedure increases the number and extent of lymph nodes cleared, potentially offering colon cancer patients a more favorable oncological prognosis.

Preoperative assessment is critical to surgical success and holds paramount importance in surgical practice. A thorough and precise preoperative evaluation is essential for developing individualized surgical plans and ensuring surgical safety. It primarily encompasses two dimensions:

Tumor-Specific Evaluation: Endoscopic biopsy confirms tumor pathology. Imaging studies like contrast-enhanced CT and high-resolution MRI (especially for rectal cancer) enable precise clinical staging (cTNM), focusing on tumor depth of invasion, regional lymph node metastasis, and proximity to adjacent organs—providing core evidence for surgical approach selection.

Patient Systemic Evaluation: Comprehensive assessment of cardiopulmonary function, hepatic and renal function, and overall systemic status. Identification of comorbidities to determine the patient's tolerance for surgical trauma.

What is more, standardized surgical approaches are tailored to tumor location. Surgical selection is primarily determined by the tumor's anatomical position, with distinct strategies for colon and rectal cancers.

Colon cancer surgery selects the corresponding radical resection approach based on the tumor's vascular supply territory. Right hemicolectomy is indicated for tumors of the cecum, ascending colon, and hepatic flexure. The resection includes the terminal ileum, cecum, ascending colon, right transverse colon, and corresponding mesentery, requiring ligation at the root of the ileocolic artery, right colic artery, and right branch of the middle colic [5]. Left hemicolectomy is indicated for tumors in the splenic flexure and descending colon. The resection includes the left transverse colon, descending colon, and part of the sigmoid colon. Vascular management requires ligation at the root of the left colic artery and branches [6]. Additionally, transverse colectomy targets tumors in the middle transverse colon, while sigmoid colectomy addresses tumors in the sigmoid colon region.

Surgical selection for rectal cancer is more complex, requiring a comprehensive assessment based on the tumor's distance from the anal margin. Low anterior resection is the most common sphincter-preserving procedure for mid-to-high rectal cancers. Following tumor resection guided by TME principles, colo-rectal anastomosis is completed intra-abdominally. To reduce anastomotic leakage risk, prophylactic ileostomy is often performed [6]. Abdominoperineal resection is indicated for extremely low rectal cancer or anal canal cancer. The procedure requires separate abdominal and perineal incisions to respect the distal sigmoid colon, entire rectum, and anal canal, resulting in a permanent [6]. Hartmann's procedure is primarily used in emergency scenarios such as rectal cancer complicated by acute intestinal obstruction or perforation, or for patients in extremely poor systemic condition who cannot tolerate anastomotic surgery. After exercising the diseased intestinal segment, the distal rectal stump is closed, and a colostomy is created at the proximal colon [7].

3.2. Chemotherapy and Radiotherapy: Critical Roles in Adjuvant, Neoadjuvant, and Palliative Settings

Chemotherapy serves as one of the comprehensive treatment modalities for colorectal cancer. The current mainstream clinical chemotherapy regimens for colorectal cancer include the FOLFOX regimen, the CAPEOX regimen, and the FOLFIRI regimen.

The FOLFOX regimen consists of the following drugs: oxaliplatin injection, calcium folinate for injection, and fluorouracil injection. Oxaliplatin injection and calcium folinate for injection are administered via intravenous infusion over 2 hours on Day 1. Fluorouracil injection is administered via continuous intravenous infusion for 46-48 hours over the preceding 2 days. Following postoperative outpatient evaluation, 3-4 weeks post-surgery, initial chemotherapy may be administered. If no significant adverse reactions occur, subsequent chemotherapy may proceed according to this regimen. It is recommended to repeat the cycle every 2 weeks for a total of 12 [8].

CAPEOX regimen: Medications include oxaliplatin injection and capecitabine tablets. Administration: Oxaliplatin injection is administered via 2-hour intravenous infusion on Day 1, followed by 2 weeks of continuous oral capecitabine tablets. Capecitabine tablets are then discontinued for 1 week. This cycle is repeated every 3 weeks for a total of 8 [8-9].

The FOLFIRI regimen uses irinotecan hydrochloride injection, calcium folinate injection, and fluorouracil injection. It is commonly used for chemotherapy in patients with metastatic colorectal cancer and for postoperative recurrence of colorectal cancer. Irinotecan hydrochloride injection and calcium folinate injection are administered via a 2-hour intravenous infusion on Day 1. Fluorouracil injection is administered via continuous intravenous infusion for 46–48 hours on the preceding 2 days. This regimen is repeated every 2 weeks for a total of 12 cycles.

Radiotherapy treatment plans for colorectal cancer are differentiated based on stage and radiation type.

Radiotherapy for Stage I Rectal Cancer: Following local resection of Stage I rectal cancer, radical surgery is recommended for patients with high-risk factors. If radical surgery cannot be performed for distinct reasons, postoperative radiotherapy is advised. Neoadjuvant Chemoradiotherapy for Stage

II–III Rectal Cancer: For clinically diagnosed Stage II–III rectal cancer, rectal MRI is the preferred modality for local examination. If MRI is contraindicated, transrectal ultrasound is recommended. Treatment should be stratified based on tumor location within the rectum and the recurrence risk indicated by MRI findings. Adjuvant Chemoradiotherapy for Stage II–III Rectal Cancer: For patients with stage II–III rectal cancer diagnosed pathologically postoperatively who did not undergo neoadjuvant chemoradiotherapy, treatment should be stratified based on the quality of total mesorectal excision (TME), circumferential margin (CRM) status, and distance of the tumor from the anal margin. Watchful Waiting Strategy: For low rectal cancers (cT1N0, cT2N0, cT3-4, or N+) where sphincter preservation is challenging, if the patient strongly desires sphincter preservation, concurrent chemoradiotherapy is recommended preoperatively. If a clinical complete response (cCR) is achieved post-treatment, a watchful waiting strategy may be adopted.

EBRT is the most used radiation therapy for colorectal cancer patients. EBRT uses an external machine to deliver high-energy rays to the cancer site. Patients undergo EBRT radiation therapy for a course lasting several days [10]. Stereotactic radiotherapy also employs an external machine to deliver high-energy rays, but this therapy is suitable for colorectal cancer that has spread to the liver or lungs. It delivers high doses of radiation to small, precise areas. Intraoperative radiation therapy delivers a single high dose of radiation to a precise location during surgery. Brachytherapy uses tiny radioactive “seeds” placed inside the body. This therapy is sometimes used to treat colon or rectal cancer that has spread [11].

3.3. Endoscopic Minimally Invasive Therapies: Curative Resection for Early-Stage Cancer and Palliative Intervention for Advanced Disease

Endoscopic treatment refers to the direct management of colorectal lesions using an endoscope as an instrument, serving as a crucial approach for treating colorectal cancer. Today, early-stage colorectal cancer resection via endoscopy has become the preferred treatment option. Common methods include endoscopic mucosal resection (EMR) and endoscopic submucosal dissection (ESD).

EMR evolved from polypectomy and mucosal injection techniques. It is suitable for flat polyps <20mm, early-stage cancers, and certain tumors originating from the muscularis mucosae and submucosa. EMR was first documented in the literature by German physician Deyhle in 1973. In 1984, Dr. Tada of Japan formally applied this technique to gastric lesions in clinical practice using a “peeling biopsy” approach. In 1985, Dr. Kudo of Japan adapted the EMR method for colorectal lesions.

EMR techniques include the transparent cap method, injection method, and injection-segmentation method.

The transparent cap method is suitable for flat lesions. Smaller flat lesions can be completely removed in a single session, making it particularly effective for small submucosal tumors without requiring specialized equipment. Its drawbacks include difficulty in controlling excision depth, risk of muscular injury, potential for bleeding and perforation, and unsuitability for larger lesions. The injection technique involves injecting a saline solution mixed with methylene blue into the submucosal layer to elevate the lesion base. A snare is then looped around the lesion, tightened to create a pseudopapillary polyp, and finally secured. Its advantages include minimal trauma, applicability to lesions throughout the colon, and no damage to the muscularis layer. When performed correctly, it avoids the risk of perforation. Small, flat lesions can be completely exercised in a single session, with a low bleeding incidence. Combined with a titanium stapler closure, bleeding can be prevented. Disadvantages include greater procedural difficulty, requiring injection needles and barbed snares, and unsuitability for larger lesions. Segmented resection via mucosal injection differs little from submucosal resection under injection in workflow, except that larger lesions cannot be resected in one snare and require staged resection. For polyps/tumors exceeding 20mm, segmented resection is indicated.

ESD has become the core minimally invasive technique in the clinical management of colorectal epithelial tumors, with its multidimensional advantages particularly evident in clinical settings. SD

overcomes the limitations of traditional endoscopic surgery by enabling resection of large lesions ≥20mm in diameter, even those with irregular shapes or ulcers, significantly broadening the indications for endoscopic treatment. Second, ESD yields intact lesion specimens, providing a reliable basis for accurately assessing tumor depth of invasion and evaluating resection margins. Clinical data show ESD achieves a high en bloc resection rate of 96%, with excellent long-term patient outcomes: 5-year overall survival reaches 93.6%, and disease-specific survival is as high as 99.6%. Furthermore, in 88.6% of treated cases, ESD effectively preserves the original anatomical structure of the gastrointestinal tract. This not only substantially reduces the risk of permanent colostomy but also significantly improves patients' postoperative quality of life. Compared to traditional surgery, ESD also reduces complications such as bleeding and infection, facilitating faster patient recovery. These conclusions stem from the long-term follow-up results of a large-scale, multicenter prospective study in Japan, which enrolled 1,740 patients and provides high-quality evidence-based medical support for the clinical application of ESD [12]. In summary, with its significant advantages in lesion resection efficacy, patient survival prognosis, organ function preservation, and precise pathological assessment, ESD has become the preferred minimally invasive treatment for early colorectal cancer and precancerous lesions.

4. Advances and Future Directions in Colorectal Cancer Treatment

4.1. Targeted Therapy: Precision Strikes Against Specific Gene Mutations

Currently, precision therapy in clinical practice primarily involves selecting targeted drug treatment regimens based on the results of tumor molecular biomarker testing. This approach enhances the specificity of treatment plans and maximizes the five-year survival rate for patients. Clinically, targeted therapies for colorectal cancer primarily include treatments targeting vascular endothelial growth factor and its receptors (VEGF/VEGFR), those targeting the epidermal growth factor receptor (EGFR), and multi-targeted kinase inhibitor drugs.

EGFR is expressed in both normal and malignant epithelial cells and plays a crucial role in tumor biology. Overexpression of EGFR is detected in 40% to 70% of colorectal cancer cells, and it is significantly associated with increased metastatic potential and reduced survival rates in colorectal cancer. Currently, the U.S. FDA has approved two EGFR inhibitors: cetuximab and panitumumab. Cetuximab is an IgG antibody with high affinity for the extracellular binding domain of EGFR, competitively inhibiting binding of endogenous ligands. Its anti-term mechanisms are multifaceted. Cetuximab induces antibody-dependent cellular cytotoxicity, activates pre-apoptotic molecules, and exhibits potent synergistic effects when combined with chemotherapy or radiotherapy. Panitumumab is a fully humanized IgG2 monoclonal antibody with high affinity for the extracellular binding domain of EGFR. It competes with endogenous ligands to prevent ligand-induced autophosphorylation of the carboxy-terminal region of EGFR, thereby inhibiting downstream signaling activation. Panitumumab exerts its antitumor effects primarily by enhancing apoptosis, inhibiting growth and invasion, and suppressing angiogenesis and metastasis. Its target population aligns with that of cetuximab.

In recent years, several novel therapeutic targets and drugs have emerged in the field of targeted therapy for colorectal cancer, including HER-2 and BRAF targets already validated in other solid tumors, as well as emerging targets NTRK and KRAS G12C. Combination therapies such as trastuzumab plus pertuzumab and trastuzumab plus lapatinib overcome the limitations of HER-2 monotherapy by simultaneously inhibiting HER-2 and HER-3, thereby blocking tumor signaling pathways. Additionally, the novel antibody-drug conjugate (ADC) DS-8201, which combines trastuzumab with a TOPO-I inhibitor, remains effective against HER2-positive metastatic colorectal cancer even after trastuzumab resistance develops. Vemurafenib and cernapinib effectively inhibit BRAFV600E mutations. However, BRAF inhibition in colorectal cancer can activate the C-RAF pathway, leading to treatment failure. Therefore, combined inhibition of upstream EGFR and downstream MEK overcomes negative feedback regulation to achieve effective suppression of

BRAFV600E mutations. Additionally, Larotrectinib and enicitinib effectively treat NTRK fusion-positive colorectal cancer by inhibiting NTRK fusions.

4.2. Immunotherapy: Revolutionary Breakthroughs in Harnessing the Immune System Against Tumors

Under normal circumstances, the immune system can recognize and eliminate tumor cells within the tumor microenvironment. However, to survive and proliferate, tumor cells employ various strategies to suppress the body's immune system. Overexpression of immune checkpoint molecules (ICMs) gradually impairs the effector function and self-renewal capacity of T cells in the tumor microenvironment, leading to T cell exhaustion and thereby promoting tumor progression. Tumor immunotherapy is a treatment approach that controls and eliminates tumors by reactivating and sustaining the tumor-immune cycle, thereby restoring the body's normal anti-tumor immune response. Common ICI targets include programmed death receptor-1 (PD-1), programmed death-ligand 1 (PD-L1), and cytotoxic T lymphocyte-associated antigen 4 (CTLA-4).

One treatment modality is ICI monotherapy. One such agent is pembrolizumab (a PD-1 inhibitor). Pembrolizumab monotherapy is indicated for unresectable or metastatic microsatellite instability-high (MSI-H) or mismatch repair-deficient (dMMR) colorectal cancer in patients with wild-type KRAS, NRAS, and BRAF genes. Pembrolizumab monotherapy significantly and statistically prolongs PFS. Regarding tumor response, the pembrolizumab group demonstrated a higher ORR than standard chemotherapy, with markedly extended response duration. However, the pembrolizumab monotherapy group exhibited a higher disease progression rate and inferior disease control rate compared to the standard chemotherapy group. The second is dotavalumab (a PD-1 inhibitor), which achieved an objective response rate (ORR) of 44% and a 24-month progression-free survival rate of 40.6% in clinical trials [13].

Another treatment approach involves dual-agent combination therapy with immune checkpoint inhibitors (ICIs). The combination of nivolumab (a PD-1 inhibitor) and ipilimumab (a CTLA-4 inhibitor) significantly improves survival in patients with advanced or unresectable hepatocellular carcinoma. PD-1 inhibits T-cell immune responses in inflammatory environments during the late effector phase of tumor immunity, acting specifically within the tumor microenvironment to target tumor-infiltrating exhausted CD8+ T cells. CTLA-4 primarily modulates the activation of naive and memory T cells during the initial stages of tumor immune responses, acting within lymph nodes and simultaneously affecting both exhausted CD8+ and CD4+ T cells. The CheckMate-142 study demonstrated a 46% overall response rate in patients with MSI-H or dMMR metastatic colorectal cancer treated with nivolumab plus ipilimumab as a later-line therapy. Compared to monotherapy, combination therapy offers the following advantages: Enhanced anticancer efficacy. Monotherapy often proves insufficient against advanced cancers. In contrast, combination therapy using anticancer drugs targeting different pathways can simultaneously “block” multiple pathways, yielding superior anticancer efficacy.

5. Conclusion

In summary, the field of colorectal cancer treatment has achieved remarkable progress over the past few decades. Treatment strategies have evolved from solely surgical interventions to a comprehensive system integrating local therapies (surgery, radiotherapy, endoscopic treatments) and systemic therapies (chemotherapy, targeted therapy, immunotherapy). Future colorectal cancer management will continue to advance along the path of precision and individualization. Successful treatment signifies not only long-term oncological survival but also optimal functional preservation and quality of life. Despite ongoing challenges, deepening insights into tumor biology and the continuous emergence of innovative therapies hold promise for tailoring the most effective treatment plans for each colorectal cancer patient. This ultimately advances the vision of transforming colorectal cancer into a preventable, treatable, and even “curable” chronic disease.

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