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Research Article

Stage II-III colorectal cancer in geriatric patients: Clinicopathological features and chemotherapy utilization

Geriyatrik hastalarda evre II-III kolorektal kanser: Klinikopatolojik özellikler ve kemoterapi kullanımı

Yakup Duzkopru*[1], Ozlem Dogan[2]

[1]Aksaray Training and Research Hospital, Medical Oncology, Aksaray, Turkey

[2]Adıyaman Training and Research Hospital, Medical Oncology, Adıyaman, Turkey

Abstract

Aim: This study aims to assess the clinicopathological characteristics, treatment patterns, and survival outcomes of geriatric patients with stage II-III colorectal cancer.

Material and Methods: This retrospective study included 99 geriatric patients (aged ≥65 years) diagnosed with stage II-III colorectal cancer at a single center from 2020 to 2024. Clinical and pathological characteristics, treatment approaches, and survival outcomes were assessed.

Results: The median age at diagnosis was 73 years, and 63.6% of patients were male. Adjuvant chemotherapy was administered to 86.9% of patients, with a significantly higher rate in stage III cases compared to stage II (91.3% vs. 58.5%, $p < 0.001$). Capecitabine-based therapy was the most frequently used chemotherapy regimen. Surgical resection achieved negative margins in 97.9% of cases, with right hemicolectomy being the most frequently performed procedure (54.5%). The median recurrence-free survival (RFS) was 20 months, and recurrence or metastasis occurred in 20.2% of patients, with the liver being the most frequent metastatic site. Treatment-related toxicity was observed in 53.5% of patients, leading to chemotherapy discontinuation in six cases.

Conclusion: Adjuvant chemotherapy was more frequently administered in stage III patients, in line with current treatment guidelines. Differences in chemotherapy regimens between stage II and III patients underscore the importance of personalized treatment strategies in the geriatric population. Further research is required to optimize treatment decisions and improve clinical outcomes in this vulnerable group.

Keywords: colon cancer, colorectal cancer, geriatrics, adjuvant chemotherapy

Corresponding Author*: Yakup Duzkopru, Aksaray Training and Research Hospital, Medical Oncology, Sanayi, Tacin Street, 68200 Aksaray, Türkiye
E-mail: y_duzkopru@hotmail.com
Orcid: 0000-0003-2314-5870
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Öz

Amaç: Bu çalışma, evre II-III kolorektal kanser tanısı almış geriyatrik hastaların klinikopatolojik özelliklerini, tedavi yaklaşımlarını ve sağkalım sonuçlarını değerlendirmeyi amaçlamaktadır.

Gereç ve Yöntemler: Bu retrospektif çalışmaya, 2020-2024 yılları arasında tek bir merkezde evre II-III kolorektal kanser tanısı almış ve yaşı ≥65 olan 99 geriyatrik hasta dahil edilmiştir. Klinik ve patolojik özellikler, tedavi yaklaşımları ve sağkalım sonuçları değerlendirilmiştir.

Bulgular: Tanı anındaki medyan yaş 73 yıl olup, hastaların %63,6'sı erkekti. Adjuvan kemoterapi, hastaların %86,9'una uygulanmış olup, evre III hastalarda evre II hastalara kıyasla belirgin şekilde daha yüksek oranda uygulanmıştır (sırasıyla %91,3 ve %58,5, $p < 0,001$). En sık kullanılan kemoterapi rejimi kapesitabin bazlı tedaviydi. Cerrahi rezeksiyon yapılan hastaların %97,9'unda negatif cerrahi sınır elde edilmiş, en sık uygulanan prosedür sağ hemikolektomi (%54,5) olmuştur. Medyan nükssüz sağkalım (RFS) süresi 20 ay olup, hastaların %20,2'sinde nüks veya metastaz gelişmiş, en sık karaciğer metastazı gözlenmiştir. Tedaviye bağlı toksisite %53,5 oranında rapor edilmiş olup, altı hastada ciddi yan etkiler nedeniyle kemoterapi bırakılmıştır.

Sonuç: Adjuvan kemoterapi, evre III hastalara daha sık uygulanmış ve bu durum mevcut tedavi kılavuzları ile uyumludur. Evre II ve III hastalar arasındaki kemoterapi rejimi farklılıkları, geriyatrik popülasyonda kişiselleştirilmiş tedavi stratejilerinin önemini vurgulamaktadır. Bu hassas hasta grubunda tedavi kararlarını optimize etmek ve klinik sonuçları iyileştirmek için daha fazla araştırmaya ihtiyaç vardır.

Anahtar kelimeler: kolon kanseri, kolorektal kanser, geriatri, adjuvan kemoterapi

Introduction

Colorectal cancer (CRC) is one of the most commonly diagnosed malignancies worldwide and remains a leading cause of cancer-related mortality[1, 2]. With advancements in healthcare and increased life expectancy, the incidence of colon cancer among elderly populations has risen significantly[3]. Patients aged 65 and older constitute a substantial proportion of newly diagnosed CRC cases, necessitating tailored treatment strategies that consider age-related physiological changes, comorbidities, and treatment tolerability[4].

Surgical resection remains the cornerstone of treatment for localized colorectal cancer. However, the role of adjuvant chemotherapy in elderly patients, particularly in stage II and III disease, is still a topic of debate[5]. Recent studies have explored the impact of adjuvant therapy on overall survival (OS) and disease-free survival (DFS) in older adults. While some reports suggest a clear survival benefit with adjuvant chemotherapy, others highlight increased toxicity risks and the potential for overtreatment in frail patients[6, 7].

The decision to administer adjuvant therapy in elderly patients should be individualized based on tumor characteristics, functional status, and life expectancy. However, limited representation of older adults in clinical trials has led to uncertainties in treatment guidelines[6]. In this study, we aimed to analyze the clinicopathological characteristics and treatment preferences of geriatric patients with stage II-III colorectal cancer.

Material and method

Patients aged 65 years and older who were diagnosed with colorectal cancer at our hospital's oncology clinic between 2020 and 2024 were included in this study. Eligible patients were those over 18 years of age, with a histopathologically confirmed diagnosis, who underwent surgery and were classified as stage II or III based on pathological staging. Patients who were clinically staged but did not undergo surgery, had a second primary tumor, were classified as stage I or metastatic, or had incomplete data were excluded. A total of 142 patients were screened, and 99 patients meeting the inclusion criteria were enrolled in the study.

The pathological characteristics of the enrolled patients, their administered treatments, dates of recurrence or metastasis, and the last follow-up dates were recorded. The duration from the date of diagnosis to the last follow-up or death was considered overall survival (OS). The time from diagnosis to the first recurrence or metastasis was defined as recurrence-free survival (RFS).

Statistical analyses were conducted using IBM SPSS Statistical Software (SPSS 22.0, IBM Corp.). The clinical and demographic characteristics of the patients were presented using descriptive statistics. Categorical and numerical variables were expressed as frequency and percentage (n, %). DFS and OS were calculated using the Kaplan-Meier method. Hazard ratios (HR) and 95% confidence intervals (CI) were calculated using the Cox regression model. A p-value < 0.05 was considered statistically significant for all analyses.

The study received ethical approval from our hospital's ethics committee(no:2025/54), and the study protocol was conducted in accordance with the 1964 Helsinki Declaration.

Results

A total of 99 geriatric patients diagnosed with stage II-III colorectal cancer were included in the study. The median age of the cohort was 73 years (68–78 years, min-max). The gender distribution was 36.4% female and 63.6% male. 40.4% of patients had a history of smoking, and 23.2% had a family

history of malignancy. The clinicopathological characteristics of the patients are presented in Table 1.

Table 1. Clinicopathological characteristics of 99 geriatric colorectal cancer patients

Features	Frequency n(%)
Age (median, range)	73 (65-91)
Gender	
Female	36 (36,4)
Male	63 (63,6)
ECOG PS	
0-1	75 (75,8)
2-3	24 (24,2)
Family history of cancer	
No	76 (76,8)
Yes	23 (23,2)
Smoking	
No	59 (59,6)
Yes	40 (40,4)
Stage	
T3N0M0	41 (41,4)
T4N0M0	12 (12,1)
T3N1M0	20 (20,2)
T4N1M0	12 (12,1)
T3N2M0	10 (10,1)
T4N2M0	4 (4)
Adjuvant chemotherapy	
No	26 (26,3)
FOLFOX/CAPEOX	38 (38,4)
Capecitabine/FUFA	35 (35,4)
Diferantiation	
Well	17 (17,2)
Moderate	69 (69,7)
Poorly	13 (13,1)
Surgery	
Elective	71 (71,7)
Emergency	28 (28,3)
Surgical margin	
Positive	8 (8,1)
Negative	91 (91,9)
Tumor location	
Right colon	27 (27,3)
Left colon	48 (48,5)
Rectum	24 (24,2)
Lenfovascular invasion	
Yes	31 (31,3)
No	68 (68,7)
Perinoral invasion	
Yes	27 (27,3)
No	72 (72,9)
Site of metastasis	
Local	4 (20)
Liver	7 (35)
Lung	4 (20)
Lymph node	4 (20)
Periton	1 (5)

ECOG PS: Eastern Cooperative Oncology Group Performance Status

The most common tumor stage was T3N0M0 (41.4%), followed by T3N1M0 (10.1%). Adenocarcinoma was the predominant histological subtype (91.9%), with mucinous adenocarcinoma accounting for 6.1% of cases. Lymphovascular invasion (LVI) was present in 68.7% of cases, while perineural invasion (PNI) was detected in 72.7%.

A significant difference was observed between stage II and stage III patients regarding adjuvant therapy administration rates($p<0.01$), the selection of adjuvant chemotherapy regimens($p<0.01$), the presence of perineural invasion (PNI) (p: 0.04) and lymphovascular invasion (LVI) (p: 0.04). The comparison of clinical and pathological features between stage II and stage III patients is presented in Table 2.

Table 2. Comparison of Clinical and Pathological Features Between Stage II and Stage III Patients

	Stage II (n,%)	Stage III (n,%)	P Value
Gender			
Male	31 (58,5)	32 (69,6)	0.253
Female	22 (41,5)	14 (30,4)	
Adjuvant chemotherapy			
No	22 (41,5)	4 (8,7)	
Yes	31 (58,5)	42 (91,3)	<0.001
Chemotherapy regimen			
Capecitabine	22 (42,5)	13 (28,2)	
FOLFOX	5 (9,4)	17 (37)	<0.001
CAPEOX	4 (7,5)	12 (26,1)	
No treatment	22 (41,5)	4 (8,7)	
Surgical margin			
Positive	2 (3,8)	6 (13)	0.091
Negative	51 (96,2)	91 (91,9)	
ECOG PS			
0-1	42 (79,2)	33 (71,7)	0.385
2-3	11 (20,8)	13 (28,3)	
Perinoral invasion			
Positive	10 (18,9)	17 (37)	0.044
Negative	43 (81,1)	29 (63)	
Lymphovascular invasion			
Positive	12 (22,6)	19 (41,3)	0.046
Negative	41 (77,4)	27 (58,7)	
Tumor location			
Right	14 (26,4)	13 (28,3)	0.863
Left	27 (50,9)	21 (45,7)	
Rectum	12 (22,6)	12 (26,1)	
Recurrence/metastasis			
No	43 (81,1)	32 (69,6)	0.180
Yes	10 (18,9)	14 (30,4)	

ECOG PS: Eastern Cooperative Oncology Group Performance Status

All patients underwent surgical resection, with negative surgical margins achieved in 97.9%. The most common surgical approach was right hemicolectomy (54.5%). Adjuvant chemotherapy was administered to 86.9% of patients, predominantly using capecitabine-based regimens. Additionally, 19.7% of patients received neoadjuvant chemoradiotherapy.

The median follow-up duration was 23 months (14–33 months). The median RFS was 20 months (11–31.5 months). Local or distant recurrence was observed in 20.2% of patients, with the liver being the most common site of metastasis.

Among patients receiving chemotherapy, 53.5% experienced treatment-related toxicity, including neutropenia, diarrhea, mucositis, and fatigue. 6 patients discontinued chemotherapy due to severe adverse effects.

Discussion

In our study, the median age at diagnosis was 73 years. A previous prospective study involving patients aged 65 years and older with colon cancer reported a similar median age at diagnosis of 72 years [8]. In our cohort, 63.6% of patients were male, which is comparable to other studies evaluating geriatric patients with colon cancer, where the male patient proportion was reported as 57.2% and 56.9%, respectively [9, 10]. Additionally, the proportion of patients with an Eastern Cooperative Oncology Group Performance Status (ECOG PS) of 0–1 was 79.2% in our study, aligning with findings from a Dutch study evaluating patients over 75 years of age, in which 70% of patients had a good ECOG PS[11]. These results are consistent with the existing literature.

In our study, only 26.4% of tumors were located in the right colon. Similarly, a population-based study conducted in Italy by Maffei et al. reported that 34.6% of tumors in the 65–79 age group were located in the right colon. However, studies conducted in Korea and France found higher rates of right-sided colon tumors (43.5% and 51.6%, respectively) [10, 12, 13].

The findings of our study demonstrate significant differences in adjuvant therapy administration, chemotherapy regimen selection, and pathological characteristics between stage II and III geriatric colorectal cancer patients. The higher rate of adjuvant chemotherapy administration in stage III patients (91.3% vs. 58.5%, $p < 0.001$) is consistent with prior studies indicating that adjuvant treatment is more strongly recommended for this group due to their increased recurrence risk[14, 15]. However, for high-risk stage II patients, the benefits of adjuvant therapy remain a topic of debate, given the risks of toxicity and limited clinical trial data[5].

Comparison with existing literature reveals similar trends in chemotherapy regimen selection, with oxaliplatin-based regimens being more frequently administered to stage III patients, while a significant proportion of stage II patients either received capecitabine monotherapy or did not receive chemotherapy. These findings align with previous studies suggesting that elderly patients have increased susceptibility to chemotherapy-related toxicity, leading to a preference for fluoropyrimidine monotherapy over combination regimens[14, 15].

Additionally, our study found significantly higher rates of PNI and LVI in stage III patients, confirming their role as key prognostic factors associated with poorer outcomes[7, 10, 14]. The recurrence/metastasis rate was higher in stage III patients, though not statistically significant, which aligns with studies highlighting the aggressive nature of advanced-stage disease[6].

In the aforementioned prospective Korean study, the majority of patients (78%) received oxaliplatin-based adjuvant chemotherapy, whereas in our study, only 52% of patients who underwent chemotherapy received oxaliplatin-based regimens[8]. A pooled analysis of four different studies demonstrated that the addition of oxaliplatin to chemotherapy significantly improved OS. However, this benefit was found to be more limited in patients aged 70 years and older and was associated with increased toxicity. These findings highlight the need for careful risk-benefit assessment when considering oxaliplatin-based regimens in elderly patients, given their heightened susceptibility to treatment-related adverse effects[16].

Several limitations should be considered when interpreting our findings. First, this was a retrospective, single-center study, which may limit the generalizability of the results. Second, although we analyzed key prognostic factors such as PNI and LVI, comorbidity indices and functional status assessments were not included, which could have provided further insight into treatment decision-making. Finally, the follow-up duration may not have been sufficient to capture long-term survival outcomes and late toxicities associated with adjuvant therapy.

Conclusion

This study provides insights into the clinicopathological characteristics and treatment patterns of geriatric patients with stage II-III colorectal cancer. Adjuvant chemotherapy was more frequently administered to stage III patients, consistent with current treatment guidelines. Differences in chemotherapy regimen selection between stage II and III patients highlight the importance of individualized treatment decisions in the elderly. Despite the retrospective nature of the study, these findings contribute to existing knowledge and emphasize the need for further research to optimize treatment approaches in this population

Ethics Approval

The study received ethical approval from Aksaray University ethics committee (number: 2025/54), and the study protocol was conducted in accordance with the 1964 Helsinki Declaration.

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Conflict of interest

The authors declare that they do not have a conflict of interest and no funding was received for this study.

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