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Challenging the age barrier: comparative outcomes in octogenarian and non-octogenarian colorectal cancer patients

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Abstract

Background The treatment of colorectal cancer (CRC) in elderly patients, particularly in octogenarians, presents unique challenges due to comorbidities and presumed treatment intolerance. However, real-world data on outcomes in this age group remain limited.

Objective This study aims to evaluate and compare the clinical characteristics, treatment modalities, toxicities, and survival outcomes of octogenarian CRC patients with those of younger cohorts.

Methods In this retrospective cohort study, 111 patients diagnosed with stage I–III CRC between March 2021 and December 2023 were analyzed. Patients were stratified into three age groups: octogenarians (≥ 80 years), non-octogenarian elderly (65–79 years), and non-elderly (< 65 years). Data on demographics, comorbidities, ECOG performance status, tumor features, treatment modalities, toxicities, and survival were collected. Survival outcomes were analyzed using Kaplan–Meier and log-rank tests**.**

Results Among the patients, 35.1% were octogenarians. Octogenarians had a significantly higher comorbidity burden but similar ECOG scores compared to younger groups. Combined local and systemic treatment was administered in 78.2% of octogenarians and was well tolerated, with comparable hematologic (15.4%) and non-hematologic (28.2%) toxicities across age groups. Disease-free survival (DFS) and overall survival (OS) were favorable in octogenarians, with 36-month OS reaching 91.8%, comparable to or slightly better than non-elderly patients (77.6%). These findings should be interpreted cautiously due to the limited sample size. The non-octogenarian elderly group demonstrated the highest survival rates overall.

Conclusion Octogenarians with non-metastatic CRC can achieve favorable treatment outcomes comparable to or even better than younger patients, supporting the feasibility of curative-intent treatment in this age group. Age alone should not preclude standard oncologic management in elderly CRC patients. However, the single-center design and modest sample size limit generalizability, and further multicenter validation is required.

Keywords Colorectal cancer, Octogenarians, Survival analysis, Progression-free survival, Retrospective study

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Introduction

According to the database maintained by the World Health Organisation (WHO), colorectal cancer (CRC) is the third most common cancer in men and the second most common cancer in women [1]. Age is a significant risk factor for sporadic CRC. CRC is rare before the age of 40, with an incidence that begins to increase significantly between the ages of 40 and 50, and with age-specific incidence rates increasing with each subsequent decade. The most common decile is 65–74 years of age (25.7%), but when all patients over 75 years of age are considered, they account for 29.1% of the total [2]. It is a fact that 70% of cancer-related fatalities occur after the age of 65 [3]. Nevertheless, the question of whether age is a determining factor in survival and treatment decisions remains a subject of controversy.

A consensus remains elusive among geriatricians and oncologists concerning the standardised assessment of elderly patients diagnosed with cancer [4]. To facilitate the integration of geriatrics into oncology practice, several screening tools from the Comprehensive Geriatric Assessment have been utilised for the identification of potential issues in various domains [5–7]. It is acknowledged that there are currently known guidelines that can be regarded as a roadmap for patients with geriatric breast cancer and prostate cancer [8, 9]. Despite the existence of an NCCN guideline [10] that provides general guidance for geriatric cancer patients and a few prior studies [11] have investigated elderly CRC patients, stage-specific treatment impact remains underexplored. Given the increasing number of older adults with cancer and the limited workforce of geriatric specialists available for co-treatment, oncologists must have a firm grasp of geriatric principles [12].

The objective of this study is to evaluate the efficacy and reliability of stage-specific treatment approaches in patients aged 80–89 with colorectal cancer. To our knowledge, few studies have stratified elderly CRC patients into octogenarian and non-octogenarian subgroups or systematically applied the Charlson Comorbidity Index in survival analyses. This provides a novel perspective to existing literature.The present study will examine the effects of treatments administered to patients diagnosed with non-metastatic colorectal cancer (stages I-III) on survival, response to treatment, and side effects.

Patients and methods

Study design and data collection

This retrospective study encompassed stage I-II-III CRCs, especially including octogenarian patients. Patients who had CRC diagnosis between March 2021 to December 2023 were obtained from the hospital informatics system. Exclusion criteria included ECOG performance status ≥ 4, history of another malignancy within the last five years, and loss to follow-up within the first three months after diagnosis.Collected data were ages, gender, comorbidities, smoking and alcohol history, Eastern Collaborative Oncology Group Performance Score (ECOG PS), tumor localization (colon vs. rectum), TNM staging, mismatch instability status, RAS and RAF mutations, surgical history, treatment modalities, treatment toxicities (hematological vs non-hematological) relapse and survival status (including non-cancer related deaths). The data was blindedly collected into electronic spreadsheets.

Data categorization and processing

Patients were grouped as octogenarians (age ≥ 80), non-octogenarian elderlies (ages ≥ 65, < 80), and non-elderlies (ages < 65). Categorized comorbidies are summed into comorbid disease counts and Charlson Comorbidity Index (CCI) was calculated for each patient. Disease-free survival (DFS) and overall survival (OS) started from initial diagnosis dates and ended on last control date, relapse or exitus dates.

CCI was retrospectively calculated for all patients based on diagnostic information extracted from medical records. Each comorbid condition was assigned a predefined score according to the original Charlson Index, encompassing 17 categories of chronic diseases. These included, but were not limited to, metastatic solid tumors, liver disease, congestive heart failure, chronic pulmonary disease, and diabetes mellitus. Diagnoses were matched with ICD-10 codes for standardization. The total CCI score was obtained by summing the individual weights, with higher scores indicating greater comorbidity burden and poorer prognosis.

Oncological curative surgical resection and/or radiotherapy treatments applied in patients with early or locally advanced colon and/or rectal cancer were defined as “Local Treatment”. DFS was defined as the interval between the date of diagnosis and the occurrence of first recurrence, death from any cause, or last follow-up, while OS was defined as the interval between the date of diagnosis and death from any cause or last follow-up.

The most administered chemotherapy regimen in both adjuvant and neoadjuvant settings was XELOX (CAPOX), consisting of capecitabine (1000–1250 mg/m^2 orally twice daily on days 1–14) and oxaliplatin (130 mg/m^2 IV on day 1), repeated every 3 weeks. The median number of treatment cycles was 8.

In a subset of patients, particularly those with higher comorbidity or advanced age, monotherapy with oral capecitabine (1000 mg/m^2 twice daily for 14 days every 21 days) was used.

FOLFOX was also employed in selected cases, combining oxaliplatin (85 mg/m^2), leucovorin (400 mg/m^2), and

5-FU (400 mg/m^2 bolus followed by 2400 mg/m^2 continuous infusion over 46 h) every 2 weeks.

Recurrence was defined as either locoregional or metastatic. Locoregional recurrence was defined as relapse at the primary tumor site or within the regional lymph nodes, whereas metastatic recurrence referred to distant organ involvement, including liver, lung, or peritoneal dissemination.

Treatment-related toxicities were categorized as hematological (anemia, neutropenia, thrombocytopenia) and non-hematological. Non-hematological toxicities were further subclassified into gastrointestinal (diarrhea, mucositis, hand-foot syndrome), hepatic, and neuropathic toxicities.

Statistical analysis

Descriptive statistics were provided for continuous variables as median and mean with standard deviations, and for categorical variables as frequencies and percentages. Differences between groups were assessed using the chi-square test for categorical variables, and analysis of variance for continuous variables.

Survival analysis was conducted using Kaplan–Meier methods to estimate DFS and OS. Comparisons of survival curves between different groups were performed using the log-rank test. Variables included in the Cox proportional hazards regression models were age, sex, ECOG performance status, tumor stage, tumor location, Charlson Comorbidity Index, and treatment modalities (surgery, chemotherapy, and radiotherapy). All variables with clinical relevance or a p-value < 0.05 in univariate analysis were subsequently entered into the multivariate model.

A p-value of < 0.05 was considered statistically significant for all analyses. All statistical analyses were performed using R version 4.4 (R Foundation for Statistical Computing, Vienna, Austria).

Results

Patient demographics and baseline characteristics

A total of 111 patients were included in the analysis, comprising 39 octogenarians (35.1%), 17 non-octogenarian elderly patients aged 65–79 years (14.3%), and 55 non-elderly patients under 65 years (49.6%). The median age was 77.5 years (IQR 59–83), with significant differences between groups as expected ($p < 0.001$). Gender distribution was balanced across all age groups, with 59 males (53.2%) and 52 females (46.8%) showing no significant difference between age cohorts ($p = 0.639$).

Comorbidity burden varied significantly among age groups. The median number of comorbid conditions was highest in both elderly groups compared to younger patients, with octogenarians and non-octogenarian elderly patients having a median of 2 comorbidities (IQR 1–2) versus 0 (IQR 0–1) in non-elderly patients ($p < 0.001$). Myocardial infarction was significantly more prevalent in elderly patients, particularly in the non-octogenarian elderly group (29.4%) compared to octogenarians (18.2%) and absent in non-elderly patients ($p = 0.005$). Diabetes was most common in the non-octogenarian elderly group (41.2%) compared to octogenarians (22.5%) and non-elderly patients (12.8%), though this difference did not reach statistical significance ($p = 0.062$). Most patients (81.1%) had good performance status with ECOG scores of 0–1, while 18.9% had ECOG scores of 2–3.

Table 1 presents the detailed demographic and baseline characteristics of all patient groups.

Disease characteristics and treatment modalities

Primary tumor localization showed no significant difference between age groups ($p = 0.155$), with right and left colon tumors comprising 74.8% of cases and rectosigmoid tumors accounting for 25.2%. TNM staging distribution was similar across age groups ($p = 0.684$), with Stage III disease predominating in 55.9% of patients, followed by Stage II (37.8%) and Stage I (6.3%). Microsatellite instability-high (MSI-H) disease was rare, occurring in only 1.8% of patients with no significant difference between groups ($p = 0.802$).

Treatment modalities differed significantly between age groups ($p = 0.021$). Combined chemotherapy and local treatment were most common overall (69.4%) but were more frequently administered to non-octogenarian patients: non-elderly (78.2%) and non-octogenarian elderly (76.5%) compared to octogenarian patients (53.8%). Conversely, local treatment only was more common in octogenarian patients (46.2%) versus non-elderly (20.0%) and non-octogenarian elderly (17.6%). Adjuvant chemotherapy was administered to 65.4% of patients overall, with the highest rate in non-octogenarian elderly patients (82.4%) compared to non-elderly (67.3%) and octogenarian patients (54.3%), though this difference was not statistically significant ($p = 0.125$). Neoadjuvant chemotherapy was used in 18.0% of patients, with similar rates across age groups ($p = 0.296$).

Treatment-related toxicities were generally well-tolerated across all age groups. Among non-hematological toxicities, gastrointestinal toxicities (mainly diarrhea, mucositis, and hand-foot syndrome) were the most frequent, followed by hepatic and neuropathic toxicities. Rates were comparable across all age groups. Non-hematological toxicities were observed in 30.6% of patients overall, with comparable rates across age groups: octogenarians (28.2%), non-octogenarian elderly (35.3%), and non-elderly patients (30.9%) ($p = 0.868$).Hematological toxicities occurred in 11.7% of patients, with similar rates

Table 1 Comparison of demographics of the patients

Demographics	Octogenarian *n* = 39 (35.1%)	Non-octogenarian elderly *n* = 17 (14.3%)	Non-elderly *n* = 55(49.6%)	Total, *n* = 111	*p**
Age, median (IQR)	83 (82–86)	67 (66–69)	57 (51–59)	77.5 (59–83)	< 0.001
Gender, n (%)					
Male	23 (59.0%)	9 (52.9%)	27 (49.1%)	59 (53.2%)	0.639
Female	16 (41.0%)	8 (47.1%)	28 (50.9%)	52 (46.8%)	
Comorbidities, n (%)					
Diabetes	14 (22.5%)	7 (41.2%)	5 (12.8%)	26 (23.4%)	0.062
Myocardial Infarction	10 (18.2%)	5 (29.4%)	-	15 (13.5%)	0.005
Chronic Pulmonary Disease	8 (14.5%)	1 (5.9%)	1 (2.6%)	10 (9.0%)	0.120
Heart Failure	3 (5.5%)	-	-	3 (2.7%)	0.208
Cerebrovascular accident/Transient ischemic attack	3 (5.5%)	-	-	3 (2.7%)	0.208
Rheumatological Disease	2 (3.6%)	-	-	2 (1.8%)	0.355
Comorbid disease counts, median (IQR)	2 (1–2)	2 (1–2)	0 (0–1)	1 (0–2)	< 0.001
ECOG performance score, n (%)					
0–1	28 (71.8%)	13 (76.5%)	49 (89.1%)	90 (81.1%)	0.094
2–3	11 (28.2%)	4 (23.5%)	6 (10.9%)	21 (18.9%)	

Table 2 Disease related properties and treatment modalities

Disease Related Properties and Treatment Modalities	Octagenarian *n* = 39 (35.1%)	Non-octogenarian elderly *n* = 17 (14.3%)	Non-elderly *n* = 55(49.6%)	Total, *n* = 111	*p**
Primary tumor localization, n (%)					
Right/Left Colon	25 (64.1%)	15 (88.2%)	43 (78.2%)	83 (74.8%)	0.155
Rectosigmoid	14 (35.9%)	2 (11.8%)	12 (21.8%)	28 (25.2%)	
TNM Stages, n (%)					
III	21 (53.8%)	11 (64.7%)	30 (54.5%)	62 (55.9%)	0.684
II	16 (41.0%)	6 (35.3%)	20 (36.4%)	42 (37.8%)	
I	2 (5.1%)	-	5 (9.1%)	7 (6.3%)	
MSI-H disease	1 (1.8%)	-	1 (2.6%)	2 (1.8%)	0.802
Treatment modalities, n (%)					
Chemotherapy and local treatment**, n (%)	21 (53.8%)	13 (76.5%)	43 (78.2%)	77 (69.4%)	0.021
Local treatment** only, n (%)	18 (46.2%)	3 (17.6%)	11 (20.0%)	32 (28.2%)	
Chemotherapy only, n (%)	-	1 (5.9%)	-	1 (0.9%)	
Adjuvant chemotherapy, n (%)	19 (54.3%)	14 (82.4%)	35 (67.3%)	68 (65.4%)	0.125
Neoadjuvant chemotherapy, n (%)	10 (26.2%)	2(11.8%)	8 (14.5%)	20 (18.0%)	0.296
Recurrence pattern (if recurred), n (%)					
Metastatic	8 (14.5%)	-	4 (10.3%)	12 (10.8%)	0.303
Locoregional	2 (3.6%)	-	1 (2.6%)	3 (2.7%)	0.719
Toxicities, any grade, n (%)					
Hematological	4 (7.3%)	3 (17.6%)	6 (15.4%)	13 (11.7%)	0.344
Non-Hematological	17 (30.9%)	6 (35.3%)	11 (28.2%)	34 (30.6%)	0.868

**Surgery, radiation therapy

among non-elderly (15.4%), non-octogenarian elderly (17.6%), and octogenarian patients (7.3%) ($p = 0.344$).

Recurrence patterns showed no significant differences between age groups. Metastatic recurrence occurred in 10.8% of patients overall, with rates of 14.5% in octogenarians, 0% in non-octogenarian elderly, and 10.3% in non-elderly patients ($p = 0.303$). Locoregional recurrence was rare, occurring in only 2.7% of patients overall with similar rates across groups ($p = 0.719$).

Detailed disease-related properties, treatmant modalities, toxicity profiles and recurrence patterns are presented in Table 2.

Survival outcomes

DFS analysis revealed that median survival was not reached in any age group during the follow-up period. The median follow-up period was 21.4 months (IQR: 18.8–22.1 months). At 12 months, DFS rates were 96.2%

for octogenarians, 100% for non-octogenarian elderly, and 81.2% for non-elderly patients. At 24 months, rates were 91.6%, 100%, and 75.1%, respectively. By 36 months, DFS rates were 73.3% for octogenarians, 100% for non-octogenarian elderly, and 68.8% for non-elderly patients.

Figure 1 illustrates the disease-free survival curves comparing all three age groups.

Values are shown with corresponding 95% CIs in Kaplan–Meier estimates (see Fig. 1).

OS demonstrated similarly favorable outcomes across all age groups, with median survival not reached in any cohort. At 12 months, OS rates were 96.2% for octogenarians, 100% for non-octogenarian elderly, and 97.4% for non-elderly patients. At 24 months, rates were 91.8%, 100%, and 87.3%, respectively. At 36 months, OS rates were 91.8% for octogenarians, 100% for non-octogenarian elderly, and 77.6% for non-elderly patients.

Notably, the non-octogenarian elderly group demonstrated higher survival outcomes overall. Octogenarians showed comparable, and in some analyses slightly better, survival than non-elderly patients. These results should be interpreted with caution given the limited sample size. Fig. 2 displays the overall survival curves for all patient age groups, demonstrating the comparative survival outcomes over the follow-up period.

Multivariate Cox regression analysis for DFS revealed that patients with TNM stage 1–2 had significantly better outcomes compared to stage 3 (HR = 0.25, $p = 0.032$). Other variables such as gender, tumor localisation, ECOG performance score, Charlson Comorbidity Index, and age did not demonstrate statistically significant associations, although ECOG scores of 2 and 3 showed a trend towards worse prognosis (Table 3).

In the multivariable Cox regression model for OS, male gender was significantly associated with better survival outcomes (HR = 0.07, $p = 0.022$), whereas ECOG performance score of 3 was significantly associated with worse OS (HR = 250.77, $p = 0.004$). No other factors showed statistical significance, although performance status remained a strong prognostic indicator (Table 4).

Discussion

The necessity for medical interventions in elderly cancer patients poses a predicament for clinicians, as the presence of multiple comorbidities, varying performance statuses, and reduced life expectancy complicates treatment decisions [4]. Consequently, even within the context of clinical trials that are poised to effect a paradigm shift within the clinic, this demographic remains underserved [13, 14]. This situation underscores the paucity of information regarding treatment plans for elderly oncological patients in the extant literature.

The novelty of our study lies in its age stratification into three groups, the incorporation of Charlson Comorbidity Index into analyses, and the contemporary real-world Turkish cohort (2021–2023). These aspects differentiate

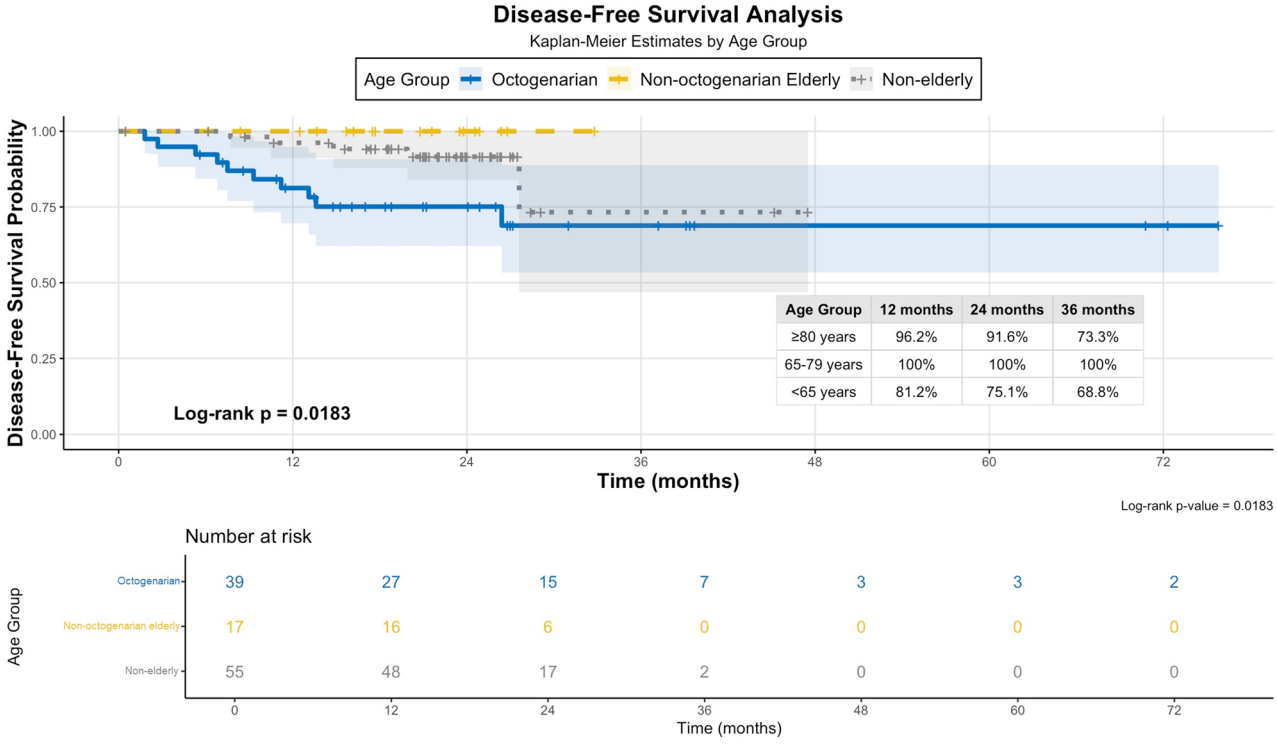

Fig. 1 Disease-Free Survival (DFS) curves comparing all three age groups

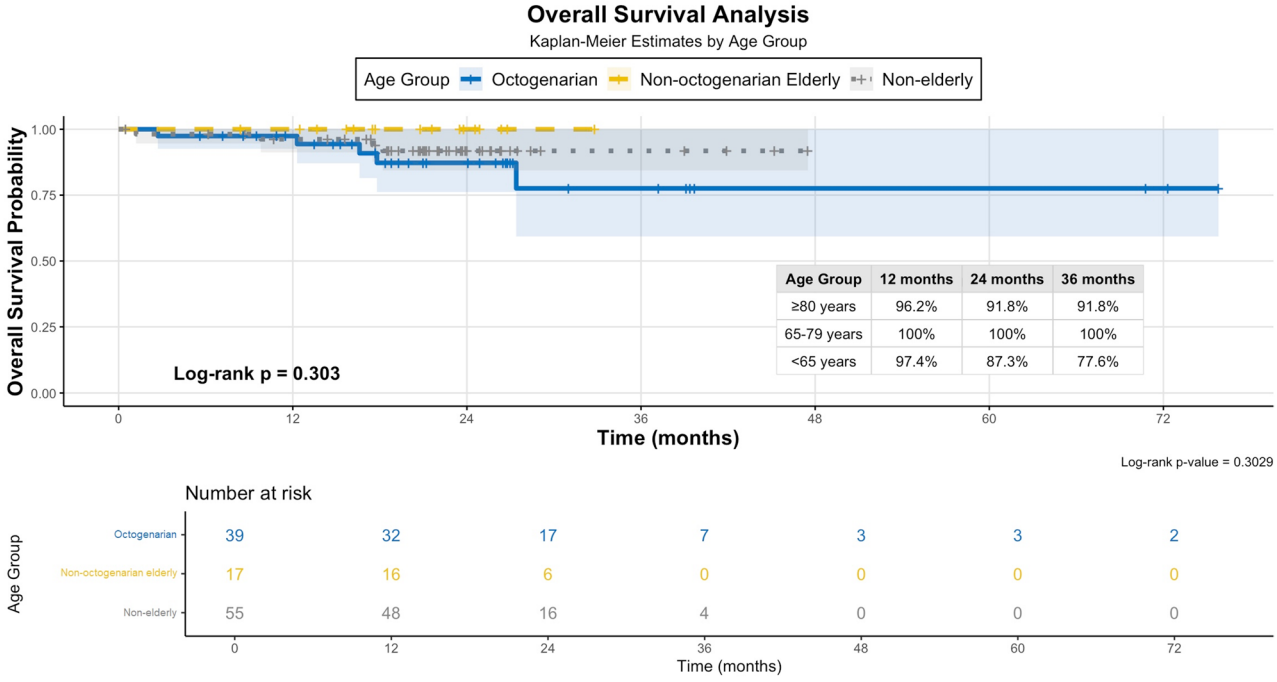

Fig. 2 Overall Survival (OS) curves comparing all three age groups. *Values are shown with corresponding 95% CIs in Kaplan–Meier estimates (see Fig. 2)

Table 3 Cox Regression analysis for Disease-Free Survival (DFS)

Variable	All (n, % or Mean ± SD)	HR (Univariable)	HR (Multivariable)
Female	52 (46.8%)	ref	ref
Male	59 (53.2%)	0.89 (0.32–2.47), $p=0.817$	0.63 (0.21–1.89), $p=0.414$
Colon	83 (74.8%)	ref	ref
Rectum	28 (25.2%)	0.94 (0.30–2.99), $p=0.915$	0.33 (0.09–1.30), $p=0.113$
ECOG PS 0	51 (45.9%)	ref	ref
1	39 (35.1%)	1.10 (0.30–4.11), $p=0.885$	1.13 (0.29–4.45), $p=0.858$
2	18 (16.2%)	3.29 (0.95–11.39), $p=0.061$	3.86 (0.92–16.23), $p=0.065$
3	3 (2.7%)	6.13 (0.70–53.64), $p=0.101$	6.84 (0.60–77.91), $p=0.121$
Stage 3	62 (55.9%)	ref	ref
1–2	49 (44.1%)	0.37 (0.12–1.17), $p=0.092$	0.25 (0.07–0.89), $p=0.032$
Charlson Comorbidity Index	5.2 ± 1.8	0.78 (0.59–1.03), $p=0.076$	0.58 (0.24–1.43), $p=0.235$
Age	71.0 ± 14.8	0.98 (0.95–1.01), $p=0.200$	1.03 (0.93–1.14), $p=0.512$

Table 4 Cox Regression Analysis for Overall Survival (OS)

Variable	All (n, % or Mean ± SD)	HR (Univariable)	HR (Multivariable)
Female	52 (46.8%)	ref	ref
Male	59 (53.2%)	0.21 (0.04–1.04), $p=0.056$	0.07 (0.01–0.68), $p=0.022$
Colon	83 (74.8%)	ref	ref
Rectum	28 (25.2%)	2.13 (0.57–7.99), $p=0.263$	1.15 (0.25–5.27), $p=0.860$
ECOG PS 0	51 (45.9%)	ref	ref
1	39 (35.1%)	8.87 (1.07–73.79), $p=0.043$	6.72 (0.69–65.75), $p=0.101$
2	18 (16.2%)	3.41 (0.21–54.78), $p=0.387$	4.14 (0.22–78.02), $p=0.343$
3	3 (2.7%)	25.11 (1.50–420.55), $p=0.025$	250.77 (5.81–10,821.39), $p=0.004$
Stage 3	62 (55.9%)	ref	ref
Stage 1–2	49 (44.1%)	0.30 (0.06–1.46), $p=0.137$	0.30 (0.04–2.19), $p=0.237$
Charlson Comorbidity Index	5.2 ± 1.8	0.87 (0.61–1.24), $p=0.442$	0.30 (0.07–1.39), $p=0.125$
Age	71.0 ± 14.8	1.00 (0.96–1.04), $p=0.917$	1.16 (0.97–1.38), $p=0.111$

our work from prior studies and provide fresh insights into the clinical management of elderly CRC patients.

The distribution of patients included in the study was as follows: 6.3% were in the stage I, 37.8% were in the stage II and 55.9% were in the stage III.This distribution was also correlated with the distribution for all ages [15].

The presence of comorbidity has been associated with impaired wound healing and reduced physiological reserve, which may prolong hospital stay and rehabilitation, as reported in previous studies [16]. When analyzed in terms of comorbidities, the majority of patients exhibited multiple diseases, with diabetes mellitus [17] and

coronary artery disease [18] – which are risk factors in previous studies – being the most prevalent.

Surgery remains the main curative treatment modality, while radiotherapy is primarily used in the context of rectal cancer [19]. Radiation therapy is primarily used for local control in rectal cancer patients. However, to date, there has been a paucity of publications that have sought to validate geriatric assessment in the domain of radiation oncology [20]. In the present study, 18(46.2%) of octogenarian colorectal cancer patients underwent local intervention. This rate was found to be significantly higher than that observed in non-octogenarian patients.

A 2020 study revealed a significant discrepancy in the treatment approach for chemotherapy, with older patients with Stage III tending to forgo adjuvant (43.6% vs. 92.8%, $P<0.001$) chemotherapy [11]. In the present study, while patients over the age of 80 years exhibited a tendency to decline adjuvant chemotherapy, this variation was not statistically significant between the non-octogenarian elderly and non-elderly groups (54.3%, 82.4%, 67.3.1%, $P=0.125$, respectively). These patterns likely reflect treatment selection bias, as octogenarians with higher comorbidity burden were more often directed towards local-only treatment. Although the difference in adjuvant chemotherapy use between octogenarians and other groups did not reach statistical significance, this finding may reflect treatment selection bias, and further studies with larger cohorts are needed to clarify this observation. This finding suggests that statistical underpower rather than lack of a true effect might explain the non-significance, and highlights the need for larger studies to further explore this treatment gap.

Several factors have been posited as possible contributors to chemotherapy-related toxicity in the treatment of elderly patients with cancer. These include decreased renal and hepatic function, increased susceptibility to neurotoxicity, age-related physiological changes, and polypharmacy [21]. In this study, hematological toxicity was observed in 13 patients (11.7%), while non-hematological toxicity was observed in 34 patients (30.6%) in the entire cohort. No substantial discrepancy in toxicity rates was observed among the groups. The findings of the present study are consistent with those of the recent HOPE study, which reported a lower mortality rate among patients with breast cancer who received 10–15% reduced-dose therapy in comparison to those who received full-dose therapy [22].

At present, some tools have been developed to assist clinicians in the estimation of the risks associated with chemotherapy in elderly cancer patients. These include the ASCO guideline [23], the Cancer and Aging Research Group (CARG) chemotherapy toxicity calculator [24], and the Chemotherapy Risk Assessment Scale for High-Age Patients (CRASH) chemotherapy toxicity calculator [25]. However, these tools, along with similar ones, were not utilised in the present study.

When examining disease-free survival in non-metastatic stages of colorectal cancer, the extant literature shows a 3-year survival rate of 70–85% in stage II-III patients [26–29]. In the present study, consistent with the extant literature, 3-year DFS rates were found to be 84% in the general population. A statistical significance was observed between the groups. The 3-year DFS was 91.8% in the octogenarian group and 77.6% in the non-elderly group.

The five-year relative survival rate for localised cancer is almost 90 [30]. In this study, the median survival rate for the entire cohort was determined to be 90% over a 36-month follow-up period, which was found to be consistent with the literature. No statistically significant differences were found between the groups.

Further multivariable Cox regression analyses provided insights into independent predictors of DFS and OS. For disease-free survival, TNM stage 1–2 was found to be a significant favorable prognostic factor compared to stage 3 (HR = 0.25, $p=0.032$). Performance status scores of 2 and 3 were not statistically significant predictors of prognosis. For overall survival, male gender appeared to be independently associated with better outcomes (HR = 0.07, $p=0.022$), whereas an ECOG score of 3 was associated with markedly worse overall survival (HR = 250.77, $p=0.004$). These findings underline the prognostic value of clinical performance status and tumor staging beyond chronological age and support a more nuanced approach to treatment planning in elderly patients. These findings are supported by the study of Hisada et al. (2021), which demonstrated that overall survival was lower in metastatic CRC patients aged ≥ 80 compared to younger patients. Moreover, in multivariate Cox regression analysis, poor nutritional status (PNI ≤ 35) and poor ECOG performance status were independently associated with decreased overall survival, despite the administration of chemotherapy [31].

The indices developed for the estimation of the mortality rate in elderly cancer patients residing in the community encompass a range of variables. These include age, gender, the presence of chronic health problems (e.g., diabetes), ECOG PS, and lifestyle variables (e.g., smoking). These variables are delineated in the primary plan [32]. A recently published study concluded that age does not independently worsen survival in CRC patients and that reduced-dose chemotherapy or monotherapy may help minimise adverse effects in elderly patients [33]. In a large-scale study, a structured exercise programme spanning three years, initiated shortly after adjuvant chemotherapy for colon cancer, was found to significantly prolong the time without recurrence of the disease. This study underscores the pivotal role of exercise,

irrespective of an individual's age, in cancer prevention and management [34]. Our study demonstrates a similar finding, indicating that age alone does not serve as an independent risk factor for overall survival.

A key limitation of the present study was the relatively short follow-up period, which precluded a more comprehensive evaluation of long-term outcomes. Another important constraint was the absence of a Comprehensive Geriatric Assessment; due to the retrospective design, validated frailty screening tools such as VES-13 or G8 could not be applied, which may contribute to a potential healthy survivor bias. Treatment modifications were nevertheless made in light of age, performance status, and comorbidities. In addition, the single-center design may limit external validity; however, our findings were consistent with international cohorts previously reported in the literature. Finally, the generalizability of the results to all octogenarian patients is constrained by the paucity of large-scale cohort studies in this population.

Conclusion

Octogenarian patients with CRC demonstrated comparable treatment tolerability and survival outcomes to younger cohorts. However, these findings should be interpreted cautiously due to the single-center design and limited sample size. Larger multicenter studies incorporating comprehensive geriatric assessments are needed to confirm these observations.

Abbreviations

CRC	Colorectal Cancer
DFS	Disease-Free Survival
ECOG	Eastern Cooperative Oncology Group
NR	Not Reached
OS	Overall Survival
PFS	Progression-Free Survival
PS	Performance Status
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organisation

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12877-025-06722-x.

Supplementary Material 1.

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Authors' contributions

EZ: Project administration; Data curation; Supervision; Resources. All authors reviewed the manuscript. İD: Conceptualization, editing. ECE: Validation; Methodology; Software, Formal analysis.EZ: Project administration; Data curation; Supervision; Resources. All authors reviewed the manuscript.

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Data availability

The datasets generated and examined in the present study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

Before the commencement of data collection, the study design was presented to the Ankara Etlik City Hospital review board and approved with the decision number AEŞK-BADEK-2024–1148. Due to the retrospective nature of the study, approval for participation was not deemed necessary by the Ankara Etlik City Hospital review board. The present study was conducted in accordance with the Helsinki Declaration.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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