Original Article

Comparison of the Characteristics and Outcomes of Right-sided and Left-sided Early-onset Colorectal Cancer

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Key Words
Early-onset colorectal cancer;
Left-sided;
Right-sided;
Outcomes

Purpose. Colorectal cancer (CRC) is a major health concern worldwide, and the incidence of early-onset colorectal cancer (EOCRC), which is defined as CRC that is diagnosed in patients younger than 50 years, is increasing. This study aimed to explore the characteristics and outcomes of right-sided and left-sided EOCRC tumors.

Methods. This study used a retrospective cohort from Chang Gung Memorial Hospital to analyze patients who were diagnosed with CRC between 2008 and 2019. Patient demographics, tumor characteristics, and survival outcomes were compared between patients with right-sided and left-sided EOCRC.

Results. A total of 1,240 patients aged 20 to 49 years were included in this cohort study. The median age at diagnosis was 44 years, and 71.1% of the patients were diagnosed between the ages of 40 and 49. Left-sided tumors predominated, accounting for 76.9% of the cases. Most patients presented with stage 3 (38.2%) or stage 4 (24.3%) disease. Patients with right-sided tumors were more likely to have mucinous (11.8% vs. 5.1%; $p < 0.001$) and signet-ring cell (4.2% vs. 1.0%) histology. In the right-sided tumor group, more patients were in their 30 s, fewer patients were diagnosed with stage I , and there was a higher rate of metastasis to the omentum or peritoneum (15% vs. 7.7%; $p < 0.001$). While 5-year overall survival (OS) did not significantly differ between right-sided and left-sided tumor groups (67.9% vs. 72.5%; $p = 0.233$), patients with stage IV right-sided tumors had significantly worse 3-year OS (30.8% vs. 40%; $p = 0.029$). Additionally, right-sided tumors were associated with lower 5-year OS in patients aged 40 to 49 years (65.1% vs. 74.0%; $p = 0.02$).

Conclusion. Most early-onset colorectal cancers occur in patients between the ages of 40 and 49, with a predominance of left-sided tumors, although right-sided tumors have higher mortality rates at advanced stages. These findings support the recommendation for earlier initial screening for colorectal cancer by colonoscopy.

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According to the latest data released by the International Agency for Research on Cancer (IARC) in February 2024, colorectal cancer (CRC) is the third most common cancer worldwide, and approximately

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1.9 million new cases were diagnosed in 2022, accounting for 9.6% of all newly diagnosed cancers.[1] Notably, early-onset colorectal cancer (EOCRC), which is defined as CRC that occurs in patients younger than 50 years, has emerged as a growing concern because of its increasing incidence across multiple regions.[2,3] Although the incidence of CRC among individuals aged ≥ 50 years has shown a decreasing trend in recent decades, the annual increase of approximately 2% in EOCRC diagnoses highlights a concerning divergence in epidemiological patterns.[4,5] Data derived from the Taiwan Cancer Registry indicate a persistent increase in the incidence of CRC across all age groups between 2000 and 2019. Thus, EOCRC demonstrates particularly alarming trends, with annual increases of 3.2% for colon cancer and 3.3% for rectal cancer during this period.[6] These findings highlight the urgent need for region-specific strategies to address the growing burden of EOCRC in younger populations. Moreover, several studies have highlighted the predominance of left-sided EOCRC among patients under 50 years of age,[7,8] prompting discussions about earlier screening strategies, such as flexible sigmoidoscopy.[9] While the tumor biology and clinical outcomes of right-sided and left-sided colorectal cancers have been extensively analyzed in older populations, there is a notable gap in understanding the distinct features and prognoses specific to EOCRC. Given the increasing incidence of EOCRC and the potential for tailored therapeutic approaches on the basis of tumor location, our study aims to address this critical knowledge gap by comparing the clinicopathological characteristics and outcomes of right-sided and left-sided tumors in younger patients.

Materials and Methods

Study design and patient selection

This retrospective cohort study utilized data from the colorectal cancer database of Chang Gung Memorial Hospital (CGMH), which includes data from patients who were diagnosed and treated between January 2008 and December 2019. This study aimed to compare the characteristics and outcomes of right-sided and left-sided early-onset colorectal cancer (EOCRC). Patients were selected on the basis of predefined inclusion and exclusion criteria to ensure the reliability of the analysis. Patients were included if they had a histopathologically confirmed diagnosis of colorectal adenocarcinoma, either before or after surgical intervention, and were between 20 and 49 years of age at the time of diagnosis. Patients were excluded if they had a second primary malignancy, recurrent colorectal cancer, anal cancer, carcinoma in situ, or inadequate follow-up data that precluded comprehensive survival and outcome analysis. Additionally, patients whose tumor location was unknown, those with nonadenocarcinoma histology, or those who were classified as having an unknown stage or benign lesions were also excluded. The tumor location was categorized as right-sided if the tumor arose from the cecum to the transverse colon and left-sided if the tumor originated from the splenic flexure to the rectum. A flowchart illustrating the clinical case selection process is presented in Fig. 1. This study was conducted with the approval of the Institutional Review Board of Chang Gung Memorial Hospital (approval number 202102418B0). All the clinical data were retrieved from the hospital's electronic medical records and used exclusively for research purposes. Owing to the retrospective nature of the study, the requirement for informed consent was waived by the review board.

Data collection

Baseline characteristics were retrospectively collected from the colorectal cancer database of Chang Gung Memorial Hospital. The clinicopathological variables included patient age, sex, body mass index (BMI), neutrophil-to-lymphocyte ratio (NLR), tumor location, tumor stage, histological grade, histological type, metastatic organ involvement and family history. All the relevant information was extracted from medical records, pathology reports, and imaging studies to ensure accuracy and consistency. The tumor stage was classified according to the eighth edition of the Union for International Cancer Control tumor-node-metastasis (TNM) classification system. The

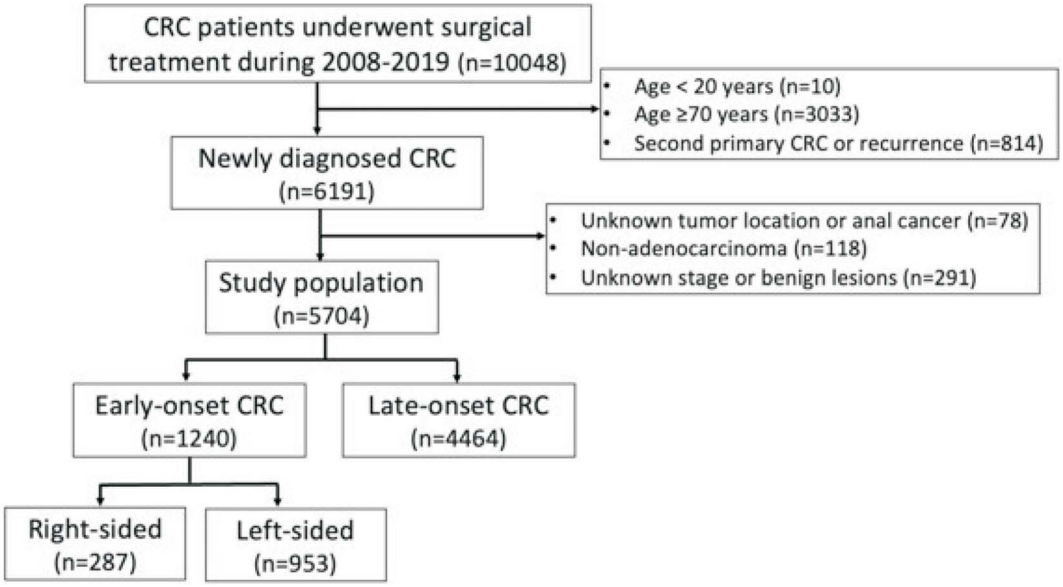

Fig. 1. The flowchart illustrating the clinical patient selection in this study.

primary endpoint of this study was overall survival (OS) in patients with EOCRC stratified by tumor location, age, and disease stage. Survival outcomes were assessed using tumor location (right-sided vs. left-sided), age groups divided into 10-year intervals (20-29, 30-39, and 40-49 years), and American Joint Committee on Cancer (AJCC) stages (1, 2, 3, and 4). These stratifications were performed to identify potential differences in survival trends and to better understand the prognostic implications of these factors.

Statistics

Baseline characteristics and clinicopathological variables are presented as medians with interquartile ranges (IQRs) for continuous variables and as frequencies with percentages for categorical variables. Comparisons between the right-sided and left-sided colorectal cancer groups were performed using Pearson's chi-square test or Fisher's exact test for categorical variables, whereas the Mann–Whitney U test was used to analyze continuous variables because of the nonnormal distribution of the data. Kaplan–Meier survival curves were constructed to estimate OS and were compared using the log-rank test. Subgroup analyses were conducted to further explore the impact of key clinical and pathological variables on OS. Forest plots were generated to visually present the results of the multivariate analysis, including HRs, 95% CIs, and *p* values for each variable. The neutrophil-to-lymphocyte ratio (NLR) was calculated by dividing the absolute neutrophil count by the absolute lymphocyte count. To determine the optimal cutoff value of NLR for OS assessment, receiver operating characteristic (ROC) curve analysis was performed. The threshold of 3.44 was selected based on the Youden index, which maximized both sensitivity and specificity. Patients were subsequently categorized into low (NLR < 3.44) and high (NLR ≥ 3.44) NLR groups for further analyses. Statistical significance was defined as $p < 0.05$. All the statistical analyses were conducted via the Statistical Package for Social Sciences (SPSS) version 26 (IBM Corp., New York, NY, USA) and R language, version 4.4.2.

Results

Patient demographics and tumor characteristics

Table 1 provides an overview of the baseline characteristics of the study population. A total of 1,240 patients with EOCRC were included. The median age at diagnosis was 44 years, with right-sided tumors being diagnosed at a younger median age than left-sided tu-

mors (43 vs. 44 years, $p = 0.003$). Most patients (71.7%) were in the 40-49 years age group, followed by the 30-39 years (23.9%) and 20-29 years (3.5%) age groups, with right-sided tumors occurring more frequently in the youngest group ($p < 0.001$). The sex distribution was similar across tumor location groups ($p = 0.266$), and BMI was not significantly different ($p = 0.282$). An elevated NLR (≥ 3.44) was observed in 31.5% of

Table 1. Baseline characteristics of patients with early-onset colorectal cancer according to tumor sidedness

Characteristics	All cases (N = 1,240)	Right-sided (N = 287)	Left-sided (N = 953)	*p* value
Age, year, median (IQR)	44 (8)	43(10)	44 (8)	0.003
20-29	43 (3.5)	20 (7.0)	23 (2.4)	< 0.001
30-39	296 (23.9)	72 (25.1)	224 (23.5)	
40-49	901 (71.7)	195 (67.9)	706 (74.1)	
Gender				
Male	634 (51.1)	155 (54.0)	479 (50.3)	0.266
Female	606 (48.9)	132 (46.0)	474 (49.7)	
BMI	23.2 (5.1)	23.3 (5.9)	23.2 (5.0)	0.282
NLR				
< 3.44	812 (68.5)	173 (62.0)	639 (70.5)	0.008
≥ 3.44	374 (31.5)	106 (38.0)	268 (29.5)	
Tumor location				
Cecum	47 (3.8)	47 (16.4)	0	< 0.001
Ascending colon	109 (8.8)	109 (38.0)	0	
Transverse colon and hepatic flexure	131 (10.6)	131 (45.6)	0	
Splenic	18 (1.5)	0	18 (1.9)	
Descending colon	90 (7.3)	0	90 (9.4)	
Sigmoid colon	357 (28.8)	0	357 (37.5)	
Rectum	488 (39.4)	0	488 (51.2)	
Histology type				
Adenocarcinoma	1135 (91.5)	241 (84.0)	894 (93.8)	< 0.001
Signet-ring adenocarcinoma	22 (1.8)	12 (4.2)	10 (1.0)	
Mucinous adenocarcinoma	83 (6.7)	34 (11.8)	49 (5.1)	
Histology grade				
Well	121 (9.8)	20 (7.0)	101 (10.6)	< 0.001
Moderate	911 (73.5)	179 (62.4)	732 (76.8)	
Poor	187 (15.1)	84 (29.3)	103 (10.8)	
Unclassified	21 (1.7)	4 (1.4)	17 (1.8)	
Stage				
I	179 (14.4)	20 (7.0)	159 (16.7)	< 0.001
II	287 (23.1)	86 (30.0)	201 (21.1)	
III	473 (38.1)	101 (35.2)	372 (39.0)	
IV	301 (24.3)	80 (27.9)	221 (23.2)	
Metastatic organ				
Liver	178 (14.4)	38 (13.2)	140 (14.7)	0.539
Lung	58 (4.7)	10 (3.5)	48 (5.0)	0.275
Omentum/peritoneum	116 (9.4)	43 (15.0)	73 (7.7)	< 0.001
Bone	9 (0.7)	1 (0.3)	8 (0.8)	0.693
Ovary*	55 (4.4)	19 (6.6)	36 (3.8)	0.040
Systemic LN	54 (4.4)	18 (6.3)	36 (3.8)	0.070
Family history				
FAP/HNPCC	68 (5.4)	31 (10.8)	37 (3.8)	< 0.001
Yes	466 (37.6)	95 (33.1)	371 (38.9)	
No	677 (54.6)	153 (53.3)	524 (55.0)	
Unknown	3 (0.2)	1 (0.3)	2 (0.2)	

* In female patients.
IQR, interquartile range; NLR, neutrophil-to-lymphocyte ratio; LN, lymph node; FAP, familial adenomatous polyposis; HNPCC, hereditary non-polyposis colorectal cancer.

patients. Right-sided tumors were significantly more likely to have a high NLR compared to left-sided tumors (38.0% vs. 29.5%, $p = 0.008$).

The tumor location varied significantly ($p < 0.001$), with right-sided EOCRC primarily found in the cecum (16.4%), ascending colon (38.0%), and transverse colon/hepatic flexure (45.6%), whereas left-sided EOCRC was more common in the sigmoid colon (37.5%) and rectum (51.2%).

Histopathological features exhibited significant differences. The right-sided tumor group had a higher proportion of signet-ring cell (4.2% vs. 1.0%) and mucinous adenocarcinomas (11.8% vs. 5.1%, $p < 0.001$), as well as a higher proportion of poorly differentiated tumors (29.3% vs. 10.8%, $p < 0.001$). The stage distribution revealed that right-sided tumors were more often identified as stage II disease (30.0% vs. 21.1%), whereas left-sided tumors were more often identified as stage I disease (16.7% vs. 7.0%, $p < 0.001$). The distributions of stage III and IV disease were similar.

Metastatic patterns showed distinct variations, with right-sided EOCRC more frequently involving the omentum/peritoneum (15.0% vs. 7.7%, $p < 0.001$) and ovaries (6.6% vs. 3.8%, $p = 0.040$), whereas liver, lung, bone, and systemic lymph node metastases were not significantly different.

A family history of familial adenomatous polyposis (FAP) or hereditary non-polyposis colorectal cancer (HNPCC) was documented in 5.4% of patients, while 37.6% reported a family history of CRC without a known hereditary syndrome. Right-sided tumors were more frequently associated with FAP or HNPCC compared to left-sided tumors (10.8% vs. 3.8%, $p < 0.001$), whereas the overall rate of any family history did not differ significantly between groups.

Overall survival

Overall survival (OS) outcomes were analyzed in EOCRC patients stratified by tumor location, age, AJCC stage, and sex, as shown in Fig. 2. No significant dif-

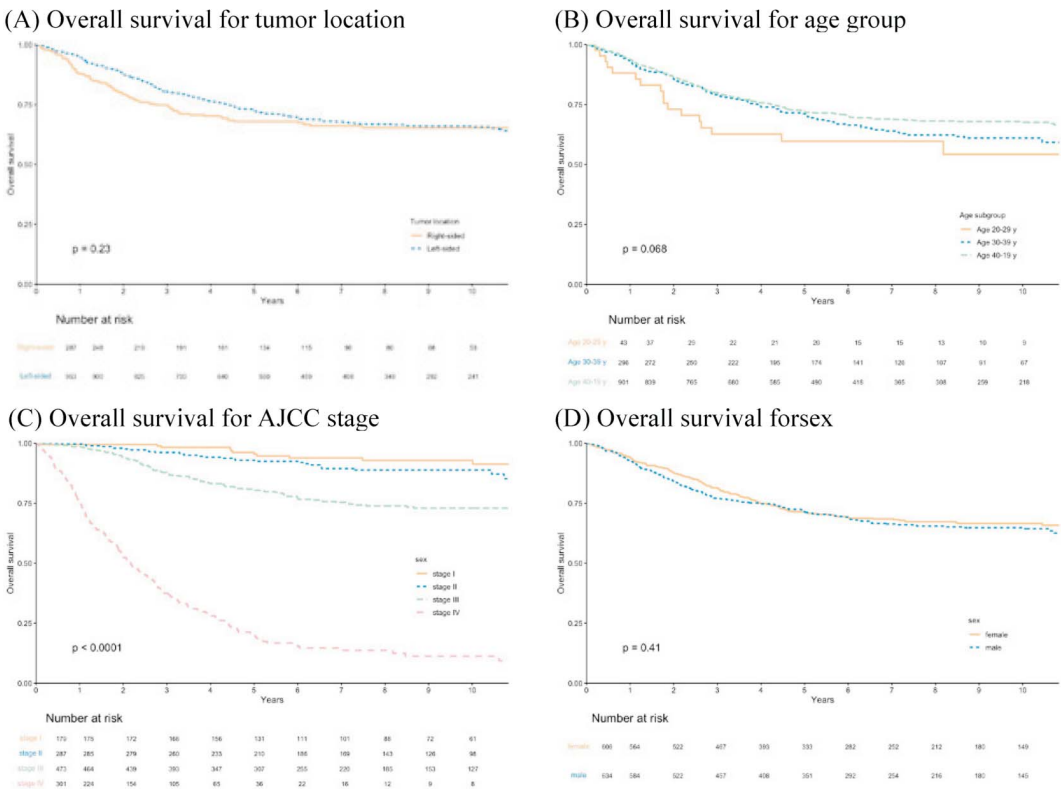

Fig. 2. Kaplan-Meier curves for overall survival in early-onset colorectal cancers stratified by (A) tumor location, (B) age (10-year interval), (C) AJCC stage, and (D) sex. AJCC, American Joint Committee on Cancer.

ferences in 5-year OS rates were observed between patients with right-sided and left-sided tumors (67.9% vs. 72.5%; $p = 0.23$; Fig. 2A). Similarly, OS of patients stratified by age (20-29, 30-39, and 40-49 years) and sex was not statistically significantly different ($p = 0.068$ and $p = 0.41$, respectively; Figs. 2B and 2D). Analysis on the basis of the AJCC stage (Fig. 2C) revealed significant disparities in 5-year OS among the stages.

Fig. 3 depicts Kaplan-Meier curves illustrating OS for EOCRC patients, stratified by tumor location for AJCC stage (Fig. 3A-D). For stage I tumors (Fig. 3A), there was no significant difference in 5-year OS between right-sided and left-sided tumors ($p = 0.95$). Similarly, no statistically significant differences in OS were observed for stage II (Fig. 3B; $p = 0.47$) or stage III tumors (Fig. 3C; p = 0.87). In contrast, among stage IV tumors (Fig. 3D), right-sided tumors were associated with worse 5-year OS compared to left-sided tumors (30.8% vs. 40%; $p = 0.029$).

Fig. 4 shows OS in EOCRC patients stratified by tumor location across different age groups. No significant differences in 5-year OS were observed for patients aged 20-29 years ($p = 0.15$) or 30-39 years ($p = 0.26$). However, in patients aged 40-49 years, patients with right-sided tumors had significantly worse 5-year OS than patients with left-sided tumors (65.1% vs. 74.0%; $p = 0.02$, Fig. 4C).

Subgroup analysis

Multivariate analysis identified several independent predictors of OS in EOCRC patients, as shown in Fig. 5. Tumor stage was significantly associated with survival outcomes, with T2 (HR: 0.02, 95% CI: 0.00-0.29, $p = 0.004$) and T3 (HR: 0.18, 95% CI: 0.04-0.89,

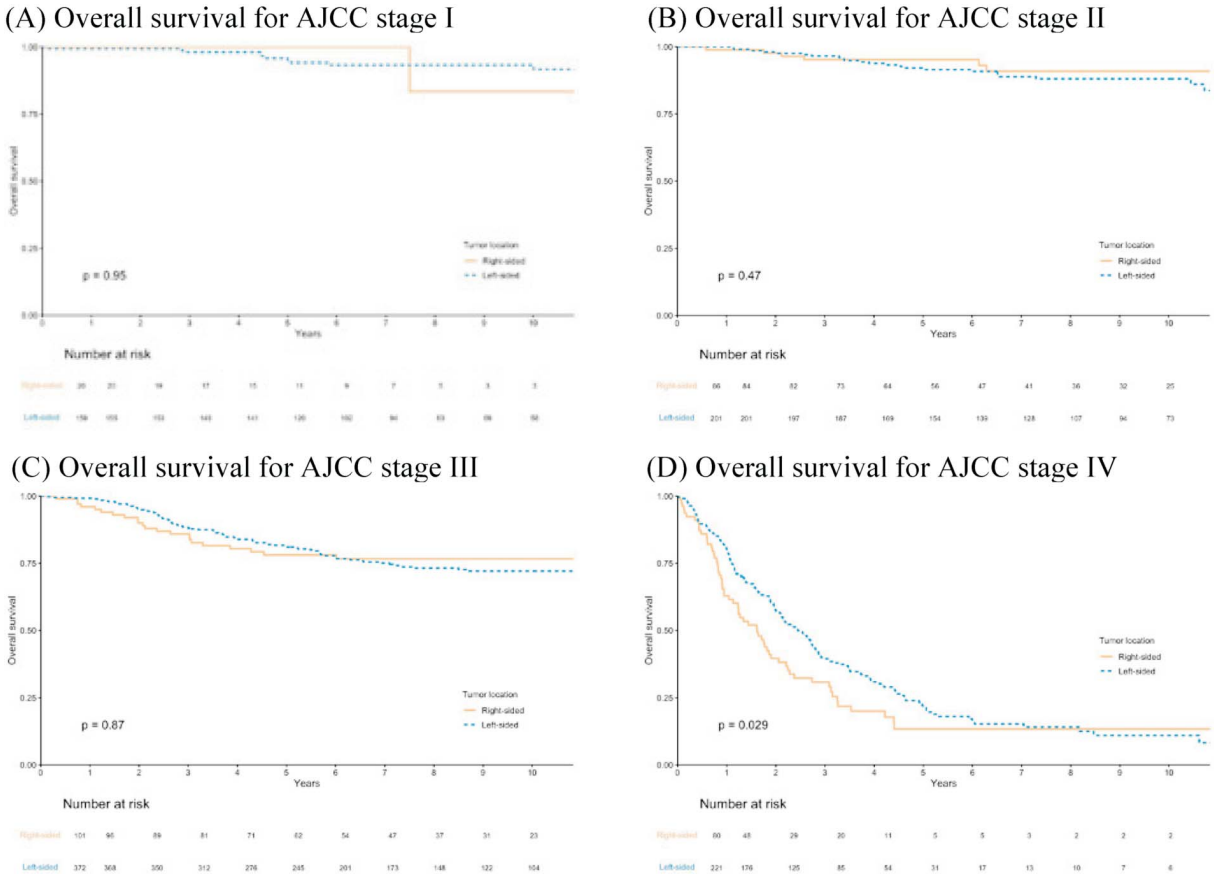

Fig. 3. Kaplan-Meier curves for overall survival in early-onset colorectal cancers stratified by tumor location for AJCC (A) stage 1, (B) stage 2, (C) stage 3, and (D) stage 4. AJCC, American Joint Committee on Cancer.

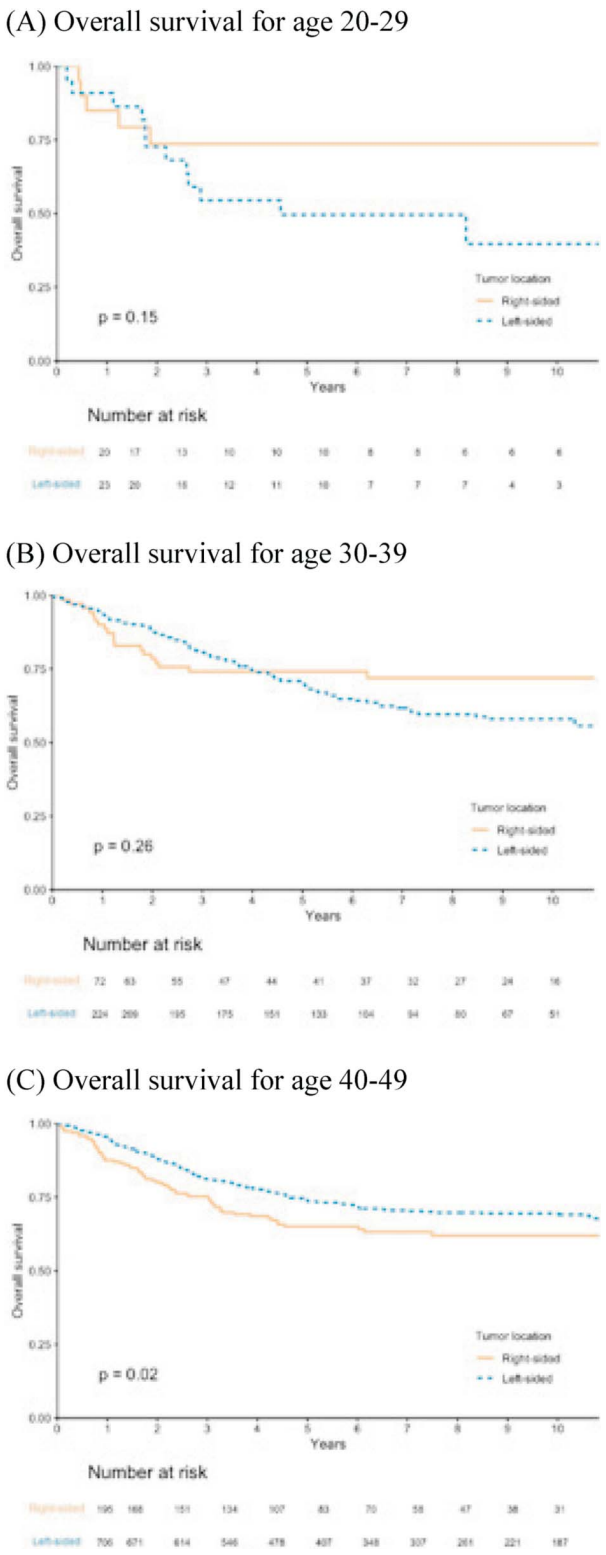

Fig. 4. Kaplan-Meier curves for overall survival in early-onset colorectal cancers stratified by tumor location for age groups (A) 20 to 29, (B) 30 to 39, and (C) 40 to 49 years.

$p = 0.035$) stages being associated with better OS than T1 tumors. Poorly differentiated histology was associated with worse OS (HR: 3.02, 95% CI: 1.14-8.02, $p = 0.027$), whereas adjuvant treatment, including chemotherapy (HR: 0.09, 95% CI: 0.04-0.20, $p < 0.001$) and chemoradiotherapy (HR: 0.11, 95% CI: 0.04-0.26, $p < 0.001$), improved survival significantly. Left-sided tumors demonstrated a trend of being associated with better outcomes compared to right-sided tumors, although the difference was not statistically significant (HR: 0.69, 95% CI: 0.45-1.04; $p = 0.074$). Laboratory findings revealed that a higher neutrophil-to-lymphocyte ratio (NLR ≥ 3.44; HR: 1.49, 95% CI: 1.04-2.12, $p = 0.029$) and lower serum albumin levels (≥ 3.5 g/dL; HR: 0.31, 95% CI: 0.16-0.58, $p < 0.001$) were associated with worse survival.

For comprehensive reference, the results of univariate Cox proportional hazards analyses for each clinical and pathological variable are presented in Supplementary Table 1. These results provide additional context supporting the multivariate findings illustrated in Fig. 5.

Discussion

Our findings indicate that EOCRC predominantly affects individuals aged 40-49 years (71.7%), which is consistent with previous studies reporting an increasing incidence of this disease.[10] The increasing incidence of EOCRC has driven updates in CRC screening policies. Major health organizations, including national cancer and preventive health agencies, have recommended lowering the age for initiating routine screening from 50 to 45 years to facilitate earlier detection and improve patient outcomes.[11,12] Our subgroup analysis further revealed that cases were nearly equally distributed between age 40-45 (35.8%) and 46-49 (36.9%), underscoring the importance of including individuals in their early forties in screening programs. These results support efforts to lower the screening age threshold and emphasize the need for heightened clinical vigilance in this population (Supplementary Table 2).

Screening plays a critical role in CRC incidence

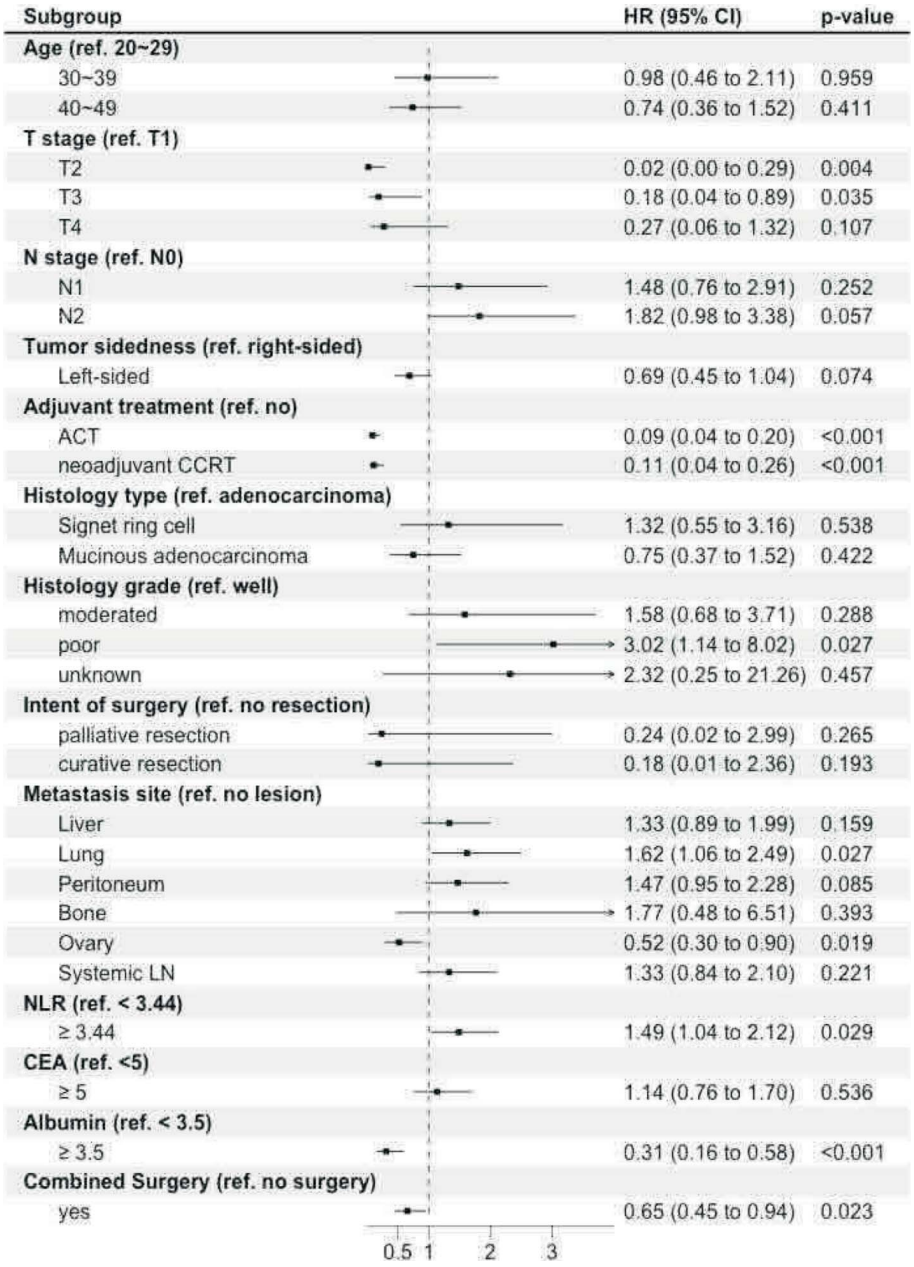

Fig. 5. Multivariate analysis of independent prognostic factors for overall survival in early-onset colorectal cancer.

and mortality reduction, with colonoscopy estimated to lower CRC incidence by 40% and mortality by 60%.[13] Notably, individuals aged 45-49 years exhibit a comparable prevalence of advanced adenomas and sessile serrated lesions to those aged 50-54 years, further supporting the clinical benefit of earlier screening.[14] Retrospective cohort studies further support this shift, demonstrating significant reductions in CRC incidence and mortality when screening is initiated at 45 years.[15,16] These findings highlight the need to improve screening adherence and accessibility, particularly among younger and underserved populations.

In our cohort, left-sided tumors accounted for 74.1% of cases, which is consistent with previous reports suggesting a greater prevalence of distal tumors in younger patients.[13,17] In settings with limited resources, flexible sigmoidoscopy is a practical screening tool for detecting distal lesions, but it does not

evaluate the proximal colon, where right-sided tumors exhibit greater aggressiveness. Colonoscopy remains the preferred method for comprehensive screening because it allows assessment of the full colon and early detection of right-sided malignancies.[18]

Symptom presentation differs between patients with left-sided and right-sided CRC, impacting detection and prognosis. Patients with left-sided tumors commonly present with rectal bleeding, tenesmus, and mucous passage, whereas patients with right-sided tumors are more often associated with abdominal pain and anemia.[6,9,17] These differences contribute to diagnostic delays, as right-sided CRC often manifests with nonspecific symptoms, leading to later-stage detection.[13] Delayed diagnosis is further exacerbated by low symptom awareness, insufficient clinical suspicion, and inefficiencies in health care systems.[2,3] Increasing public education and optimizing early detection strategies are critical for mitigating these delays and improving survival outcomes, particularly in EOCRC patients.

Despite the predominance of left-sided tumors, survival outcomes are notably worse in patients with advanced right-sided EOCRC, which is consistent previous findings.[19] Our study demonstrated that compared with left-sided tumors, right-sided tumors were more often signet-ring cell and mucinous adenocarcinomas; were more frequently poorly differentiated; and presented an increased likelihood of omental, peritoneal, and ovarian metastases. These findings are consistent with previous research highlighting the aggressive nature of right-sided CRC, which is frequently associated with chemoresistant histological subtypes and a greater tendency for peritoneal dissemination.[20,21] In particular, mucinous and signet-ring cell carcinomas have been associated with poor prognoses owing to their advanced stage at presentation and limited treatment response.[22,23] Given these findings, patients with right-sided EOCRC may require more intensive treatment strategies and closer surveillance owing to the distinct biological and clinical behavior of these tumors. Future studies should further investigate the molecular mechanisms underlying these histological differences to further optimize therapeutic approaches and improve patient outcomes.[24]

Our multivariate analysis identified several independent prognostic factors for OS in EOCRC patients. Although higher tumor stages are generally associated with poorer survival, our analysis indicated that patients with T2 and T3 tumors had better OS than those with T1 tumors. This unexpected finding may be explained by variations in treatment strategies, sample size limitations, or differences in tumor biology. Poorly differentiated histology was also associated with worse outcomes, reflecting its established role in aggressive tumor progression and unfavorable survival.[25] Adjuvant treatment significantly improved survival, with chemotherapy and chemoradiotherapy reducing mortality risk. These findings highlight the critical role of adjuvant therapy in EOCRC management, confirming previous studies showing prolonged OS in patients receiving such interventions.[26,27]

In the present study, ovarian metastasis was identified as an independent factor associated with better overall survival. This finding contrasts with the general understanding that ovarian metastasis indicates poor prognosis. However, previous studies have suggested that patients with isolated ovarian metastasis who underwent complete resection may achieve favorable outcomes. Song et al. reported a 5-year overall survival rate of 68.6% in patients who received R0 resection for ovarian metastasis, compared to 0% in those with incomplete resection.[28] Another study showed a median survival of 49 months in patients with ovarian-only metastasis, which was significantly longer than in patients with other metastatic sites.[29] These findings suggest that the improved survival observed in our cohort may reflect the selection of patients with resectable, isolated ovarian metastases. This observation should be interpreted with caution and requires further validation in future studies.

This study has several limitations. As a single-center retrospective study, selection and referral biases may exist, and the findings may not reflect the characteristics of nationwide populations. Family history was included in the analysis to better characterize the hereditary component of EOCRC. Although 5.4% had known hereditary syndromes and 37.6% reported a family history of CRC, this variable was not incorporated into the survival analysis due to the limited

number of confirmed cases and the retrospective nature of the study. Further investigation with integrated germline and molecular profiling is warranted to clarify its prognostic relevance. The relatively small sample size of certain subgroups, such as the T1 tumor subgroup, may have reduced the statistical power, leading to potential biases in the survival analysis. Moreover, the absence of molecular data, including microsatellite instability and RAS/RAF mutation data, limits the understanding of prognostic and predictive biomarkers.

Conclusion

This study provides critical insights into the distinct characteristics and outcomes of right-sided and left-sided EOCRC, reinforcing the need for location-specific considerations in diagnosis and treatment. The predominance of left-sided tumors is consistent with previous reports; however, the disproportionately poorer prognosis of right-sided EOCRC, particularly in advanced stages, highlights the urgency of improved screening and early detection strategies.

These findings support lowering the CRC screening age to 45 years and emphasize the necessity of raising awareness about right-sided CRC symptoms, which often lead to diagnostic delays. Future research should focus on refining risk stratification models and evaluating the effectiveness of targeted screening approaches, particularly for high-risk subgroups, to mitigate disparities in survival outcomes.

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Supplementary Materials

Supplementary Table 1. Univariate Cox proportional hazards analysis of prognostic factors for overall survival in early-onset colorectal cancer (EOCRC)

Characteristics	HR	95% CI	*p* value
Age			
20-29	1		
30-39	0.731		
40-49	0.615		
T stage			
T1	1		
T2	1.580	0.517-4.831	0.422
T3	6.484	2.666-15.774	< 0.001
T4	18.647	7.652-45.441	< 0.001
N stage			
N0	1		
N1	4.477	3.123-6.419	< 0.001
N2	5.121	3.837-6.837	< 0.001
Tumor sidedness			
Right-sided	1		
Left-sided	0.866	0.684-1.097	0.233
Adjuvant treatment			
No	1		
ACT	3.148	2.236-4.434	< 0.001
Neoadjuvant CCRT	5.788	3.984-8.409	< 0.001
Histology type			
Adenocarcinoma	1		
Signet ring cell	2.450	1.377-4.358	0.002
Mucinous adenocarcinoma	1.105	0.758-1.624	0.612
Histology grade			
Well	1		
Moderated	2.288	1.401-3.737	< 0.001
Poor	4.918	2.928-8.262	< 0.001
Unknown	11.732	5.849-23.534	< 0.001
Intent of surgery			
No resection	1		
Palliative resection	0.439	0.310-0.621	< 0.001
Curative resection	0.050	0.035-0.070	< 0.001
Metastasis site			
No lesion	1		
Liver	6.724	5.421-8.340	< 0.001
Lung	5.101	3.781-6.881	< 0.001
Peritoneum	7.630	5.989-9.721	< 0.001
Bone	11.923	5.897-24.108	< 0.001
Ovary	4.196	2.989-5.889	< 0.001
Systemic LN	7.174	5.244-9.813	< 0.001
NLR			
< 3.44	1		
≥ 3.44	2.128	1.734-2.613	< 0.001
CEA			
< 5	1		
≥ 5	2.861	2.334-3.508	< 0.001
Albumin			
< 3.5	1		
≥ 3.5		0.309-0.615	< 0.001
Combined surgery			
No surgery	1		
Yes	2.239	1.833-2.734	< 0.001

Supplementary Table 2. Age distribution of early-onset colorectal cancer (EOCRC) cases (age 20-49)

Age group	Case number	Percentage %
20-39	339	27.3
40-45	444	35.8
46-49	457	36.9
Total	1240	100.0

原　著

右側與左側早發性大腸直腸癌之臨床特徵與預後比較

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目的　大腸直腸癌為全球重要癌症負擔之一，而早發性大腸直腸癌，即診斷年齡小於 50 歲之大腸直腸癌，近年發生率逐漸上升。本研究旨在比較右側與左側早發性大腸直腸癌之臨床病理特徵及預後差異。

方法　本研究為單一醫學中心回溯性世代研究，分析 2008 年至 2019 年間於林口長庚紀念醫院診斷並治療之大腸直腸癌病人。納入診斷年齡介於 20 至 49 歲、經病理證實為大腸直腸腺癌之病人，並依腫瘤位置分為右側與左側大腸直腸癌。右側腫瘤定義為位於盲腸至橫結腸，左側腫瘤則定義為位於脾彎曲至直腸。比較兩組病人之基本人口學資料、腫瘤特徵、轉移型態及整體存活率。

結果　本研究共納入 1,240 位早發性大腸直腸癌病人，診斷年齡中位數為 44 歲，其中 40 至 49 歲病人占多數。左側腫瘤較為常見，占 76.9%。多數病人診斷時已為第 III 期或第 IV 期疾病。相較於左側腫瘤，右側腫瘤較常見於較年輕族群，且具有較高比例之黏液性腺癌、印戒細胞癌及低分化腫瘤。右側腫瘤亦較常合併大網膜或腹膜轉移。整體而言，右側與左側腫瘤之 5 年整體存活率無顯著差異；然而，在第 IV 期病人中，右側腫瘤之整體存活率顯著較差。此外，於 40 至 49 歲族群中，右側腫瘤亦與較低之 5 年整體存活率相關。多變項分析顯示，腫瘤分期、低分化組織型態、較高 neutrophil-to-lymphocyte ratio、血清白蛋白較低及治療方式皆與整體存活相關。

結論　早發性大腸直腸癌多發生於 40 至 49 歲族群，且以左側腫瘤為主；然而，右側早發性大腸直腸癌在進展期疾病中呈現較差預後，並具有較侵襲性之病理特徵及轉移型態。本研究結果支持將大腸直腸癌初次篩檢年齡提前，並強調對年輕族群及右側大腸直腸癌相關症狀提高臨床警覺之重要性。

關鍵詞　早發性大腸直腸癌、左側、右側、預後。