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Original Paper

Serum IL-17A as a Diagnostic and Prognostic Biomarker in Colorectal Cancer: Development and Validation of a Multi-Indicator Model

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Abstract

Objective*: Colorectal cancer ranks as the third most prevalent malignancy globally. To address the limited sensitivity of conventional biomarkers, this study evaluated the clinical utility of preoperative serum interleukin-17A (IL-17A) in CRC diagnosis and prognosis. We aimed to develop a multi-indicator diagnostic model and assess its prognostic efficacy.*

Methods*: This study involved 126 patients diagnosed with colorectal cancer (CRC) who underwent radical resection at the First Affiliated Hospital of Chongqing Medical University between June 2022 and December 2023. Additionally, a control group was established, consisting of 28 patients diagnosed with colorectal adenoma and 27 healthy volunteers. Clinical parameters included age, sex, tumor stage, CEA, CA199, and IL-17A. Optimal IL-17A cutoff values were determined using X-tile software. A combined diagnostic model (IL-17A + CEA + CA199) was developed, and its performance was evaluated via receiver operating characteristic (ROC) analysis. Cox regression and Kaplan-Meier survival analyses identified prognostic factors.*

Results*: Serum IL-17A levels were significantly higher in the CRC group compared to the healthy control group (10.0 pg/mL vs 7.1 pg/mL, P = 0.034) and positively correlated with vascular invasion (P = 0.027). The IL-17A-CEA-CA199 combined diagnostic model demonstrated superior diagnostic accuracy compared to single indices such as CEA (AUC=0.754 vs 0.704, P = 0.001) and CA199 (AUC=0.587). Multivariate analysis revealed that elevated IL-17A levels were associated with prolonged OS (HR=0.26, 95%CI 0.08-0.81, P = 0.022), and IL-17A was identified as an independent protective factor for OS (P =0.032).*

Conclusion*: The IL-17A-CEA-CA199 diagnostic model enhances the sensitivity of early CRC diagnosis, and IL-17A serves as an independent prognostic marker for CRC. This study validates the*

role of IL-17A in both early diagnosis and prognosis prediction of CRC, offering novel insights for optimizing CRC screening strategies and personalized treatment approaches.

Keywords

Colorectal cancer, Interleukin-17A, Diagnostic marker, Combined detection, Prognosis

1. Introduction

Colorectal cancer (CRC) is among the most prevalent cancers and stands as the second leading cause of cancer-related mortality worldwide. Currently, colonoscopy is regarded as the gold standard for diagnosis (Wu, Guo, Cao, Wang, Chen, Wang, et al., 2017); However, its invasive nature, potential complications—including bleeding, perforation, and infection—and barriers to patient compliance significantly limit screening coverage. The fecal occult blood test (FOBT), a non-invasive alternative, has limited sensitivity and may lead to missed diagnoses (Medical Advisory, 2009). Traditional biomarkers such as Carcinoembryonic Antigen (CEA) and Carbohydrate Antigen 199 (CA199) are primarily utilized for monitoring recurrence rather than for early diagnosis due to their limited diagnostic sensitivity (Lee, Baek, Kim, & Park, 2012; Nicolini, Ferrari, Duffy, Antonelli, Rossi, Metelli, et al., 2010; Sturgeon, Duffy, Stenman, Lilja, Brunner, Chan, et al., 2008). Consequently, there is an urgent need to develop a highly sensitive and non-invasive biomarker that can meet the demand for early detection of CRC.

Interleukin-17A (IL-17A) is secreted by various cell types, including CD4+ T cells, CD8+ T cells, and γδ T cells (Patil, Shah, Shrikhande, Goel, Dikshit, & Chiplunkar, 2016; Ueyama, Imura, Fusamae, Tsujii, Furue, Aoki, et al., 2017; Cua & Tato, 2010). Fluctuations in IL-17A levels significantly influence tumor development across multiple organs, such as the liver (Wu, Guo, Cao, Wang, Chen, Wang, et al., 2017), pancreas (McAllister, Bailey, Alsina, Nirschl, Sharma, Fan, et al., 2014), breast (Shibabaw, Teferi, & Ayelign, 2023), and lungs (Wu, Xu, Huang, Han, Duan, Fan, et al., 2016). In breast cancer specifically, IL-17A has been shown to promote the proliferation and metastasis of tumor cells via NF-kB-mediated MMP signaling pathways (Shibabaw, Teferi, & Ayelign, 2023). Additionally, IL-17A promotes glioblastoma cell proliferation and migration via the PI3K/AKT pathway (Laszczych, Czernicka, Gostomczyk, Szylberg, & Borowczak, 2024). Notably, compared to traditional tumor markers, IL-17A demonstrates superior diagnostic value in non-small cell lung cancer (NSCLC) (Wang, Xu, Zhu, Cao, Yang, Zhen, et al., 2023), gastric cancer (Zhuang, Peng, Zhao, Shi, Mao, Chen, et al., 2012), and liver cancer (Tian, Zeng, Lu, Xie, & Li, 2024). It is particularly important to highlight that in CRC, elevated levels of IL-17A are directly associated with the progression of the adenoma-carcinoma sequence. Further investigations have revealed significant differences in IL-17A levels between CRC patients and healthy individuals (Razi, Baradaran Noveiry, Keshavarz-Fathi, & Rezaei, 2019; Radosavljevic, Ljujic, Jovanovic, Srzentic, Pavlovic, Zdravkovic, et al., 2010; Yan, Liu, Yin, Kang, & Wang, 2018); this disparity may indicate its potential utility for early diagnosis of colorectal cancer (Wu, Wu, Huang, Liu, Ye, & Huang, 2013). Given the established role of IL-17A in

CRC pathogenesis, however, the diagnostic value derived from combining IL-17A with conventional tumor markers remains unclear at present. We hypothesize that integrating IL-17A with traditional tumor markers could enhance both sensitivity and specificity for early detection of CRC.

In this study, we aimed to investigate the expression level of IL-17A among CRC patients while elucidating how serum levels correlate with disease status. Our objective was to develop a highly specific and sensitive model based on IL-17A for diagnosing early-stage CRC patients and evaluating its prognostic significance within this patient population.

2. Methods

2.1 Patients

Patients with colorectal cancer who underwent radical surgery in the First Affiliated Hospital of Chongqing Medical University from June 2022 to December 2023 were selected as the subjects of this study. The inclusion criteria were as follows: 1) pathologically diagnosed as colorectal cancer; 2) patients with complete clinical data and follow-up records; 3) the primary tumor is resectable. Exclusion criteria: 1) patients with other primary malignant tumors; 2) preoperative neoadjuvant therapy; 3) patients with hematological diseases or infections; 4) severely damaged vital organs; A total of 126 patients with colorectal cancer were enrolled, including 27 healthy volunteers with no abnormalities in physical examination and laboratory tests and 28 patients diagnosed with colorectal adenoma. Each group was from the outpatient department or inpatient department of the First Affiliated Hospital of Chongqing Medical University. The study was approved by the Ethics Committe of the First Affiliated Hospital of Chongqing Medical University (approval number: K2023-483), and all participants signed written informed consent.

2.2 Data Collection

The baseline characteristics of the patients, including age, gender, tumor location, stage, and other relevant indicators, were retrospectively reviewed and collected through the electronic medical record system. Blood markers were assessed within three days prior to surgery, encompassing tumor markers such as CEA and CA199, IL-17A, along with additional clinical data.

2.3 Follow-up

All patients included in the study underwent radical resection. Patients identified as being at high risk for local recurrence and distant metastasis received adjuvant chemotherapy based on their preferences. Trained study coordinators maintained regular follow-up with all patients via telephone. Overall Survival (OS) was defined as the duration from pathological diagnosis to death due to cancer or until the most recent follow-up assessment.

2.4 Statistical Analysis

The optimal cutoff value for IL-17A was determined using X-tile software. All statistical analyses were conducted using SPSS version 27.0. The measurement data in this study exhibited a skewed normal distribution and are presented as median values (with interquartile ranges). The Kruskal-Wallis test was

utilized for comparisons among multiple independent samples. Categorical variables were analyzed using either the chi-square test or Fisher's exact test, as appropriate. A Cox regression model was applied to assess risk factors associated with postoperative recurrence and survival prognosis. The diagnostic efficacy of serological indicators for CRC was evaluated through Receiver Operating Characteristic (ROC) curve analysis. Survival curves were generated using the Kaplan-Meier method. All tests were two-sided, and a p-value of less than 0.05 was deemed statistically significant.

3. Results

3.1 Clinical Data and Laboratory Parameters

This study included a total of 126 patients diagnosed with colorectal cancer, with an average age of 65 ± 13 years. As observed in Table 1, the high expression levels of IL-17A were significantly associated with vascular invasion.

3.2 Comparison of Serum IL-17A Levels among Different Groups

The differences in age, gender, and laboratory parameters among the groups are presented in Table 2. As illustrated in Figure 1, the level of IL-17A in the CRC patient group is significantly higher than that in the healthy control group (P = 0.034).

Table 1. Relationship between Serum IL17 Level and Clinicopathological Parameters in Patients with Colorectal Cancer

Variables	Total	IL-17A		χ^2	p Value
		Low	High		
Sex				0.025	
Male	70	36	34		0.87
Famale	56	28	28		
Age (years)				0.002	
<60	47	24	23		0.962
≥ 60	69	40	39		
Tumor site				0.494	
Colon	59	28	31		0.482
Rectum	67	36	31		
T				0.304	
T1-T2	22	10	12		0.581
T3-T4	104	54	50		
N				0.330	
N0	74	36	38		0.566
N1-2	52	28	24		

M				1.716	
M0	111	54	57		0.19
M1	15	10	5		
TNM stage				1.626	
I/II	70	32	38		0.202
III/IV	56	32	24		
Differentiation				1.454	
Medium-Well	101	54	47		0.228
Poor	25	10	5		
Nerves invasion				0.442	
Yes	12	5	7		0.506
No	114	59	55		
Vessels invasion[1]					
Yes	5	0	5		0.027*
No	121	64	57		
CEA				0.107	
Low	75	39	36		0.742
High	51	25	26		
CA 199				0.097	
Low	87	45	42		0.755
High	39	19	20		

*p<0.05 **p <0.01 ***p<0.001

[1]Fisher's exact test

Table 2. Demographic and Baseline Characteristics of Each Group

Variables	**Healthy subjects, N = 27**	**Colorectal cancer, N = 126**	**Colorectal adenoma, N = 28**	**Statistic**	**p-value**
Age (years)				12.78	0.002[1]
Median (IQR)	55 (34, 64)	66 (56, 74)	65 (54, 73)		
Sex				0.50	0.780[2]
Male	13 (48.1%)	70 (55.6%)	15 (53.6%)		
Female	14 (51.9%)	56 (44.4%)	13 (46.4%)		
CEA				19.25	<0.001[1]
Median (IQR)	3 (2, 3)	4 (2, 11)	2 (1, 3)		
CA199				4.01	0.135[1]
Median (IQR)	11 (4, 15)	13 (6, 31)	11 (8, 17)		

IL-17A				9.11	0.011[1]
Median (IQR)	7.1 (3.5, 9.4)	10.0 (6.9, 12.1)	7.2 (4.4, 11.4)		

[1]Kruskal-Wallis rank sum test

[2]Pearson's Chi-squared test

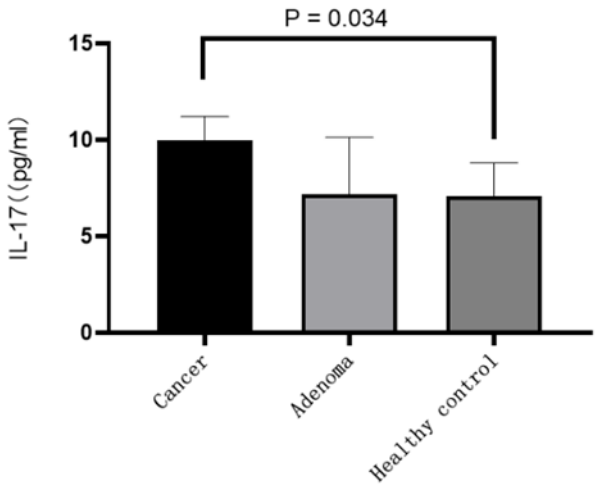

Figure 1. Serum IL-17A Levels in Colorectal Cancer Patients versus Adenoma and Healthy

3.3 The Diagnostic Value of Serum IL-17A, CEA, CA199 Single Tests and Their Combined Detection for Colorectal Cancer

The diagnostic efficacy of serum IL-17A in CRC patients was validated using the ROC curve, as illustrated in Figure 2a. The performance of IL-17A alone (AUC=0.640; cutoff value: 8.82; sensitivity: 61.9%; specificity: 67.3%) was found to be lower than that of CEA (AUC=0.704; cutoff value: 25.6; sensitivity: 45.2%; specificity: 90.9%), but higher than CA199 (AUC=0.587; cutoff value: 4.6; sensitivity: 34.1%; specificity: 94.5%). When combining CEA and CA199 with IL-17A, the screening efficacy improved significantly (AUC=0.754; cutoff value: 0.723; sensitivity: 54.0%; specificity: 96.5%; Figure 2b), surpassing the individual performances as well as the combined efficacy of CA199 and IL-17A (CEA+CA199+IL-17A vs IL-17A and CEA+CA199+IL-17A vs CA199+IL-17A).

Furthermore, we evaluated the diagnostic performance of the model in distinguishing early-stage CRC patients from the control group. In early-stage (I/II) patients, the area under the curve (AUC) values for IL-17A and CEA were 0.665 (cut-off value: 8.810; sensitivity: 67.6%; specificity: 67.3%; Figure 2c) and 0.641 (cut-off value: 4.550; sensitivity: 33.8%; specificity: 91.0%), respectively. The combination of biomarkers IL-17A, CA199, and CEA significantly increased the AUC to 0.722 (cut- off value: 0.555; sensitivity: 73.0%; specificity: 65.5%; Figure 2d).

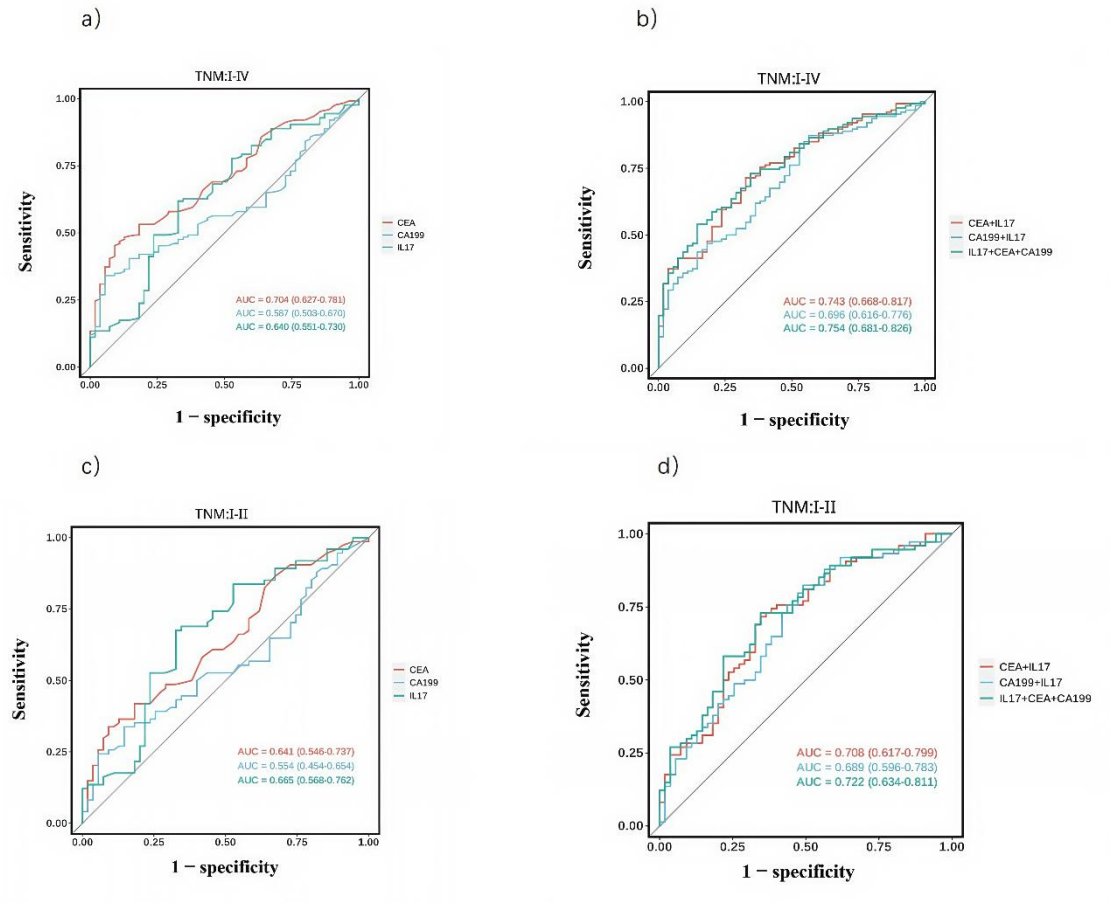

Figure 2. ROC Curve Analysis of Single and Combined Detection of IL-17A, CEA and CA199 for Colorectal Cancer Diagnosis

3.4 The Relationship Between IL-17A and Patient Survival Prognosis

The serum levels of IL-17A are positively correlated with the prognosis of colorectal cancer patients (P = 0.022, Figure 3). Compared to patients with lower serum IL-17A levels, those exhibiting high expression of IL-17A demonstrated a longer overall survival (OS). As shown in Table 3, univariate Cox regression analysis was conducted to evaluate the correlation between IL-17A and survival variables. All clinical pathological parameters that were significantly associated with OS in univariate analyses (P < 0.1) were included in the multivariate Cox regression model. Univariate analysis revealed that N stage (HR=3.85, P = 0.011), M stage (HR=5.85, P<0.001), and IL-17A levels (HR=0.29, P = 0.032) were significantly associated with prognosis. The findings from multivariate regression analysis revealed that N stage (HR=3.29; P = 0.027), M stage (HR = 3.72; P = 0.016), and IL-17A (HR=0.26; P = 0.021) serve as independent prognostic factors for OS, indicating that patients with elevated levels of IL-17A have a longer overall survival duration.

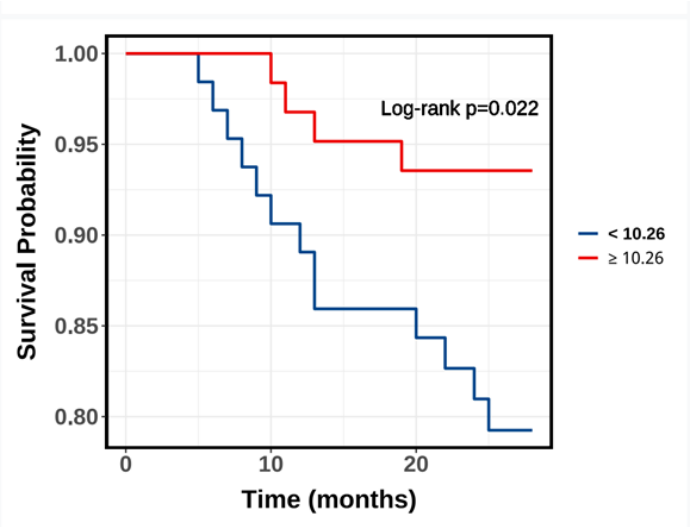

Figure 3. Kaplan-Meier Curve of Serum IL17 Levels and Survival Outcomes

Table 3. Cox Proportional Risk Model Analysis of Prognostic Factors in Patients with Colorectal Cancer

Variables	Univariable					Multivariable				
	N	Event N	HR[1]	95% CI[1]	p-value[2]	N	Event N	HR[1]	95% CI[1]	p-value[2]
Age (years)										
< 60	47	4	—	—						
≥ 60	79	13	2.00	0.65, 6.14	0.225					
Sex										
Male	70	10	—	—						
Female	56	7	0.84	0.32, 2.21	0.724					
T										
1-2	22	1	—	—						
3-4	104	16	3.63	0.48, 27.35	0.211					
N										
0	74	5	—	—		74	5	—	—	
1-2	52	12	3.85	1.36, 10.94	0.011*	52	12	3.29	1.14, 9.45	0.027*
M										
0	111	11	—	—		111	11	—	—	
1	15	6	5.85	2.08, 16.45	<0.001***	15	6	3.72	1.27, 10.88	0.016*
Differentiation										
Medium-Well	101	11	—	—		101	11	—	—	
Poor	25	6	2.36	0.87, 6.38	0.091	25	6	2.25	0.80, 6.34	0.125
Tumor site										

Colon	67	10	—	—						
Rectum	59	7	0.79	0.30, 2.08	0.633					
Nerves invasion										
Yes	114	15	—	—						
No	12	2	1.23	0.28, 5.38	0.784					
Vessels invasion										
Yes	121	15	—	—						
No	5	2	3.42	0.78, 14.99	0.103					
MSI										
Yes	10	1	0.73	0.10, 5.54	0.764					
No	116	16	—	—						
CEA										
< 5	75	7	—	—						
≥ 5	51	10	2.25	0.86, 5.92	0.100					
CA199										
< 27	87	11	—	—						
≥ 27	39	6	1.26	0.47, 3.42	0.645					
IL-17A										
< 10.26	64	13	—	—		64	13	—	—	
≥ 10.26	62	4	0.29	0.10, 0.90	0.032*	62	4	0.26	0.08, 0.81	0.022*

[1]HR = Hazard Ratio, CI = Confidence Interval

[2]*p<0.05; **p<0.01; ***p<0.001

3. Discussion

Colorectal cancer is among the most prevalent malignancies globally. Both the incidence and mortality rates of colorectal cancer have shown a significant upward trend, with an alarming decrease in the age of onse (Cao, Chen, Yu, Li, & Chen, 2021). In light of this situation, there is an urgent need for a straightforward screening method to facilitate early diagnosis and treatment. In this study, we measured preoperative serum IL-17A levels in patients with colorectal cancer and combined these measurements with traditional biomarkers such as CEA and CA199 to establish a novel biomarker and assess its diagnostic efficacy for CRC. Our findings revealed that preoperative serum IL-17A levels in colorectal cancer patients were significantly elevated compared to those in healthy individuals. Furthermore, we analyzed the relationship between IL-17A levels and both baseline characteristics as well as clinicopathological features of the patients. We found that high levels of IL-17A were significantly associated with vascular invasion. Current research suggests that IL-17A may promote tumor vascular invasion through its interaction with endothelial cells. Specifically, IL-17A directly binds to the IL-17 receptor (IL-17R) on endothelial cells, stimulating them to produce vascular endothelial growth factor

(VEGF). Additionally, IL-17A can induce the migration of endothelial cells, thereby facilitating angiogenesis (Numasaki, Fukushi, Ono, Narula, Zavodny, Kudo, et al., 2003). Additionally, IL-17A has been shown to promote angiogenesis in CRC by upregulating periostin (Kula, Dawidowicz, Mielcarska, Kiczmer, Chrabanska Rynkiewicz, et al., 2022). In murine models, the knockout of IL-17RA effectively inhibits tumor growth and vascular distribution (Jiang, Lin, Chang, Lo, Lin, Lu, et al., 2024). Our research findings corroborate these previous studies, indicating that elevated serum levels of IL-17A may facilitate the progression of colorectal cancer through enhanced vascular invasion.

The analysis of the ROC curve indicates that the combination of IL-17A, CA199, and CEA biomarkers exhibits superior diagnostic efficacy compared to individual biomarkers. This combination effectively differentiates CRC patients from healthy controls. The area under the curve (AUC) value for this biomarker combination in early-stage CRC patients is 0.722. Although this AUC does not meet the ideal threshold, its performance significantly surpasses that of traditional markers such as CEA (AUC = 0.641) and CA199 (AUC = 0.587). In comparison to existing non-invasive screening methods—such as fecal immunochemical tests or plasma SEPT9 methylation detection—the detection sensitivities for CRC are reported at 73.3% (95% CI: 63.9 - 80.9%) and 68.0% (95% CI: 58.2 - 76.5%), respectively (Johnson, Barclay, Mergener, Weiss, Konig, Beck, et al., 2014). The sensitivity of our model, which stands at 73%, has the potential to reduce missed diagnoses in early-stage CRC detection and can serve as a complementary tool alongside current non-invasive screening approaches, thereby enhancing the identification rate of early cases during initial screenings and triage processes for high-risk individuals. By implementing an initial screening process to identify high-risk individuals followed by confirmation through colonoscopy, we can mitigate unnecessary invasive examinations. In conclusion, the IL-17A-CEA-CA199 model improves sensitivity in early CRC screening. However, large-scale prospective studies are required to validate its diagnostic efficacy.

This study also discloses that the expression level of IL-17A can serve as a biomarker for the prognosis of colorectal cancer patients. Elevated serum levels of IL-17A are associated with improved overall survival. Both univariate and multivariate analyses indicate that IL-17A functions as an independent prognostic factor for overall survival (OS). This finding aligns with the research conducted by Lin et al. (2015), which demonstrated that the mRNA levels of IL-17A in colorectal cancer tissues were significantly higher than those found in adenoma and adjacent non-cancerous tissues, along with a markedly elevated positive expression rate of IL-17A in colorectal cancer specimens compared to both colorectal adenomas and non-tumor groups. Furthermore, the expression of IL-17A correlates positively with high differentiation and early-stage colorectal cancer.

However, studies by Wang (2019), Liu (2011), and Tseng et al. (2014) present contrasting results, indicating that patients exhibiting high levels of IL-17A experience shorter overall survival and disease-free survival rates. This discrepancy may be attributed to the dual role of IL-17A within tumor biology. On one hand, IL-17A has been shown to promote the progression of colorectal cancer through various mechanisms: 1) activating the vascular endothelial growth factor (VEGF) pathway to induce

angiogenesis; 2) upregulating anti-apoptotic protein Bcl-2 and matrix metalloproteinases (MMPs) via signaling cascades involving signal transducer and activator of transcription 3 (STAT3), phosphatidylinositol 3-kinase/protein kinase B (PI3K/Akt), and nuclear factor κB (NF-κB) pathways (Richter, Herrero San Juan, Weigmann, Bergis, Dauber, Muders, et al., 2017; Wu, He, Zhao, & Wang, 2019); 3) creating an immunosuppressive microenvironment by recruiting and activating myeloid-derived suppressor cells (MDSCs (Thiele Orberg, Fan, Tam, Dejea, Destefano Shields, Wu, et al., 2017; Amicarella, Muraro, Hirt, Cremonesi, Padovan, Mele, et al., 2017; Chang, Mirabolfathinejad, Katta, Cumpian, Gong, Caetano, et al., 2014); and 4) enhancing glycolytic metabolism to support tumor energy supply (Straus, 2013).

On the other hand, IL-17A has been shown to exert anti-tumor effects. Recent studies indicate that IL-17 receptor A (IL-17RA) can accelerate tumorigenesis through inflammatory responses in early CRC. Mouse models of early CRC with IL-17RA knockout exhibit slower tumor progression. However, in advanced CRC, IL-17RA appears to inhibit epithelial-mesenchymal transition (EMT) and tumor metastasis by restricting epidermal growth factor receptor (EGFR) membrane recycling and Src kinase activity. Furthermore, IL-17RA enhances the anti-tumor response of CD8+ T cells via the dectin-1/Syk/IL-18 axi (Denk, Ramakrishnan, Conche, Pallangyo, Pesic, Ceteci, et al., 2025; Kryczek, Wei, Szeliga, Vatan, & Zou, 2009). These findings suggest a stage-dependent regulatory role of IL-17A signaling in CRC progression.

Notably, our study found no significant difference in IL-17A levels among CRC patients at various stages. This observation may be linked to the stage-dependent function of IL-17A in tumor regulation: while it promotes tumor development in early CRC, it inhibits EMT and metastasis in advanced stages. Consequently, this could explain the lack of a direct association between its level and disease stage.

Additionally, it is important to note that IL-17A is produced by diverse cell types, including Th17 cells, Te17 cells, γδ T cells, natural killer (NK) cells, lymphocytes, monocytes, neutrophils, and mast cells (Monin & Gaffen, 2018). IL-17 derived from different cellular sources may play distinct roles in tumors. Wu et al. (2014) discovered that γδT17 cells are the primary producers of IL-17 in CRC patients and found a positive correlation between these cells and tumor stage, tumor size, tumor infiltration, lymphatic and vascular invasion, as well as lymph node metastasis. Li et al. (2013) reported that mast cells can recruit cytotoxic T lymphocytes (CTLs) and macrophages via IL-17 to exert anti-tumor effects; moreover, the location of TH17 cells also influences their role in colorectal cancer. The presence of intraepithelial Th17 cells correlates positively with improved survival outcomes; they promote the recruitment of highly cytotoxic CCR5+ CCR6+ CD8+ T cells into tumor tissue through the release of CCL5 and CCL20 to mediate anti-tumor effects. In contrast, TH17 cells located within the stroma do not exhibit this effect(33). The prognostic discrepancies of IL-17A in our study may arise from heterogeneous patient cohorts. Our research aligns with that conducted by Lin et al, which included CRC patients across stages I to IV; however, Liu et al.'s investigation was limited solely to stage III patients. The discrepancies in tumor development stages among these studies could account

for this contradictory outcome. In conclusion, the specific role of IL-17A appears contingent upon its source, localization within tissues or tumors, spatiotemporal characteristics, and developmental stage of colorectal cancer. Further investigations are warranted to elucidate its implications for prognosis in CRC.

Due to various factors, our current study has certain limitations. This investigation is a single-center retrospective design characterized by a limited sample size, a short follow-up period for patients, the lack of a standardized IL-17A detection system, and insufficient comparability among multi-center data. In future research, it will be essential to develop a standardized detection protocol and conduct large-scale multi-center clinical studies for further validation. The existing data only includes baseline IL-17A levels and do not provide postoperative continuous monitoring information. Moving forward, we can establish a longitudinal follow-up plan with regular postoperative assessment time points to enhance the comprehensiveness of our findings.

4. Conclusion

Our study indicates that there is a significant difference in serum IL-17A between colorectal cancer patients and healthy individuals. In colorectal cancer patients, high levels of IL-17A are associated with vascular invasion. The IL-17A-CEA-CA199 model offers a non-invasive triage tool for high-risk populations, potentially reducing unnecessary colonoscopies. Further validation in multicenter cohorts is warranted. Furthermore, high IL-17A levels predict a longer OS for CRC patients and can be utilized as an independent prognostic factor.

Ethics statement

This study received ethical approval from the Ethics Committee of the First Affiliated Hospital of Chongqing Medical University (Approval No. K2023-483). All procedures adhered to institutional and national ethical guidelines. Human samples were collected during standard preoperative protocols for surgical patients. No identifiable patient data were included. Written informed consent was obtained from participants or legal guardians in accordance with institutional requirements.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Funding Statement

The authors declare no commercial, financial, or competing interests related to this research.

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Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Abbreviations: CRC, colorectal cancer; IL-17A, interleukin-17A; CEA, carcinoembryonic antigen; CA199, carbohydrate antigen 19-9; ROC, receiver operating characteristic; AUC, area under the curve; OS, overall survival; HR, hazard ratio; CI, confidence interval; FOBT, fecal occult blood test; MMP, matrix metalloproteinase; NSCLC, non-small cell lung cancer; NF-κB, nuclear factor kappa B; PI3K/AKT, phosphatidylinositol 3-kinase/protein kinase B; STAT3, signal transducer and activator of transcription 3; MDSCs, myeloid-derived suppressor cells; EMT, epithelial-mesenchymal transition; EGFR, epidermal growth factor receptor; Th17, T helper 17 cells; NK, natural killer cells; CTLs, cytotoxic T lymphocytes; VEGF, vascular endothelial growth factor; IL-17RA, interleukin-17 receptor A; SEPT9, septin 9; CCL, chemokine (C-C motif) ligand; CCR, C-C chemokine receptor.

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