

# Analysis of the Peripheral Blood Helper T-Cell 17-Cell Level and Monocyte/Lymphocyte Ratio for Colorectal Cancer Prognosis Prediction

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**Abstract:** *Objective:* To investigate the value of peripheral blood helper T cell 17 cell level and monocyte/lymphocyte ratio to predict the prognosis of colorectal cancer patients. *Methods:* 74 colorectal cancer patients who attended Hospital 960 from January 2021 to January 2022 were retrospectively analyzed. Clinical data of the patients were collected, including gender, age, and histologic type. Immunohistochemical indexes such as Th17 cell level and monocyte/lymphocyte ratio in the peripheral blood of patients were also collected. The prognosis of patients after treatment, as well as peripheral blood Th17 and MLR levels, were observed and analyzed. *Results:* After follow-up after treatment, in the final 74 patients, the prognosis was good in 32 patients, accounting for 43.24%, and the prognosis was bad in 42 patients, accounting for 56.76%. There were no significant differences between the average age and tumor diameters of the good prognosis and poor prognosis groups ( $P > 0.05$ ). However, the TNM staging, intervention taken, differentiation degree, presence of distant metastasis, presence of lymph node metastasis, Th17 level, and MLR level are significantly different between the two groups ( $P < 0.05$ ). *Conclusion:* Peripheral blood Th17 and MLR have predictive value for the prognosis of colorectal cancer patients, and high levels of peripheral blood Th17 and MLR imply poor prognosis. The detection of peripheral blood Th17 and MLR levels is simple and convenient and can be used as indicators to provide a reference for the prognostic assessment of colorectal cancer patients.

**Keywords:** Helper T cell 17 cells; Monocyte/lymphocyte ratio; Colorectal cancer

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## 1. Introduction

Colorectal cancer is one of the most common malignant tumors of the digestive system and poses a serious threat to human health. Surgical resection is the main treatment for early-stage colorectal cancer; however, there is currently no model that can accurately predict the prognosis of colorectal cancer patients. In clinical practice, the prognosis of colorectal cancer patients is influenced by many factors, such as tumor size, infiltration depth, metastasis, degree of differentiation, and immune status. Additionally, tumor load is an important factor affecting patient prognosis. Studies have shown that a larger tumor load is associated with a poorer prognosis<sup>[1]</sup>. However,

current clinical assessment methods for tumor load are not standardized, which affects clinical diagnosis and treatment planning to some extent.

Existing studies have shown that Th17 cells play an important role in various tumors. As a T-cell subpopulation, Th17 cells can promote the proliferation, differentiation, and function of CD8+ T cells [2]. Some studies have reported that Th17 cells are up-regulated in a variety of tumors, including colorectal cancer, breast cancer, and prostate cancer. Th17 cells also promote tumor angiogenesis and the inflammatory response [3]. It has been found that peripheral blood IL-17 levels are closely related to the prognosis of colorectal cancer patients [4]. However, the role of Th17 in colorectal cancer remains unclear. Recently, a study reported that peripheral blood Th17 cells could inhibit tumor neoangiogenesis [5].

Therefore, this study aims to explore the role of Th17 in colorectal cancer patients by detecting peripheral blood Th17 levels and combining these findings with clinical indicators. In this study, 74 colorectal cancer patients who underwent treatment at this hospital from January 2021 to January 2022 were selected as research subjects. Clinical data and immunohistochemical indexes of the patients were collected. These data were analyzed and compared to explore the relationship between peripheral blood Th17 levels, the monocyte/lymphocyte ratio, and the prognosis of colorectal cancer, thereby investigating the predictive value of these factors for the prognosis of colorectal cancer patients.

## **2. Materials and methods**

### **2.1. General information**

Seventy-four cases of colorectal cancer patients who visited Hospital 960 from January 2021 to January 2022 were retrospectively analyzed. Inclusion criteria: (1) Met the naming criteria of the World Health Organization/International Agency for Research on Cancer (WHO/IARC) and diagnosed by pathology; (2) Aged between 18 and 70 years old; (3) Had no history of malignant tumors, tumor-related treatments, immune system disorders, or other concurrent malignant tumors; (4) Had no severe liver or renal function impairment. Exclusion criteria: (1) Multiple metastases; (2) Combined with other organ tumors; (3) Combined with acute infections or autoimmune diseases, etc. The study was approved by the hospital ethics committee and informed consent was obtained from patients and their families.

### **2.2. Methods**

Clinical data of patients were collected, including gender, age, histologic type, etc. Immunohistochemical indicators such as Th17 cell level and monocyte/lymphocyte ratio in the peripheral blood of patients were also collected.

### **2.3. Observation indexes**

The prognosis of patients after treatment, as well as peripheral blood Th17 and MLR levels, were observed and analyzed.

### **2.4. Statistical methods**

The research results were imported into SPSS 22.0 software to analyze the data. Count data were expressed as percentages, and the  $\chi^2$  test was used for comparison between groups. Measurement data were expressed as mean  $\pm$  standard deviation (SD), and the *t*-test was used for comparison between groups. The difference was considered significant at  $P < 0.05$ .

### 3. Results

#### 3.1. Prognosis

After follow-up after treatment, among the final 74 patients, there were 32 patients (43.24%) with good prognosis while 42 patients (56.76%) with poor prognosis. The patients were grouped into two groups according to their prognosis results.

#### 3.2. Clinical characteristics

**Table 1** shows that there were no significant differences between the average age and tumor diameters of the good prognosis and poor prognosis groups ( $P > 0.05$ ). However, the TNM staging, intervention taken, differentiation degree, presence of distant metastasis, presence of lymph node metastasis, Th17 level, and MLR level are significantly different between the two groups ( $P < 0.05$ ).

**Table 1.** Comparison of clinical characteristics between the two groups

Group	Good prognosis group (n = 32)	Poor prognosis group (n = 42)	t/ $\chi^2$	P	
Age (years)	47.36 ± 2.45	48.12 ± 2.12	1.4281	0.1576	
Tumor diameter (cm)	2.31 ± 0.79	4.87 ± 1.01	11.8363	0.0000	
Clinical stage	I–II	21 (65.63)	17 (40.48)	4.5981	0.0320
	III–IV	11 (34.37)	25 (59.52)		
Treatment	Surgical treatment	21 (65.63)	17 (40.48)	4.5981	0.0320
	Non-surgical treatment	11 (34.37)	25 (59.52)		
Degree of differentiation	Low differentiation	11 (34.37)	29 (69.05)	8.7915	0.0030
	Medium-high differentiation	21 (65.63)	13 (30.95)		
Distant metastasis	Yes	10 (31.25)	32 (76.19)	14.9454	0.0001
	No	22 (68.75)	10 (23.81)		
Lymph node metastasis	Yes	8 (25.00)	31 (73.81)	17.3583	0.0000
	No	24 (75.00)	11 (26.19)		
Th17	2.02 ± 0.45	2.31 ± 0.47	2.8883	0.0050	
MLR	0.34 ± 0.15	0.46 ± 0.12	4.0485	0.0001	

### 4. Discussion

From the follow-up results, the median survival of patients was 3 months (range 0–3 years) and the median progression-free survival was 479 days (range 0–7 years). Dong *et al.* [6] showed that peripheral blood Th17 cell level and monocyte/lymphocyte ratio in colorectal cancer patients were closely related to poor prognosis and that the combined prediction of prognosis in colorectal cancer patients in this way was clinically significant. Besides, this study also found that tumor load was an independent risk factor affecting the prognosis of colorectal cancer patients in both groups. The results of Wang *et al.* [7] showed that tumor load was closely related to the prognosis of colorectal cancer patients, and its combined predictive value was better than applying these two indexes individually.

In this study, there were no significant differences between the average age and tumor diameters of the good prognosis and poor prognosis groups ( $P > 0.05$ ). However, the TNM staging, intervention taken, differentiation degree, presence of distant metastasis, presence of lymph node metastasis, Th17 level, and

MLR level are significantly different between the two groups ( $P < 0.05$ ). This study indicates that even though colorectal cancer patients have low clinical stages and do not have lymphatic or distant metastases, patients with high levels of peripheral blood Th17 and MLR levels still need to be closely watched and actively treated. High peripheral blood Th17 and MLR levels can be used as an independent risk factor for determining the prognosis of TNBC patients with a high degree of accuracy, while peripheral blood Th17 and MLR levels, although capable of predicting the prognostic survival of patients, are of limited clinical value and relatively inaccurate, and thus the combination of the two did not significantly improve the predictive accuracy. This is mainly because Th17 cells, which are mainly characterized by the secretion of IL-17, are involved in the immune response to a variety of autoimmune and infectious diseases, and in colorectal cancer, Th17 cells can promote tumor growth and angiogenesis through the secretion of cytokines, such as IL-17A, and also participate in anti-tumor immunity through the recruitment and activation of other immune cells<sup>[8,9]</sup>. Therefore, the specific role of Th17 cells in colorectal cancer depends on the complex interactions between the tumor microenvironment and the immune response. monocytes, as an important part of the immune system, have the functions of phagocytosis and antigen presentation. Lymphocytes, on the other hand, are the main executors of the body's immune response. MLR, as an indicator reflecting the relationship between the number of monocytes and lymphocytes, is negatively correlated with the prognosis of a variety of tumors<sup>[10,11]</sup>. In colorectal cancer, high MLR often suggests a poor prognosis, which may be related to monocytes promoting tumor growth and metastasis. Combining the two indicators of Th17 cell level and MLR can reflect the immune status and tumor load of colorectal cancer patients more comprehensively. High Th17 cell levels and high MLR may suggest that patients have active immune responses but poor anti-tumor effects, suggesting that clinicians need to adjust treatment regimens to enhance anti-tumor immune responses or inhibit tumor growth<sup>[12]</sup>.

In summary, the combined detection of peripheral blood Th17 cell level and monocyte/lymphocyte ratio has a certain application value in predicting the prognosis of patients with colorectal cancer, especially in predicting the prognosis of patients with early-stage colorectal cancer, which shows good specificity and sensitivity, and has high clinical application value. It is worth noting that this study is retrospective, and the included subjects are all colorectal cancer patients who underwent surgical treatment in our hospital from January 1, 2021, to January 2022, there are some limitations in this study, such as the small sample size and the inclusion of patients with early-stage colorectal cancer. In the future, with the continuous development of immunotherapy and precision medicine, immune cell indicators such as Th17 cell level and MLR are expected to play a greater role in the diagnosis, treatment, and prognosis assessment of colorectal cancer. Meanwhile, an in-depth study of the specific mechanism of Th17 cells and monocytes in colorectal cancer is expected to provide a theoretical basis for the development of new therapeutic strategies.

## Disclosure statement

The authors declare no conflict of interest.

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