

Serum Interleukin-10 and Interleukin-17 Levels in Papillary Carcinoma and Their Relationship with Prognosis

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Abstract: Object: To investigate the levels of serum interleukin-10 (IL-10) and IL-17 in papillary thyroid carcinoma (PTC) and their relationship with prognosis. Method: 120 PTC patients who underwent radical mastectomy in the Department of Thyroid and Mammary Surgery of Cangzhou Central Hospital from January 2018 to April 2019 were randomly selected as the experimental group, and 120 healthy people who matched 1:1 with the hospital physical examination center in the same period were selected as the control group according to the sex, age and body mass index of the experimental group. Compare the levels of serum IL-10 and IL-17 between the two groups, analyze the relationship between the levels and the pathological features of PTC patients, draw the characteristic curve of subjects' working characteristics, and calculate the area under the curve (AUC) to evaluate the diagnostic value of serum IL-10 and IL-17 for PTC. All patients were followed up for 12 months after operation. Imaging and pathological examination results were used as prognostic indicators. Kaplan-Meier survival analysis was used to analyze the relationship between serum IL-10 and IL-17 levels and the prognosis of PTC patients. COX regression analysis was used to analyze the prognostic factors of PTC patients. Result: The levels of serum IL-10 and IL-17 in experimental group were significantly higher than those in control group ($P < 0.05$). Comparison of serum IL-10 levels in PTC patients with different tumor diameters and lymphatic metastasis showed statistically significant difference ($P < 0.05$). The level of IL-17 in serum of PTC patients with different TNM stages, differentiation degree and lymphatic metastasis was statistically significant ($P < 0.05$). The diagnostic value of serum IL-10 combined with IL-17 in PTC is significantly higher than that of single detection ($P < 0.05$). According to the median serum IL-10 and IL-17 for PTC diagnosis, the postoperative recurrence rate of IL-10 high expression group was significantly higher than that of IL-10 low expression group, and the postoperative recurrence rate of IL-17 high expression group was significantly higher than that of IL-17 low expression group ($P < 0.05$). TNM stage, IL-10 level and IL-17 level are independent risk factors for postoperative recurrence of PTC patients ($P < 0.05$). Conclusion: The elevated levels of serum IL-10 and IL-17 in PTC patients are related to TNM stage, degree of differentiation, maximum tumor diameter and lymphatic metastasis, and are independent risk factors for postoperative recurrence of PTC patients, which may be a reference index for disease diagnosis and prognosis evaluation.

Keywords: Papillary Thyroid Carcinoma, Interleukin 10, Interleukin 17, Diagnosis, Prognosis

1. Introduction

Papillary thyroid carcinoma (PTC) is the most common

type in the pathological classification of thyroid cancer, with low malignancy and good early prognosis [1]. However, the early diagnosis rate is still at a low level because most patients

have painless thyroid nodules as the main clinical symptoms [2]. Studies have shown that stromal cells in the tumor microenvironment of thyroid cancer play an important role in the process of tumor invasion and metastasis [3-4]. The tumor microenvironment is the "small environment" for tumor growth. Macrophages, fibroblasts, lymphocytes, etc. interact with tumor cells in the microenvironment and participate in the regulation of the occurrence and development of malignant tumors, among which, inflammatory cells and their secreted inflammatory factors constitute an important part of the tumor microenvironment. Chronic inflammation promotes cell malignancy, and malignant tumor cells recruit inflammatory cells to form an inflammatory environment that promotes tumor development in some malignant tumors. The persistence of chronic inflammation further destroys the body's immune surveillance ability, promotes tumor cell proliferation, metastasis and tumor angiogenesis, while inhibiting the sensitivity of cells to chemotherapy. Cytokines are an important link factor between chronic inflammation and tumors, and they play an important role in maintaining chronic inflammation and promoting malignant epithelial transformation. Interleukin is one of the important members of cytokines among them. It is a type of cytokine that interacts between leukocytes and immune cells. It plays an important role in transmitting information, activating and regulating immune cells, mediating T and B cell activation, proliferation and differentiation, and inflammation. Interleukin-10 and interleukin-17 are recognized inflammatory and immunosuppressive factors, which can regulate cell growth and differentiation, and participate in inflammatory and immune responses [5]. Studies have analyzed the expression of the above indicators in PTC tissues and found that IL-10 and IL-17 are up-regulated in PTC tissues and participate in tumorigenesis and development [6, 7]. Serological examination is easy to operate and low in cost, compared with pathological examination. Therefore, 120 patients with PTC were randomly selected as the experimental group, who were treated by radical mastectomy at the Thyroid and Breast Surgery Department of Cangzhou Central Hospital from January 2018 to April 2019. And 120 healthy people were matched 1:1 as the control group from the hospital physical examination center during the same period, according to the gender, age and body mass index of the experimental group. The serum levels of IL-10 and IL-17 were compared between the two groups, and the value of the above indicators was analyzed in the diagnosis and prognosis of PTC. The specific results are as follows.

2. Materials and Methods

2.1. Materials

120 PTC patients who underwent radical mastectomy in the Department of Thyroid and Mammary Surgery of Cangzhou Central Hospital from January 2018 to April 2019 were randomly selected as the experimental group, including 90 females and 30 males, aged 18 to 70 years, with an average

age (45.29 ± 4.42) years old and the average body mass index (BMI) was (27.76 ± 1.31) kg/m^2 . 69 cases were over 45 years old and 51 cases were less than or equal to 45 years old; 49 cases were larger than 2 cm and 71 cases were less than or equal to 2 cm in terms of the largest tumor diameter; 58 cases were single and 62 cases were multiple cases in terms of the number of lesions; 62 cases were in stage I-II, and 58 cases were in stage III-IV in terms of TNM staging; 34 cases were low, 53 cases were medium, and 33 cases were high in terms of the degree of differentiation; 46 cases had lymphatic metastasis, 74 cases did not. 120 healthy people served as the control group, matched 1:1 to the physical examination center of the hospital in the same period, according to the gender, age and BMI of the experimental group. Among them, 90 were females and 30 were males, aged from 18 to 70 years old, with an average age of (46.12 ± 4.48) years and an average BMI of (28.23 ± 1.35) kg/m^2 .

2.2. Inclusion and Exclusion Criteria

2.2.1. Inclusion Criteria

Inclusion criteria of study subjects: (1) All patients were between 18 and 80 years old; (2) All patients were pathologically confirmed to be papillary thyroid carcinoma and were primary [8]; (3) All patients did not receive radiotherapy, chemotherapy or other related treatments before enrollment; (4) All patients were New-onset patients; (5) All patients have complete clinical and follow-up data; (6) All patients have informed consent and signed an informed consent form.

Inclusion criteria for the control group: (1) All patients have been excluded from immune diseases, malignant tumors and other related diseases; (2) All patients have no history of thyroid disease or surgery. (3) The research complied with the regulations of the hospital ethics committee, and the subjects signed the informed consent form.

2.2.2. Exclusion Criteria

Exclusion criteria: (1) Combined with other malignant tumors; (2) Recurrent papillary thyroid carcinoma; (3) With other autoimmune or infectious diseases; (4) Insufficiency of important organs.

2.3. Methods

2.3.1. Determination of Serum IL-10 and IL-17 Levels

Take 5 mL of peripheral venous blood from the experimental group and the control group in the fasting state in the morning, centrifuge at 3500 r/min for 10 min, take the supernatant, and store it in a refrigerator at -80°C for later use. Serum IL-10 and IL-17 levels were determined, using double antibody sandwich enzyme-linked immunosorbent assay, and operating in strict accordance with the instructions. All kits were purchased from Hebei Jincan Medical Equipment Sales Company, and all use the same batch number.

2.3.2. Prognostic Analysis

All patients were followed up for 12 months after operation,

using outpatient follow-up or telephone follow-up. Imaging and pathological examination results were used as prognostic evaluation indicators. Kaplan-Meier survival analysis analyzed the relationship between serum IL-10 and IL-17 levels and the prognosis of PTC patients. COX regression analysis analyzed the factors affecting the prognosis of PTC patients.

2.4. Statistical Analysis

The SPSS19.0 software is used for data analysis and processing. Normally distributed measurement data are expressed as (\pm s), paired-sample t-test was used for comparison between two groups, one-way analysis of variance was used for three-group comparison, and Snk-q test was used for pairwise comparison. Counting data is expressed by frequency or composition ratio, using chi-square non-correction method. Draw receiver operating characteristic curve (ROC), calculate sensitivity, specificity, area under curve (AUC), and evaluate the diagnostic value of serum IL-10 and IL-17 for PTC. COX regression was used to analyze the factors affecting the prognosis of PTC patients. The difference is statistically significant with $P < 0.05$.

3. Results

3.1. Comparison of Serum IL-10 and IL-17 Levels Between The Two Groups

The levels of serum IL-10 and IL-17 in the experimental group were significantly higher than those in the control group ($P < 0.05$). (Table 1)

Table 1. Comparison of Serum IL-10 and IL-17 Levels between the Two Groups of Subjects (\pm s).

Group	n	IL-10 (pg/mL)	IL-17 (pg/mL)
Test group	120	8.11 \pm 3.28	2.38 \pm 0.63
Control group	120	5.92 \pm 3.24	1.56 \pm 0.52
<i>t</i>		5.203	10.996
<i>P</i>		<0.01	<0.01

3.2. The Relationship Between IL-10 Levels in PTC and Clinicopathological Characteristics

The expression of serum IL-10 was related to the maximum tumor diameter and lymphatic metastasis in PTC ($P < 0.05$). There was no significant difference in serum IL-10 expression in terms of age, gender, number of lesions, TNM stage, and degree of differentiation ($P > 0.05$). (Table 2).

Table 2. Relationship between IL-10 Levels in PTC and Clinicopathological Characteristics.

Feature	n	IL-10 (pg/mL)	<i>t/F</i>	<i>P</i>
Age			0.175	0.861
>45years	69	7.82 \pm 1.24		
\leq 45years	51	7.78 \pm 1.23		
Gender			0.207	0.836
Male	30	7.74 \pm 1.13		
Female	90	7.69 \pm 1.15		
Maximum tumor diameter			65.593	0.000
>2cm	49	8.69 \pm 1.21		
\leq 2cm	71	7.23 \pm 1.18		
Number of lesions			0.224	0.823
Single	58	7.87 \pm 1.21		
Multiple	62	7.92 \pm 1.23		
TNM staging			1.637	0.104
Stage I-II	62	7.26 \pm 1.18		
Stage III-IV	58	7.61 \pm 1.16		
Differentiation			0.271	0.763
Low	34	7.47 \pm 0.89		
Middle	53	7.56 \pm 0.91		
High	33	7.63 \pm 0.87		
Lymphatic metastasis			4.247	0.000
Yes	46	8.38 \pm 1.26		
No	74	7.39 \pm 1.23		

3.3. The Relationship Between IL-17 Levels in PTC and Clinicopathological Characteristics

The expression of serum IL-17 was related to TNM stage, degree of differentiation, and lymphatic metastasis ($P < 0.05$). There were no significant differences in serum IL-17 levels in terms of age, gender, maximum tumor diameter, and number of lesions ($P > 0.05$). (Table 3)

Table 3. Relationship between IL-17 Levels in PTC and Clinicopathological Characteristics.

Feature	n	IL-17 (pg/mL)	<i>t/F</i>	<i>P</i>
Age			1.465	0.146
>45 years	69	1.87 \pm 0.23		
\leq 45 years	51	1.93 \pm 0.21		
Gender			0.812	0.419
Male	30	1.83 \pm 0.16		

Feature	n	IL-17 (pg/mL)	t/F	P
Female	90	1.86±0.18		
Maximum tumor diameter			1.844	0.068
>2cm	49	2.12±0.14		
≤2cm	71	2.07±0.15		
Number of lesions			1.945	0.054
Single	58	1.69±0.13		
Multiple	62	1.74±0.15		
TNM staging			18.631	0.000
Stage I-II	62	1.97±0.18		
Stage III-IV	58	2.67±0.23		
Differentiation			14.738	0.000
Low	34	1.76±0.12		
Middle	53	1.82±0.13		
High	33	1.92±0.11		
Lymphatic metastasis			16.136	0.000
Yes	46	2.45±0.23		
No	74	1.79±0.21		

3.4. The Diagnostic Value of Serum IL-10 and IL-17 for PTC

The clinical diagnosis critical points of IL-10 and IL-17 for PTC are selected according to the literature method. It can be seen from the ROC curve that the 4th and 5th cut-off points of IL-10 and IL-17 are respectively 7.11pg/mL and 2.12pg/mL. Further analysis found that the AUCs of IL-10, IL-17 and IL-10 combined with IL-17 to diagnose PTC were 1.283, 1.336, 1.694, respectively, and the diagnostic value of combined detection was significantly higher than that of single detection ($P<0.05$). (Table 4, Figure 1)

3.5. The Relationship Between Serum IL-10 and IL-17 Levels and the Prognosis of PTC Patients

PTC patients were divided into IL-10 high expression group, IL-10 low expression group, IL-17 high expression group and IL-17 low expression group based on the median value of serum IL-10 and IL-17. Kaplan-Meier survival analysis

showed that the postoperative recurrence rate of IL-10 high expression group was significantly higher than that of IL-10 low expression group. The postoperative recurrence rate of IL-17 high expression group was significantly higher than that of the IL-17 low expression group ($P<0.05$). (Figure 2)

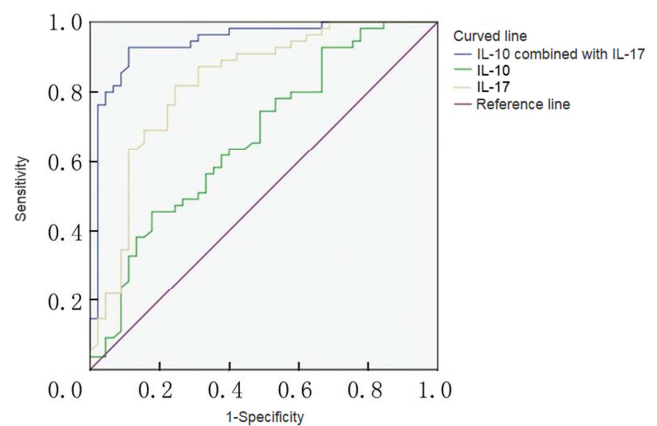


Figure 1. ROC Curve of Serum IL-10 and IL-17 in the Diagnosis of PTC.

Table 4. The Diagnostic Value of Serum IL-10 and IL-17 for PTC.

Item	Critical Value	Sensitivity (%)	Specificity (%)	P	AUC (95%CI)
IL-10 (pg/mL)	7.11	78.92	80.26	0.024	1.283 (0.876~1.987)
IL-17 (pg/mL)	2.12	79.27	80.31	0.018	1.336 (0.914~1.698)
IL-10 combined with IL-17	-	84.39	83.27	0.000	1.694 (0.762~2.123)

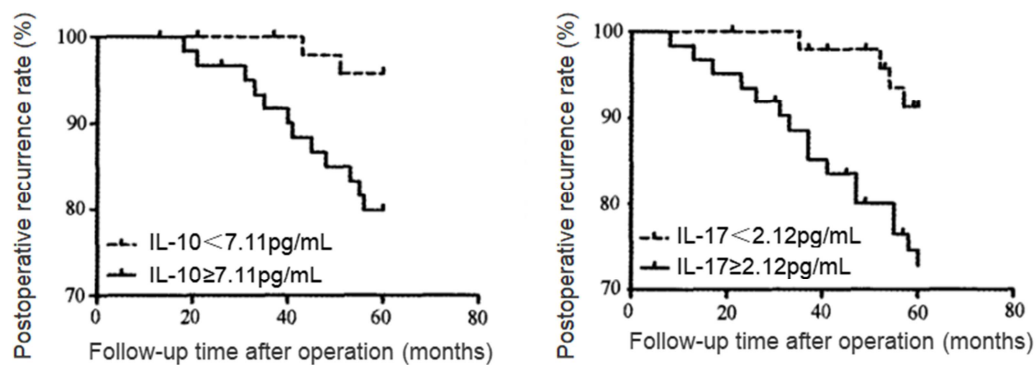


Figure 2. The Relationship between Serum IL-10 and IL-17 Levels and the Prognosis of PTC Patients.

3.6. COX Regression Analysis of Factors Affecting the Prognosis of PTC Patients

In COX regression analysis, single factor analysis showed that the largest tumor diameter, TNM stage, degree of differentiation, lymphatic metastasis, IL-10 level, and IL-17

level are the influencing factors of postoperative recurrence of PTC patients ($P < 0.05$); multiple factors analysis showed that TNM staging, IL-10 level, and IL-17 level are independent risk factors that affect postoperative recurrence in PTC patients ($P < 0.05$). (Table 5)

Table 5. COX Regression Analysis of Factors Affecting the Prognosis of PTC Patients.

Factor	Classification	Single Factor			Multiple Factors		
		HR	95%CI	P	HR	95%CI	P
Age	≤45 years vs >45 years	0.644	0.232~1.071	0.121	0.665	0.339~1.125	0.143
Gender	Male vs Female	0.113	0.102~1.215	0.157	0.124	0.038~0.294	0.298
Maximum tumor diameter	≤2cm vs >2cm	5.422	3.212~8.372	0.000	5.392	3.294~8.921	0.097
Number of lesions	Single vs Multiple	3.286	2.182~5.301	0.247	3.594	1.284~6.494	0.273
TNM staging	Stage I-II vs Stage III-IV	2.238	1.211~4.823	0.000	2.482	1.228~5.982	0.000
Differentiation	Low vs Middle vs High	3.084	1.372~6.924	0.000	3.115	1.294~7.291	0.352
Lymphatic metastasis	No vs Yes	3.723	1.879~6.392	0.000	3.980	2.685~5.980	0.288
IL-10	Low expression vs High expression	5.232	3.221~8.348	0.000	4.985	3.211~6.809	0.000
IL-17	Low expression vs High expression	4.698	1.281~6.923	0.000	4.923	2.912~7.986	0.000

4. Discussions

4.1. Research Background

Thyroid cancer (TC) is one of the most common malignant tumors in the head and neck and endocrine system. Thyroid cancer can be divided into thyroid follicular carcinoma, papillary thyroid carcinoma, medullary thyroid carcinoma, and undifferentiated thyroid carcinoma [9]. Among them, PTC accounts for about 80% of all thyroid cancers. The occurrence, development and prognosis of papillary thyroid carcinoma are affected by many factors such as the patient's age, gender, environmental factors, genetic factors, histopathological types, lymph node metastasis, clinical staging, immunohistochemical factors, etc. [10]. Papillary thyroid carcinoma is not highly malignant and has a high clinical cure rate. However, its early diagnosis rate is generally low, because the early clinical symptoms of PTC are not obvious and lack specificity [11]. At present, the serological diagnosis of PTC still has certain limitations [12]. Previous studies have shown that interleukins are involved in a variety of inflammatory reactions and the occurrence and development of a variety of tumors [13]. Studies have shown that the determination of certain serum interleukin levels is of great significance for the diagnosis of PTC and prognostic evaluation [14].

4.2. PTC and IL-10

IL-10 is mainly secreted by Th2 cells, and can also be secreted by monocytes, macrophages, dendritic cells, CD4 + T lymphocytes, CD8 + T lymphocytes, tumor cells, etc. [15]. There are two receptors for IL-10, namely: IL-10R1 and IL-10R2. IL-10R1 is mainly expressed on the surface of hematopoietic cells, almost all of which are low expression, but can be greatly up regulated after stimulation; IL-10R2 is expressed in most cells of the body, so most cells of the body can bind to IL-10R. The main biological function of IL-10 is

to inhibit the differentiation and maturation of DC cells; inhibit the secretion of IL-2 by Th1 cells; inhibit the production of pro-inflammatory cytokines by macrophages; inhibit initial CD4 + T lymphocytes; promote the proliferation of B lymphocytes; promote NK Proliferation of cells but inhibit the secretion of cytokines; promote the proliferation of CD8 + T lymphocytes.

It is currently believed that IL-10 is a type of factor that inhibits the body's cellular immunity, promotes tumor growth, and leads to tumor immune escape. The main mechanism is to down-regulate human leukocyte antigen (HLA)-1 molecules on the surface of tumor cells, reduce tumor immunogenicity and promote tumor immune escape [16]; inhibit the function of antigen presenting cells by down-regulating HLA- on the surface of DCs and other cells; induce the production of Tregs through IL-10 which is secreted by antigen-presenting cells such as DC, thereby mediating peripheral blood immune tolerance [17]; inhibit the secretion of IFN and other cytokines by NK cells and reduce the anti-tumor effect of NK cells.

A large number of studies have confirmed that IL-10 is up-regulated in the tissues and peripheral blood of diseases such as colon cancer, ovarian cancer, and thyroid papillary carcinoma, and is related to tumor invasion and metastasis. Studies have pointed out that the level of Treg in the tumor tissue of patients with colon cancer is higher. After 3 years of follow-up, the levels of Treg and CD4+ T cells in patients with recurrence were found to be significantly increased, accompanied by an increase in IL-10 levels [18]. Another study showed that IL-6 and TNF- α in peripheral blood of patients with ovarian cancer metastasis were significantly reduced, while IL-10 levels were significantly increased, indicating that the overall Th1/Th2 cell immunity of ovarian cancer patients drifted to Th2 cell immunity [19]. Factors such as IL-10 can also lead to imbalance of the patient's immune function by inducing the differentiation of CD4 + T lymphocytes into regulatory T lymphocytes, thereby inhibiting the patient's overall immune function. In the study of the relationship between IL-10 and papillary thyroid

carcinoma, Liyan Li and others have found that highly expressed IL-10 is involved in the process of tumor cell proliferation, invasion and metastasis, and is also highly expressed in cancer tissues of PTC patients. And the expression level of IL-10 is closely related to the degree of tumor differentiation, TNM stage, cervical lymphatic metastasis and degree of invasion [7].

In this study, the serum IL-10 level of the experimental group was significantly higher than that of the control group, which was in line with the results of previous studies. The serum IL-10 level of patients with tumors larger than 2 cm and lymphatic metastasis increased significantly. All of the above suggest that IL-10 is involved in the occurrence and development of PTC. In this study, patients with PTC were divided into IL-10 high expression group and IL-10 low expression group based on the median value of serum IL-10. Kaplan-Meier survival analysis showed that the postoperative recurrence rate of IL-10 high expression group was significantly higher than that of IL-10 low expression group, suggesting that IL-10 is closely related to the prognosis of PTC.

4.3. PTC and IL-17

Interleukin 17 is a pro-inflammatory cytokine discovered in recent years. NK cells, CD8 + T cells and neutrophils are also sources of IL-17 in addition to Th17 cells. The IL-17 family consists of 6 subtypes, namely IL-17A, IL-17B, IL-17C, IL-17D, IL-17E, and IL-17F. Among them, IL-17A, as the earliest discovered member and the most in-depth research in this family, is the iconic cytokine of this family, and can also be called IL-17 or CTLA-8 in the literature.

IL-17 can promote inflammation development, immune rejection, hematopoiesis and other functions through specific binding with receptors. IL-17R is widely distributed. CD56+NK cells, monocytes, human lung epidermal cell line A549all have IL-17R expression. It conducts signals mainly through three ways after IL-17 binds to IL-17R. On the one hand, TRAF6, NIK and IKK- α activate NF- κ B. NF- κ B quickly translocates into the nucleus and binds to the κ B site at the promoter of the target gene to initiate transcription and Protein synthesis after the nuclear localization signal of NF- κ B is exposed [21]; On the other hand, IL-17 can transmit signals through the mitogen-activated protein kinase (MAPK) signaling pathway, the most important of which are extracellular regulatory protein kinase (ERK), c-Jun N-terminal kinase (JNK), and P38 pathway [22]; IL-17 can also transmit signals through the JAKS/STATs pathway, IL-17 can induce the phosphorylation activation of JAK1/2/3, TyK2 and STAT1-4, of which JAK2 is the most important [23].

IL-17 is closely related to the occurrence and development of a variety of malignant tumor diseases. It can promote tumor development through various mechanisms such as affecting cell proliferation, promoting angiogenesis, and inflammatory cell aggregation and activation [24]. Meng et al. performed immunohistochemical staining on cancer tissues and normal gastric mucosa of 50 gastric cancer patients and found that IL-17 was mainly distributed in the cytoplasm of mononuclear

cells in cancer tissues, and was rarely expressed in normal gastric mucosa [25]. Research by Zhang Xiaoyu et al. found that serum IL-17 combined with carbohydrate antigen 125 and microRNA-200a can be used for early diagnosis of epithelial ovarian cancer, and tumor progression can be assessed through changes in its level [26]. Cunningham D et al. found that IL-17 may be related to tumor proliferation and distant metastasis [27]. For this reason, the experimental group used biofluorescence imaging technology to track the growth and metastasis process of prostate cancer metastasis, and used immunohistochemical examination to confirm the existence of distant metastasis. Liao et al. used immunohistochemical methods to detect the expression of five IL-17R subtypes in 300 cases of hepatocellular carcinoma, and found that except for the weak expression of IL-17RC, the remaining four receptor subtypes showed strong cytoplasmic and cellular staining in cancer tissues and adjacent tissues, and semi-quantitative analysis showed that the high expression of IL-17RE was related to the poor prognosis of patients [28]. Mao Kang et al. mentioned in the review that IL-17 is abnormally expressed in PTC, and its expression is closely related to lymph node metastasis and TNM staging and IL-17 may participate in the occurrence, development and transformation of PTC through a variety of cytokines and inflammatory cells [29].

In this study, the serum IL-17 level of the experimental group was significantly higher than that of the control group, which was in line with the results of previous studies [30]; Serum IL-17 levels in PTC patients with TNM stages III to IV, well-differentiated and lymphatic metastasis were significantly increased, suggesting that PTC patients have abnormal IL-17 levels, which may be involved in the occurrence, development and metastasis of the disease. In this study, patients with PTC were divided into IL-17 high expression group and IL-17 low expression group based on the median value of serum IL-17. Kaplan-Meier survival analysis found that the postoperative recurrence rate of IL-17 high expression group was significantly higher than that of IL-17 low expression group, suggesting that high IL-17 levels may indicate the prognosis of PTC patients is poor.

In addition, the AUCs of IL-10, IL-17 and IL-10 combined with IL-17 to diagnose PTC were respectively 1.283, 1.336, and 1.694 according to ROC analysis. The diagnostic value of combined detection was significantly higher than that of single detection, indicating that serum IL-10 and IL-17 may become a new biomarker for the diagnosis of PTC. 15% to 20% of patients still have recurrence or metastasis although PTC is generally considered to be an indolent tumor with a good prognosis [31]. How to more accurately assess and identify patients with poor prognosis has become one of the hotspots of PTC research. Further COX regression analysis found that TNM staging, IL-10 levels, and IL-17 levels are independent risk factors for postoperative recurrence in PTC patients, indicating that IL-10 and IL-17 may become reference indicators for evaluating the prognosis of PTC patients.

5. Conclusion

In summary, the elevated serum IL-10 and IL-17 levels in PTC patients are closely related to TNM staging, degree of differentiation, tumor maximum diameter, and lymphatic metastasis. Moreover, serum IL-10 and IL-17 levels are independent risk factors affecting postoperative recurrence of PTC patients, and may become reference indicators for disease diagnosis and prognosis evaluation. The sensitivity and specificity of serum IL-10 combined with IL-17 in the diagnosis of PTC are significantly higher than single detection, which is suitable for early diagnosis of papillary thyroid carcinoma in clinic. Regarding the relationship between IL-10, IL-17 and thyroid papillary carcinoma, there is still a lot to study, such as how IL-10 and IL-17 are expressed in other types of thyroid cancers except papillary thyroid carcinoma; which types of cells can secrete IL-10 and IL-17 in thyroid cancer; what are their mechanisms of action; how IL-10 and IL-17 affect the prognosis of patients and so on. All of the above require deeper laboratory research and statistical analysis of clinical case data with a large sample size, and it is also our next research goal. This research only stays at the phenomenon level. In the next step, we need to further study the specific reasons for the imbalance of Th1/Th2 cytokines in tumor tissues, transformation rules, and specific biological effects in the development and development of tumors.

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