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Analysis of clinical characteristics and prognosis of patients with peripheral T-cell lymphoma

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Abstract

Background: This study aimed to explore the clinical characteristics, therapeutic efficacy and prognostic factors of peripheral T-cell lymphoma (PTCL).

Methods: The clinical data of 119 PTCL patients who were admitted to the Xinjiang Medical University Affiliated Tumor Hospital from January 2010 to December 2017 were retrospectively analyzed, including the clinical characteristics, therapeutic efficacy, prognosis-related factors and treatments. Among the patients, 98 patients received antharcyclines-based therapeutic protocols, including Cyclophosphamide, Pirarubicin, Vincristine, Prednisone (CHOP) protocol and Cyclophosphamide, Pirarubicin, Vincristine, Prednisone, Etoposide (CHOPE) protocol, with median follow-up time of 32.5 months (2–166 months). The patients' clinical characteristics were analyzed, and COX ratio risk regression model was adopted to analyze the prognostic factors related with the survival rate of PTCL patients.

Results: The 5-year overall survival (OS) rate was 46.4% and progression-free survival (PFS) rate was 42.7% in the 98 patients, and there were insignificant differences between patients with CHOP protocol and those with CHOPE protocol in the 5-year OS and PFS rates (OS: $P = 0.197$, PFS: $P = 0.663$). The univariate analysis results showed that different pathological types, Ann Arbor stage, Eastern Cooperative Oncology Group (ECOG) score ≥ 2, the number of extranodal lymphomas involved, Lactic dehydrogenase (LDH) level, presence/absence of bone marrow involved, international prognostic index (IPI) score, β_2 microglobulin (β_2-MG) level and hemoglobin (Hb) level were poor prognosis factors influencing patients' OS and PFS rates (P all $< .05$). Multivariate analysis demonstrated that different pathological types, Ann Arbor stage, presence/absence of bone marrow involved and Hb level were independent prognostic indicators influencing patients' OS and PFS rates (P all $< .05$).

Conclusion: PTCL is poor in therapeutic efficacy and prognosis, and different pathological types, Ann Arbor stage, presence/absence of bone marrow involved and Hb level are related with the prognosis of PTCL patients. Anemia occurring before the treatment is an important predictive indicator influencing the prognosis of PTCL patients and patients who experience anemia will be poor in prognosis.

Abbreviations: β_2-MG = β_2 microglobulin, aaIPI = age adjusted international prognostic index, AITL = angioimmunoblastic T-cell lymphoma, ALCL = anaplastic large cell lymphoma, ATLL = adult T-cell leukemia/ lymphoma, CHOP = Cyclophosphamide, Pirarubicin, Vincristine, Prednisone, CHOPE = Cyclophosphamide, Pirarubicin, Vincristine, Prednisone, Etoposide, CI = confidence interval, CR = complete remission, DHAP = Cisplatin, Cytarabine, Dexamethasone, DLBCL = diffuse large B-cell Lymphoma, ECOG = eastern cooperative oncology group, ENKL = extranodal NK/T-cell lymphoma, nasal type, ESHAP = Etoposide, Methylprednisolone, Cisplatin, Cytarabine, GEMOX = Gemcitabine, Oxaliplatin, Prednisone, Hb = hemoglobin, HR = hazard ratio, IPI = international prognostic index, LDH = lactic dehydrogenase, NHL = non-Hodgkin's lymphoma, OS = overall survival, PD = progressive disease, PET-CT = positron emission tomography- computed tomography, PFS = progression-free survival, PR = partial remission, PTCL = peripheral T-cell lymphoma, PTCL-NOS = PTCL-not otherwise specified, SD = stable disease, WHO = world health organization.

Keywords: non-Hodgkin's lymphoma, overall survival, peripheral T-cell lymphoma, progression-free survival

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1. Introduction

Peripheral T-cell lymphoma (PTCL) is defined as a highly-heterogeneous invasive non-Hodgkin's lymphoma (NHL) originated from mature T cells. PTCL has 29 subtypes, accounting for about 10%–15% in NHL patients 10%–15%.[1,2] The most common subtypes in the hematopoiesis and lymphatic tissue classification established by World Health Organization (WHO) in 2016 include PTCL-not otherwise specified (PTCL-NOS), angioimmunoblastic T-cell lymphoma (AITL), extranodal NK/T-cell lymphoma, nasal type (ENKL), anaplastic large cell lymphoma (ALCL) and adult T-cell leukemia/lymphoma (ATLL).[3] The prevalence and clinicopathologic characteristics of PTCL vary significantly in different regions, and are also extremely different at home and abroad in PTCL therapeutic efficacy and prognosis due to the imbalanced economic and medical levels. The primary first-line therapy is CHOP protocol, which leads to poor prognosis in PTCL patients, with 5-year OS rate $\leq$ 30% and high recurrence rate, relative to those with B-cell NHL.[4] This study retrospectively analyzed the clinical data of PTCL patients admitted to the Tumor Hospital Affiliated to Xinjiang Medical University from January 2010 to December 2017, so as to further explore the clinical characteristics, therapeutic efficacy and prognosis-related factors of PTCL.

2. Materials and methods

2.1. Study subjects

This study, which had been approved by the Ethic Committee, retrospectively analyzed the clinical data of 119 PTCL patients admitted to the Third School of Clinical Medicine in Xinjiang Medical University (The Tumor Hospital) from January 2010 to December 2017. All patients received bone marrow biopsy, ultrasound of superficial lymph nodes, and generalized positron emission tomography-computed tomography (PET-CT) or enhanced CT after admission. All pathological tissues were acquired through surgery or puncture biopsy. All patients were confirmed by histopathological morphology and immunohistochemical analysis, and they met the classification criteria of lymphatic tissue neoplasms established by WHO in 2008.[1] Patients with PTCL-NOS, AITL and ALCL, 3 PTCL intranodal subtypes, were enrolled in this study.

2.2. Therapeutic methods

Among the 119 PTCL patients, 22 refused to receive any treatments in the initial treatment, while 98 received antharcyclines-based therapeutic protocol including Cyclophosphamide, Pirarubicin, Vincristine, Prednisone (CHOP) protocol and Cyclophosphamide, Pirarubicin, Vincristine, Prednisone, Etoposide (CHOPE) protocol. CHOP protocol: Cyclophosphamide 750 mg/m^2 using micro-pump ivgtt, d1; Pirarubicin 50 mg/m^2 using micro-pump ivgtt, d1; Vincristine 1. 4 mg/m^2 using micro-pump ivgtt, (maximal dose: 2 mg), d1; Prednisone 60 mg/ (m^2·d) po, d1–5; 3 weeks as one cycle. CHOPE protocol: Add Etoposide 100 mg/ (m^2·d) ivgtt, d1–3 on the basis of CHOP protocol, 3 weeks as one cycle. All patients had received 2–8 cycles. The second-line therapeutic protocols for recurrent and refractory patients contained Gemcitabine, Oxaliplatin, Prednisone (GEMOX), Cisplatin, Cytarabine, Dexamethasone (DHAP), and Etoposide, Methylprednisolone, Cisplatin, Cytarabine (ESHAP) protocol, etc.

2.3. Observational indicators

Clinical data: Patients' gender, age, Ann Arbor stage, Eastern Cooperative Oncology Group (ECOG) performance status score, the number of extranodal lymphomas involved, presence/absence of B symptoms (pyrexia, night sweat, and body weight decreased > 10% within 6 months), and international prognostic index (IPI) score, etc.

Laboratory data: Lactic dehydrogenase (LDH) level (reference range: 120–250 U/L), β_2 microglobulin (β_2-MG) level (reference range: 0.8–2.2 ug/L), hemoglobin (Hb) level (reference range: 115–150 g/L), Ki67 percentage, and presence/absence of bone marrow involved in initial diagnosis, etc. LDH of 245U/L was defined as level increased while β_2-MG of 2.2 ug/L and Hb of 120 g/L as level decreased.

Chemotherapeutic data: The number of chemotherapeutic cycle, chemotherapeutic efficacy, overall survival (OS) and progression-free survival (PFS), etc.

2.4. Efficacy assessment

The clinical efficacy was assessed based on lymphoma efficacy assessment criteria.[5] In this study, the efficacy assessment was performed through radiographic examinations and laboratory tests after 2-cycle medications. The clinical efficacy was assessed as complete remission (CR), partial remission (PR), stable disease (SD), and recurrent or progressive disease (PD). Response rate = CR rate+ PR rate. Invalid rate = SD rate + PD rate.

2.5. Follow-up visits

All patients were followed up by reviewing hospitalization data and calls until March 13th, 2020 or death, with median follow-up time of 32.5 (2–166) months. The follow-up content included OS and PFS. OS was defined as a time frame from disease diagnosis to death due to any reason, loss to follow-up, or the end of follow-up visits. PFS was defined as a time frame from initial disease diagnosis to the first PD, first recurrence, or death due to any reason. Until the end of follow-up visits, of the 98 patients, 54 died, 37 survived, and 7 lost to follow-up, with rate of loss to follow-up being 7.14%.

2.6. Statistical data analysis

SPSS23.0 software was applied for data analysis. χ^2 test was adopted for the comparison of the rate between two samples. OS or PFS was analyzed using Kaplan-Meier method, and Log-rank test was used for intergroup comparison. The clinical characteristics, pathological factors and therapeutic methods were enrolled in the univariate analysis, in which clinical characteristics included gender, age, different pathological types, Ann Arbor stage, ECOG score $\geq$ 2, the number of extranodal lymphomas involved, LDH level, presence/absence of bone marrow involved, IPI score, β_2-MG level, B symptoms, Hb level, Ki67 percentage and therapeutic protocol. Logistic regression analysis was performed for the univariate analysis, while COX ratio risk regression model was used for the multivariate analysis of the prognostic factors related with the survival rate of the PTCL patients. The results are expressed as a hazard ratio (HR) and 95% confidence interval (CI). $P < .05$ was considered to be statistically significant.

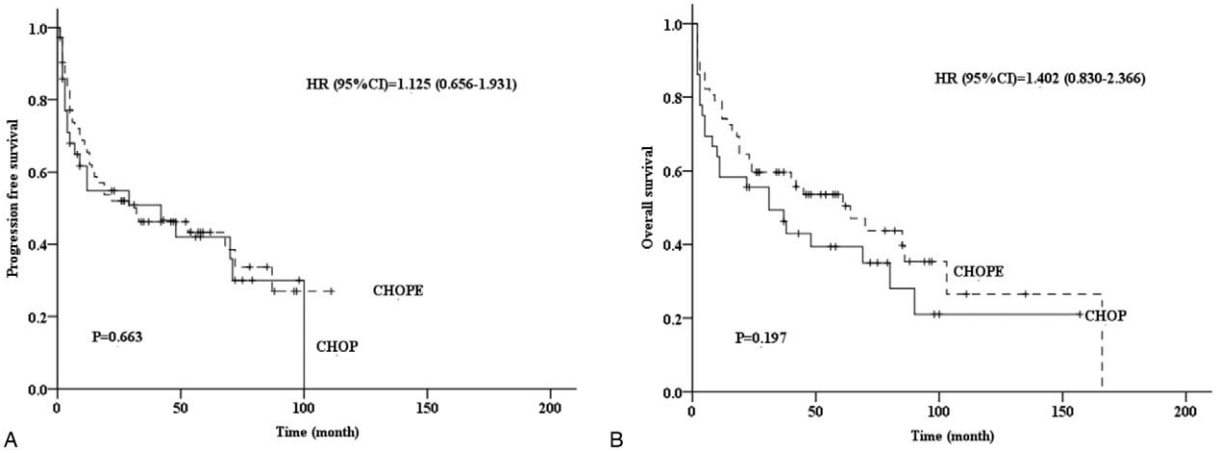

Figure 1. Comparison of 5-year PFS and OS between CHOP protocol and CHOPE protocol. A: PFS, B: OS. CHOP = Cyclophosphamide, Pirarubicin, Vincristine, Prednisone, CHOPE = Cyclophosphamide, Pirarubicin, Vincristine, Prednisone, Etoposide, CI = confidence interval, HR = hazard ratio, OS = overall survival, PFS = progression-free survival.

3. Results

3.1. Clinical characteristics

A total of 119 PTCL patients were enrolled into the analysis, among whom there were 77 males and 42 females (male/female ratio: 1.8:1) with median age of 57 (10–83) years, among whom 49 patients (41.2%) were > 60 years old. Based on the WHO classification criteria, there were 56 (47.0%) PTCL-NOS patients, 24 (20.2%) AITL patients and 39 (32.8%) ALCL patients. Of the 119 patients, 14 (11.8%) were in clinical stage I, 20 (16.8%) in stage II, 41 (34.4%) in stage III and 44 (36.9%) in stage IV; 30 (25.2%) were with ECOG score ≥ 2 points, and 30 (25.2%) had the number of extranodal lesions ≥ 2 sites; 53 (44.5%) were divided into IPI/age adjusted international prognostic index (aaIPI) score lowly-to-moderately risky group (with IPI score of 0–2 points or aaIPI score of 0–1 point) and 66 (55.5%) into moderately-to-highly risky group (with IPI score of 3–5 points or aaIPI score of 2–3 points); 33 (27.7%) were complicated with B symptoms, and 13 (10.9%) had bone marrow infiltration; 73 (61.3%) were with LDH level increased, while 73 (61.3%) with β_2-MG increased, 60 (50.4%) with Ki-67 ≥ 80% and 36 (30.3%) with Hb decreased.

3.2. Therapeutic efficacy

3.2.1. Short-term efficacy. Of the 98 patients enrolled into the analysis, 36 (30.3%) received CHOP protocol while 62 (52.1%) received high-intensity chemotherapeutic protocol (CHOPE protocol) in initial treatment, with median chemotherapeutic cycle number of 5.3 (2–8). Of the patients treated with CHOP protocol, the clinical efficacy was assessed as CR in 16 patients, PR in 6 patients, SD in 1 patient, and PD in 13 patients. Of the patients treated with CHOPE protocol, the clinical efficacy was assessed as CR in 34 patients, PR in 10 patients, SD in 6 patients, and PD in 12 patients. A total of 21 patients (17.6%) refused to receive any treatment in the initial treatment.

3.2.2. Long-term efficacy. The 5-year OS rate was 46.4% and 5-year PFS rate was 42.7% in the 98 patients. There were insignificant differences in the 5-year PFS and OS between patients with CHOP protocol and those with CHOPE protocol (OS: $P = .197$; PFS: $P = .663$), as shown in Fig. 1.

3.3. Analysis of the survival prognosis of PTCL patients

3.3.1. Univariate analysis. The univariate analysis results showed that different pathological types, Ann Arbor stage, ECOG score ≥ 2, the number of extranodal lymphomas involved, LDH level, presence/absence of bone marrow involved, IPI score, β_2-MG level and Hb level were poor prognosis factors influencing the OS and PFS rates of PTCL patients (P all $< .05$), as shown in Table 1.

3.3.2. Multivariate analysis. The prognosis-related factors ($P < .05$) obtained from univariate analysis were collected for Cox regression model multivariate analysis which indicated that different pathological types, Ann Arbor stage, presence/absence of bone marrow involved and Hb level were independent prognostic indicators influencing the OS and PFS of PTCL patients (P all $< .05$), as shown in Table 2.

3.4. Correlation between Hb level with the prognosis

Of the 98 enrolled patients, 26 (26.5%) who experienced anemia before treatment were poor in prognosis. The median survival time was 69 months (95%CI: 28.89–109.11) in patients with normal Hb and 10 months (95%CI: 5.00–15.00) in those with Hb decreased. The Log-rank test result revealed that there were significant differences between patients with normal Hb and those with Hb decreased in OS rate and PFS rate ($\chi^2 = 12.869$, $P < .001$), as shown in Fig. 2.

4. Discussion

PTCL, as a relatively rare invasive neoplasm with heterogeneous shape changes, is relatively low in prevalence in all NHL (10%–15%)[6] and in European and American countries (for < 10%), but is higher in Asian countries. PTCL-NOS is the most common subtype worldwide, followed by AITL, ALCL, ENKL and ATLL.[1] The prevalence of PTCL varies prominently in regions,

Table 1.

Univariate analysis of clinical characteristics and prognosis of the 98 PTCL patients.

		OS				PFS			
Influencing factors	**n (%)**	**Median time (months)**	**5-year OS/%**	χ^2	**P**	**Median time (months)**	**5-year PFS/%**	χ^2	***P***
Gender				0.075	0.785			0.015	.901
Male	62 (63.3)	48	45.7			32	39.7		
Female	36 (36.7)	42	41.7			19	39.8		
Age (years)				4.149	0.042			1.448	.229
≤60	61 (62.2)	64	52.8			48	45.9		
>60	37 (37.8)	24	31.2			14	30.7		
Ann Arbor stage				7.068	0.008			8.553	.003
I-II	30 (30.6)	85	63.2			100	59.7		
III-IV	68 (69.4)	24	36.4			14	31.4		
B symptoms				1.4	0.237			0.358	.55
No	72 (73.5)	48	46.8			29	42.2		
Yes	26 (26.5)	24	38.6			33	32.1		
ECOG score (points)				10.425	0.001			14.521	.001
0–1	72 (73.5)	64	51.9			53	49.6		
≥2	26 (26.5)	3	23.1			4	11.7		
LDH level				13.592	0.001			15.345	.001
Normal	45 (45.9)	90	64.2			100	55.2		
Abnormal	53 (54.1)	19	28.7			11	25.5		
The number of extranodal lymphomas involved				8.03	0.005			5.262	.022
0–1	74 (75.5)	69	53.1			53	47.8		
≥2	24 (24.5)	11	0			12	0		
Bone marrow, CNS, liver, stomach, intestinal tract and lung involved				0.71	0.4			0.185	.668
No	73 (74.5)	61	49.2			33	43.2		
Yes	25 (25.5)	37	0			14	0		
Bone marrow involved				6.245	0.012			6.345	.012
No	86 (87.8)	61	49.7			42	45.4		
Yes	12 (12.2)	5	0			4	0		
Ki67 (%)				0.155	0.694			0.128	.721
<80	49 (50)	42	40.7			22	40.3		
≥80	49 (50)	69	48.1			42	40.9		
IPI/aaIPI score				16.656	0.001			19.059	.001
Lowly to moderately risky	48 (49)	90	64.4			100	57.5		
Moderately to highly risky	50 (51)	18	26.5			10	22.9		
Pathological type				21.429	0.001			15.189	.001
PTCL-NOS	48 (49)	23	35.2			15	25.9		
AITL	18 (18.3)	19	0			13	0		
ALCL	32 (32.7)	103	74.9			100	70		
Therapeutic protocol				1.667	0.197			0.19	.663
CHOP	36 (36.7)	31	35			42	36		
CHOPE	62 (63.3)	64	50.5			32	43.3		
β2 MG level (mg/L)				7.933	0.005			5.335	.021
Normal	40 (40.8)	80	59.5			70	57.6		
Abnormal	58 (59.2)	22	33.7			13	24.4		
Hb level (120g/L)				12.869	0.001			9.698	.002
Normal	72 (73.5)	69	52.4			68	46.9		
Abnormal	26 (26.5)	10	20.2			7	21.4		

β_2-MG = β_2 microglobulin, aaIPI = age adjusted international prognostic index, AITL = angioimmunoblastic T-cell lymphoma, ALCL = anaplastic large cell lymphoma, CHOP = Cyclophosphamide, Pirarubicin, Vincristine, Prednisone, CHOPE = Cyclophosphamide, Pirarubicin, Vincristine, Prednisone, Etoposide, CNS = central nervous system, ECOG = eastern cooperative oncology group, Hb = hemoglobin, IPI = international prognostic index, LDH = lactic dehydrogenase, OS = overall survival, PFS = progression-free survival, PTCL = peripheral T-cell lymphoma, PTCL-NOS = PTCL-not otherwise specified.

in which the prevalence of PTCL-NOS is about 25–36% in all PTCL, 22% in Asian and 15% in China.[2,7] A study[8] has discovered that ENKL occurs more frequently in Asian, especially south China and Southeast Asia, with prevalence of > 4 folds than that in western countries. This study disclosed that in the PTCL subtypes, PTCL-NOS was still the most common, followed by ALCL and AITL. The enrolled patients in this study were selected mainly from Xinjiang, China, which might cause the difference of PTCL subtypes between Xinjiang and south China.

This study also demonstrated that the mean age of the patients when diagnosed was 57 years, with males in majority, which was similar to the previous report results in western and Asian countries.[9,10] In addition, it also found that 71.3% patients were diagnosed as advanced, 25.2% were with multiple extranodal involvements, 61.3% experienced LDH level increased and

Table 2

. Multivariate analysis of influencing factors for the prognosis of PTCL patients.

Influencing factors	B	SE	Wald	df	*P*	HR	95% CI
Hb	0.704	0.313	5.051	1	.025	2.022	1.094–3.737
Stage	0.877	0.420	4.371	1	.037	2.405	1.056–5.473
Bone marrow involved	1.268	0.463	7.513	1	.006	0.281	0.114–0.697
ALCL			16.252	2	.000		
PTCL-NOS	1.634	0.426	14.718	1	.000	5.126	2.224–11.815
AITL	1.857	0.517	12.887	1	.000	6.406	2.324–17.661

AITL = angioimmunoblastic T-cell lymphoma, ALCL = anaplastic large cell lymphoma, CI = confidence interval, Hb = hemoglobin, HR = hazard ratio, PTCL = peripheral T-cell lymphoma, PTCL-NOS = PTCL- not otherwise specified.

30.3% developed Hb decreased. These clinical manifestations of PTCL indicated that the neoplasm could easily have metastasis with strong invasiveness. However, only 10.1% patients in this study had bone marrow infiltration, slightly lower than that in previous studies by 20%–30%, which might be associated with the relative small sample size in this study.

Currently, there has been no standard therapeutic method for PTCL, and the most common first-line chemotherapeutic protocol is CHOP protocol. However, DLBCL patients can benefit from CHOP protocol while PTCL patients are poor in outcome. About 70% PTCL shows diffusive progression, and about 50% PTCL have systemic symptoms, whose prognosis is relatively poor, with 5-year OS rate of < 30%.[11] This study results demonstrated that as to patients treated by CHOP protocol, the short-term clinical efficacy assessment showed CR rate of 44.4%, PR rate of 16.7%, SD rate of 2.8% and PD rate of 36.1% in patients treated by CHOP protocol, and CR rate of 54.8%, PR rate of 16.1%, SD rate of 9.7%, and PD rate of 19.4% in those treated with CHOPE protocol. As to long-term clinical efficacy, there were insignificant differences in 5-year OS and PFS between patients treated with CHOP protocol and those treated with CHOPE protocol. Similarly, univariate and multivariate analysis also suggested that neither of the chemotherapeutic protocol had significantly improved the patients' OS and PFS. Therefore, breakthrough progression on the therapeutics and protocols as well as timely standardized treatment are urgently needed specific to the status that the present medications cannot effectually block the PTCL disease progression.

It was found in the univariate analysis that the factors influencing the prognosis of PTCL patients included Ann Arbor stage, ECOG score, the number of extranodal lymphomas involved, LDH level, presence/absence of bone marrow involved, IPI score, β2-MG level and Hb level. The multivariate Cox regression analysis illustrated that Hb level (HR = 2.022 95%CI: 1.094–3.737), Ann Arbor stage (HR = 2.405, 95%CI: 1.056–5.473), bone marrow infiltration (HR = 3.554, 95%CI: 1.435–8.802), pathological type (HR = 5.126 95%CI: 2.224–11.815; HR = 6.406, 95%CI: 2.324–17.661) were the prognostic risk factors influencing the OS of PTCL patients treated with both CHOP and CHOPE protocols. The clinical efficacy and prognosis were impacted by clinical stage, bone marrow infiltration, which might be related with the patients' neoplastic progression and invasiveness degrees. Therefore, more positive therapeutic protocols can be applied in patients in early stage, without bone marrow infiltration, so as to prolong their survival time. However, as to advanced and highly risky patients, treatment focus can be changed and chemotherapeutic strategies can be adjusted in order to reduce chemotherapeutic adverse reactions and promote the patients' quality of life.

This study results revealed that there were significant differences between patients with normal Hb and those with Hb decreased (Hb < 120 g/L) in OS rate and PFS rate, indicating that

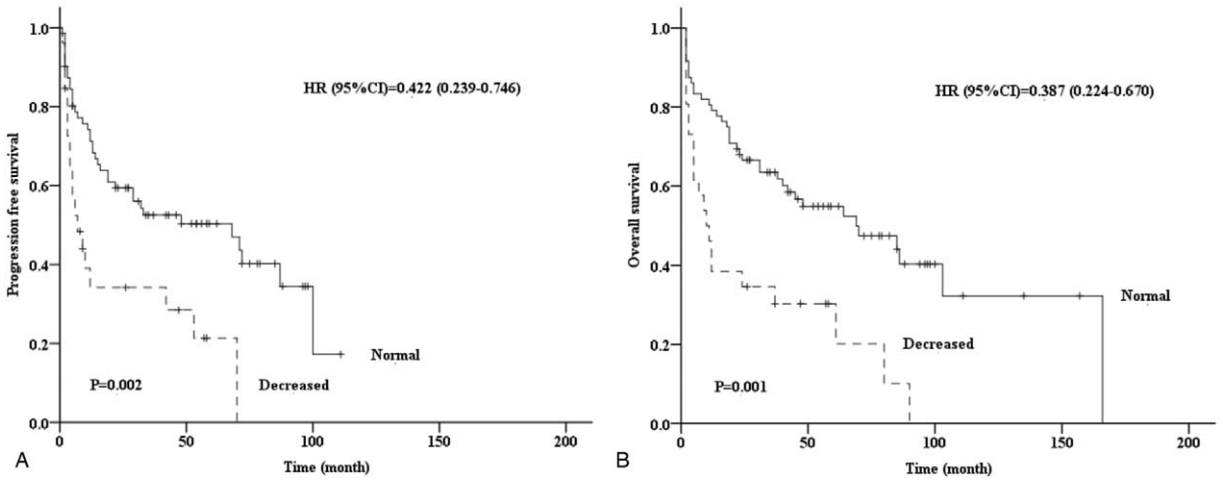

Figure 2. Comparison of PFS and OS between patients with normal Hb and those with Hb decreased. A: PFS, B: OS. CI = confidence interval, Hb = hemoglobin, HR = hazard ratio, OS = overall survival, PFS = progression-free survival.

anemia was an important predictive indicator for the prognosis of PTCL patients. Currently, the pathogenesis of anemia in lymphoma patients is still unclear, but it has been believed that anemia may be caused by autoimmune hemolysis, bone marrow involvement and inflammatory factors rather than an independent factor. Suzuki K et al[12] have found that anemia is a vital prognostic indicator for the OS of patients with invasive NHL. The study results of Tisi MC et al[13] have suggested that lymphoma involving bone marrow is an influencing factor for the occurrence of anemia. It indicates that anemia may be a result of bone marrow infiltration which may be one of the causes for anemia. Some studies[13,14] have believed that the inflammatory factor levels increased is possibly associated with the anemia of lymphoma patients. In vitro, cytokines promote the decrease of hemopoietin and inhibits the response of erythroid progenitor cells to erythropoietin. Moreover, Hepcidin is a critical substance for regulating iron homeostasis, whose generation is induced by IL-6 and lipopolysaccharide, indicating that anemia in patients with chronic diseases is closely related with the in vivo ion hemostasis.

PTCL is low in the response rate to initial treatment and is high in recurrence rate. Although various clinical characteristics are similar, the global prognosis is relatively poor. However, the prognosis varies in different PTCL subtypes. Except a few subtypes, such as the ALCL of ALK (+), the global survival rate is lower than B-cell lymphoma. Pellatt et al[15] have compared the therapeutic conditions of 120 PTCL patients (including PTCL-NOS, ALCL, AITL and ETCL), and the results demonstrate that after receiving the same first-line therapeutic protocol, ALCL group is the highest in response rate (86%) and CR rate (77%), with mean OS of 84 months, followed by PTCL-NOS group in which the response rate is 51% and CR rate is 40%, and the recurrence rate is the highest (37%), with mean OS of 16 months, indicating that although the response rate is high, it will not last long, and the prognosis is often poor; AITL group is the lowest in global response rate (41%) but is the highest in mortality and disease progression rate among the four groups, which are consistent with the result of our study. ALCL is classified into ALK + ALCL and ALK-ALCL based on the presence of ALK expression.[16] Savage KJ et al[17] have collected 159 ALCL patients and 331 PTCL-NOS patients from international cooperative PTCL group, and the study results indicate that the 5-year OS rate and failure-free survival rate are 49% and 36% in ALK-ALCL group and are 32% and 20% in PTCL-NOS group (OS: $P = .012$, PFS: $P = .032$), suggesting that ALK-ALCL is notably superior to PTCL-NOS in both failure-free survival rate and OS rate. Deng XW et al[18] have discovered by retrospective analysis that ALK-ALCL patients are notably superior to PTCL-NOS patients in OS and PFS, and patients with early ALK-ALCL are also superior to patients with early PTCL-NOS in survival. Hapgood et al[19] have reported that ALK + ALCL patients are prominently better than ALK-ALCL patients in prognosis (5-year OS rate: 70–89% vs.15–58%). ALK + patients are evidently higher in CR rate after initial treatment and OS rate than ALK- patients. Since there has been no standard therapeutic method for PTCL, the present therapeutic methods for various types of PTCL are unsatisfactory in therapeutic efficacy. Hence, the establishment of prognostic factor is of vital importance. Hematological and biological prognostic indicators will be found in the future to more accurately determine the highly risky populations and help select early and reasonable therapeutic methods.

In conclusion, PTCL is poor in therapeutic efficacy and diverse in influencing factors, in which ALCL patients are lower than B cell lymphoma patients in global survival rate although they are relatively better in prognosis than patients with other subtypes. Additionally, pre-treatment occurrence of anemia is an important predictive indicator influencing the prognosis of PTCL patients. Since all patients enrolled in this study were collected from the same hospital in Xinjiang, whether the clinical characteristics of PTCL discussed above are distinctive in Xinjiang or whether there is regional bias in the study sample still needs to be further verified by multi-center and large-scale clinical studies.

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