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State of Art on T-cell Lymphomas: The Epidemiology

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The diagnosis of T-cell and natural killer (NK-) cell lymphoma remains a big challenge to histopathologists and clinicians managing lymphoma. In most places around the world, these tumors are less commonly seen than their B-cell counterparts. Also, their presentations are often atypical. A final diagnosis of T-cell lymphoma depends on an accurate histopathological assessment by an experienced pathologist. Although the WHO Classification for neoplasms has provided a better definition of T-cell and NK-cell lymphomas, a precise diagnosis is still not always easy. (Table 1) In a recent study, it has been demonstrated that the final diagnosis of about 11% of the cases initially given a diagnosis of mature T-cell or NK-cell lymphomas needs to be revised after review. Critical pathology review is therefore essential for every serious epidemiological study on T/NK cell lymphomas.

The International Non-Hodgkin's Lymphoma Classification Project has previously reported the histopathology of a cohort of patients with non-Hodgkin's lymphomas from eight major medical centers of four continents. (Table 2 and 3) There was only one Asian centre in the study (Hong Kong) and a relatively low percentage of follicular lymphoma (10%) and high percentage of T-cell and NK-cell lymphomas were seen there, when compared with the other seven centers. Nasal NK/T-cell lymphoma was also uniquely found in Hong Kong.

The above project was followed by an international T-cell non-Hodgkin's lymphoma study. T-cell and NK lymphomas were investigated lymphomas in greater details. A larger number of medical centers from three continents were involved. A total of 1320 cases with an initial diagnosis of T-cell and NK-cell lymphomas were reviewed by an expert panel of experienced histopathologists. 11% of the cases were excluded from the analysis, as only confirmed cases of mature T or NK neoplasms were included. (Table 4) In this cohort, the common pathological subtypes included: peripheral T-cell lym-

Table 1. WHO Classification for Mature T-cell and NK-cell Neoplasms.

1.	T-cell prolymphocytic Leukemia
2.	T-cell large granular lymphocytic leukemia
3.	Aggressive NK cell leukemia
4.	Adult T-cell leukemia/Lymphoma
5.	Extranodal NK/T cell lymphoma., nasal type
6.	Enteropathy-type T-cell lymphoma
7.	Hepatosplenic T-cell lymphoma
8.	Subcutaneous panniculitis-like T-cell Lymphoma
9.	Mycosis fungoides
10.	Sezary's syndrome
11.	Primary cutaneous anaplastic large cell lymphoma
12.	Peripheral T-cell lymphoma, unspecified
13.	Angioimmunoblastic T-cell lymphoma
14.	Primary anaplastic large cell lymphoma

Table 2. Geographic Distribution of Mature T-cell Neoplasms: An International Non-Hodgkin's Lymphoma Classification Project.

1.	Omaha	3%
2.	Vancouver	1.5%
3.	Capetown	8.5%
4.	London	9.2%
5.	Locarno	6.3%
6.	Lyon	5.2%
7.	Wurzburg	4.4%
8.	Hong Kong	18.3%

Table 3. International Non-Hodgkin's Lymphoma Classification Project: Geographic Distribution of Mature T-cell Neoplasms.

Percentage	*USA*	*Canada*	*South Africa*	*England*	*Germany*	*France*	*Switzerand*	*Hong Kong*
Peripheral T-cell Lymphoma- NOS	3%	1%	8%	8%	4%	4%	6%	10%
Anaplastic Large Cell Lymphoma	2%	3%	3%	2%	1%	3%	0	3%
Nasal								
NK-/T-cell Lymphoma	0	0	0	0	0	2%	0	8%

Table 4. International T-cell Non-Hodgkin's Lymphoma Study:Consensus Diagnosis.

-	Peripheral T-cell Lymphoma –NOS:	23%
-	Angioimmunoblastic T-cell:	18.4%
-	Adult T-cell Leukemia/Lymphoma	9.6%
-	Nasal NK/T-cell Lymphoma:	7.0%
-	Anaplastic Large Cell, ALK+:	6.4%
-	Anaplastic Large Cell, ALK-:	5.5%
-	Entertopathy-type T-cell:	4.7%
-	Unclassificable T-cell Lymphoma:	2.9%
-	NK/T-cell Lymphoma, nasal type:	2.7%
-	Primary cutaneous anaplastic large Cell:	1.7%
-	Hepatosplenic T-cell:	1.4%
-	Subcutaneous panniculitis:	0.9%
-	Blastic NK cell Leukemia/Lymphoma:	0.2%
-	Peripheral Gamma-Delta:	0.1%

phoma – not otherwise specified (23%) and angioimmunoblastic T-cell lymphoma (18%). Adult T-cell leukemia and lymphoma (9,6%) was the next common entity but was seen mainly in the Japanese centers. Nasal NK/T-cell lymphoma (7%) also affects mainly the Asian patients.

A relatively high incidence of T or NK cell lymphomas, up to as high as 26%. has been reported in Asia. This is largely due to the relatively high incidence of the HTLV related Adult T-cell leukemia and lymphoma seen in Japan and the Nasal NK/T-cell lymphoma in East Asia. It is also interesting to note a relatively high incidence of T-lymphoblastic lymphoma (7% of all non-Hodgkin's lymphoma) reported in India.

The peculiar pattern of T-cell and NK-cell lymphomas seen around the world may provide important clues to their possible aetiological causes, genetic or environment. Further international collaboration would be most useful to tackle this difficult problem.

References

1. Anderson JR, Armitage JO, Weisenburger DD for the Non-Hodgkin's lymphoma Classification Project. Epidemiology of the non-Hodgkin's lymphomas: distributions of the major subtypes differ by geographic locations. Ann Oncol 1998;9: 717-20.
2. Arisawa K, Soda M, Endo S, Kurokawa K, Katamine S, Shimokawa I, et al. Evaluation of adult T-cell leukemia/lymphoa and its impact on non-Hodgkin's lymphoma incidence in southwestern Japan. Int J Cancer 2000;85: 319-24.
3. Au WY, Liang R. Peripheral T-cell lymphoma. Curr Oncol Rep 2002;4: 434-42.
4. Au WY, Lie AK, Liang R, Kwong YL, Yau CC, Cheung MM, et al. Autologous stem cell transplantation for nasal NK/T-cell lymphoma: a progress report on its value. Ann Oncol 2003;14:1673-6.
5. Au WY, Ma SY, Chim CS, Choy C, Loong F, Lie AK, et al. Clinicopathologic features and treatment outcome of mature T-cell and natural killer-cell lymphomas diagnosed according to the World Health Organization classification scheme: a single center experience of 10 years. Ann Oncol 2005;16:206-14.
6. Biggar RJ, Engels EA, Frisch M, Goedert JJ. AIDS Cancer Match Registry Study Group. Risk of T-cell lymphomas in persons with AIDS. Journal of Acquired Immune Deficiency Syndromes 2001;26: 371-6.
7. Chai SP, Peh SC, Kim LH, Lim MY, Gudum HR. The pattern of lymphoma in east Malaysian patients as experience in the University Hospital, Kuala Lumpur. Malaysian J Pathol 1999;21: 45-50.
8. Chuang SS, Lin CN, Li CY. Malignant lymphoma in southern Taiwan according to the revised European-American Classification of lymphoid neoplasms. Cancer 2000;89: 1586-92.
9. Hatta C, Ogasawara H, Okita J, Kubota A, Ishida M, Sakagami M. Non-Hodgin's malignant lympjom of the sinonasal tract – treatment outcome for 53 patients according to REAL classification. Auris Nasus Larynx 2001;28: 55-60.
10. Izumo T, Maseki N, Mori S, Tsuchiya E. Practical utility of the revised European-American Classification of lymphoid neoplasms for Japanese non-Hodgkin's lymphomas. Japan J Cancer Res 2000;91: 351-60.
11. Ku LS, Lo KK. Mycosis fungoides – a retrospecitive study of 40 cases in Hong Kong. Int J Dermatol 2005;44: 215-20.
12. Kwong YL, Chan AC, Liang R, Chiang AK, Chim CS, Chan TK, et al. CD56+ NK lymphomas: clinicopathological features and prognosis. Br J Haematol 1997;97:821-9.
13. Kwong YL, Chan AC, Liang RH. Natural killer cell lymphoma/leukemia: pathology and treatment. Hematol Oncol 1997;15: 71-9.
14. Lee MY, Tsou MH, Tan TD, Lu MC. Clinicaopathological analysis of T-cell lymphoma in Taiwan according to WHO classification: high incidence of entropathy-type intestinal T-cell lymphoma. Eur J Haematol 2005;75: 221-6.
15. Lee SS, Cho KJ, Kim CW, Kang YK. Clinicopathological analysis of 501 non-Hodgkin's lymphomas in Korea according to the revised European-American classification of lymphoid neoplasms. Histopathology 1999;35: 345-54.
16. Liang R. HTLV-I associated adult T-cell leukaemia/lymphoma in Hong Kong. Am J Hematol 1994;45:100-1.
17. Liang R. Diagnosis and management of primary nasal lymphoma of T-cell or NK-cell origin. Clin Lymphoma 2000;1:33-7.
18. Lymphoma Study Group of Japanese Pathologists. The WHO classification of malignant lymphomas in Japan: incidence of recently recognized entities. Pathology Int 2000; 50:696-702.
19. Naresh KN, Agarwal, B, Nathwani BN, Diebold J, McLennan KA, Muller-Hermelink KH, et al. Use of the World Health Organization Classification of Non-Hodgin's lym-

phoma in Mumbai, India: a review of 200 consecutive cases by a panel of five expert hematopathologists. Leuk Lymphoma 2004;45: 15679-777.
20. Ohshima K, Suzumiya J, Kikuchi M. The WHO classification of malignant lymphoma: incidence and clinical prognosis in HTLV-1 endemic area of Fukuoka. Pathology Int 2002; 52:1-12.
21. Rueffer U, Josting A, Franklin J, May M, Sieber M, Breuer K, et al. for German Hodgkin's lymphoma Study Group. Non-Hodgkin's lymphoma after primary Hodgkin's disease in the German Hodgkin's lymphoma Study Group: incidence, treatment an prognosis. J Clin Oncol 2001;19: 2026-32.
22. Rüdiger T, Weisenburger DD, Anderson JR, Armitage JO, Diebold J, MacLennan KA, et al. Peripheral T-cell lymphoma (excluding anaplastic large-cell lymphoma): results from the Non-Hodgkin's Lymphoma Classification Project. Ann Oncol 2002;13: 140-9.
23. Sukpanichnant S. Analysis of 1983 cases of malignant lymphoma in Thailand according to the World Health Organization Classification. Human Pathol 2004;35: 224-30.
24. Tse E, Liang R. Natural killer cell neoplasms. Clin Lymphoma 2004;5: 197-201.