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ORIGINAL ARTICLE

Mycosis fungoides in a referral center in central Taiwan: A retrospective case series and literature review

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ABSTRACT

Background/Objective: Mycosis fungoides (MF) comprises the majority of cutaneous T-cell lymphomas (CTCLs). CTCLs associated with eosinophilia have a poor prognosis. Similar results were shown in white and black individuals with MF; however, the data on Asians is scant. In the past 10 years, few studies have provided profiles of the characteristics of MF patients in Taiwan. The purpose of this study was to investigate the demographic, clinicopathologic features, and prognosis of MF patients in Taiwan.
Methods: A retrospective analysis was used to evaluate patients with MF in a referral center in central Taiwan covering a period of 16 years, from 1997 to 2013. The records of 22 Taiwanese patients with MF were reviewed for clinical, laboratory, and histopathologic data and evaluated by analysis of variance.
Results: The male to female ratio was approximately 2:1. The average age at diagnosis was 44.8 years. One pediatric patient presented with hypopigmented MF, and the other 21 patients had typical clinical manifestations with patches-to-plaques, tumors or erythroderma. Common histopathologic features in over half of the patients included epidermotropism, atypical lymphocytes, vacuolar interface changes, and Pautrier's microabscesses. Treatment modalities, including skin-directed and systemic therapies, primarily depended on the clinical staging. Age 65 years or over ($p = 0.004$), and Stage IIB disease or higher ($p = 0.026$) were significant contributors to disease-specific mortality. There was no significant sex difference in overall survival. Of the 22 patients, 36.3% had blood eosinophilia. Blood eosinophilia was associated with Stage II disease or higher ($p = 0.029$) and an increased number of treatment types ($p = 0.018$), but not lactate dehydrogenase (LDH).
Conclusion: Age 65 years or over, Stage IIB disease or higher, and blood eosinophilia may be poor prognostic factors for Taiwanese patients with MF.

Introduction

Primary cutaneous lymphomas represent a rare heterogeneous entity of T- and B-cell lymphomas, with mycosis fungoides (MF) comprising the majority of cases. MF accounts for 65% of cutaneous T-cell lymphoma (CTCL).[1] MF is characterized by an indolent clinical course, a long-term evolution, and typical manifestations in the patch-or-plaque stage, with variable progression to the tumor stage and erythroderma. Approximately 30% of patients present with cutaneous tumors or erythroderma at disease onset.[2] A confident diagnosis of MF needs to take both clinical and histopathologic findings into consideration. Characteristic histopathologic and immunohistochemical features include skin-homing $CD4^+$ lymphocytes with epidermotropism or formation of Pautrier's microabscesses, cytologically atypical lymphocytes with hyperchromatic, cerebriform or vesicular nuclei, a band-like upper dermal infiltration of cytologically atypical cells, and papillary dermal fibrosis.[3]

Several epidemiologic and laboratory factors were previously reported to correlate with poor prognosis in patients with MF including male sex,[4,5] advanced disease age,[4–6] blood eosinophilia,[7] elevated serum lactate dehydrogenase (LDH) levels,[4,6] and advanced stages.[6] Histopathologic variables that correlated with poor

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prognosis include follicular mucinosis,[4] folliculotropic variant,[8] moderate-to-marked dermal lymphocyte atypia,[9] large-sized Pautrier's microabscesses with more than 10 atypical lymphocytes per cluster,[9] and diminished proportion of $CD7^+$ and $CD8^+$ cells in the dermal infiltrate.[9,10]

Although MF is the most common variant of CTCL, it is still a relatively uncommon malignancy, with estimated annual incidences 3.6–4.5/one million person-years in the United States.[11–14] The majority, about 70%, of patients are whites, while blacks, Hispanics, and Asians constitute 14%, 9%, and 7% of MF cases in the United States, respectively.[14] Compared with the Western countries, MF was rare whereas extranodal natural killer/T-cell lymphoma, nasal type, was more common in Taiwan.[15] Although the prognosis of MF patients with limited patches and plaques is favorable, there is a considerable racial difference showing a higher incidence and poorer outcome among blacks than whites.[12,13] It has been suggested that blood eosinophilia may contribute to this racial difference.[16] However, population-based information about Asians, American Indians, and Hispanics is limited.[12,16] Recent epidemiological data about East-Asians with MF has been reported in Hong Kong,[17] Singapore,[18] and Japan.[6,19] To the best of our knowledge, few studies conducted in Taiwan in the past 10 years have provided racial profiles. Herein, we retrospectively reviewed the medical data of MF patients in a referral center in central Taiwan and investigated the indigenous demographic, clinicopathologic, laboratory, and prognostic characteristics of MF.

Methods

Patients

From September 1997 to August 2013, patients with a diagnosis of MF were identified using the pathology database of the Department of Pathology of Taichung Veterans General Hospital. Patients were excluded if their medical records were not available for review of the clinical diagnosis and laboratory data. This query generated cases with both clinically and pathologically confirmed MF.

The demographic profiles, clinical presentations, laboratory data, histopathologic features, stage, types of treatment, and treatment response of all the patients were reviewed. Age at diagnosis was determined using the date the pathologic diagnosis was made. Patients were considered as having eosinophilia if their complete blood cell count was >300 eosinophils/mL of blood, the normal laboratory standard. Those who had at least one instance of eosinophilia were included in the group. Elevated LDH level was defined as >240 U/L, the upper limit of normal range in the referral center. A patient was classified as having a previous history of eczema if a medical record noted tentative diagnosis or empirical treatment. Stage at diagnosis was inferred using the tumor-node-metastasis-blood (TNMB) staging system for MF. The total number of treatment types received was determined from clinical notes. Phototherapy with narrowband UV-B (NB-UVB) and photochemotherapy with psoralen and UV-A (PUVA) were viewed as different types of treatment. Other types of treatment included topical corticosteroids, retinoids, interferon-α, and pegylated liposomal doxorubicin.

Histopathologic variables included Pautrier's microabscesses, defined as clusters of three or more atypical lymphocytes in the epidermis, epidermotropism with tagging of lymphocytes along the basal layer to diffuse exocytosis of lymphocytes in all layers of the epidermis, dermal infiltrate, atypical lymphocytes with hyperchromatic or cerebriform nuclei, with or without increased mitotic figures, presence or absence of follicular mucinosis, fibrosis of papillary dermis, and eosinophils, plasma cells, and histiocytes in the dermal infiltrate. Lymphocyte surface markers including CD3, CD4, CD8, and CD20 were routinely studied by immunohistochemistry.

Approval for this retrospective chart review was obtained from the Institutional Review Board of Taichung Veterans General Hospital in Taichung, Taiwan.

Statistical analysis

Because of the small sample size, Fisher's exact test and Pearson's Chi-square test were conducted to analyze the differences in categorical variables in 2×2 and $r \times c$ contingency tables, respectively. The Pearson correlation coefficient was used to measure the strength of association between two continuous variables. All tests were two-sided. A p value <0.05 was considered statistically significant. All statistical analyses were performed using SPSS version 17 (SPSS Inc., Chicago, IL, USA).

Results

Epidemiology

Of the 23 patients with a pathologic diagnosis of MF over the period of 16 years, one patient for whom there was no clinical information was excluded. In our data set, there were 22 Taiwanese patients with both clinically and pathologically confirmed MF (Table 1). The male to female ratio was approximately 2:1, similar to the ratio reported in white patients.[16,20] The mean age at diagnosis was 44.8 years (range, 10–80 years; median, 40.5 years); for males it was 43.5 years (range, 10–80 years; median, 43 years) and for females it was 47.6 years (range, 20–80 years; median, 37 years). The correlation of age with sex was statistically insignificant ($p = 0.706$). The average duration from symptoms to diagnosis was 4.36 years (range, 1 month–20 years; median, 3 years), and there was no significant sex or age-based difference at diagnosis. There were 12 patients (54.5%) with initial presentation before age 40 years, among whom 11 (50.0%) had an established diagnosis before age 40. Case 15 presented with hypopigmented MF (Figure 1A and B), and the other 21 patients had typical clinical manifestations with patches to plaques, tumors or erythroderma.

Clinical features

Nineteen of the 22 patients (86%) presented with patches and plaques, two (9%) showed tumor growths, and one (4.5%) was erythrodermic. Ten patients (45.5%) had no itching, nine patients (40.9%) had itching, and three patients (13.6%) had no record of itching. MF was considered as the first differential diagnosis in 10 (45.5%) and the second differential diagnosis in four cases (18.2%), respectively. According to the medical records, the differential diagnoses made by the dermatologists after the first visit were MF, eczema, parapsoriasis, psoriasis, subacute cutaneous lupus erythematosus, drug eruption, and pityriasis rosea, in descending order. Case 9 was the only patient who suffered from lymphomatoid papulosis type B during a 3-year period prior to the diagnosis of MF. There was no familial clustering. The family histories did not reveal other lymphoproliferative disorders or hematologic malignancies.

Stages

Among the 22 MF patients listed in Table 1, there were four cases with advanced stage disease. The four cases were as follows: Case 7 with erythroderma over >80% of the body surface area/Stage IIIA (Figure 2A), Case 11 with tumors/Stage IIB (Figure 2B), Case 13 with tumors/Stage IIB, and Case 22 with plaques and bone marrow involvement/Stage IIIA. There were seven at Stage IA (31.8%), eight at Stage IB (36.4%), three at Stage IIA (13.6%), two at Stage IIB (9.1%), and two at Stage IIIA (9.1%) at diagnosis (Figure 3). Two patients

Table 1 Basic demographic characteristics and clinical findings of the patients.

No.	Sex	Age at diagnosis (y)	Age at onset (y)	Elevated LDH	Blood eosinophilia	History of eczema	Stage	Types of treatment	Death
1	F	77	62	−	−	+	IA	2	−
2	M	36	28	−	−	+	IA	2	−
3	M	38	35	−	−	−	IB	1	−
4	M	59	55	+	−	+	IB	1	−
5	M	44	34	−	+	+	IB	2	−
6	F	20	16	−	−	−	IB	2	−
7	M	80	78	+	+	+	IIIA	3	+
8	M	46	45	−	−	−	IB	1	−
9	F	62	56	−	−	+	IA	1	−
10	F	24	23	−	−	+	IB	2	−
11	F	37	36	−	−	+	IIB	2	−
12	M	16	11	−	+	−	IIA	2	−
13	M	65	62	−	+	−	IIB	2	+
14	M	38	36	−	+	−	IA	2	−
15	M	10	7	−	−	+	IB	2	−
16	M	22	18	−	−	−	IIA	2	−
17	M	16	6	−	+	+	IIA	2	−
18	F	80	79	−	+	+	IB	2	−
19	M	60	59	−	−	−	IA	1	−
20	M	80	79	−	−	−	IA	2	−
21	F	33	23	−	−	−	IA	2	−
22	M	43	42	−	+	+	IIIA	5	−

F = female; LDH = lactate dehydrogenase; M = male.

who died of MF-related disease were confirmed in the group of stages IIB or higher, while there was no death in the group of stages lower than IIB. Patients with stages IIB and above were associated with disease-specific death ($p = 0.026$).

Laboratory data

The mean, median, and maximum eosinophil counts were 209, 205, and 309 cells/mL, respectively. Blood eosinophilia occurred in 36.3% of MF patients. There was no significant association between blood eosinophilia and previous diagnosis of eczema ($p = 0.572$). Blood eosinophilia alone was associated with Stage II disease or higher ($p = 0.029$), a more advanced disease presentation. Blood eosinophilia was also associated with increased number of treatment types ($p = 0.018$). Elevated LDH level was associated with neither a more advanced disease presentation ($p = 0.571$), nor an increased number of treatment types ($p = 0.939$).

Histopathology

The mean number of incisional skin biopsies required to establish a diagnosis of MF was 1.23 (range, 1–3; median, 1.0). The positive percentages of the histopathologic findings among the 22 MF patients were as follows. There were 22 patients with dermal lymphocytic infiltrate (100.0%), 21 with epidermotropism (95.5%), 21 with atypical lymphocytes (95.5%), 13 (59.1%) with vacuolar interface changes, 12 with Pautrier's microabscesses (54.5%), seven with fibrosis of papillary dermis (31.8%), two with eosinophils (9.1%), two with follicular

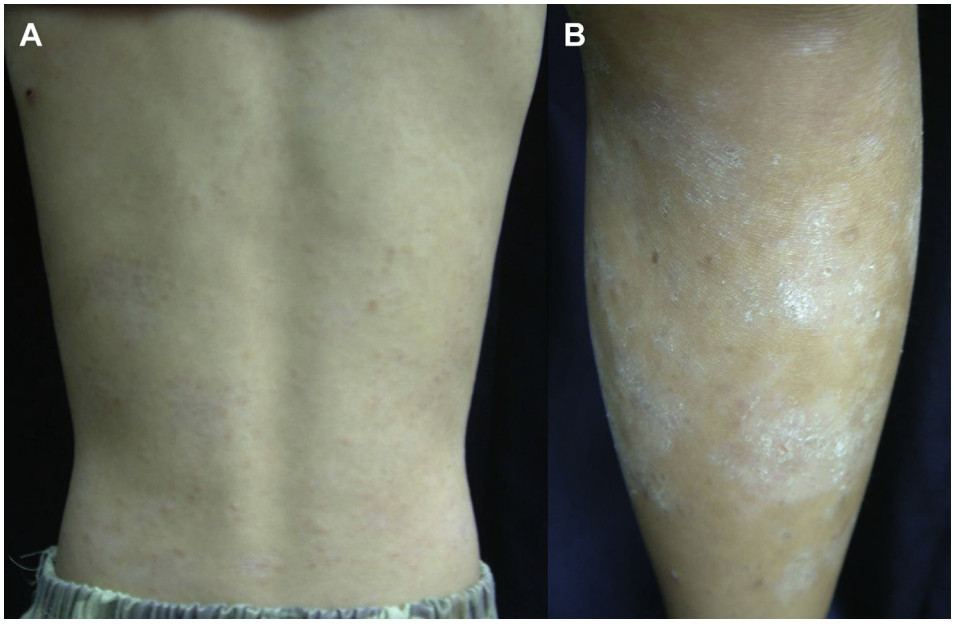

Figure 1 Case 15: Hypopigmented mycosis fungoides. The patient presented with widespread hypopigmented, scaly patches and plaques on: (A) the back and (B) the left leg.

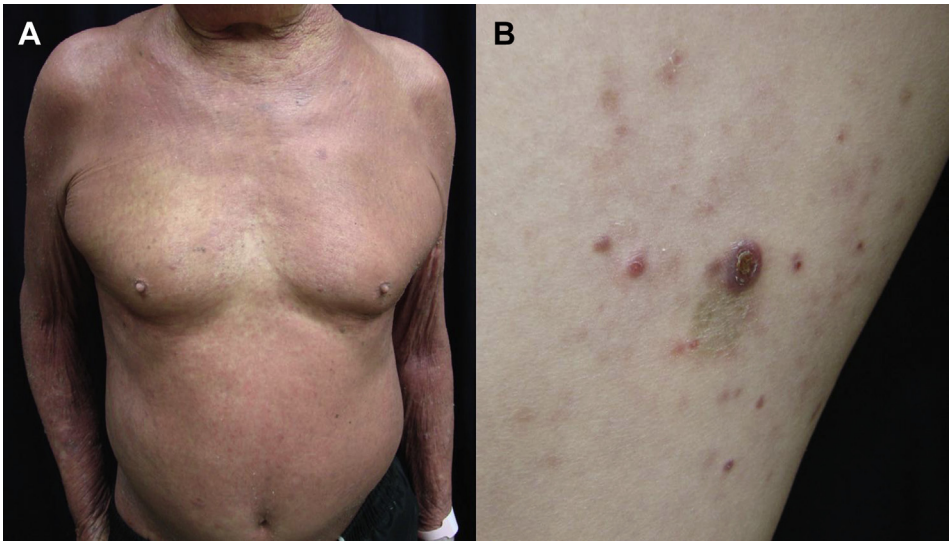

Figure 2 Clinical features of two patients with advanced stage disease: (A) Case 7: erythroderma over >80% of the body surface area and (B) Case 11: tumors on the right medial thigh.

mucinosis (9.1%), one with increased mitotic figures (4.5%), and none with plasma cells (0.0%) or histiocytes (0.0%) in the dermal infiltrate (Table 2). None of the above histopathologic features was associated with advanced disease presentation at Stage II or higher, increased number of treatment types, or disease-specific death.

Treatment

The average mean number of treatment types was 2.14 (range, 1–5; median, 2.0). The maximum number of treatment types was five, including topical corticosteroids, NB-UVB, retinoids, interferon-α, and pegylated liposomal doxorubicin in Case 22, as shown in Table 1. A complete remission was achieved in this case and maintained for >10 years. The minimum number of treatment types was one, which is phototherapy. NB-UVB with or without topical corticosteroids was the main therapy in 17 patients (77.2%). None of the patients received long-term PUVA treatment because it is a time-consuming regimen. Three patients were given interferon-α and two patients were given chemotherapy by oncologists. All patients, except two mortality cases, responded to treatment with partial or complete remission and no disease progression. Disease progression was defined as progression into a more advanced clinical stage or disease-specific death.

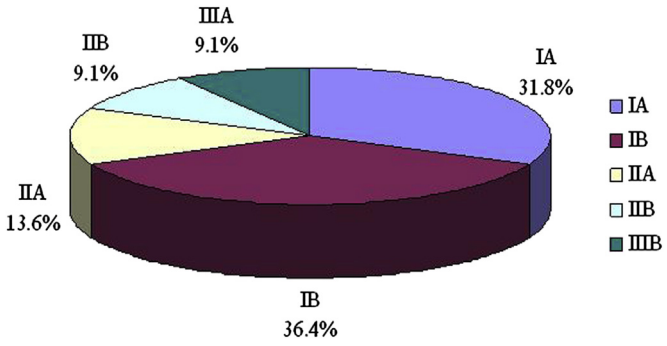

Figure 3 Stages of mycosis fungoides in the patients of the present study.

Disease outcome and mortality

In the present study, the overall 5-year survival rate was 90.9%. The 5-year survival rate for patients at Stages I and IIA was 100%. The two patients (9.1%) whose deaths were attributable to MF, Case 7 and Case 13, presented with more advanced disease. Case 7, with chronic obstructive pulmonary disease and diabetes mellitus under oral hypoglycemic agents, presented with erythroderma. Histopathology from a specimen of repeat skin biopsy demonstrated superficial perivascular mixed-cell infiltration composed of lymphocytes, eosinophils, and neutrophils in the dermis. Some of the small to medium-sized lymphocytes showed hyperchromatic and even cerebriform nuclei with exocytosis in the epidermis and increased mitotic counts. Immunohistochemical studies showed positive CD4, negative CD8, and diminished expression of CD7. The clinicopathologic features were compatible with MF at Stage IIIA without Sézary cells in peripheral blood. The patient received three types of treatment including topical corticosteroids, NB-UVB, and PUVA, but he failed to achieve remission. He decided not to seek other treatment modalities because of his age. The patient died 6 months after the diagnosis had been established. The survival time from onset of symptoms was 2.5 years. Case 13 with Stage IIB, who

Table 2 Comparison of the histopathologic features of patients in the present study with those in previously reported case series of mycosis fungoides in the literature.

Criteria	Positive percentage (%)			
	Present study	Hsiao and Lee[21] 2001	Ku and Lo[17] 2005	Vonderheid et al[9] 2013
	N = 22	*N* = 18	*N* = 40	*N* = 103
Dermal lymphocytic infiltrate	100.0	100.0	NA	100.0
Epidermotropism	95.5	96.8	51.6	97.1
Atypical lymphocytes	95.5	43.8	91.9	75.5
Vacuolar changes	59.1	28.1	48.4	NA
Pautrier's microabscesses	54.5	43.8	37.1	53.9
Fibrosis of papillary dermis	31.8	71.9	16.1	NA
Eosinophils	9.1	6.3	NA	34.3
Follicular mucinosis	9.1	NA	1.6	17.1
Increased mitotic figures	4.5	NA	NA	16.7
Plasma cells	0.0	3.1	NA	31.4
Histiocytes	0.0	3.1	NA	10.8

N = number of cases; NA = not available.

Table 3 Comparison of the clinical features of the patients in present study with previously reported case series of mycosis fungoides in the literature.

Clinical features	Present study	Hsiao and Lee[21] 2001	Ku and Lo[17] 2005	Tan et al[18] 2006	Suzuki et al[6] 2010	Tobisawa et al[19] 2013	Zampella and Hinds[16] 2013	
Race	Taiwanese/ Chinese	Taiwanese/ Chinese	Mainly Chinese (95%)	Mainly Chinese (77.1%)	Japanese	Japanese	Whites	Blacks
Sex								
Male	15	9	27	87	66	60	128	32
Female	7	9	13	44	34	45	85	77
Male to female ratio	2.14	1	2.1	1.98	1.97	1.33	1.51	0.42
Mean age at diagnosis (y)	44.8	46.1	56.4	36.3	60 (median)	63 (median)	54.8	45.3
Average years from symptoms to diagnosis	4.36	6.2	8.0	3.12	2 (median)	1.5 (median)	6.57	6.35
Percent with blood eosinophilia	36.3	NA	NA	NA	NA	NA	26.2	35.3
Average maximum eosinophil count (cells/mL)	309	NA	NA	NA	NA	NA	328	819

NA = not available.

received phototherapy and chemotherapy, died at another hospital. Both patients were male and had an established diagnosis at age ≥65 years. There was no significant sex difference in overall survival ($p = 0.334$). Age ≥65 years was significantly associated with disease-specific death ($p = 0.004$).

Discussion

In this study, we observed certain demographic, laboratory, and histopathologic characteristics in the diagnosis of MF in Taiwan. Comparisons with different races, whites, blacks, and Asians in regions other than Taiwan, including Japan, Singapore, and Hong Kong, were made. We assessed the relationship between laboratory features and prognosis in patients with MF. The main finding of the study was that blood eosinophilia was associated with a more advanced disease and an increased number of treatment types.

We compared the characteristics of our MF patients with several previous reported case series focused on different races (Table 3). Our data showed the classic 2:1 male to female ratio was consistent with the ratio reported in whites,[2,16] but was different from the 1:1 ratio in another case series focused on Taiwanese, reported by Hsiao and Lee.[21] A 2:1 male to female ratio was reported in Hong Kong[17] and Singapore,[18] where Chinese made up the majority of the population. In several Japanese studies, the mean or median age at diagnosis of MF was ≥60 years old.[6,19,22] We noted an approximately 15-year difference in age at diagnosis between Taiwanese and Japanese patients. Both the study by Hsiao and Lee[21] and our study revealed that the MF population in Taiwan was about 10 years younger than that in the West, mainly the United States.[2,16] In contrast, the mean age at diagnosis in Taiwanese was similar to that in African Americans.[16] A difference in the mean age at diagnosis, 59.2 years in whites, 51.5 years in African Americans, versus 51.3 years in Asian/Pacific Islanders, has also been noted in the literature.[13] In the present study, 50% of patients were aged <40 years at diagnosis. Seven patients (31.8%) experienced onset of symptoms in the age range 20–40 years, while one patient did not have an established diagnosis until the mid-forties. Five patients (22.7%) presented with initial cutaneous manifestations before the age of 20 years. Among these pediatric patients, three (13.6%) had a definite diagnosis of MF established before age 20 years. In general, MF predominantly affects older adults. Those diagnosed before 20 years of age were reported to account for only 0.5–5% of all MF patients.[17,23] However, in a Singapore study, more than 25% of patients were <20 years old and less than one-third were >50 years old.[18] It is possible that the incidence of MF in pediatric patients and young adults has been underestimated. Therefore, clinicians should be more alert to the possibility of MF in these age groups.

Up to 86% of patients presented with patches and plaques in the present study. There is a global consensus that most patients have initial manifestations of limited or generalized patches and/or plaque disease.[2,6,16–19,21,24] Despite the difficulty of diagnosing MF, it was considered as the first or second differential diagnosis during the first visit in 63.7% of cases in our study. Dermatologists in a tertiary referral center might be more aware of the symptoms and signs of MF; however, interpersonal and intrapersonal variations require further study. MF is most frequently misdiagnosed as eczema, as it was in a study conducted in Hong Kong.[17] Because pruritus was not found in 45.5% of our MF patients, it could be a key to differentiating eczema from MF. With 40.9% patients reporting itchiness, clinicopathologic correlation remains the gold standard diagnosis of MF. In this study, one of the three pediatric patients presented with the hypopigmented variant. The association between hypopigmented MF and young age has been reported.[18,23] Hypopigmented MF was also associated with a more indolent clinical course and better prognosis.[4,18,24] Among our patients, 18.2% had advanced stage disease, IIB or higher. In contrast, none had Stage IIB disease or higher in the previous Taiwanese study.[21] Other studies on MF in Asian patients revealed that Stage IIB disease or higher accounted for 7.0% of patients in Singapore,[18] 17.5% in Hong Kong,[17] and 16.2%[19] and 22.0%,[6] respectively, in two reports in Japan. In the West, those with Stage IIB disease or higher accounted for 29.4% of patients with MF reported in the United Kingdom,[4] and 28.5%[24] and 33.7%,[2] respectively, in two reports in the United States. It is worth noting that the proportion of patients with advanced clinical stage seems to be higher in Western populations than in Asian populations. Further study will be needed to determine whether advanced disease is less common in Asian patients. Two patients with Stages IIB or higher were associated with disease-specific death in this study. It is not unexpected that patients staged as IIB to IV at diagnosis were more likely to have disease progression or die of MF than patients with an early stage at diagnosis.[24] Several studies demonstrated that more advanced skin involvement, the T stage of TNMB classification, was associated with MF-specific death.[2,6,24] Because of the limited number of cases, our study did not reflect the correlation between each TNMB stage and survival.

Over one-third of our patients were found to have blood eosinophilia. However, there was no significant association between blood eosinophilia and previous diagnosis of eczema in our study, which was in contrast to the findings of Zampella and Hinds.[16] Tancrède-Bohin et al[7] suggested blood eosinophilia at baseline as a prognostic factor of poor outcome in patients with CTCL. Zampella and Hinds[16] observed that MF patients with at least one instance of eosinophilia presented with later-stage disease and had poorer responses to treatment. Our study adopted one instance of eosinophilia as one of the inclusion criteria for patients with blood eosinophilia. In the present study, blood eosinophilia alone was associated with more advanced disease presentation and an increased number of treatment types, while elevated LDH level was not. The proportion of patients with blood eosinophilia in our

cohort was similar to that in African Americans, but a large disparity existed in average maximum eosinophil count (Table 3). Although blood eosinophilia may partly account for the worse outcomes observed in African Americans[16] and some cases in our data set, the differences observed in average maximum eosinophil count and prognosis among races need further investigation. Increased total serum immunoglobulin E (IgE) levels were demonstrated to be a significant factor for disease progression and overall survival in one study of early MF,[9] but were not reported to be of significance in another study.[25] Total IgE level was not routinely checked in our cases. Additional studies are needed to clarify the relationship between IgE levels and prognosis.

We compared the histopathologic characteristics of our MF patients with several previously reported case series (Table 2). Similar to the results of our study, the data in studies by Hsiao and Lee[21] and Vonderheid et al[9] revealed dermal lymphocytic infiltrate as an invariable feature. Atypical lymphocytes, epidermotropism, Pautrier's microabscesses, and fibrosis of papillary dermis were common histopathologic findings without definite orders of occurrence frequency.[9,17,21] None of the above histopathologic features was associated with advanced disease presentation, increased number of treatment types, and disease-specific death in the present study. In a study focused on early MF at Stage I to IIA, significant histopathologic factors that correlated with both disease progression and overall survival included the presence of large Pautrier's microabscesses with $\geq$10 atypical lymphocytes, and atypical lymphocytes with hyperchromatic or vesicular nuclei in the dermal infiltrate.[9] Early diagnosis of MF is one of the most challenging problems in dermatopathology because of the close resemblance to other inflammatory dermatoses. Histopathologic examination alone in the diagnosis of early MF had low sensitivity and low specificity.[26] Evaluation of clonal T-cell receptor γ gene rearrangement by polymerase chain reaction could be helpful in making a diagnosis in early, lymphocyte-poor cases of MF.[27] Therefore, taking clinical and histopathologic features with molecular correlation into consideration would make the diagnosis and prognostic factors of MF more reliable.

Treatment modalities in this study include topical corticosteroids, NB-UVB, PUVA, retinoids, interferon-α, and pegylated liposomal doxorubicin. The choice of treatment modality for MF primarily depended on the clinical staging and seemed to be influenced by the areas of expertise of clinicians. Patients with early-stage disease treated by dermatologists usually received skin-directed therapies, mainly phototherapy with or without topical corticosteroids, while those treated by oncologists tended to receive systemic therapies such as interferon-α. All of these patients at Stages I and IIA responded to treatment without disease progression. In the present study, the overall 5-year survival rates and 5-year survival rates of patients at Stage I were 90.9% and 100%, respectively, similar to those reported in the literature, around 90% and nearly 100%, respectively.[2,6,14,17] Two of our patients died of MF-specific disease. The common characteristics shared by the two patients included male sex, old age at diagnosis, advanced clinical stage, and blood eosinophilia. Sex differences in overall survival remain controversial.[2,4,5] Age and disease stage are important prognostic factors.[4–6] Eosinophil counts may be a clue to distinct cytokine profile portending a worse prognosis.[16] As mentioned previously, blood eosinophilia is associated with more advanced disease and poorer responses to treatment.

Limitations of our study include its retrospective nature, referral bias, and a small sample size. The incidence rate of CTCL among Asians is lower than among blacks and non-Hispanic whites.[13,14] The main limitation of this study is the small number of cases due to the rarity of MF in Taiwan. A large retrospective study based on multicenter analysis or the Taiwan National Health Insurance Research Database is needed for further survey in the Taiwanese population.

In conclusion, we have provided local demographic, clinicopathologic, and laboratory features in a series of 22 Taiwanese patients with MF. Blood eosinophilia may be a predictive factor for advanced clinical stages and increased number of treatment types in Taiwan. The relationship among blood eosinophilia, prognosis, and racial differences warrants further study.

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