ORIGINAL ARTICLE

Clinical presentation, immunopathology, and treatment of juvenile-onset mycosis fungoides: A case series of 34 patients

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Background: Mycosis fungoides (MF), the most common form of cutaneous T-cell lymphoma, typically presents in middle-aged to elderly individuals.

Objective: We sought to study the demographics, clinicopathologic features, treatment response, and prognosis of patients with biopsy-proven MF diagnosed before 20 years of age.

Methods: Patients were identified from a prospectively collected database for retrospective analysis.

Results: Of 1902 patients with MF, 34 had juvenile-onset MF: 41% were stage IA, 56% were stage IB, and 3% were stage IIB at diagnosis. The male to female ratio was 1.1:1. The median age of symptom onset was 9 years (range 3-19 years), with a delay in diagnosis between 1 month and 14 years. Patients primarily presented with hypopigmented (53%), hyperpigmented (29%), and pink-violaceous (41%) patches/plaques. Immunohistochemistry revealed 39% with $CD8^+$ immunophenotype, 67% of which had hypopigmented lesions. The phototherapy response rate in 21 patients was 81%. All patients who completely responded to narrowband ultraviolet B phototherapy had hypopigmented MF.

Limitations: This is a single cancer center study.

Conclusion: Juvenile-onset MF presents with early-stage disease with an overrepresentation of hypopigmented MF and $CD8^+$ immunophenotype. Narrowband ultraviolet B is an effective treatment option for juveniles, especially for those with the hypopigmented variant. (J Am Acad Dermatol http://dx.doi.org/10.1016/j.jaad.2014.07.049.)

Key words: cutaneous T-cell lymphoma; immunopathology; juvenile onset; mycosis fungoides; narrowband ultraviolet B radiation; presentation; treatment; vitamin-D deficiency.

Mycosis fungoides (MF), the most common cutaneous T-cell lymphoma, often presents in middle age with a 2:1 male to female predominance.[1] In a large Surveillance, Epidemiology, and End Results cohort analyzed by Weinstock and Horm,[2] patients with MF were found to have a median survival of 9.7 years whereas prior work from our group showed a median survival of 29 years in a large cohort of 1263 patients with MF.[3] The incidence of MF is 6.4 per 1,000,000 per year in adults, but the occurrence in children and young adults is rare and has not been well established.[1] The aim of our study was to describe the demographics,

Abbreviations used:

MF:	mycosis fungoides
NB:	narrowband
PUVA:	psoralen and ultraviolet A
TCR:	T-cell receptor
UV:	ultraviolet

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Supported by the Sherry L. Anderson Research Fund.
Conflicts of interest: None declared.
Accepted for publication July 25, 2014.
Reprints not available from the authors.

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Published online September 25, 2014.
0190-9622/$36.00

http://dx.doi.org/10.1016/j.jaad.2014.07.049

immunophenotype, treatment, and clinical course of 34 patients younger than 20 years with biopsy-proven MF.

METHODS

Study participants

Of 1902 patients consented and prospectively entered into our cutaneous T-cell lymphoma database with biopsy-proven MF, 34 patients younger than 20 years were identified and included in the study. An additional 62 patients experienced onset of symptoms during childhood, but were not given the diagnosis of MF until 20 years of age or older. Patient records were reviewed for: sex, race, age of onset, age of diagnosis, clinical features, vitamin-D levels, staging, treatment, and disease progression. The duration of follow-up was based on elapsed time from initial clinic visit to the most current follow-up at time of data collection or time of death. Patients were staged at the time of diagnosis using medical history, physical examination, laboratory tests, imaging studies, presence or absence of enlarged lymph nodes, and bone-marrow biopsy findings in appropriate cases.

Response to therapy was determined by the change in the modified skin-weighted assessment tool, and imaging when appropriate.[4] "Complete response" to treatment was defined as the total disappearance of clinical lesions for at least 1 month, "partial response" as disappearance of 50% or more, and "stable disease" as disappearance of less than 50%. "Progression" was defined as an increase in TNMB stage.

Laboratory analysis

All cases were reviewed for histopathologic criteria and MF was confirmed by immunohistochemistry on formalin-fixed, paraffin-embedded tissue of skin biopsy specimens. Polymerase chain reaction amplification of T-cell receptor (TCR)-beta and −gamma genes was performed on DNA extracted from either fresh or paraffin-embedded material from lesional skin biopsy specimens or from peripheral blood lymphocytes where indicated. Furthermore, TCR gene rearrangements were in some cases obtained from a subsequent biopsy specimen. All patients had baseline peripheral blood flow cytometry performed to determine if aberrant T-cell clones were present.

Statistical analysis

A cross-sectional study was designed to study 34 patients with juvenile MF. The descriptive statistical analysis is reported in Tables I and II.

CAPSULE SUMMARY

- Mycosis fungoides can rarely present in children.
- Pediatric patients with mycosis fungoides and darker skin types present more commonly with hypopigmented lesions and an overrepresentation of the $CD8^+$ immunophenotype.
- Narrowband ultraviolet B with topical steroids is a safe treatment option, whereas topical alkylating agents are not recommended because of their carcinogenicity and potential long-term risks.

RESULTS

Demographics

Based on our cutaneous T-cell lymphoma database of 1902 patients with MF seen at University of Texas MD Anderson Cancer Center in Houston between 1987 and 2011, 34 cases of juvenile-onset MF represented an incidence of 2%. The 62 patients who reported lesions in childhood but had a delayed diagnosis of MF represented 3% of our patients with MF for an overall incidence of 5%. Table I summarizes patient demographics, lesion morphology, staging, and clinical course. Of the 34 patients with juvenile-onset MF, 16 (47%) were female and 18 (53%) were male, with a male to female ratio of 1.1:1. The racial demographic included 11 Hispanic (32%), 10 Caucasian (29%), 9 African American (27%), 2 Middle Eastern (6%), and 2 Indian (6%) patients. Of interest, 71% (24 of 34 patients) had Fitzpatrick skin type III or greater. The median age of onset was 9 years (range 3-19 years). The median age of definitive diagnosis was 14 years (range 4-19 years). The mean and median delay in diagnosis was 4.5 years and 4 years (range 1 month-14 years), respectively.

Initial diagnosis

The most common initial diagnosis was eczema, with one third of the patients carrying this diagnosis. Three patients (9%) were given the diagnosis erroneously of dermatophyte infection. Ten patients (29%) received a correct initial diagnosis of MF, but in 6 patients (67%) the diagnosis was delayed for at least 1 year after the onset of symptoms (range 2 months-12 years).

Stage, morphology, and laboratory findings at diagnosis

All except 1 of the juvenile patients had cutaneous patches and/or plaques without evidence of tumors