ISSN: 3069-9533

Journal of Cancer Research and Reports

Research Article

Mycosis Fungoides in Pediatric Patients: A Real-Life Retrospective Study in Cuba

Mariuska Forteza Saez, MD[1]*, Yolainy Romero Rodriguez, MD[1], Maria del Carmen Llantá Abreu, PhD[2] and Dayne Clarivel Quintero Vazquez, MD[1]

[1]*Institute of Oncology and Radiobiology (INOR), Paediatric Oncology Service, Havana, Cuba.*

[2]*Institute of Oncology and Radiobiology (INOR), Psycho-oncology service, Havana, Cuba.*

Abstract

Background: Mycosis fungoides (MF) is the most common primary cutaneous T-cell lymphoma and accounts for fewer than 5% of cases in the pediatric population. No studies on Cuban children had previously been identified. We report the first real-life retrospective series of pediatric MF from a national oncology reference center in Cuba.

Procedure: Retrospective analysis of all patients under 18 years of age with histopathologically confirmed MF treated at the Institute of Oncology and Radiobiology (INOR), Havana, Cuba (2015–2025). Predictors of complete remission and relapse were identified by multivariable logistic regression. Time-to-event outcomes were analyzed using the Kaplan-Meier method with log-rank testing.

Results: Eighty-nine patients were included (mean age at diagnosis: 9 years). The hypopigmented variant predominated (70.8%). Early clinical stages (IA/IB) were present in 59.6%. Recombinant alpha-interferon combined with phototherapy was prescribed in 92.1% of patients. Complete remission (CR) was achieved in 100% of patients; sustained CR was documented in 34.8% at a median time to CR of 22 months (P25–P75: 12–48). Greater body surface area involvement and longer disease duration were independently and inversely associated with sustained CR. Relapse-free survival at 24 months was 84.3% (95% CI: 76.1–92.5%; 14 events); non-hypopigmented variant and darker skin phototype were independent predictors of relapse. The median institutional diagnosis delay was 3 months (range: 0.8–10.7) with no significant impact on CR. Overall survival was 100% at a median follow-up of 19 months, with no disease progression.

Conclusions: This is the first Cuban pediatric MF cohort. Interferon plus phototherapy achieves universal CR with a favorable relapse-free survival profile. The hypopigmented phenotype is dominant and confers a lower relapse risk. Early diagnosis and treatment initiation are critical for optimal sustained remission.

Keywords

Mycosis fungoides, Cutaneous T-cell lymphoma, Pediatric oncology, Hypopigmented mycosis fungoides, Phototherapy, Interferon, Kaplan-Meier, Cuba.

Corresponding Author Information

Mariuska Forteza Saez
Institute of Oncology and Radiobiology (INOR), Paediatric Oncology Service. Havana, Cuba.

Received: May 04, 2026; **Accepted:** June 02, 2026; **Published:** June 15, 2026

Citation: Mariuska Forteza Saez, Yolainy Romero Rodriguez, Maria del Carmen Llantá Abreu. Mycosis Fungoides in Pediatric Patients: A Real-Life Retrospective Study in Cuba. J Can Res Rep. 2026; 2(2):1-5.

Introduction

Mycosis fungoides (MF) is the most common type of primary cutaneous T-cell lymphoma (CTCL), representing approximately 50–60% of all primary cutaneous lymphomas in adults [1]. In the pediatric population, MF is rare, accounting for fewer than 5% of all MF cases globally, yet it represents the most frequently diagnosed CTCL in children and adolescents [2,3]. Its clinical presentation in younger patients differs substantially from adult disease, most notably by the striking predominance of the hypopigmented variant — a phenotype that closely mimics pityriasis versicolor, vitiligo, and post-inflammatory hypopigmentation, thereby contributing to significant diagnostic delays [4,5].

The natural history of pediatric MF is predominantly indolent. Most patients present with early-stage disease (stages IA–IIA) and achieve favorable outcomes with skin-directed therapies. However, the chronic and relapsing nature of the disease, combined with the cumulative toxicity of long-term treatments, demands careful individualization of therapy [6,7]. Recombinant alpha-interferon and phototherapy — particularly narrowband ultraviolet B (NB-UVB) and psoralen plus ultraviolet A (PUVA) — are among the most widely used first-line modalities in this setting [8,9].

Despite the clinical importance of pediatric MF in low- and middle-income countries, Latin American epidemiological data remain scarce. The hypopigmented phenotype, more common in darker skin phototypes, is likely overrepresented in Cuban and Caribbean cohorts, potentially influencing both diagnostic pathways and treatment response. To our knowledge, no prior study has systematically described MF in Cuban pediatric patients. This study addresses that gap and contributes real-world data from a national oncology reference center.

The primary objectives were: (1) to describe the epidemiological and clinicopathological characteristics of pediatric MF in Cuba; (2) to evaluate treatment response and identify independent predictors of complete and sustained remission; (3) to characterize relapse-free survival and its predictors using Kaplan-Meier methodology; and (4) to assess the clinical impact of institutional diagnosis delay.

Patients and Methods

Study Design and Setting

We conducted a retrospective, single-center cohort study at the Institute of Oncology and Radiobiology (INOR), Havana, Cuba — the national pediatric oncology reference center — encompassing all patients under 18 years of age diagnosed with MF between January 2015 and December 2025.

Patient Selection

Patients were eligible if they: (a) were under 18 years at diagnosis; (b) had histopathologically confirmed MF per 2018 WHO-EORTC criteria [1]; and (c) received at least one treatment cycle at INOR. Patients were excluded if histopathological confirmation was unavailable or follow-up was less than 3 months.

Data Collection

Demographic, clinical, histopathological, and treatment data were extracted using a standardized case report form. Variables included: age at symptom onset and at institutional diagnosis, sex, Fitzpatrick skin phototype, clinical variant (hypopigmented vs. non-hypopigmented), TNMB clinical stage (per ISCL/EORTC criteria; Olsen et al., 2011), involved body surface area (BSA), treatment received, time to complete remission (CR), relapse status, time to relapse, institutional diagnosis delay (interval between first symptom onset and confirmed institutional diagnosis), and total follow-up duration.

Response Definitions

Complete remission (CR): Complete disappearance of all clinical disease evidence per ISCL/EORTC criteria [10].

Sustained CR (sCR): CR maintained without relapsing at last follow-up.

Relapses: Reappearance of clinically or histopathologically confirmed MF after documented CR.

Diagnosis delay: Months elapsed from first reported symptom to confirmed institutional diagnosis at INOR.

Statistical Analysis

Descriptive statistics are presented as mean ± SD, median [range], or n (%). Univariable and multivariable logistic regression analyses identified independent predictors of sCR and relapses; variables with $p < 0.20$ in univariable analysis were included in multivariable models. Results are reported as adjusted odds ratios (OR) with 95% confidence intervals (CI).

Time-to-event outcomes — time to CR, relapse-free survival (RFS), and overall survival (OS) estimated using the Kaplan-Meier method. RFS was defined as time from first documented CR to first relapse or last follow-up, whichever occurred first. OS was defined as time from diagnosis to death from any cause or last follow-up. Between-group comparisons (hypopigmented vs. non-hypopigmented variant) used the log-rank test. Statistical significance was set at $p < 0.05$. All analyses were performed with SPSS version 26.0 (IBM Corp., Armonk, NY, USA).

Ethics

The study was approved by the INOR Institutional Review Board (reference: INOR-IRB-2025-XX). Individual informed consent was waived given the retrospective design. Patient data were fully anonymized prior to analysis.

Results

Patient and Disease Characteristics

Eighty-nine patients met inclusion criteria. Table 1 summarizes baseline characteristics. The mean age at diagnosis was 9.0 ± 4.2 years. The hypopigmented variant was the dominant presentation (70.8%), consistent with the known predominance of this phenotype in pediatric populations with darker skin phototypes

[4,5]. Early clinical stages (IA/IB) were present in 59.6% of patients; no patient presented with extracutaneous involvement (stages III–IV) at diagnosis.

Table 1: Baseline demographic, clinical, and histopathological characteristics (N = 89).

Characteristic	Value
Demographics	
Age at institutional diagnosis, years — mean ± SD	9.0 ± 4.2
Age at symptom onset, years — mean ± SD (estimated)	7.8 ± 4.1
Fitzpatrick phototype I–II, n (%)	29 (32.6%)
Fitzpatrick phototype III–IV, n (%)	60 (67.4%)
Fitzpatrick phototype V–VI, n (%)	0 (0%)
Clinical presentation	
Hypopigmented variant, n (%)	63 (70.8%)
Non-hypopigmented variant, n (%)	26 (29.2%)
Clinical stage IA, n (%)	38 (42.7%)
Clinical stage IB, n (%)	15 (16.9%)
Clinical stage IIA or advanced early, n (%)	36 (40.4%)
Involved body surface area (BSA), % — median [IQR]	36% [IQR: 18–72%]
Diagnosis	
Institutional diagnosis delay, months — median [range]	3.0 [0.8–10.7]
Follow-up duration, months — median [range]	19 [1–40]
SD: standard deviation; IQR: interquartile range; BSA: body surface area.	

Treatment

Recombinant alpha-interferon combined with phototherapy (NB-UVB or PUVA) was prescribed in 92.1% of patients, reflecting INOR's institutional protocol aligned with current NCCN and European guidelines [8,9]. The remaining 7.9% received interferon monotherapy or topical agents (corticosteroids, nitrogen mustard) due to phototherapy contraindications or intolerance (Table 2).

Table 2: Treatment regimens and clinical outcomes (N = 89).

Variable	Value
Treatment	
Recombinant alpha-interferon +/− phototherapy, n (%)	82 (92.1%)
Phototherapy type — NB-UVB, n (% of interferon +/− phototherapy group)	7 (8.5%)
Phototherapy type — PUVA, n (% of interferon +/− phototherapy group)	14 (17.1%)
Phototherapy type — subtype not documented, n (% of interferon +/− phototherapy group)	12 (14.6%)
Interferon alone (no phototherapy), n (% of interferon +/− phototherapy group)	49 (59.8%)
Topical agents only (corticosteroids/nitrogen mustard), n (%)	7 (7.9%)
Complete remission (CR)	
CR achieved (ever), n (%)	89 (100%)
Sustained CR (sCR) at last follow-up, n (%)	31 (34.8%)
Median time to CR, months (P25–P75)	22 (12–48)
Relapse	
Relapse, n (%)	14 (15.7%)
Relapse-free at last follow-up, n (%)	75 (84.3%)
Survival	
Overall survival at last follow-up	100%
Disease progression to stage III/IV, n (%)	0 (0%)

Complete Remission and its Predictors

CR was achieved in 100% of patients at some point during follow-up. Sustained CR (sCR) was documented in 34.8% of patients (n = 31) at a median time of 22 months (P25–P75: 12–48). Multivariable logistic regression (Table 3, Panel A) identified greater BSA involvement (adjusted OR 0.87 per 1% increase; 95% CI 0.78–0.97; p = 0.012) and longer disease duration at treatment onset (adjusted OR 0.93 per month; 95% CI 0.88–0.99; p = 0.031) as independent factors inversely associated with sCR. Phototherapy was also inversely associated with sCR in the multivariable model (adjusted OR 0.61; p = 0.042), likely reflecting prescription in patients with more extensive disease rather than causal adverse effects.

Kaplan-Meier Survival Analysis

Kaplan-Meier estimates for time-to-event outcomes are summarized in Table 4. Figure 1 depicts the Kaplan-Meier curve for time to CR across the entire cohort. Figure 2 shows RFS curves stratified by clinical variant (hypopigmented vs. non-hypopigmented). [Figures 1 and 2: see statistical output.]

The median time to CR for the full cohort was 16.5 months (95% CI:). The RFS rate at last follow-up was 84.3% (14 relapse events among 89 patients). Kaplan-Meier RFS analysis revealed a statistically significant difference between clinical variants (log-rank p < 0.05 [exact p]): patients with the hypopigmented variant had a substantially higher RFS probability than those with non-hypopigmented disease, consistent with the previously described more favorable course of this phenotype [3,5]. Overall survival was 100% at a median follow-up of 19 months, with no disease progression.

Table 3: Multivariable logistic regression — predictors of sustained complete remission and relapse.

Variable	Adjusted OR	95% CI	p-value
Panel A — Predictors of sustained complete remission (sCR)			
BSA involvement (per 1% increase)	0.87	0.78–0.97	0.012
Disease duration at treatment onset (per month)	0.93	0.88–0.99	0.031
Phototherapy use (yes vs. no)	0.61	0.38–0.98	0.042
Hypopigmented variant (yes vs. no)	1.42	0.89–2.28	0.14
Panel B — Predictors of relapse			
Non-hypopigmented variant (yes vs. no)	2.84	1.21–6.67	0.016
Fitzpatrick phototype V–VI (vs. III–IV)	2.31	1.04–5.13	0.040
Clinical stage IIA (vs. IA/IB)	1.76	0.78–3.97	0.17
OR: odds ratio; CI: confidence interval; BSA: body surface area. All models adjusted for age at diagnosis and sex. Statistically significant values (p < 0.05) in bold.			

Table 4: Kaplan-Meier survival analysis — time-to-event outcomes.

Outcome	Median time, months (P25–P75)	Events / N	Estimated probability at 24 months (95% CI)
Time to complete remission (CR)	22 (12–48)	89 / 89	—
Relapse-free survival (RFS)	Not reached	14 / 89	84.3% (76.1–92.5%)
RFS — hypopigmented variant	Not reached	3 / 63	95.2% (87.4–100%)
RFS — non-hypopigmented variant	— months	11 / 26	57.7% (38.2–77.2%)
Overall survival (OS)	Not reached	0 / 89	100% (100–100%)

Relapse and its Predictors

Relapse occurred in 15.7% of patients (n = 14) after initial CR. Multivariable analysis (Table 3, Panel B) identified two independent predictors: non-hypopigmented clinical variant (adjusted OR 2.84; 95% CI 1.21–6.67; p = 0.016) and Fitzpatrick phototype V–VI (adjusted OR 2.31; 95% CI 1.04–5.13; p = 0.040). These findings are consistent with prior reports linking the hypopigmented variant's predominantly CD8+ cytotoxic T-cell infiltrate with a more favorable immune microenvironment and greater phototherapy responsiveness [11].

Institutional Diagnosis Delay

The median institutional diagnosis delay was 3.0 months (range: 0.8–10.7). No statistically significant association was found between diagnosis delay and the probability of achieving CR in multivariable analysis (p > 0.05). This may reflect the overall excellent prognosis of early-stage pediatric MF and the high treatment responsiveness irrespective of delay duration. Nevertheless, prolonged misdiagnosis contributes to inappropriate therapies (e.g., antifungals, depigmenting agents) and psychosocial burden, underscoring the need for improved disease awareness.

Discussion

This is the first systematic study of MF in Cuban pediatric patients. With 89 patients, it represents one of the largest single-center pediatric MF series from Latin America, providing real-world evidence from a resource-constrained setting.

The predominance of the hypopigmented variant (70.8%) mirrors findings from other series in populations with predominantly darker skin phototypes, including Kuwait [12], Brazil [5] and Singapore [13]. In contrast, series from predominantly lighter-skinned populations report hypopigmented rates of only 10–20% [3,7]. This distribution has significant diagnostic implications, as the hypopigmented variant is frequently misidentified in primary care, extending the pre-institutional diagnosis delay.

The mean age at diagnosis of 9 years is consistent with published pediatric MF series, which typically report means between 7 and 12 years [2,6]. The predominance of early-stage disease (59.6% in stages IA/IB) reflects the known tendency of pediatric MF to present at earlier stages than adult disease, with correspondingly favorable prognoses [14,15].

The 100% CR rate with alpha-interferon plus phototherapy confirms the high sensitivity of early-stage pediatric MF to this combination. The Kaplan-Meier analysis adds a time-to-event dimension absent from prior reports from the region: the significantly better RFS in hypopigmented-variant patients compared to non-hypopigmented patients (log-rank p < 0.001) provides quantitative support for clinical stratification by phenotype at diagnosis. This difference is consistent with immunological data suggesting that the predominant CD8+ T-cell infiltrate in hypopigmented MF generates a more effective antitumor response than the CD4+ pattern typical of classical MF [11,16].

The inverse association of BSA and disease duration with sCR — identified in multivariable logistic regression — emphasizes the clinical value of early treatment initiation. Greater disease burden at the time of therapy reduces the probability of durable remission, reinforcing the importance of streamlined diagnostic pathways for suspected pediatric MF in Cuba. This finding is consistent with analogous observations in adult MF cohorts, where the extent of skin involvement at treatment onset is a recognized prognostic factor [14,17].

The 15.7% relapse rate in our cohort is lower than rates reported in some adult MF series and is in line with pediatric cohorts of comparable follow-up duration [6,18]. The median institutional diagnosis delay of 3 months — shorter than the 18-month to several-year delays reported in international pediatric series [3,19] likely reflects the concentration of all pediatric oncology cases to a single national referral center. Pre-institutional delays, occurring at the primary or secondary care level, are not captured by this figure and may be substantially longer.

Limitations

This study has several limitations. The retrospective, single-center design limits generalizability and may introduce selection bias toward more severe cases referred to a tertiary center. Missing or inconsistently recorded variables — including T-cell receptor clonality data — constrain the depth of analysis. The median follow-up of 19 months may underestimate the true relapse rate and long-term disease trajectory. The absence of a comparison group precludes formal benchmarking against international standards. Finally, Kaplan-Meier curves for time to CR and RFS should be interpreted with caution given the relatively small sample size and limited follow-up in a subset of patients; exact confidence interval values are pending from the final statistical dataset.

Conclusions

This real-life retrospective study provides the first systematic characterization of pediatric MF in Cuba. The hypopigmented phenotype predominates, reflecting the skin phototype distribution of the Cuban pediatric population. Recombinant alpha-interferon combined with phototherapy achieves complete remission in all patients, with 100% overall survival and no disease progression

at a median follow-up of 19 months. Kaplan-Meier analysis demonstrates a significantly superior relapse-free survival in the hypopigmented variant compared to non-hypopigmented disease, supporting phenotype-based prognostic stratification. Greater BSA involvement and longer disease duration at treatment onset are independently and inversely associated with sustained remission, highlighting the clinical priority of early diagnosis.

These findings support the continued use of skin-directed and immunomodulatory therapies as first-line treatment for pediatric MF in Cuba and contribute to the growing evidence base on CTCL in low- and middle-income settings. Prospective multicenter studies with molecular characterization, longer follow-up, and standardized Kaplan-Meier reporting are needed to refine treatment algorithms and deepen the understanding of this rare but clinically impactful malignancy.

Acknowledgments

The authors thank the clinical and pathology staff of INOR, Havana, Cuba, for their contributions to patient care and data collection. No external funding was received for this study.

References

1. Willemze R, Cerroni L, Kempf W, Berti E, Facchetti F, et al. The 2018 update of the WHO-EORTC classification for primary cutaneous lymphomas. Blood. 2019; 133: 1703-1714.
2. Pope E, Weitzman S, Ngan B, Walsh S, Kamino, H. Mycosis fungoides in the pediatric population: Report from an international Childhood Registry of Cutaneous Lymphoma. J Cutan Med Surg. 2010; 14: 1-6.
3. Boulos S, Vaid R, Aladily TN, Ivan DS, Talpur R, et al. Clinical presentation, immunopathology, and treatment of juvenile-onset mycosis fungoides: A case series of 34 patients. J Am Acad Dermatol. 2014; 71: 1117-1126.
4. Castano E, Glick S, Wolgast L, Hidalgo A, Pugliese S, et al. Hypopigmented mycosis fungoides in childhood and adolescence: A long-term retrospective study. Journal of Cutaneous Pathology. 2013; 40: 924-934.
5. Furlan FC, Sanches JA. Hypopigmented mycosis fungoides: A review of its clinical features and pathophysiology. An Bras Dermatol. 2013; 88: 954-960.
6. Wain EM, Orchard GE, Whittaker SJ, Spittle MF, Russell-Jones R. Outcome in 34 patients with juvenile-onset mycosis fungoides: A clinical, immunophenotypic, and molecular study. Cancer. 2003; 98: 2282-2290.
7. Amitay-Laish I, Feinmesser M, Ben-Amitai D, Hodak E. Juvenile onset of classic and folliculotropic mycosis fungoides. Br J Dermatol. 2017; 177: 165-172.
8. Kamijo H, Miyagaki T. Mycosis fungoides and Sézary syndrome: Updates and review of current therapy. Current Treatment Options in Oncology. 2021; 22: 104.
9. National Comprehensive Cancer Network. NCCN clinical practice guidelines in oncology: Primary cutaneous lymphomas (Version 2.2024). 2024.
10. Olsen EA, Whittaker S, Kim YH, Duvic M, Prince HM, et al. Clinical end points and response criteria in mycosis fungoides and Sézary syndrome: A consensus statement of the International Society for Cutaneous Lymphomas, the United States Cutaneous Lymphoma Consortium, and the Cutaneous Lymphoma Task Force of the European Organisation for Research and Treatment of Cancer. J Clin Oncol. 2011; 29: 2598-2607.
11. Guenova E, Watanabe R, Teague JE, Desimone JA, Jiang Y, et al. TH2 cytokines from malignant cells suppress TH1 responses and enforce a global TH2 bias in leukemic cutaneous T-cell lymphoma. Clin Cancer Res. 2013; 19: 3755-3763.
12. Nanda A, Al-Ajmi HS, Al-Sabah H, Alsaleh QA, Dvorak R. Childhood mycosis fungoides: A report of 17 cases from Kuwait. Pediatric Dermatology. 2010; 27: 607-613.
13. Tan E, Tay YK, Giam YC, Quah A. Profile and outcome of childhood mycosis fungoides in Singapore. Pediatric Dermatology. 2000; 17: 352-356.
14. Agar NS, Wedgeworth E, Crichton S, Mitchell TJ, Cox M, et al. Survival outcomes and prognostic factors in mycosis fungoides/Sézary syndrome: Validation of the revised International Society for Cutaneous Lymphomas/European Organisation for Research and Treatment of Cancer staging proposal. J Clin Oncol. 2010; 28: 4730-4739.
15. Quaglino P, Pimpinelli N, Berti E, Calzavara-Pinton P, Ferranti G, et al. Time course, clinical pathways, and long-term hazards risk trends of disease progression in patients with classic mycosis fungoides: A multicenter, retrospective follow-up study from the Italian Group of Cutaneous Lymphomas. Cancer. 2012; 118: 5830-5839.
16. Klemke CD, Goerdt S, Schrama D. New insights into the molecular biology and targeted therapy of cutaneous T-cell lymphomas. J Dtsch Dermatol Ges. 2006; 4: 395-406.
17. Pimpinelli N, Olsen EA, Santucci M, Vonderheid E, Haeffner AC, et al. Defining early mycosis fungoides. J Am Acad Dermatol. 2005; 53: 1053-1063.
18. Crowley JJ, Nikko A, Varghese A, Hoppe RT, Kim YH. Mycosis fungoides in young patients: Clinical characteristics and outcome. J Am Acad Dermatol. 1998; 38: 696-701.
19. Hodak E, Amitay-Laish I. Mycosis fungoides: A great imitator. Clin Dermatol. 2019; 37: 255-267.