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Azithromycin: A Safe and Effective Treatment for Pityriasis Lichenoides: A Brief Retrospective Review

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Abstract

Pityriasis Lichenoides Chronica (PLC) and Pityriasis Lichenoides et Varioliformis Acuta (PLEVA) are rare conditions characterized by inflammatory skin lesions with unclear etiology [1,2]. Standard treatments include antibiotics, steroids, methotrexate, and phototherapy [1,3,4,5]. This retrospective chart review compares azithromycin to other standard treatments to assess its safety and effectiveness. Results demonstrated no detectable difference from standard treatments, with the additional advantage of less frequent dosing.

Introduction

Pityriasis lichenoides chronica (PLC) and pityriasis lichenoides et varioliformis acuta (PLEVA) are rare conditions characterized by inflammatory skin lesions [1, 2]. The exact etiology of this group of diseases is unknown, but it is thought to include infectious agents as a potential trigger for cutaneous outbreaks [2, 5, 6, 7, 8]. Standard treatments offered for pityriasis lichenoides (PL) lesions include clarithromycin, doxycycline, minocycline, erythromycin, methotrexate, systemic and topical steroids, and phototherapy [1, 3, 4, 5, 7]. Currently, there is no standardized treatment for this group of diseases [1, 3, 4, 5]. Additionally, azithromycin use for PL has been described in medical literature mainly through case reports or other small studies, and the data are limited [2, 3, 6, 9]. This study aims to evaluate azithromycin as an additional treatment option for both the chronic and acute forms of the condition compared to other standard treatments.

Methods

This study was a retrospective chart review of patients with diagnoses of PLC, PLEVA, and “PL unspecified.” Patient records were collected from Cincinnati Children’s Hospital between 01/01/2009 and 02/01/2024 for patients aged 2–18 years old. Inclusion criteria included:

1) Diagnosis of PLC or PLEVA by clinical evaluation or biopsy.

2) Treatment for a PL condition at Cincinnati Children’s Hospital.

Patients were categorized into two primary treatment groups. The azithromycin group included all patients treated with azithromycin. The standard treatment group included all patients who received any treatment other than azithromycin (ie. clarithromycin, doxycycline, minocycline, erythromycin, methotrexate, systemic and topical steroids, and phototherapy). All patients treated with azithromycin were given a dose of 10 mg/kg two times a week, except for one patient treated with 5 mg/kg daily for up to three months. In every instance, the maximum dose per patient was 500 mg two times a week.

The effectiveness of treatment was assessed based on the degree to which lesions resolved over the course of the regimen. There were five classifications of lesion resolution based on physician-reported outcomes in patient charts: worsening, no response, minimal improvement, improved, and complete

resolution. Safety was determined based on documentation of adverse effects attributed to the treatment regimen, including nausea, abdominal pain, diarrhea, hearing loss, Stevens-Johnson Syndrome, and hepatotoxicity. To assess baseline severity of PL lesions, the number of body regions and lesion characteristics were recorded and compared across groups to determine any difference prior to starting treatment. PLC and PLEVA were analyzed together because of limited sample size. Additionally, adjunct treatments, treatment duration, and dosing frequency were compared between the azithromycin and standard treatment groups.

Results

Treatment response did not differ significantly between the azithromycin and standard treatment groups, showing complete resolution of 30.8% vs 31.7%, improvement of 30.8% vs 29.3%, minimal improvement of 23.1% vs 17.15, or no improvement of 15.4% vs 12.2%, respectively ($p = 0.938$). Notably, there were no instances of “worsening” outcomes within the azithromycin treatment group (n = 13), while two patients in the standard treatment group (n = 41) experienced worsening. The frequency of adverse events did not significantly differ between the two groups ($p = 1.00$), with only one instance of GI effects reported in the azithromycin group. Within the azithromycin cohort, 8/13 (61.5%) patients received concurrent topical corticosteroids. In the standard treatment cohort, topical corticosteroids were used in 21/41 (51.2%) patients, with the remaining treatments including phototherapy (n = 6), oral antibiotics (clarithromycin n = 2, doxycycline n = 2, minocycline n = 2, erythromycin n = 1), systemic corticosteroids (n = 2), methotrexate (n = 1), mupirocin (n = 2), and other therapies (n = 2).Because concurrent therapies were common in both cohorts, treatment outcomes should be interpreted as reflecting overall treatment strategies rather than the isolated effects of azithromycin.There was no difference in treatment duration ($p = 0.184$). Azithromycin was dosed significantly less frequently per week than the standard treatment group (2 doses per week vs 14 doses per week, $p < 0.001$). For the patients who had additional treatment after azithromycin, phototherapy was most common (n = 3), leading to complete resolution (n = 2) or improvement (n = 1) in all cases.

Discussion

In this retrospective cohort, no statistically significant differences in physician-reported treatment response or adverse events were detected between azithromycin-treated patients and patients receiving other commonly used therapies. Given the study's limited sample size, heterogeneous comparator group, and frequent use of adjunct therapies, these findings should not be interpreted as evidence of equivalence but rather that no detectable differences were observed within this cohort. Azithromycin had no instances of worsening lesions in the observed period, and any adverse events were similar to those seen in the standard treatment group.

Although there was no significant difference in treatment duration and patient outcomes, azithromycin had a clear advantage over standard treatments in dosing frequency. With a median of 14 doses per week in the standard treatment group, azithromycin’s 2-dose-per-week schedule presents a major

benefit. Azithromycin's tolerability and less frequent dosing schedule are advantageous in the pediatric population, for whom adherence may be more difficult with 1–3 times daily regimens traditionally used to treat PL diseases [2, 9].

This study has several important limitations. The retrospective design limited standardization of treatment selection and outcome assessment. With pityriasis lichenoides being relatively uncommon, this study is limited by its small and unbalanced cohorts which limited statistical power to detect clinically meaningful differences. Relying on interpretation of physician notes and observations to determine treatment response also introduces the possibility of inter-observer variability. Additionally, the heterogeneous comparator group included multiple treatment modalities, and concurrent adjunct therapies—particularly topical corticosteroids—introduced potential confounding that prevents attribution of outcomes solely to azithromycin. Finally, PLC and PLEVA were analyzed together because of limited sample size, preventing disease-specific comparisons.Future studies would benefit by controlling adjunct therapies to limit confounding variables, as patients are usually using multiple treatment modalities to control skin lesions. Additionally, further data and analysis would be beneficial for standardizing treatment for PL eruptions and to determine the appropriate first-line therapy for both the acute and chronic forms of the condition.

Conclusion

Azithromycin presents as a reasonable treatment for patients presenting with PL lesions, appearing non-inferior to standard treatments with the benefit of reduced dosing frequency. Although no definitive comparative effectiveness conclusions can be drawn because of the study design and sample size. Its convenient twice-weekly dosing schedule may represent a practical advantage for pediatric patients, supporting its consideration as a reasonable treatment option while larger prospective studies further define its role.

Declarations

Funding Statement

The authors received no funding for this study.

Conflict of Interest statements

The authors declare no conflicts of interest related to this work.

Ethics Approval Statement

This study was reviewed and approved by the Institutional Review Board of Cincinnati Children's Hospital Medical Center.

Patient Consent Statement

Given the retrospective design and use of de-identified data, the requirement for informed consent was waived by the Institutional Review Board of Cincinnati Children's Hospital Medical Center.

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Data Availability

The data that support the findings of this study are derived from patient records at Cincinnati Children's Hospital Medical Center. Due to privacy and institutional restrictions, the dataset is not publicly available. De-identified data may be made available from the corresponding author upon reasonable request and with permission of Cincinnati Children's Hospital Medical Center.

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Tables

Table 1
Characteristics of Azithromycin vs Standard Treatment Groups†§

Age (y)	**Full Cohort (n = 54)**	**Azithromycin (n = 13)**	**Standard (n = 41)**	***p*-value‡**
	8.28 (4.80)	**6.8 (5.0)**	**8.8 (4.7)**	**0.207**
Sex				0.180
Male	27 (50)	6 (46.2)	21 (51.2)	
Female	27 (50)	7 (53.8)	20 (48.8)	
Race				0.639
Asian	2 (3.9)	0 (0)	2 (5.1)	
Black	7 (13.7)	3 (25)	4 (10.3)	
Native Hawaiian	1 (2.0)	0 (0)	1 (2.6)	
White	40 (78.4)	9 (75)	31 (79.5)	
Not Reported	1 (2.0)	0 (0)	1 (2.6)	
Diagnosis				0.830
PLC	29 (53.7)	6 (46.2)	23 (56.1)	
PLEVA	16 (29.6)	5 (38.5)	11 (26.8)	
Unspecified Pityriasis Lichenoides	9 (16.7)	2 (15.4)	7 (17.1)	
Determination of Diagnosis				0.663
Confirmed with Biopsy	42 (82.4)	10 (90.9)	32 (80.0)	
Clinical Evaluation	9 (17.6)	1 (9.1)	8 (20)	
# of Body Regions Affected£				0.366
1	3 (5.6)	3 (7.3)	0 (0.0)	
2–5	26 (48.1)	6 (46.2)	20 (48.8)	
6–10	22 (40.7)	17 (41.5)	5 (38.5)	
11–14	3 (5.6)	2 (15.4)	1 (2.4)	
Comorbidities				
ADHD	7 (13)	1 (7.7)	6 (14.6)	1
Eczema	7 (13)	1 (7.7)	6 (14.6)	1
Asthma	5 (12.2)	0 (0)	5 (9.3)	0.321

Age (y)	**Full Cohort (n = 54)**	**Azithromycin (n = 13)**	**Standard (n = 41)**	***p*-value‡**
	8.28 (4.80)	**6.8 (5.0)**	**8.8 (4.7)**	**0.207**
Anxiety	4 (7.4)	1 (7.7)	3 (7.3)	1
Depression	3 (5.6)	1 (7.7)	2 (4.9)	1
Seizures/Epilepsy	4 (7.4)	0 (0)	4 (9.8)	0.563
Developmental Delay	8 (14.8)	2 (15.4)	6 (14.6)	1
Other¥	24 (44.4)	7 (53.8)	17 (41.5)	0.528
# of Past Treatments Tried				0.948
0	14 (25.9)	5 (38.5)	9 (22)	
1	19 (35.2)	4 (30.8)	15 (36.6)	
2	9 (16.7)	2 (15.4)	7 (17.1)	
3	2 (3.7)	0 (0)	2 (4.9)	
4	8 (14.8)	2 (15.4)	6 (14.6)	
5	1 (1.9)	0 (0)	1 (2.4)	
6	1 (1.9)	0 (0)	1 (2.4)	

† Continuous variables are summarized as mean (SD) and categorical variables as n (%).

§Standard treatments included topical or oral antibiotics, topical or systemic corticosteroids, phototherapy, and methotrexate.

‡Chi-square test or Fisher's Exact test was used for categorical variables and t-test was used for continuous variables.

£ Body regions included face, head, neck, chest, trunk, abdomen, back, arms, upper legs, lower legs, hands, feet, groin/genitals, and buttocks.

¥Other comorbidities included Hypoplastic Left Heart Syndrome, Crohn's disease, chronic diarrhea, GERD, lymphatic malformation, psoriasis, Juvenile Idiopathic Arthritis, Uveitis, Hypermobility Syndrome, Autism Spectrum Disorder, Disruptive Mood Regulation Disorder, and lactose intolerance.

Table 2
Treatment Response & Duration for Azithromycin vs Standard Treatment Groups†§

Current Treatment Response	**Azithromycin (n = 13)**	**Standard (n = 41)**	***p*-value‡**
			0.938
Complete Resolution	4 (30.8)	13 (31.7)	
Improvement	4 (30.8)	12 (29.3)	
Minimal Improvement	3 (23.1)	7 (17.1)	
No Response	2 (15.4)	5 (12.2)	
Worsened	0 (0)	2 (4.9)	
Other£	0 (0)	2 (4.9)	
Treatment Duration (mo)¥	4.0 (2.9)	8.2 (11.3)	0.184
Average Weekly Doses*	**2.5 (1.5)**	**12.4 (4.9)**	**< 0.001**
Adverse Events	1 (7.7)	0 (0)	0.241
Diarrhea	0 (0)	1 (2.4)	1
Nausea	0 (0)	1(2.4)	1
Other††			

† Continuous variables are summarized as mean (SD) and categorical variables as n (%).

§Standard treatments included topical or oral antibiotics, topical or systemic corticosteroids, phototherapy, and methotrexate.

‡Chi-square test or Fisher's Exact test was used for categorical variables, and t-test was used for continuous variables.

£Other current treatment response includes no documented response to treatment, and a patient who was clear by initial presentation to the dermatologist.

¥For treatment duration, sample sizes for Azithromycin and Standard Treatment Groups were 13 and 39, respectively.

*For the average weekly dose, sample sizes for the Azithromycin and Standard Treatment Groups were 11 and 38, respectively.

†† Other includes a patient who reported both insomnia and arthralgias on systemic steroids.