CASE SERIES

Trichophyton indotineae in New York: A Case Series Highlighting Diagnostic Pitfalls and Therapeutic Considerations

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J Clin Aesthet Dermatol. 2026;19(6):35–43.

OBJECTIVE: To describe the clinical characteristics, treatment responses, and outcomes of patients with *Trichophyton indotineae* infection in New York state and to contribute to the collective knowledge necessary for appropriate antifungal stewardship and management strategies. **METHODS:** We conducted a retrospective cohort study of 20 patients with culture-confirmed *T. indotineae* infection seen across New York City between June 2023 and April 2025. Demographic data, clinical features, medical history, and treatment outcomes were collected. All patient data were deidentified, and informed consent was waived. **RESULTS:** Patients were evenly distributed by gender, with a mean age of 43.8 years for men and 33.4 years for women. All patients reported pruritus and, notably, 90% had intact immune function. Common presentations included tinea corporis and tinea cruris. Itraconazole was the most effective first-line therapy; however, there was a high rate of recurrence after stopping the treatment. Griseofulvin, voriconazole, and fluconazole showed some success. **LIMITATIONS:** This study is limited by a small sample size and reliance on self-reported medical histories. Additionally, the study did not assess the impact of topical antifungal use or combination oral antifungal therapy on treatment efficacy. **CONCLUSION:** *T. indotineae* presents diagnostic and therapeutic challenges due to its atypical clinical features and antifungal resistance. Early recognition and appropriate systemic antifungal therapy are critical. Itraconazole remains the preferred first-line agent based on current clinical experience. Greater clinician awareness and further research are urgently needed to address the rising burden of this infection.
KEYWORDS: *Trichophyton indotineae*, dermatophytes, antifungal resistant, antifungal stewardship, itraconazole, infectious disease

Dermatophytosis is a superficial and inflammatory mycosis caused by keratinophilic fungi, including *Trichophyton*, *Microsporum*, and *Epidermophyton* species.[1] *Trichophyton rubrum*, *Trichophyton interdigitale*, *Trichophyton mentagrophytes*, and *Trichophyton tonsurans* are the most common causes of tinea infections in humans. Most *Trichophyton* species are anthropophilic, meaning they are restricted to humans and typically cause mild inflammatory reactions. However, *T. mentagrophytes* is zoophilic, primarily affecting animals and triggering a strong inflammatory response in humans.[1] It can cause kerion, tinea corporis, tinea barbae, and tinea pedis in the human body.[1] A recently identified species, *Trichophyton indotineae* (previously known as *Trichophyton mentagrophytes* type VIII), has been seen in increasing numbers throughout the Indian subcontinent and has emerged as a public health concern.[2] First described in 2019, its identification relied on sequencing the Internal Transcribed Spacer (ITS) region of ribosomal DNA (rDNA).[3]

Commonly used treatments for tinea include terbinafine, itraconazole, and fluconazole, which were approved by the US Food and Drug Administratin (FDA) in the 1990s, while griseofulvin was approved in the 1950s. Among these, only terbinafine is approved specifically for tinea corporis. In vitro studies have shown *T. indotineae* to be resistant to terbinafine, a commonly used first-line oral antifungal therapy targeting squalene epoxidase.[4] This resistance is attributed to a point mutation in the squalene epoxidase gene (SQLE) phenylalanine-to-leucine amino acid change at codon 397 (F397L).[3,5] Clinically, patients are typically immunocompetent and present with widespread, scaly, pruritic plaques on the trunk, groin, and extremities. Unlike classical tinea infections, *T. indotineae* commonly lacks central clearing.[6] Many

FUNDING: No funding was provided for this article.
DISCLOSURES: The authors have no relevant conflicts of interest.
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patients have a history of travel, particularly to the Indian subcontinent.[7] Diagnosis of *T. indotineae* requires specialized laboratory testing using molecular methods, such as DNA sequencing, because culture alone may show *T. mentagrophytes* or *T. interdigitale* by most clinical laboratories.[8]

To date, *T. indotineae* has been reported in many distant continents, including North America, southern Africa, western and central Europe, and Latin America.[5,9–12] The first 2 cases of *T. indotineae* in United States (US) were reported in May 2023 by dermatologists and public health officials in New York City.[13,14] One immunocompetent patient reported her tinea infection had developed while she was in Bangladesh; the other patient developed the infection during her third trimester of pregnancy and denied any international travel history. These 2 cases underscored the potential transmission of *T. indotineae* within the US.[13] However, due to diagnostic challenges, the prevalence and incidence of this infection in the US remain unclear. Furthermore, antifungal susceptibility testing (AFST) does not always correlate with clinical clearance, posing additional therapeutic obstacles for clinicians.[14]

To enhance antifungal stewardship and better understand the epidemiology of *T. indotineae* infections, our team conducted what we believe to be the largest case series to date, examining the treatments use and the clinical course.

METHODS

This retrospective cohort study included 20 cases of *T. indotineae* from private practice settings in New York City, New York, from June 2023 to April 2025. Information regarding patients' demographics, clinical presentation, past medical history, and treatment outcomes was collected (**Figures 1–10**). Informed consent was waived because all data were deidentified.

Identification of *T. indotineae*. The diagnosis was reached by history (travel history, prior failure to oral antifungal therapy, pruritus), physical examination (widespread eczematous plaque ± excoriations), clinical suspicion, and confirmatory laboratory testing by the New York State Department of Health. Fungal cultures were performed at a community laboratory. Isolates identified as *T. mentagrophytes* complex were referred to the New York State Department of Health Wadsworth Center for species-level confirmation using ITS rDNA sequencing. Of the 20 isolates, all 20 were confirmed as *T. indotineae*, and all had been preliminarily identified as *T. mentagrophytes*.

RESULTS

In terms of patient demographics, 50% were men, 50% were women, and ethnically, all were from the Indian subcontinent. The mean age of male patients was 43.8 years (SD: 14.1), while the mean age of female patients was 33.4 years (SD: 22.0) (**Table 1**). Eight patients (40%) reported a travel history to or immigration from Bangladesh; 1 patient (5%) immigrated from India and another patient (n=1, 5%) immigrated from Nepal. The detailed demographic information, clinical findings, treatments, and outcomes are listed in **Supplemental Table 1**.

Clinically, all patients reported pruritus. Sixty-five percent (13/20) reported prior use of topical corticosteroids or topical calcineurin inhibitors. Most patients (18/20, 90%) were immunocompetent, and 2 patients had diabetes. Notably, patients 4, 5, 6, and 14 were related and lived in the same household. The wife of patient 16 also had active disease; however, culture was not performed, as the diagnosis was made based on clinical examination and history. She was subsequently treated with antifungal therapy and demonstrated a good clinical response.

There were a variety of clinical presentations: 17 patients (85%) had tinea corporis, 15 patients (75%) had tinea cruris, 6 patients (30%) had tinea faciei, and 3 patients (15%) had tinea manuum. None of the patients developed tinea capitis or onychomycosis, which aligns with prior knowledge that *T. indotineae* is a rare cause of these conditions. In contrast to adult counterparts, tinea faciei was more common in adolescent and pediatric patients.

Regarding diagnostic workup, skin biopsies were performed on 9 patients, with 4 (44%) demonstrating spongiotic dermatitis. One additional patient reported a prior biopsy by an outside dermatologist that also showed spongiotic dermatitis. Among patients with spongiotic dermatitis on biopsy, all had either positive cultures or strong clinical suspicion of tinea and were subsequently treated with appropriate antifungal therapy with or without adjunctive topical steroids.

TABLE 1. Demographics and clinical characteristics (N=20)

CHARACTERISTIC	n (%)
Male	10 (50); mean age: 43.8 years
Female	10 (50); mean age: 33.4 years
Immunocompetent	18 (90)
Tinea corporis	17 (85)
Tinea cruris	15 (75)
Tinea faciei	6 (30)
Tinea manuum	3 (15)
Patients reported prior use of topical corticosteroid or topical calcineurin inhibitor	13 (65)

The mean duration of systemic antifungal therapy was 4.3 months (median: 4.1 months). The mean follow-up period was 6.9 months (median: 5.75 months). Among patients who experienced recurrence, the mean time to recurrence was 10.3 weeks (median: 6 weeks). Patients 8 and 9 each experienced 2 recurrences, and both events for each patient were included in the recurrence analysis. Notably, 1 recurrence in patient 9 occurred during antifungal taper. Patient 17 also experienced a recurrence during taper, therefore time to recurrence after complete discontinuation of therapy was not included in the analysis.

Among the 20 patients, 6 (30%) were lost to follow-up. Ten patients (50%) achieved clearance or improvement with the initial course of itraconazole; however, 8 of these 10 patients (80%) experienced recurrence after discontinuation or tapering of the medication. One patient (5%) achieved clearance with voriconazole but experienced a flare 4 weeks after discontinuation. Five patients (25%) achieved clearance with griseofulvin; however, 3 required continued therapy due to ongoing household transmission. One patient (5%) demonstrated improvement with fluconazole. Additionally,1 patient was referred to an infectious disease specialist. Overall, 10 patients (50%) experienced flaring or recurrence after cessation of oral antifungal therapy (**Table 2**).

DISCUSSION

In July 2023, a reference laboratory analyzed the genetic profile and AFST of 21 strains of *T. indotineae* from North America, collected

TABLE 2. Treatment outcomes

ANTIFUNGAL	# OF PATIENTS BEEN TREATED[a]	CLEARANCE/ SIGNIFICANT IMPROVEMENT	EFFECTIVE RATE	RECURRENCE AFTER ORAL ANTIFUNGAL DISCONTINUATION OR TAPERING	RECURRENCE RATE (FLARE/CLEARANCE)
Terbinafine	10	1	10%	1	100%
Itraconazole	15	10	66.7%[b]	8	80%[b]
Voriconazole	3	2	66.7%	1	50%
Griseofulvin	7	4	57.1%	0	0%[c]
Fluconazole	4	1	25.0%	0	0%
Referred to infectious disease	1	N/A	N/A	N/A	N/A

[a]Total exceeds 20 because some patients received more than 1 oral antifungal.
[b]Two patients (Patients 2 and 9) who initially improved with itraconazole and experienced recurrence after discontinuation were subsequently lost to follow-up; these patients were included in both the efficacy and recurrence analyses.
[c]Three patients tapered griseofulvin from daily to every-other-day dosing despite clinical clearance due to ongoing disease in household contacts. None of these patients experienced recurrence.
N/A: not applicable

FIGURE 1. Patient 4; *Trichophyton indotinease* flare-up after stopping voriconazole after 1 month. Examination was remarkable for scaly hyperpigmented papules that coalesced into plaques with lichenification.

between 2021 and 2022. 5 A further database search identified 3 additional *T. indotineae* isolates, the earliest of which dated back to 2017. Interestingly, the earliest strain did not harbor an F397L codon change but instead exhibited a leucine-to-serine amino acid substitution at codon 393 on the SQLE.[5]

The majority of *T. indotineae* strains had a terbinafine minimal inhibitory concentration (MIC) >2 µg/mL and remained susceptible to itraconazole, with MIC values ranging from ≤0.03 to 0.125 µg/mL. Regarding the source of *T. indotineae* isolates, all were cultured from skin samples.

To the best of the authors' knowledge, this is the first and largest case series conducted in New York City. Caplan et al[13,14] identified 11 patients with *T. indotineae*. Our observations are consistent with those reports, as *T. indotineae* typically causes widespread inflammatory lesions in patients with intact immune systems.

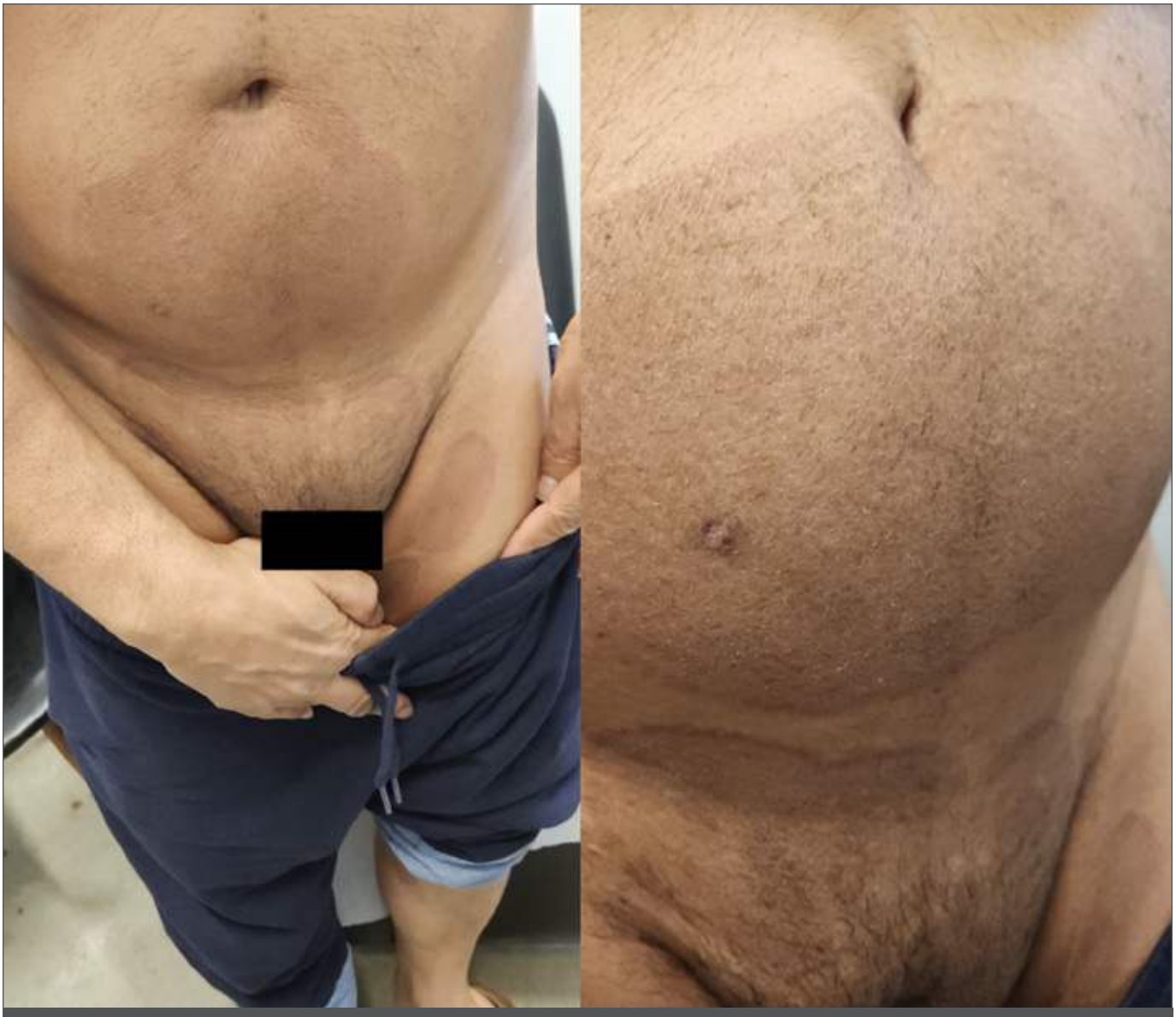

FIGURE 2. Patient 19 initially presented with widespread erythematous scaly plaques.

Moreover, based on the author's (S.C.) clinical experience, many additional patients are treated empirically for *T. indotineae* based on history and physical examination without confirmatory culture, such as those with a history of travel to the Indian subcontinent, failure of terbinafine treatment, and extensive pruritic rashes affecting the body and groin. Itraconazole was the most commonly used agent, but griseofulvin demonstrated a higher clearance rate in this small cohort. This may be due to longer duration, higher dosages, different SQLE mutation profiles, or the overall smaller sample size. Of the 6 patients lost to follow-up, 15 were receiving itraconazole and 7 were receiving griseofulvin.[14] According to a literature review conducted by Sonego et al,[15] which included 58 published cases of *T. indotineae*, the most effective treatment leading to disease resolution was itraconazole at a dosage of 200 mg/day for a variable duration of 1 to 12 weeks, with 15 cases reported. Interestingly, Sonego et al[15] also noted improvement with topical or oral terbinafine, although recurrences were observed later in the disease course.[15] Compared to the report by Sonego et al,[15] griseofulvin was ineffective in 5 patients but appeared to be effective in our study.

T. indotineae poses a significant public health concern due to challenges in diagnosis and management. Diagnosis is often complicated by the absence of central clearing and the frequent finding of spongiotic dermatitis in histopathology. However, a helpful diagnostic clue is a history of travel to the Indian subcontinent (particularly India or Bangladesh) or contact with someone who has, as cases have been reported in the US even without a significant travel history. Widespread use of antifungal and topical corticosteroids; multiple familial contacts; unhygienic practices; treatment by nondermatologists with inappropriate drugs, doses, and duration; and poor compliance with treatment have contributed to the emergence of antifungal-

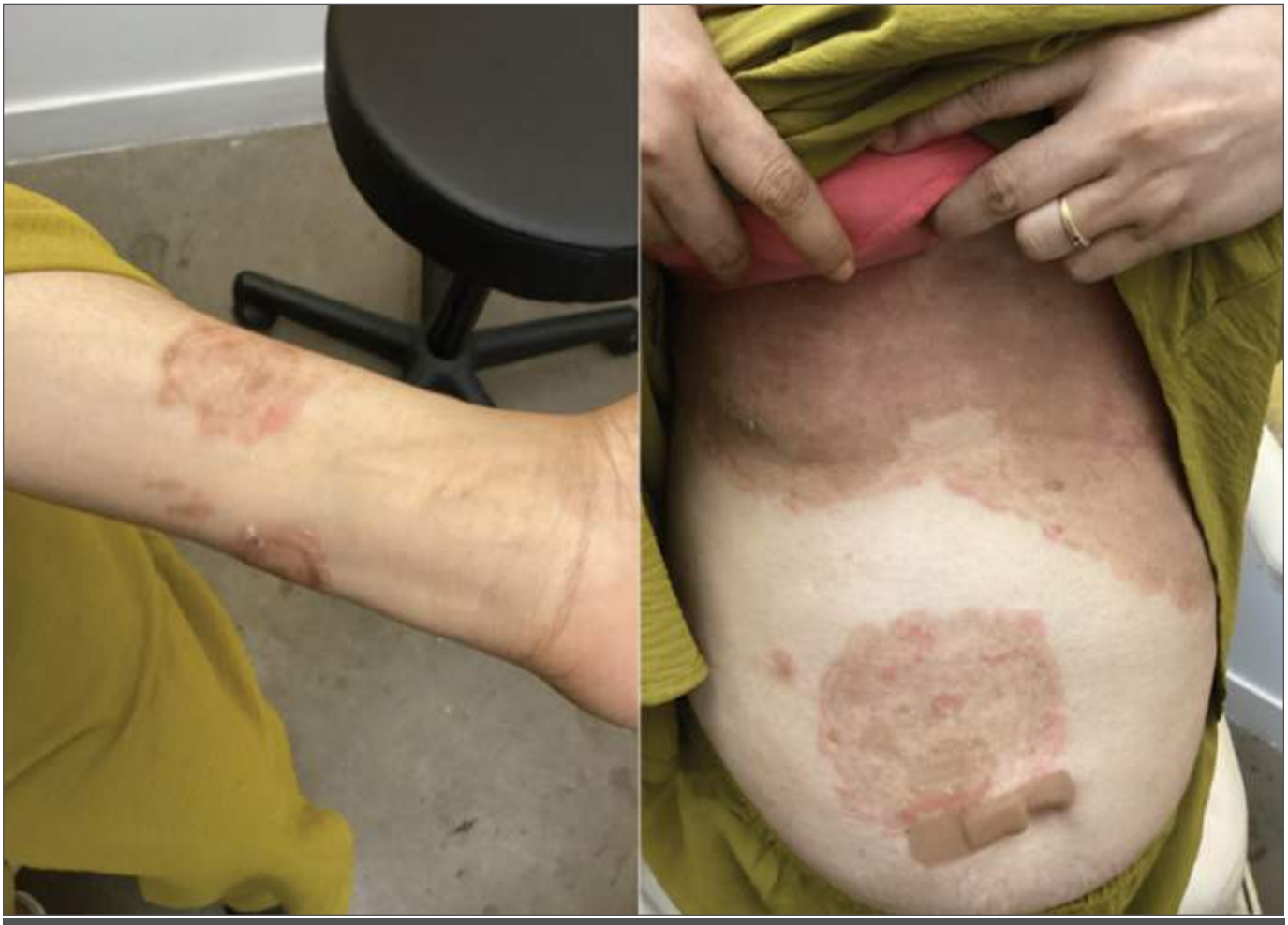

FIGURE 3. Patient 13 initially presented with tinea corporis and tinea faciei.

resistant species.[15,16] This resistance complicates treatment, leading to prolonged infections and increased risk of transmission. In particular, misuse or overuse—such as using topical corticosteroids without confirming a fungal diagnosis—can mask symptoms, delay proper therapy, and promote the growth of resistant strains. Consequently, infections may even masquerade as spongiotic dermatitis, likely due to prior corticosteroid use or tinea incognito. A case study demonstrated that tinea incognito can present with spongiotic changes and a negative periodic acid-Schiff stain, further obscuring diagnosis.[17] The treatment course for *T. indotineae* is often prolonged and may require extended maintenance therapy, even after clinical resolution, to prevent relapse and ensure complete mycologic cure.

Clinically, *T. indotineae* tends to be chronic, involving large body surface areas with frequent recurrences, often due to household transmission. The disease is often mismanaged with oral terbinafine or other ineffective treatments without proper fungal culture, leading to increased resistance. Past management often includes multiple courses of topical and systemic antifungal therapies, topical corticosteroids, and repeated biopsies, increasing the risk of adverse effects. A diagnostic challenge for community clinicians is that routine fungal culture cannot distinguish *T. indotineae* from other members of the *T. mentagrophytes*/*T. interdigitale* complex. Species-level confirmation requires molecular methods such as ITS sequencing, which are not readily available at most commercial laboratories. In New York, isolates can be referred to the New York State Department of Health Wadsworth Center for identification. Clinicians should suspect *T. indotineae* in patients presenting with widespread, pruritic dermatophytosis, particularly in those with a travel history to the Indian subcontinent, failure of terbinafine therapy, or household contacts with similar infections. In such cases, empiric initiation of itraconazole while awaiting confirmatory testing is reasonable, given the known inefficacy of terbinafine against most *T. indotineae* strains. Emerging polymerase chain reaction–based assays may eventually allow for a more rapid identification process. Prompt initiation of effective antifungal treatment, such as itraconazole, should be considered and continued until complete clearance of infection. In fact, treatment often becomes chronic, and continued antifungal therapy 2 to 3 times per week for several months is often necessary even after clinical clearance, especially if household contacts remain infected. In fact, the author's (SC) clinical experience demonstrates that most patients needed 12 weeks to achieve clearance and several took up to 24 weeks

FIGURE 4. Patient 5 initially presented with tinea corporis and tinea faciei.

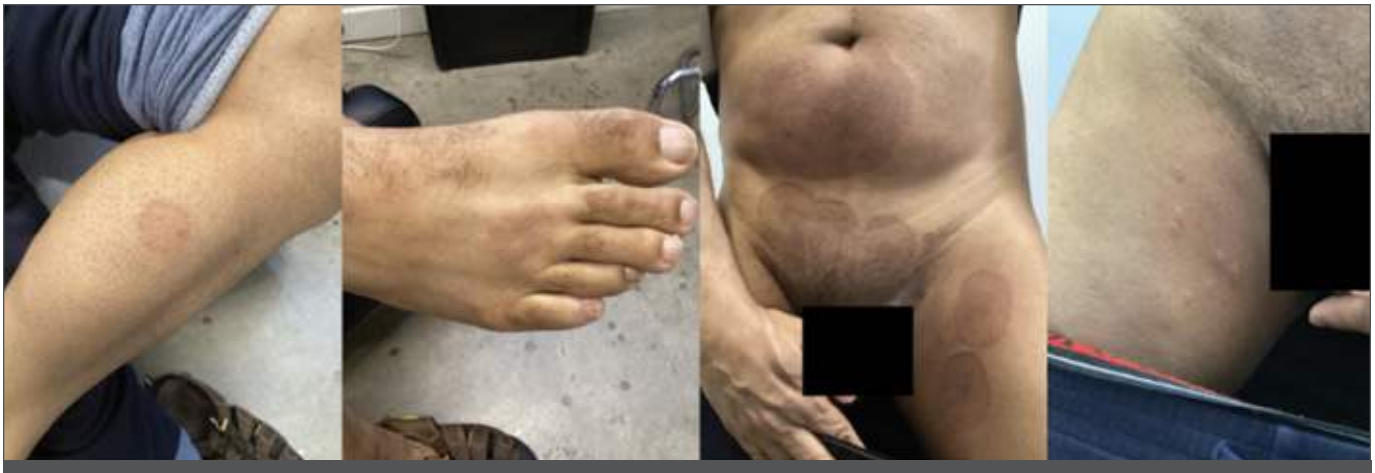

FIGURE 5. Patient 19 initially presented with tinea corporis and tinea faciei.

to completely clear. Loss to follow-up was common, potentially related to the prolonged treatment course and persistent pruritus, leading to patient dissatisfaction. These data highlight the importance of examining and treating all household members and close contacts. Prompt identification and treatment are critical to preventing the continued spread. As with scabies and certain sexually transmitted infections, it is recommended that when a patient is diagnosed with *T. indotineae*, close contacts and household members should be examined and treated as necessary to prevent ongoing transmission.

Future directions may include the development of newer antifungal therapies, such as oral formulations of efinaconazole and tavaborole, both of which are approved for the treatment of onychomycosis caused by *T. rubrum* and *T. mentagrophytes*.

This study's limitations include reliance on patients' self-reported medical histories, a small sample size, and, most importantly, the lack of AFST reports, which prevents correlation between AFST results and clinical response. Differences in observed efficacy between agents in this series should be interpreted cautiously given the small sample size and may not fully reflect broader treatment patterns. Additionally, none of the patients in this study

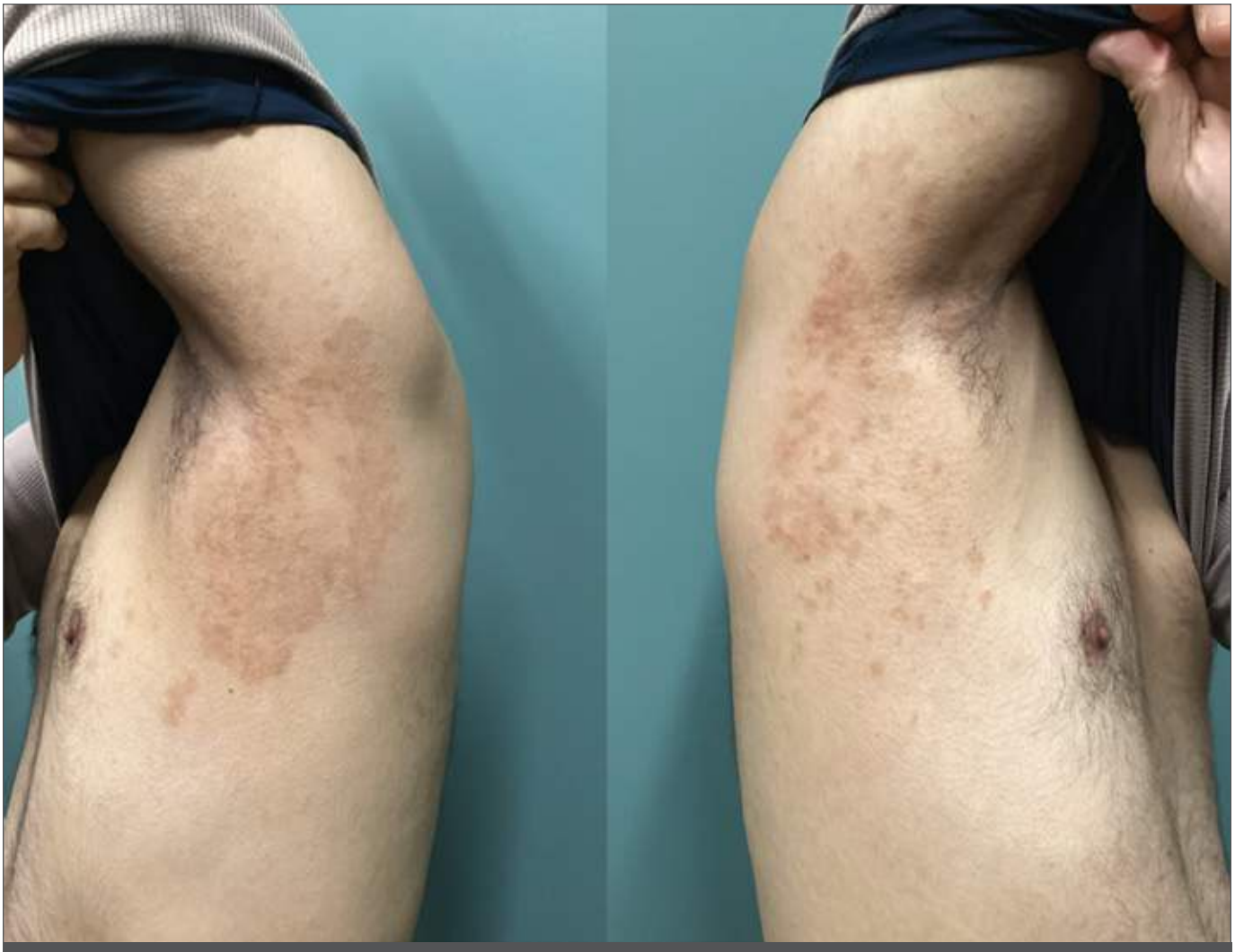

FIGURE 6. Patient 6 initially presented with tinea corporis.

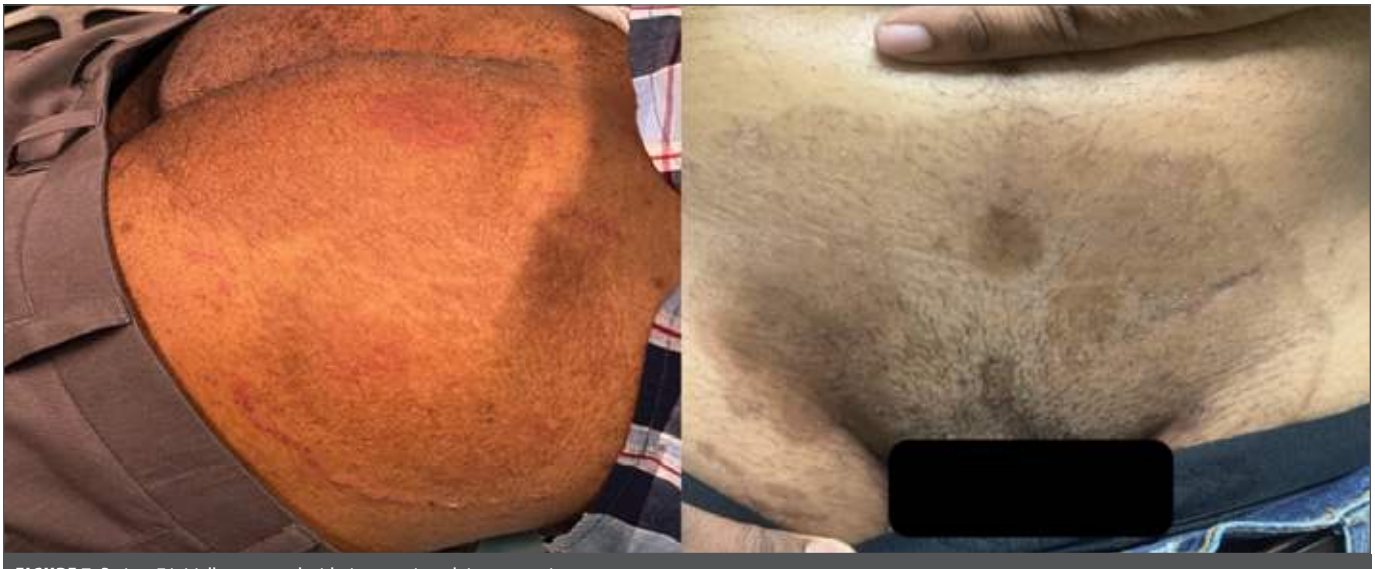

FIGURE 7. Patient 7 initially presented with tinea cruris and tinea corporis.

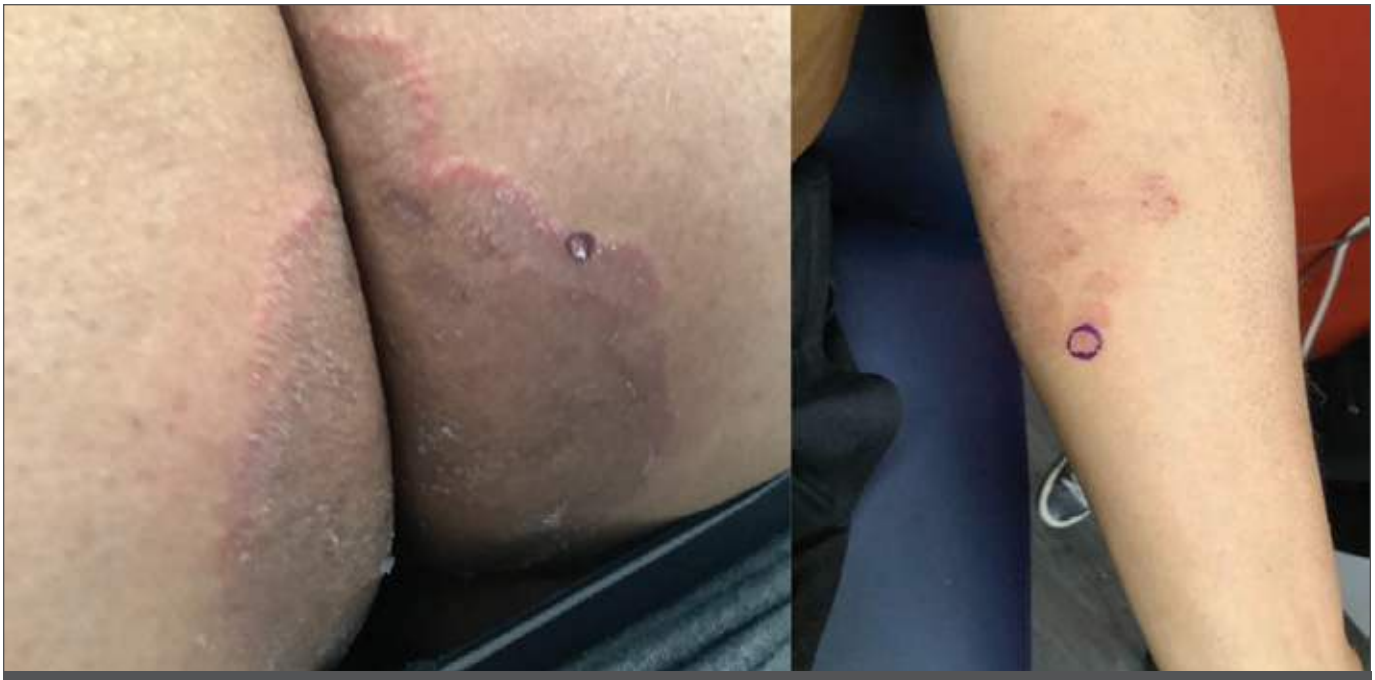

FIGURE 8. Patients 8 (left) and 9 (right) at initial presentation with suspected tinea curis between intergluteal folds and tinea corporis on the left anterior forearm, respectively.

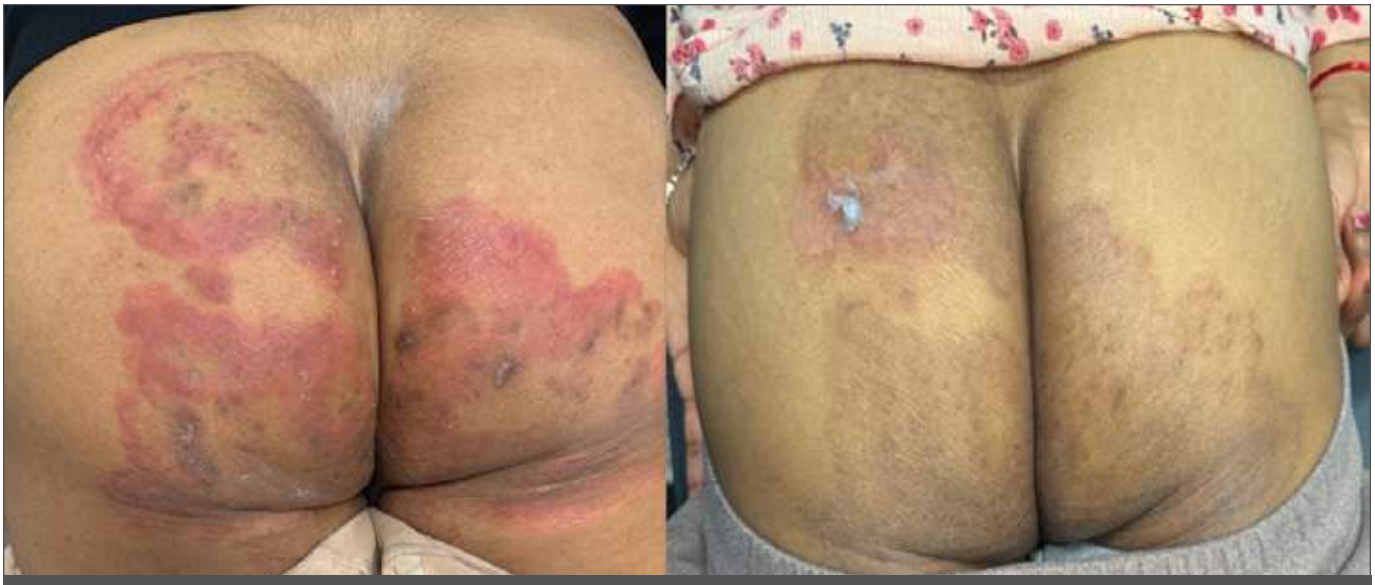

FIGURE 9. Patient 10 presented with tinea cruris on the bilateral glutes, showing initial presentation (left) and improvement after treatment course (right).

received combination oral antifungal therapy, and topical antifungal use was documented but not considered in the analysis.

CONCLUSION

Our case series highlights the clinical challenges associated with diagnosing and managing *T. indotineae* infections. Given its chronicity, frequent recurrence, and potential for household transmission, early recognition and appropriate systemic antifungal therapy are critical for successful outcomes. Itraconazole remains the most effective first-line treatment based on current evidence, although voriconazole, fluconazole, and griseofulvin may offer an alternative option in select cases. Greater awareness among clinicians and improved antifungal stewardship are essential to address the growing public health impact of this emerging pathogen.

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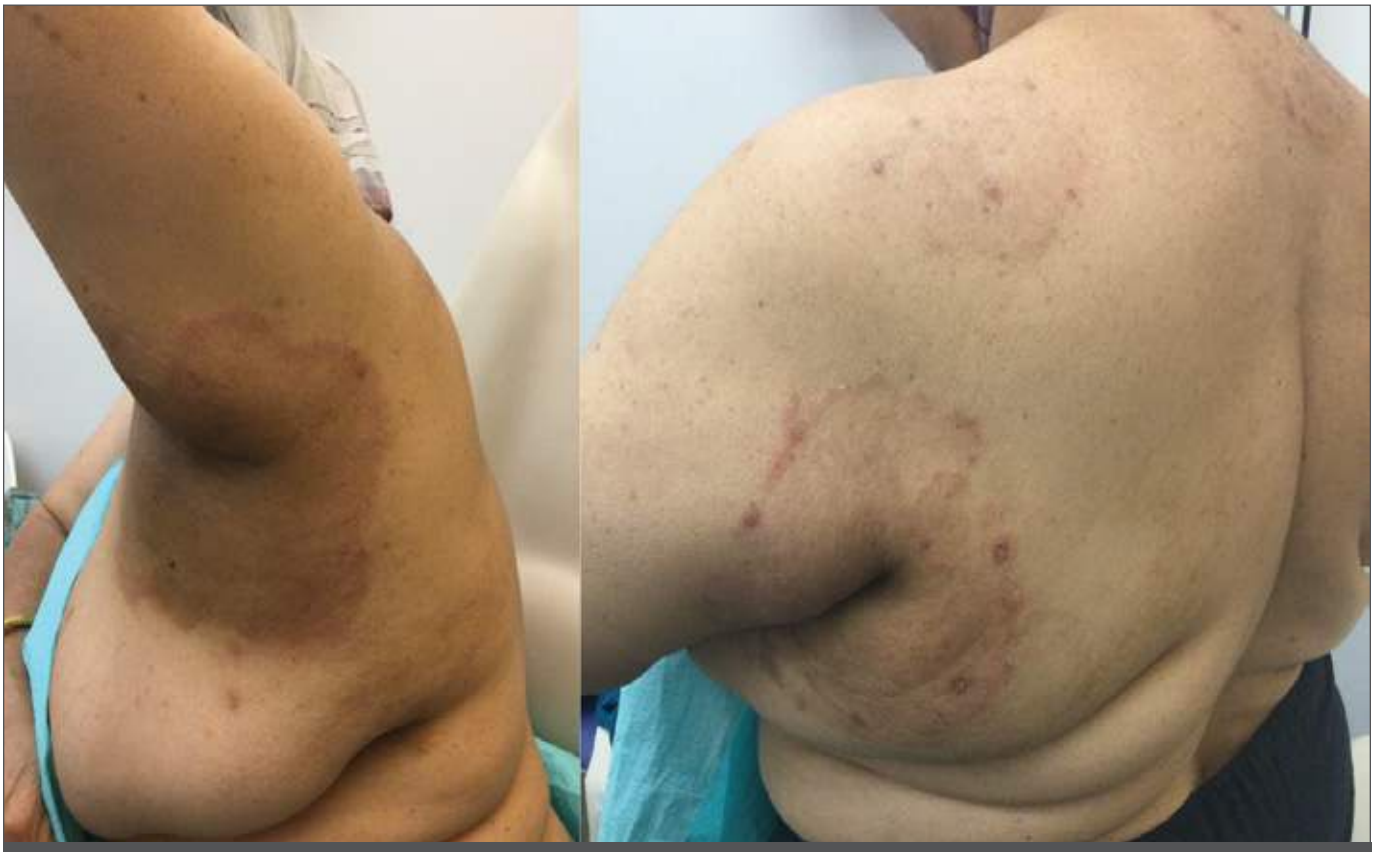

FIGURE 10. Patient 11 presented with tinea corporis in bilateral axillae and superior back.

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