

EDITORIAL



Challenges in recurring superficial fungal infections: a reappraisal for the twenty-first century

Chandra Sekhar Sirka

Department of Dermatology, All India Institute of Medical Sciences, Odisha, India

ARTICLE HISTORY

Received 9 August 2023; Revised 20 September 2023; Accepted 28 September 2023

Over the last decade, superficial fungal infection (tinea corporis, tinea cruris, and tinea faciei) has been challenged by a rise in the incidence of Trichophyton mentagrophytes species, poor or variable response to antifungal therapy (clinical cure, no response, and/or aggravation of symptoms after the initiation of an effective drug), frequent recurrence despite prolonged antifungal therapy, recurrence of lesion with diverse morphology, and/or lack of correlation between drug resistance and treatment outcome; poor correlation of risk factor (fungal infection of nail and disease in families) to chronic fungal disease, and recurrence was confined to treated tinea sites [1-8]. Such a diverse change in superficial fungal infection posed a diagnostic and therapeutic challenge for treating physicians. To overcome these challenges, research focused on various aspects of superficial fungal infection. Like epidemiology, species identification, clinical course and morphology, associated risk factors, drug resistance, and treatment [1-4,7-19]. However, researchers lacked consensus in identifying the cause of such diverse change in superficial fungal infection.

Researchers observed that the challenge was only observed in superficial fungal infections of the skin (tinea corporis, tinea cruris, and tinea faciei) [1,4,13,15,20]. They further observed that the changes were confined to the treated site of fungal infection despite adequate antifungal therapy. They also observed that the treated tinea site developed a fungal infection, adverse effects unique to prolonged topical steroid use, "topical steroid withdrawal syndrome," and trauma by a fungal infection on the atopic dermatitis skin developed chronic eczema/post-traumatic eczema. Further, observations were made that fungal infection (complicated), development of topical steroid withdrawal syndrome, and chronic eczema shared common features (like episodes of recurrence, episodes recurred with diverse morphology, poorly/variably responded to therapy, run a remitting and relapsing course) [1,21,22]. Hence, recurred lesions at the treated site of fungal infection need to be correctly diagnosed before initiating appropriate treatment.

The use of topical steroids and association of atopic dermatitis has increased in superficial fungal infected patients [1,2,14,15]. Researchers arbitrarily attributed the challenges in superficial fungal infection to risk factors; however, it was not supported by a well-designed study. Further, researchers observed there is a lack of correlation in diverse changes in fungal infection to immune status, associated comorbidity, occupation, tight clothes, topical steroid use [14,23], disease in the family [6], fungal infection of nail and hair [5,9], and drug

resistance [1,2,7,8]. Hence, there is a need for further understanding of the interaction between a) risk factors and fungal infection and b) risk factors and skin. The interaction of risk factor topical steroid use and associated atopic dermatitis with fungal infection and skin is well known. The topical steroids have anti-inflammatory and immune-suppressive properties [24]. These properties of steroids may alter the course [25], morphology [11-13], and complicate the fungal infection [26,27]. While its prolonged use may develop adverse effects unique to topical steroid use, "topical steroid withdrawal syndrome" [21,28]. In Atopic dermatitis patients, the shift in immunity towards Th2 cytokines [29] may prolong the course of fungal infection. Inherent skin barrier defect of atopic dermatitis may facilitate the adhesion of fungal arthroconidia to Keratinized tissue of skin [30] and result in widespread fungal infection and/or increased predilection of disease to the frictional sites [4,9,13]. Further, the ability of traumatized skin (by surgery, friction and/or disease) of atopic dermatitis may develop post-traumatic eczema/chronic eczema [22,31,32]. Hence, there is a need to assess the recurred lesions at the treated tinea site to identify what has recurred in the treated tinea site (fungal infection or dermatosis unrelated to fungal infection).

The current challenge in the diagnosis of recurring lesions after adequate antifungal therapy is because of diverse morphology of recurred lesions, recurred lesion minimizing other dermatoses, poor response to therapy, variable response to antifungal therapy, and/or drug susceptibility studies test not correlating with treatment outcome in a real-world scenario. An ideal approach to diagnosis of superficial fungal is clinical. Laboratory tests are indicated only for the complicated and doubtful cases of fungal infection [33]. Since complicated fungal infection [1,3,19], topical steroid withdrawal syndrome [21], and chronic eczema/post-traumatic eczema [22] may share common clinical features like the appearance of lesions during medication, episodes appearing with diverse morphology, poor/variable response of lesions to therapy, episodes may continue to appear long after the completion of antifungal therapy and discontinuing topical steroid use; hence, patients with recurred lesions at the treated tinea site with history of topical steroid and associated atopic dermatitis may be subjected to fungal test prior to initiating therapy.

Hopefully, this editorial will draw the attention of researchers and readership to focus on the diagnosis of recurred lesions, identifying fungal infection from the

*Correspondence: Dr. Chandra Sekhar Sirka, Department of Dermatology, All India Institute of Medical Sciences, Bhubaneswar 751019, Odisha, India, e-mail: csirka2006@gmail.com

© 2023 The Author(s). Published by Reseapro Journals. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

development of dermatosis unrelated to fungal infection at the treated site of fungal infection in patients who have risk factors like topical steroid use and associated atopic dermatitis.

Disclosure statement

No potential conflict of interest was reported by the author.

References

1. Pathania S, Rudramurthy SM, Narang T, Saikia UN, Dogra S. A prospective study of the epidemiological and clinical patterns of recurrent dermatophytosis at a tertiary care hospital in India. *Indian J Dermatol Venereol Leprol.* 2018;84(6):678-684.
2. Vineetha M, Sheeja S, Celine MI, Sadeep MS, Palackal S, Shanimole PE, et al. Profile of Dermatophytosis in a Tertiary Care Center. *Indian J Dermatol.* 2018;63(6):490-495.
3. Rajagopalan M, Inamadar A, Mittal A, Miskeen AK, Srinivas CR, Sardana K, et al. Expert Consensus on The Management of Dermatophytosis in India (ECTODERM India). *BMC Dermatol.* 2018;18(1):6.
4. Verma SB, Panda S, Nenoff P, Singal A, Rudramurthy SM, Uhrlass S, et al. The unprecedented epidemic-like scenario of dermatophytosis in India: I. Epidemiology, risk factors and clinical features. *Indian J Dermatol Venereol Leprol.* 2021;87(2):154-175.
5. Kalekhan FM, Asfiya A, Shenoy MM, Vishal B, Pinto M, Hegde SP. Role of tinea unguium and other factors in chronic and recurrent dermatophytosis: A case control study. *Indian Dermatol Online J.* 2020;11(5):747-752.
6. Tuknayat A, Bhalla M, Kaur A, Garg S. Familial Dermatophytosis in India: A Study of the Possible Contributing Risk Factors. *J Clin Aesthet Dermatol.* 2020;13(2):58-60.
7. Shah SR, Vyas HR, Shah BJ, Jangid NC, Choudhary A, Gehlawat T, et al. A clinical-mycological study of dermatophytosis in western India with focus on antifungal drug resistance as a factor in recalcitrance. *Indian J Dermatol.* 2023;68(2):234.
8. Sardana K, Kaur R, Arora P, Goyal R, Ghunawat S. Is antifungal resistance a cause for treatment failure in dermatophytosis: a study focused on tinea corporis and cruris from a tertiary centre? *Indian Dermatol Online J.* 2018;9(2):90-95.
9. Singh BS, Tripathy T, Kar BR, Ray A. Clinicomycological study of dermatophytosis in a tertiary care hospital in eastern India: a cross-sectional study. *Indian Dermatol Online J.* 2019;11(1):46-50.
10. Nenoff P, Verma SB, Vasani R, Burmester A, Hipler UC, Wittig F, et al. The current Indian epidemic of superficial dermatophytosis due to *Trichophyton mentagrophytes*-A molecular study. *Mycoses.* 2019;62(4):336-356.
11. Dogra S, Narang T. Emerging atypical and unusual presentations of dermatophytosis in India. *Clin Dermatol Rev.* 2017;1:S12-S18.
12. Singal A, Jakhar D, Kaur I, Pandhi D, Das S. Tinea pseudomimbricata as a unique manifestation of steroid abuse: A clinico-mycological and dermoscopic study from a tertiary care hospital. *Indian Dermatol Online J.* 2019;10(4):422-425.
13. Verma S, Madhu R. The great indian epidemic of superficial dermatophytosis: An appraisal. *Indian J Dermatol.* 2017;62(3):227-236.
14. Singh S, Verma P, Chandra U, Tiwary NK. Risk factors for chronic and chronic-relapsing tinea corporis, tinea cruris and tinea faciei: Results of a case-control study. *Indian J Dermatol Venereol Leprol.* 2019;85(2):197-200.
15. Saha I, Podder I, Chowdhury SN, Bhattacharya S. Clinico-mycological profile of treatment-naïve, chronic, recurrent and steroid-modified dermatophytosis at a tertiary care centre in eastern India: An institution-based cross-sectional study. *Indian Dermatol Online J.* 2021;12(5):714-721.
16. Verma KK, Senthilnathan G, Bhatia S, Kess I, Gupta V, Dwivedi SN, et al. Oral isotretinoin combined with oral terbinafine versus oral terbinafine alone to treat recurrent dermatophytosis : An open-label randomised clinical trial. *Indian Dermatol Online J.* 2021;12(6):820-825.
17. Sharma P, Bhalla M, Thami GP, Chander J. Evaluation of efficacy and safety of oral terbinafine and itraconazole combination therapy in the management of dermatophytosis. *J Dermatolog Treat.* 2020;31(7):749-753.
18. Majid I, Sheikh G, Kanth F, Hakak R. Relapse after oral terbinafine therapy in dermatophytosis: A clinical and mycological study. *Indian J Dermatol.* 2016;61(5):529-533.
19. Rengasamy M, Shenoy MM, Dogra S, Asokan N, Khurana A, Poojary S, et al. Indian association of dermatologists, venereologists and leprologists (IADVL) task force against recalcitrant tinea (ITART) consensus on the management of glabrous tinea (INTACT). *Indian Dermatol Online J.* 2020;11(4):502-519.
20. Sharma R, Adhikari L, Sharma RL. Recurrent dermatophytosis: A rising problem in Sikkim, a Himalayan state of India. *Indian J Pathol Microbiol.* 2017;60(4):541-545.
21. Sheary B. Topical Steroid Withdrawal: A Case Series of 10 Children. *Acta Derm Venereol.* 2019;99(6):551-556.
22. Verma S, Ramamoorthy R, Resham J V. Chronic eczema developing over skin treated for dermatophytosis in atopic patients -Importance of treating gently and intelligently. *Indian J Dermatol.* 2022;67(1):93.
23. Paudel D, Manandhar S. Dermatophytic infections among the patients attending the skin hospital and research center at Maharajgunj Kathmandu. *J Nepal Health Res Council.* 2015;13(31):226-232.
24. Manchanda K, Mohanty S, Rohatgi PC. Misuse of topical corticosteroids over face: A clinical study. *Indian Dermatol Online J.* 2017;8(3):186-191.
25. Alston SJ, Cohen BA, Braun M. Persistent and recurrent tinea corporis in children treated with combination antifungal / corticosteroid agents. *Pediatrics.* 2003;111(1):201-203.
26. Rallis E, Katoulis A, Rigopoulos D. Pubic Majocchi's granuloma unresponsive to itraconazole successfully treated with oral terbinafine. *Skin Appendage Disord.* 2015;1(3):111-113.
27. Segal D, Wells MM, Rahalkar A, Joseph M, Mrkobrada M. A case of tinea incognito. *Dermatol Online J.* 2013;19(5):18175.
28. Abraham A, Roga G. Topical steroid-damaged skin. *Indian J Dermatol.* 2014; 59(5): 456-459.
29. Vermout S, Tabart J, Baldo A, Mathy A, Losson B, Mignon B. Pathogenesis of dermatophytosis. *Mycopathologia.* 2008;166(5-6):267-275.
30. Zurita J, Hay RJ. Adherence of dermatophyte microconidia and arthroconidia to human keratinocytes in vitro. *J Invest Dermatol.* 1987;89(5):529-534.
31. Mathias CG. Post-traumatic eczema. *Dermatol Clin.* 1988;6(1):35-42.
32. Rzepecki AK, Wang J, Urman A, Amin B, McLellan B. Nummular eczema of the breast following surgery and reconstruction in breast cancer patients. *Acta Oncol.* 2018;57(11):1586-1588.
33. Ely JW, Rosenfeld S, Stone MS. Diagnosis and management of tinea infections. *Am Fam Physician.* 2014;90(10):702-710.