Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Assessment of the therapeutic efficacy and safety of liquid nitrogen cryotherapy in treating interdigital candidiasis

Satish Chandra

MD (Dermatology) , Medical officer , Department of U.P. Health Services, Joint District Hospital Siddhartha Nagar

ABSTRACT:

Background: Interdigital candidiasis can affect the webbing of toes and any of the fingers. Cryotherapy is an effective alternative to more invasive techniques and can be delivered quickly and cost-effectively in an outpatient setting. Hence, under the light of above mentioned data, the present study was undertaken for assessing the therapeutic efficacy and safety of liquid nitrogen cryotherapy in treating interdigital candidiasis. **Materials & methods:** 20 patients with presence of interdigital candidiasis were enrolled. Liquid nitrogen cryotherapy was administered with a hand held cryotherapy gun device by timed spot freeze technique. Two cycles were performed in each visit. This procedure was performed for every 2 weeks upto 3 sessions. All the patients were evaluated for therapeutic outcome by clinical examination and photographically. The clinical improvement was assessed. The results were tabulated by score. Grades of improvement were assessed by evaluating reduction in lesion severity. No response: No reduction in score, Mild response: <25% reduction in score, Moderate response: 25 % to <50% reduction in score, Good response: 50% to <75% reduction in score and Very good response >=75% reduction in score. **Results:** In 45 percent of the patients, the mean duration of disease was more than 3 months. Percentage reduction in the lesion assessment score at final follow-up was very good in 80 percent of the patients while it was good in 15 percent of the patients. **Conclusion:** Interdigital candidiasis is a fungal infection affecting the interdigital web spaces. Cryotherapy using liquid nitrogen is effective in treating such patients.

Key words: Cryotherapy, Interdigital

Received: 16, April 2021 Accepted: 20 May, 2021

Corresponding Author: Satish Chandra, MD (Dermatology) , Medical officer , Department of U.P. Health Services, Joint District Hospital Siddhartha Nagar

This article may be cited as: Chandra S. Assessment of the therapeutic efficacy and safety of liquid nitrogen cryotherapy in treating interdigital candidiasis. J Adv Med Dent Scie Res 2021;9(5):106-109.

INTRODUCTION

Superficial and cutaneous fungal infections are among the most widespread groups of mycoses. The factors that determine the outcome of skin infection are divided into innate mechanisms and those that require the expression of immunological memory. The presence of free fatty acids (FFAs) on the skin surface is known to affect fungi as those of medium chain length inhibit the growth of dermatophytes while facilitating the growth of pityrosporum yeasts. The composition of sebum containing these FFAs changes at puberty when the inhibitory moieties of medium chain length come to dominate. This is believed to be the explanation of the comparative rarity of tinea capitis in postpubertal children whereas pityrosporum infections, such as pityrasis versicolor, are seen more frequently.[1- 3]

The most frequent fungal disease in the world is candidiasis. Candidiasis is an infection caused by the yeasts of the genus candida. Superficial infections of the skin and mucous membrane are most important, but deep invasive diseases such as septicaemia, endocarditis and meningitis can also occur.[4, 5] Interdigital candidiasis can affect the webbing of toes and any of the fingers. It most frequently presents in the webbing between the third and fourth fingers of the hand. Interdigital candidiasis typically presents as an oval area of eroded (scaling) skin surrounded by an erythematous border.[6- 8] Topical anti-fungal agents are the mainstay of treatment. Cryotherapy is an effective alternative to more invasive techniques and can be delivered quickly and cost-effectively in an outpatient setting.[6- 9] Hence, under the light of above mentioned data, the present study was undertaken for

assessing the therapeutic efficacy and safety of liquid nitrogen cryotherapy in treating interdigital candidiasis.

MATERIALS & METHODS

The present study was undertaken for assessing the therapeutic efficacy and safety of liquid nitrogen cryotherapy in treating interdigital candidiasis. 20 patients with presence of interdigital candidiasis were enrolled.

Inclusion Criteria

1. Subjects of age 18 years and above.
2. Subjects with diagnosed case of interdigital candidiasis by clinical and KOH examination

Ethical approval was obtained from institutional ethical committee and written consent was obtained from all the patients after explaining in detail the entire research protocol. Liquid nitrogen cryotherapy was administered with a hand held cryotherapy gun device by timed spot freeze technique. Two cycles were performed in each visit. This procedure was performed for every 2 weeks upto 3 sessions. All the patients were evaluated for therapeutic outcome by clinical examination and photographically. The clinical improvement was assessed. The results were tabulated by score. Grades of improvement were assessed by evaluating reduction in lesion severity. No response: No reduction in score, Mild response: <25% reduction in score, Moderate response: 25 % to <50% reduction in score, Good response: 50% to <75% reduction in score and Very good response>=75% reduction in score. All the results were recorded in Microsoft excel sheet and were analyzed by SPSS software. Chi-square test was used for evaluation.

RESULTS

Mean age of the patients was 45.48 years. 40 percent of the patients belonged to the age group of 51 to 60 years. 60 percent of the patients were females while the remaining were males. In 45 percent of the patients, the mean duration of disease was more than 3 months. Percentage reduction in the lesion assessment score at final follow-up was very good in 80 percent of the patients while it was good in 15 percent of the patients.

Table 1: Age-wise distribution

Age group (years)	Number of patients	Percentage
18 to 30	1	5
31 to 40	4	20
41 to 50	5	25
51 to 60	8	40
More than 60	2	10
Total	20	100
Mean ± SD	45.48 ± 11.35	

Table 2: Gender-wise distribution

Gender	Number of patients	Percentage
Males	8	40
Females	12	60
Total	20	100

Table 3: Distribution of patients according duration of disease

Duration of disease (months)	Number of patients	Percentage
Less than 1	3	15
1 to 3	8	40
More than 3	9	45
Total	20	100

Table 4: Distribution of patients according to percentage reduction in lesion assessment score at final follow-up

Percentage reduction	Number of patients	Percentage
Mild (Less than 25%)	0	0
Moderate (25% to <50%)	1	5
Good (50% to <75%)	3	15
Very good (75% and above)	16	80
Total	20	100

DISCUSSION

C. albicans is a part of the normal flora in skin and genital and/or intestinal mucosa in 70% of healthy individuals. Similar to many other opportunistic microorganisms of the skin, it exists as commensal yeast in individuals with an intact immune system. It

may lead to mucocutaneous or systemic infections under appropriate conditions.[5- 8] Many Candida species are known to produce virulence factors like proteases. Species lacking these virulence factors are considered less pathogenic. Mechanisms of pathogenicity for Candida albicans may be summarized as below: secretion of hydrolases, molecules that mediate adhesion with concomitant invasion into host cells, the yeast-to-hypha transition, biofilm formation, contact sensing and thigmotropism, phenotypic switching, and a variety of fitness attributes.[6- 9]

Toe web space infections are frequently seen in humans and, although not life-threatening, affect the quality of life of sufferers in our country and all over the world. Several pathogens and factors may play a role in toe web infections. The etiologic agents of infection between the toes are most frequently dermatophytes, followed by yeast, saprobes, moulds and less frequently bacteria. Superficial mycoses are infections of the keratinous tissue caused by dermatophytes and yeasts. Dermatophytes follow a course such as skin scaling, vesicle formation and sometimes inflammation and it is possible for them to spread from human to human, animal to human, and nature to human.[7- 10] Hence, under the light of above mentioned data, the present study was undertaken for assessing the therapeutic efficacy and safety of liquid nitrogen cryotherapy in treating interdigital candidiasis.

In the present study, mean age of the patients was 45.48 years. 40 percent of the patients belonged to the age group of 51 to 60 years. 60 percent of the patients were females while the remaining were males. Sariguzel FM et al in 2014 determined the prevalence of the etiologic agents of superficial mycoses and the frequency of Corynebacterium minutissimum in interdigital foot infections. All the samples obtained from the 121 patients with interdigital foot infections were examined directly with the use of 20% potassium hydroxide mounts and Gram stain under the microscope and cultured on Sabouraud's dextrose agar plates. In identification of superficial mycoses, the rate was found to be 14% with the culture method and 14% with direct microscopic examination. Using a combination of direct microscopic examination and culture, a 33.8% ratio was achieved. The examination of interdigital foot lesions in the laboratory, the coexistence of erythrasma with dermatophytes and yeast should be considered.[11]

In the present study, in 45 percent of the patients, the mean duration of disease was more than 3 months. Percentage reduction in the lesion assessment score at final follow-up was very good in 80 percent of the patients while it was good in 15 percent of the patients. Zawar V et al in 2018 conducted a study on liquid nitrogen cryotherapy for chronic recalcitrant IDC of toe spaces. Study enrolled 21 adult patients with chronic IDC. Diagnosis was confirmed by the characteristic clinical appearance and potassium hydroxide preparation in each patient. Liquid nitrogen cryotherapy was administered with a hand-held cryotherapy unit. Uniform frosting occurred within 15 seconds. Then repeated after a thaw of 30 seconds. The therapy was performed every 2 weeks for a maximum of 3 treatment sessions. Then they examined all patients every 2 weeks for 1 month. At each visit, the responses were assessed with clinical examination and photography. 12 patients showed an excellent response, 7 showed a good response, 1 showed a poor response, and 1 showed no response.[12]

CONCLUSION

Interdigital candidiasis is a fungal infection affecting the interdigital web spaces. Cryotherapy using liquid nitrogen is effective in treating such patients.

REFERENCES

1. Kundu RV, Garg A. Chapter 189. Yeast infections: candidiasis, Tinea (pityriasis) versicolor, and Malassezia (pityrosporum) folliculitis. In: Goldsmith LA, Katz SI, Gilchrest BA, Paller AS, Leffell DJ, Wolff K, editors. Fitzpatrick's dermatology in general medicine. 8th ed. New York: McGraw-Hill; 2012. p. 2298–307.
2. Hoofnagle JH, Serrano J, Knoben JE, Navarro VJ. LiverTox: a website on drug-induced liver injury. Hepatology. 2013;57(3):873-874.
3. Sawyer PR, Brogden RN, Pinder RM, Speight TM, Avery. Clotrimazole: A Review of Its Antifungal Activity and Therapeutic Efficacy. Drugs. 1975;9(6):424-47.
4. Metin A, Dilek N, Bilgili SG. Recurrent candidal intertrigo: challenges and solutions. Clin Cosmet Investig Dermatol. 2018;11:175-185/
5. Shroff PS, Parikh DA, Fernandez RJ, Wagle UD. Clinical and mycological spectrum of cutaneous candidiasis in Bombay. J Postgrad Med. 1990;36(2):83-6
6. Jain A, Jain S, Rawat S. Emerging fungal infections among children: A review on its clinical manifestations, diagnosis, and prevention. J Pharm Bioallied Sci. 2010;2(4):314-320.
7. James W, Berger T, Elston D, RB O. Diseases Resulting from Fungi and Yeast. Andrews' Diseases of the Skin: Clinical Dermatology. 10 ed. Philadelphia, PA: Saunders Elsevier; 2006. p. 285-318.e4
8. Pichard DC, Freeman AF, Cowen EW. Primary immunodeficiency update: Part II. Syndromes associated with mucocutaneous candidiasis and noninfectious cutaneous manifestations. J Am Acad Dermatol. 2015;73(3):367-81.
9. Jelen G, Tennstedt D. Contact dermatitis from topical imidazole antifungals: 15 new cases. Contact Dermatitis. 1989 Jul;21(1):6-11.
10. Yiu WK, Basco MT, Aruny JE, Cheng SW, Sumpio BE. Cryosurgery: A review. Int J Angiol. 2007;16(1):1-6.
11. Sariguzel FM, Koc AN, Yagmur G, Berk E. Interdigital foot infections: Corynebacterium minutissimum and agents of superficial mycoses. Braz J Microbiol. 2014;45(3):781-784.
12. Zawar V, Manoj P, Reddy RR. Liquid nitrogen cryotherapy for chronic recalcitrant interdigital

candidiasis of toe spaces. J Am Acad Dermatol. 2018;78(5):1004-7.