



JSSTD Symposium

Non-pharmacological interventions in the management of atopic dermatitis

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Received : 05 February 2021

Accepted : 21 February 2021

Published : 14 October 2021

DOI

10.25259/JSSTD_12_2021

Quick Response Code:



ABSTRACT

The diagnosis and management of atopic dermatitis are often challenging due to the complexity of its etiopathogenesis and the variety of presentation. Atopic dermatitis is one of the very prevalent dermatoses in which drug therapy alone will not suffice. However, it also requires a logical modification of the patient's day-to-day activities and his microenvironment. For this, the patient has to understand the disease very well, and knowledge regarding the disease, conditions the patient, for the prolonged treatment course. Various non-pharmacological interventions play an important role in achieving this.

Keywords: Atopic dermatitis, Non-pharmacological interventions, Management

Atopic dermatitis is an immune mediated, environmentally modified, and chronic, inflammatory dermatosis. The disease exemplifies the crucial interaction between the outer environment and the human immune system with skin as an interface. Dermatological research in the recent years has put skin barrier in the central stage, perturbation of which may initiate downstream inflammatory pathway (outside inside pathway). Even though, it has been challenged that immune mediated changes lead to skin barrier defect (inside outside pathway), skin barrier perturbation in atopic dermatitis is undeniable.^[1,2] Hence, a comprehensive and well-planned approach, targeting the possible environmental factors which may alter the skin barrier, immune mediated inflammatory pathway and most importantly the skin barrier is essential in the management of the disease.

Atopic dermatitis affects 7%–29% of the world pediatric population.^[3,4] With the impact, it has on the quality of life of patients, it is not wondering that world is still in a race to find an even better drug for atopic dermatitis. However, there is no single panacea for atopic dermatitis; it should be a well concerted management plan involving both pharmacological and non-pharmacological interventions. Non-pharmacological interventions are aimed to address the modifiable factors which initiate, exacerbate, or precipitate atopic dermatitis. Maintenance of skin barrier integrity and minimizing the influence of external factors which may compromise skin barrier are the main objectives of non-pharmacological interventions in atopic dermatitis. This article is intended to give an outline of the various non-pharmacological interventions in atopic dermatitis. Each of these interventions is dealt with in detail in the following text [Table 1].^[5]

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EDUCATIONAL INTERVENTIONS IN ATOPIC DERMATITIS

In this age of information overload, it is always better that the patients get to know the facts about their disease from their treating clinician. Educational intervention leads to increased patient adherence and reduction in severity of atopic dermatitis which, in turn, improves the quality of life of the patients.^[6,7] It should begin ideally in the first visit itself. This helps in building a rapport between the patient and the clinician. Group approaches, workshops, educational videos, and pamphlets are other modes of patient education.^[8] Overall management of atopic dermatitis depends on the socioeconomic and cultural background of the patient, patient's understanding about the disease, and the attitude of the patient and the family towards the disease. Customized approach for each patient and family is relevant in this regard. Basic steps in educational intervention are given in Table 2.^[5]

MOISTURIZERS AND BARRIER REPAIR THERAPY IN ATOPIC DERMATITIS

Moisturizers and barrier repair formulations constitute the mainstay of management in atopic dermatitis. They aid in barrier repair and recovery and maintenance of soft and supple skin, which will ultimately help in immunological recovery. This is supported by various studies which showed a significant improvement in symptoms and severity of atopic dermatitis with the use of moisturizers.^[9-11]

Commercially available moisturizers contain active ingredients (humectants, occlusives, emollients, ceramides,

essential fatty acids, vitamins, and herbal extracts) and excipients (preservatives, emulsifiers, and antioxidants).^[12] Physiological lipids such as ceramide or pseudoceramide are incorporated in barrier repair formulations.^[13,14] They enhance the usual moisturizing property of the product, but the cost is often prohibitory. Locally, available natural oils are another economical option for moisturizer. The type of moisturizer to be used should be the one best tolerated by the patient.

Most importantly, how the moisturizer is applied is more important than the type of product used. Liberal application of a traditional cheaper moisturizer is always better than an expensive sophisticated preparation sparingly applied. Patient should be encouraged to use the moisturizer whenever they feel dry and itchy. Moisturizer should be applied immediately after bathing and soft pat drying (soak and smear approach). Based on author's experience, application of warmed, locally available, natural oil 10–15 minutes before bathing and frequently thereafter is an effective regimen for moisturization of atopic skin.^[5] Moisturizers dispensed in bottles with pump dispenser are ideal. If dispensed in a pot, the required amount should be removed with a clean spoon or spatula instead of fingers.^[15]

WET WRAP THERAPY (WWT)

It is a treatment modality that uses topical steroid and double layer of tubular bandages or gauze, with a moist first layer and a dry second layer. WWT is devised based on the basic understanding that hydration and occlusion increase the penetration and hence the effectiveness of the topical drug applied and provides a moist, undisturbed microenvironment for faster healing of the lesion. It helps in relief of pruritus and also leads to significant reduction in the severity of atopic dermatitis.^[16,17]

There are various institution based WWT protocols for atopic dermatitis. Here, authors recommend a modified double layer WWT protocol. This comparatively patient friendly protocol has been in practice in our institution (Amala Institute of Medical Sciences, Thrissur, Kerala, India) for past several years. According to Amala modification of WWT, twice daily 2 hour wet wrap is done with fluticasone propionate ointment and once daily wet wrap is done with moisturizer [Table 3].^[5]

Limitations are minimal. The time consuming application of bandages is one of the most common problems of WWT. Discomfort may be encountered after the application of the inner wet bandage layer. This can be reduced by adjusting the temperature of water used (lukewarm water is preferred). Occlusive effect of treatment may predispose to folliculitis. The application of topical product should be in the direction of hair growth. Secondary skin infections with *Pseudomonas aeruginosa* is another rare adverse effect.^[18]

Table 1: Non-pharmacological interventions in atopic dermatitis.

1. Educational interventions
2. Moisturizers and barrier repair in atopic dermatitis
3. Wet wrap therapy
4. Skin hygiene measures
5. Identification and avoidance of trigger factors
6. Psychological interventions in atopic dermatitis.

Table 2: Steps in educational intervention.

1. Assessment and estimation of role of educational intervention in a particular patient
2. Assessing the background knowledge about the disease of the patient, parent, and/or care giver
3. Education about the disease
4. Helping patient identify possible triggers
5. Addressing misconceptions, if any
6. Education regarding various management approaches – non-pharmacological and pharmacological
7. Establishing the role of comprehensive approach in management of atopic dermatitis.

Table 3: Protocol for modified WWT with ointment/moisturizer and water.**Name : X. Age: Y years. Date of commencement of treatment:**

7:00 am–9:00 am*

- After bathing and soft pat drying, apply fluticasone propionate ointment as per fingertip unit over the affected areas.
- Dampen the pre-prepared, open weaved, cotton gauze or clothing or tube fast bandage in lukewarm water, squeeze out the excess water, and apply closely as the first wet bandage layer.
- Apply a dry layer of open weaved, cotton gauze or clothing or tube fast bandage as second, dry bandage layer.
- Wet wrap thus applied should be kept for 2 hours.

9:00 am–11:00 am*

- Remove the bandage layers and leave the area open for 2 hours with frequent application of moisturizer

11:00 am–1:00 pm*

- Apply moisturizer over the affected areas in the direction of hair growth.
- Do the wet wrap as done previously and is kept for 2 hours.

1:00 pm–3:00 pm*

- Remove the bandage layers and leave the area open for 2 hours with frequent application of moisturizer.

3:00 pm–5:00 pm*

- Apply fluticasone propionate ointment as per fingertip unit over the affected areas.
- Do the wet wrap as done previously and is kept for 2 hours.

5:00 pm onwards*

- Remove the bandage layers and leave the area open for 2 hours with frequent application of moisturizer.

*Time schedule of WWT protocol given here is personalized for Patient X. The time schedule may be altered to make personalized timetable for WWT for different patients, WWT: Wet wrap therapy

SKIN HYGIENE MEASURES IN ATOPIC DERMATITIS

Bathing and cleansing reduce the quantum of bacteria in skin, remove irritants and potent allergens and pre-hydrate the skin, thus improving the efficacy of topical therapies.^[19,20] Although bathing has its beneficial effects, the effect of bathing on atopic dermatitis depends on the actual bath conditions such as type of cleansing agent, the water used, and the duration of bath. Various types of cleaning agents are soaps, combars, syndets, and lipid free low foaming cleansers.^[21] Of these, latter two are proven better for atopic dermatitis. Combars contain antibacterial agents like triclosan. It alters normal skin flora, aggravates skin dryness, and causes irritation, hence not preferred in atopic dermatitis.^[22] It is recommended to use lukewarm water of temperature 27°C–30°C, in which the child should enjoy to play. There is no definite frequency or duration of bath that is truly optimal for atopic dermatitis. The patients may be recommended to take once or twice daily bath to remove the serous crust and dirt, duration of which should be restricted to a maximum of 10–15 minutes. As mentioned in the above section, it is advisable to use emollient immediately after bath.^[5,15]

Adding sodium hypochlorite or bleach to bath water has shown to reduce the *Staphylococcus aureus* counts, the severity of atopic dermatitis and the frequency of its relapses. The antimicrobial effect of bleach is based on the property of hypochlorous acid to aggregate the essential bacterial proteins. The patient may be advised to take bleach bath daily when there is overt infection as evidenced by heavy crusting

and oozing. The frequency may be reduced as the condition improves and continued as a maintenance treatment, prolonging the remission period. The bleach solution is to be prepared by adding one tablespoon of household bleaching powder to 1 L of water and this should be diluted to one bucket of water (20 L).^[5,23,24]

IDENTIFICATION AND AVOIDANCE OF TRIGGER FACTORS

The common trigger factors for atopic dermatitis include irritants, skin infections, contact allergens, air allergens, food allergens, and psychological stress. Approach to an episode of flare of atopic dermatitis should be based on a meticulous history taking, examination, and relevant investigations leading to a logical conclusion of the possible trigger factor for that particular episode and advice regarding the avoidance measures in future.^[2,3]

AEROALLERGEN

The common aeroallergen triggers for atopic dermatitis include house dust mite, pollen, and exposure to pets. In majority of the patients with atopic dermatitis having aeroallergen sensitization, there will be an associated respiratory allergy manifesting as asthma or allergic rhino-conjunctivitis. Seasonal exacerbation of symptoms gives a clue for sensitization with pollen of flowering flora of that season. Improvement, when taken away from the place of stay, is another clue to diagnose aeroallergen sensitization.^[25,26]

MINIMISATION OF EXPOSURE IS THE KEY STEP TO AVOID THIS TRIGGER

Advise avoidance of wall to wall carpeting and ensure prompt removal of damp carpets or upholstery. Proper ventilation and airflow in house should be ensured. Any water leaks, when present, should be repaired. Spending time in basement of house and attic should be advised against. The potential source of exposure to mites such as clothes, mattresses, carpets, curtains, and upholstery should be washed in hot water, preferably at temperature 55°C (130°F) and dried in direct sunlight. Regular, thorough vacuum cleaning using cleaners with high efficiency particulate air (HEPA) filters is recommended. Encasing of mattresses and pillow has shown efficacy in reducing the mite allergen exposure and severity of atopic dermatitis.^[27-29]

In cases, of pollen allergy, the sensitized individuals should be restricted to stay indoors during the peak pollen season. Windows should be kept closed during pollen season and airing done at night or early morning; or pollen proof window nets may be used. Patient should also be advised to take bath, wash hair, and change the clothes after returning indoors. If at all a patient needs to go out, use of mask and nose plugs may be advised. Other actions which can cause disturbance and spread of pollen like lawn mowing should be discouraged during this season.^[5]

In cases when pet allergen is suspected, pets should be kept outdoors or their entry should be restricted to only a few rooms. Pets should be bathed at least once week. Handling of pets should be minimized and if done by the patient or any household member, change of clothes should be recommended after that.^[5] Hypoallergenic cats and dogs are now available.

IRRITANT TRIGGERS

Certain fabrics, detergents and other laundry aids, chlorines, bleaches, acids, alcohol, solvents, and even water can act as irritant for atopic skin. The spiky nature of wool fibers and the innumerable tiny harpoons at its fiber endings evoke prickly sensation in skin.^[30,31] Cotton or silk fabrics are better tolerated by atopic individuals. However, as silk is expensive, for all practical purposes, loose fitting, light colored, open weaved cotton fabrics are considered near to ideal and more acceptable by atopic individuals. Biofunctional textiles with antimicrobials or antifungals have been shown efficacious in atopic dermatitis.^[32]

Excess use of detergents should be avoided. All the fabrics used by the patients should be double rinsed so that no residual detergent is left behind. The folds, seams of clothes and places where clothing come snugly in contact with body should be taken special care of. As softened fabrics are found to be more agreeable with atopic skin, fabric softeners may be

Table 4: When to suspect contact allergy in atopic dermatitis ?

1. Moderate to severe atopic dermatitis, which is persistent or refractory to treatment.
2. Exacerbation on topical therapy with moisturizers and corticosteroids.
3. Atypical pattern or distribution of dermatitis, especially with predominant involvement of head and neck region, hands and feet, eyelids and lips.
4. Treatment resistant hand dermatitis, which is occupation related.
5. Adolescent or adult onset atopic dermatitis.

used. Use of antiseptic solutions in bath water or for washing clothes should be discouraged.

CONTACT ALLERGEN

Once contact allergy is suspected [Table 4] the possible allergens responsible can be identified using investigations like patch testing. However, in clinical practice, counseling of the patient regarding avoidance strategies is possible only when these allergens are correlated with objects of use or contact in the patient's microenvironment. Hence, a detailed history of the daily routine activities of the patient, leisure activities, and details of occupation should be reviewed and a clinical provisional diagnosis of contact allergy and possible contact allergen should be made, before ordering for investigations like patch testing.^[33,34]

FOOD ALLERGY

Eczematous food allergic reactions may act as significant contributor for perpetuation and exacerbation of the inflammatory reaction in atopic dermatitis. Hence, its identification and management are of high relevance in the overall management of atopic dermatitis. Late phase eczematous reactions are often difficult to identify, as the causative specific food ingestion might have occurred hours or even days before.^[35]

INFECTIVE TRIGGER

Infective agents like *S. aureus* commonly induce skin inflammation and act as a trigger for atopic dermatitis. The main non-pharmacological, anti-infective interventions include proper cleansing and bathing, maintenance of skin barrier by adequate skin moisturization, local hygiene, and wet compress of eczematous lesion and bleach bath.^[5,36]

PSYCHOLOGICAL INTERVENTIONS

Psychological stress has shown to exacerbate atopic dermatitis. Furthermore, atopic individuals are prone for

psychological comorbidities such as anxiety, depression, attention deficit disorder, and mood disturbances. Psychological assessment should begin from the first visit itself. Basic psychological interventions can be done by the dermatologist after building a good rapport with the patient. In case of specific comorbidities psychiatric help should be sorted. Habit reversal therapy to break itch-scratch cycle is the most effective intervention.^[5,36-38]

CONCLUSION

Non-pharmacological interventions are best described as a set of guidance plans on how to live with atopic dermatitis. It fundamentally includes lifestyle and daily life interventions, done in a holistic manner. Management of atopic dermatitis may be mastered only with a skillful integration of these non-pharmacological interventions with drug therapy.

Declaration of patient consent

Not required as there are no patients in this article.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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How to cite this article: Gangadharan G. Non-pharmacological interventions in the management of atopic dermatitis. *J Skin Sex Transm Dis* 2021;3:130-5.