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MANAGEMENT OF ATOPIC DERMATITIS; A COMPARATIVE STUDY

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ABSTRACT

Atopic dermatitis is a chronic inflammatory skin condition that affects millions of individuals worldwide. Its management requires a multidisciplinary approach, including skin care, pharmacotherapy, and environmental modifications. This review article provides an overview of the comparative management strategies for atopic dermatitis, including topical corticosteroids, topical calcineurin inhibitors, systemic immunomodulators, and phototherapy. The benefits and limitations of each treatment option are discussed, along with the potential adverse effects and the importance of patient education and counseling. While there is no cure for atopic dermatitis, an individualized treatment plan can help to control symptoms, reduce flares, and improve the quality of life for patients with this chronic condition.

Keywords: Atopic dermatitis, chronic inflammatory, systemic immunomodulators and phototherapy

1. INTRODUCTION

Atopic dermatitis known as atopic eczema is a typical persistent skin sickness. It is described by outrageous irritation joined with sore and excruciating skin and the event of surges in the general body. The skin of individuals experiencing this condition could drain in the wake of scratching, which can prompt different skin contaminations. Individuals with atopic dermatitis have a cluttered and exceptionally responsive

resistant framework, which triggers harming skin boundary irritation leaving it very delicate and as we composed above inclined to tingle with seeming surges of liquid coming from impacted regions. As a matter of fact, it is a predominant disease everywhere - in Poland up to 9% of kids and 2% of grown-ups experience the ill effects of this sickness. Overall, it impacts up to 20% of youngsters and 3% of grown-ups. The reason for this sickness is as yet unclear, but clinical specialists actually guess about potential reasons. Among the others, it is accepted that the primary initiator of it very well may be hereditary qualities, dysfunctions in the resistant framework, and ecological circumstances (sensitivities, natural contamination, diseases, temperature varieties, and stress). It is realized that more impacted are individuals living in huge urban communities and dry environments. The current way of life can be a vital explanation, which could be engaged with the event of issues of the insusceptible framework **[1]**.

2. Definition

Atopic dermatitis is a common inflammatory syndrome that usually occurs in the skin producing itching, redness, swelling, and sometimes blood pops out due to excessive itching. It is referred to as one of the chronic diseases and re-occurrence is also mostly observed **[2]**.

This type of inflammatory disease occurs mainly in young children (2-5 years). The word “Atopy” refers to the production of immunoglobulin IgE inherently and “dermatitis” according to Greek means inflammation of the skin **[3]**.

3. Etiology-

The exact cause is yet not known; however, some theory suggests that the reason might be the liberation of inflammatory pro-mediators due to IgE-mediated hypersensitivity reaction.

4. Epidemiology-

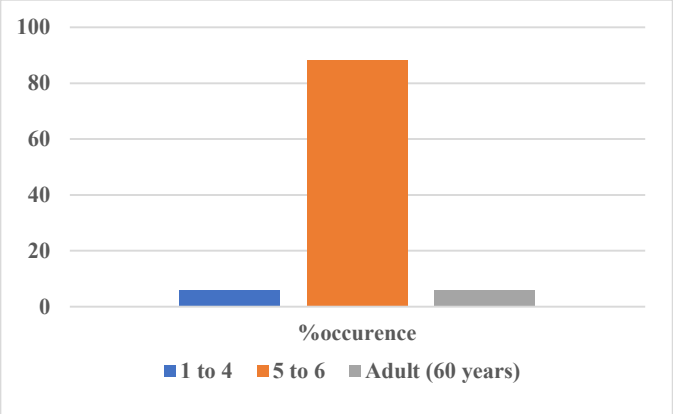

Figure 1: Occurrence of Atopic Dermatitis

5. Risk Factors

Table 1: Occurrence of Atopic dermatitis in Twins

Parameters	%occurrence (Atopic Dermatitis)
Monozygotic Twins	75
Twin Sibling	75
Dizygotic twins	30

Some risk factors such as genetics and environment play a key role in the development of inflammatory diseases **[4]**.

For example-

a) In genetic factors, many genes involved in atopic dermatitis which are also the encoder of structural proteins and gene encoding help in the progress of the disease **[5]**.

b) Considering risk factors due to environmental conditions such as lifestyle (food habits, hygiene, communicable diseases) plays an important role in the generation of atopic dermatitis **[6]**.

6. Pathophysiology

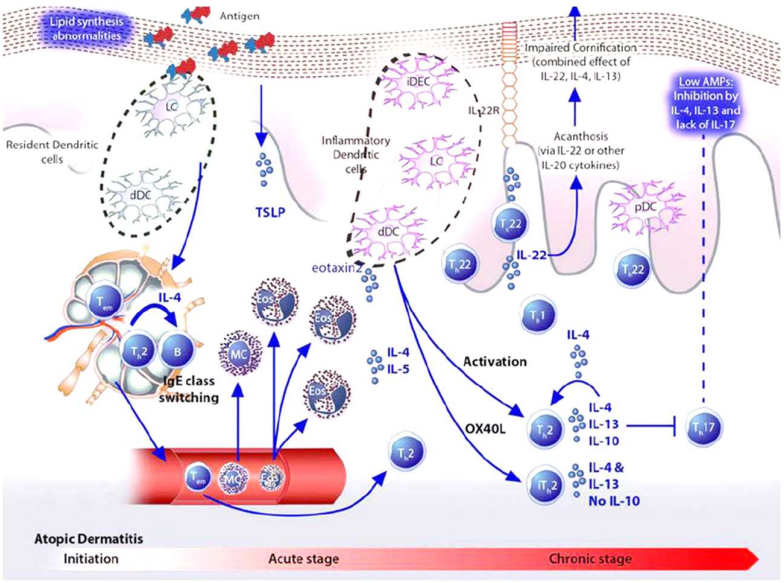

Figure 2: Pathophysiology of Atopic Dermatitis
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Figure 2, shows that the Pathogenesis of Atopic dermatitis has three fundamental stages, including initiation, intense and chronic. Defects in the epidermal boundary lead to the entrance of the skin by epicutaneous antigens, which in turn experience Langerhans and dermal Dendritic cells that actuate Th2 cells and IL-4 and IL-13 production. These cytokines bring about two significant impacts: IgE class exchanging and expanded Th2 cell endurance. Moreover, these cytokines bit by bit increment from nonlesional through persistent illness, and meaningfully affect the epidermis. These incorporate expanded TSLP production by keratinocytes, restraint of hostile to the microbial peptide (AMP) synthesis, and impeded epidermal separation. The subsequent upset epithelial boundary further elevates related diseases. Also, the provocative arbiters of Th2 Lymphocytes and DCs incite fringe eosinophils and mast cells. Additionally of importance is an expansion in Th22 cells in Promotion skin; this subset produces IL-22, which is most essentially expanded in constant Promotion skin **[7]**.

7. Clinical features of Atopic dermatitis

The signs and symptoms of this disease include skin dryness, skin rashes, flakiness, and peeling of skin sometimes with blood. Inflammation on the skin is also been reported. There is a high chance of developing Hay fever and Asthma if it is not diagnosed early **[8]**.

8. Diagnosis

There are only a few tests that are employed in practice for the diagnosis of Eczema. The most common is the Patch Test, where different substances are applied to the skin and covered just to check the signs and reaction of the skin to that particular substance. Patch testing can be an aid to identify different types of allergies to skin dermatitis **[9]**.

9. Differential diagnosis of Atopic Dermatitis

Because the skin lesions in atopic dermatitis can take many forms (papules, vesicles, plaques, nodules, and excoriations), the differential diagnosis of atopic dermatitis is extensive. Conditions that need to be considered in patients with pruritus include seborrheic dermatitis, psoriasis, and neurodermatitis. Features that distinguish these and other conditions from atopic dermatitis are listed in **[10, 11]**.

Disease	Distinguishing features
Seborrheic dermatitis	Greasy, scaly lesions, absence of family history
Neurodermatitis	Usually, a single patch in an area accessible to itching; absence of family history
Contact dermatitis	Positive exposure history, rash in the area of exposure, absence of family history
Dermatitis herpetiformis	Vesicles over extensor areas and associated enteropathy
Dermatophyte infection	Serpiginous plaques with central clearing, positive potassium hydroxide preparation

10. Management of Atopic dermatitis

1. **Home Remedy-**

Generally, this type of infection can be minimized by practising hygienic procedures such as

- **Bathing-** Once daily with warm water and the use of soap should be conditional until and unless the removal of dirt is required. After bathing, moisturizer should be applied in order to keep the skin from drying.
- **Skin protective creams-** Formulations related to cosmetics should be used according to the direction. This type of product should be used only in small areas as it has a potential side effect **[12]**.

2. **Drugs-**
3. **Antihistaminic**

Mostly, drugs belonging to the class Anti-histaminic and Anti-depressants can be given to patients with mild pruritus. However, the patient should once consult with the physician in order to cope with the side effects they exert.

Mechanism of Action of Anti-histaminic Histamines when bonded to the protein receptors of the nerve cells, it causes a series of molecular events that causes the nerve cells to radiate high itching signals to the brain which leads to excessive itchiness. Therefore, topical anti-histaminic drugs such as Diphenhydramine are used that will block the histamine release from its receptors which will eventually lower the itchy sensation **[13]**.

a. Antibiotics-

When the infection surpasses there is a high probability of secondary infections. In this case, antibiotics such as clindamycin, dicloxacillin, and macrolides antibiotics are used.

b. Cortico-steroids-

Atopic dermatitis can also be treated by use of cortico-steroids viz: - Prednisolone, beclo-methasone. They generally act by inhibiting the inflammatory responses from mast cells, eosinophils basophils etc. However, the withdrawal of drugs may cause reverse effects, therefore, the patient should be directed accordingly **[14]**.

c. Immuno-suppressants-

Drugs such as Cyclosporine have been prominently used for the treatment of Atopic dermatitis. In some cases, after the cessation of therapy, the condition may reverse but the severity will not be similar.

11. HERBAL APPROACH FOR THE TREATMENT OF ATOPIC DERMATITIS

According to the research studies, many herbs has been reported based on the Ethnopharmacological and Ethnobotanical evaluation that has a primary role in the treatment of skin infection such as Atopic dermatitis (eczema). The advantage of such types of herbs is that the factors such as toxicity, and side-effects are not found generally **[15]**.

There are more than 20 herbs (either used as an extract or as an oil) that have been reported that have a prominent action in the treatment of Atopic dermatitis. Some of them are briefed below.

1. **Borage oil-**

   It is extracted from the seeds of *Borago officinalis.* The oil contains a high amount of polyunsaturated omega-6 fatty acids mostly gamma-linolenic acid (GLA) and linolenic acid (LA). GLA and LA exert their anti-inflammatory action by inhibiting the activation of NF-kappa B and AP-1 by suppressive oxidative stress **[16]**.

2. **Argan oil-**

   It is extracted from the kernels of *Argania Spinosa.* The major chemical components of argan oil are polyphenols, tocopherols, squalene, and xanthophyll. It has a high amount of tocopherol about 60-90 mg/100 g. Other chemical constituents such as triterpenes, and terpenoids are present.

   argan oil gives anti-inflammatory & synergistic effects by melanogenesis in B16 cells as an effective melanin biosynthesis inhibitor.

3. **Shea Butter-**

   It is extracted from the seeds of the *Vitellaria paradox.* The oil contains heigh amount of fatty acid i.e. (palmitic, stearic, oleic, linoleic, and arachidic) that are given anti-inflammatory & anti-microbial action **[17]**.

Table 2: Herbal Approach for The Treatment of Atopic Dermatitis

S. No.	Herbs	Biological Source	Traditional use and benefits
1	Ashwagandha	*Withania somnifera*	its ability to combat stress and anxiety [18]
2	Astragalus Root	Astralagus Membranaceus	minimize scarring and promote wound healing [19]
3	Calendula	*Calendula officinalis*	potent remedy for issues like dermatitis, ulcers, sore throat, and diaper rash [20]
4	Cat's Claw	*Uncaria tomentosa*	used to relieve issues like muscle and joint pain [21]
5	St. John's Wort	*Hypericum perforatum*	Used to relieve depression and boost mood
6	Spearmint	*Mentha spicata*	Bacteria or fungal infections boost memory [22]
7	Sage	*Salvia officinalis*	protect the body against oxidative stress and free radical damage fight bacterial and viral infections, and reduce inflammation
8	Rosemary	*Salvia Rosmarinus*	attenuate brain inflammation and boost cognitive health [23]

9	**Aloe**	***Aloe barbadensis Mill***	**The gel is used for the external treatment of minor wounds and inflammatory skin disorders, and minor skin irritations including burns, bruises, and abrasions. The use of freshly prepared gel is recommended because of its sensitivity to enzymatic, oxidative, or microbial degradation [24]**
10	**Oats**	***Avena sativa L***	**Oat straw is used for inflammatory and seborrheic skin diseases, especially those accompanied by itching Avena fructus is a traditional, herbal medicinal product for the symptomatic treatment of minor skin inflammations (such as sunburn), and it is used as an aid in the healing of minor wounds. Skin reactions may occur in atopic patients and in patients with contact dermatitis [25]**
11	**marshmallow root**	***Althaea officinalis L***	**Reduced UV radiation and widely used in eczema and dermatitis [26]**
12	**comfrey**	***Symphytum officinale L***	**Comfrey root is used in the treatment of skin inflammation and leg ulcerations it shows s hepatotoxic, carcinogenic, and mutagenic properties in rats [27]**
13	**yarrow**	***Achillea millefolium L.s.l.***	**Yarrow is used in the supportive treatment of small wounds and mild inflammations of the skin and allergies to contact dermatitis [28]**
14	**walnut**	***Juglans Regia L.***	**treat dandruff and scalp itching, superficial burns and sunburns, and as itch-relieving treatment in skin disorders, and as a wash for malignant sores and pustules [29]**
15	**Lini semen**	***Linum usitatissimum L***	**. It is used for local inflammations of the skin and furunculosis as a warm poultice or compress [30]**
16	**fenugreek seed**	***Trigonella frenum-graecum L***	**anti-inflammatory activity in the carrageenan-induced paw edema in rats furunculosis, eczema, ulcers, and local inflammations of the skin**
17	**ribwort plantain**	***Plantago lanceolata L***	**The macerate of ribwort plantain leaf/herb is used for cataplasms and rinse in supportive therapy of poorly healing wounds and skin inflammation [31]**
18	**evening primrose**	***Oenothera biennis L***	**Oleum Oenothera Bennis should be used with caution in patients with a history of epilepsy and schizophrenia and atopic dermatitis [32].**
19	**Honey**		**exhibits immunoregulatory and anti-staphylococcal activities to the treatment of atopic dermatitis [33]**
20	**Coconut oil**		**Coconut oil can increase fat burning. Kill harmful microorganisms Reduce hunger and helps in weight loss Coconut oil raises the good UDL Cholesterol Good for skin, hair, and teeth. Beneficial for Alzheimer patients [34]**

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