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ECZEMA: DIAGNOSIS, NATURAL HISTORY, TREATMENT - REVIEW

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ABSTRACT

Eczema is a common, long term skin disease which starts early from the beginning of the life. Which extremely gives impact on quality life of the individual and their families. Optimum skin care practice and topical corticosteroids remain the basis of the therapy of eczema. TCIs gives better and effective, second line alternative to topical corticosteroids in suitable patient's which are prone to repetitive flare-ups. In severe cases systemic immunosuppressive agents are used with appropriate skin care and topical therapies. Number of alternative methods as phototherapy, biologics are being used to treat the eczema. Biologics is the promising therapy to provide better results for eczema.

KEYWORDS: Eczema, Topical corticosteroids, Phototherapy, Immunosuppressive agents, Biologics.

INTRODUCTION

Atopic dermatitis is also known as atopic eczema which is common persistent erythrogenic skin diseases, which is likely affecting in greater extent to children's and in some cases to adults.[1,2] Eczema usually occurs in infants and can also appear in adult age which is challenging worlds dermatologists. The pathogenesis of eczema remains mostly unsure. Sensitization of allergens and skin barrier irregularity and Acquired/Adaptive immunity (cytokines type II are produced such as interleukins as IV, V, IX & XIII) gives rise to pathogenic process which leads to eczema growth.[3,4] Patients having eczema shown supresses the expression of Lymphocytes T cytokines, antimicrobial peptides, chemokines, immunoglobulin E, proteases and proteins for normal structure of epithelial cell barrier.[3,4] Atopic eczema involves genetic, environmental, and socioeconomic factors.[5,6] For e.g.,

mutations in filaggrin gene are found to be linked with eczema growth.[7] Recently, the generality of eczema is raising and the cause is still uncertain. Some studies have recommended that environmental factors effects the increase in the prevalence of eczema.[8] Size of family size reduced, increase income, literacy, migration from remote or rural areas to cities and extended use of antibiotics gave rise to increase in the risk of eczema.[9] Recently some reports illustrated that indoor air pollution and outdoor exposure of allergens and tobacco smoke in environment can be considered as environmental factors.[6,9] Eczema is a major global health problem, affects mostly 1%-20% of people in world.[10-12] Majorly the children are affected.

An expanding prevalence of eczema has been revealed, especially in low-income countries.[13] From past decades the prevalence of eczema has been increased by 2-3-fold in industrialized countries.[13] Normally, eczema is raised up from early child stage, as in the beginning of the 'eczema', which gives the natural history of atopic demonstrations and it is characterized by xerotic skin and acute flareups of extreme pruritic eczematous lesions on skin.[14] Recent study had recognized a preference of eczema for determination in adulthood, with a lifelong prevalence for about 34.1%.[15] Allergic rhinitis and eczema lesions on hands are higher risking factors for persistent eczema in childhood.[15] Eczema is devitalizing skin disorder in children as well adults, and critical unmanageable cases which is difficulty challenging for clinicians and patients. Before eczema was considered as skin disorder but nowadays its context of the complex interplays between the genetic dysfunction of epidermal barriers of skin and lipid composition of the body and due to the exposure of skin by environmental factors. Hence allergy is certainly a phenomenon of the dysfunctional or impaired cutaneous barrier function in allergic individuals, the sensitization may be involved in disease worsening and tenacious pattern.[16,17] Nowadays better improvement in the treatment and elucidation of the skin barriers, genetic and environmental factors interactions have been done. The understanding of the pathological pathways in best manner is improving the treatment of the eczema patients.

EPIDEMIOLOGY

Eczema effects about 1/5th of individuals throughout their lifetime but the prevalence of the disease differs from country to country in the whole world.[18] Mostly in industrialized countries the prevalence of the eczema has been raised considerably between 1950 to 2000 that was generally referred as the "allergic epidemic". Although eczema symptoms are

increasing in some countries and even decreasing in some countries with higher prevalence such as UK and New Zealand. It indicates that allergic disease epidemic is not affecting or growing continually in the world. But then also eczema remains extreme and serious health concern to the developing countries while it's not very much increasing in the developed countries.

NATURAL HISTORY

Many of the individuals develops the symptoms of eczema from their childhood only and mostly 95% experience it in the first five years of life.[19] About 75% experiences the eczema disease from the childhood and have the reoccurring of the lesions on the skin up to adolescence age and also continues in some amount in the adulthood. In the mostly cases in adulthood affects the individual's career or employment while having this type of disease which can lead to being pulled out from the market. Almost the children's being susceptible to the allergens from the source of food allergens, house dust mites or pets.[20] hence, intake of food or airborne allergens through any media is rarely cause of worsening in eczema, some of the patient's with eczema are sensitized to food without this playing role in activity of eczema. Eczema, especially is severe condition in the childhood comparing to other diseases. If child is having moderate to severe eczema can have 50% risk of developing asthma and 75% of hay fever.[21]

Risk factors for eczema

- Genetics: due to filaggrin gene
- Environmental factors

Treatment of Eczema

Treatment of eczema can be summarised and can be done in the following three ways:

1. Basic treatment
2. Standard medical treatment
3. Adjuvant treatment

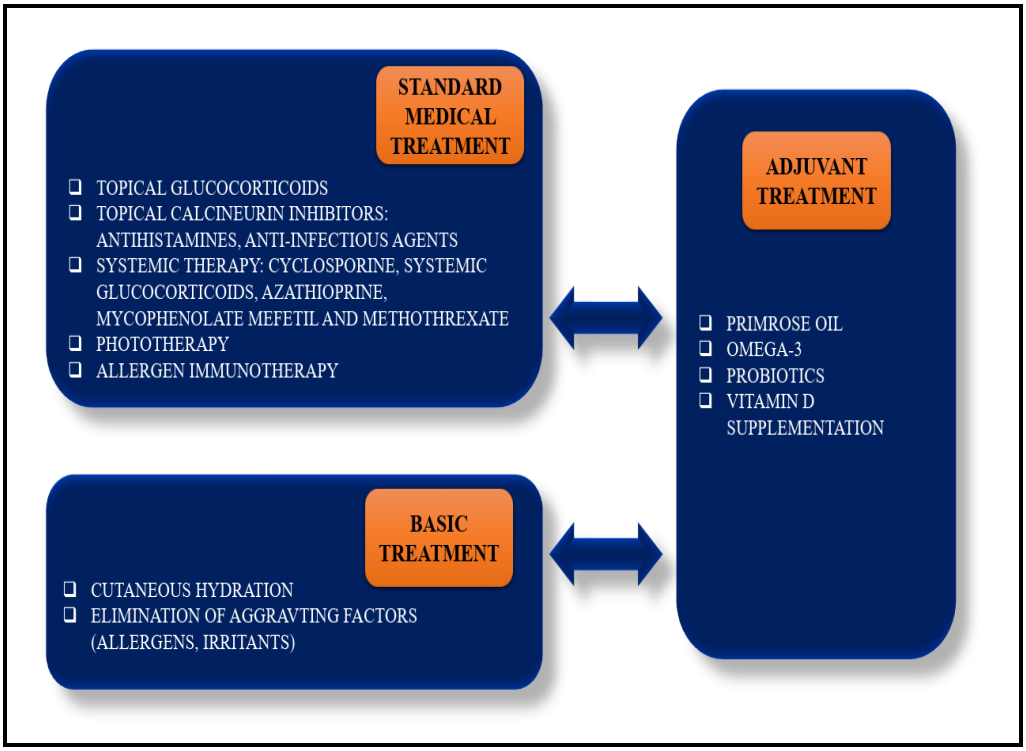

Fig no. 01: Various Treatments of Eczema.

Basic treatment

First line treatment by reducing the dryness using emollient which directly relieves pruritus. Exacerbating factors should be avoided by the individual under evaluation.

Cutaneous hydration

Eczema is the impaired skin barrier with lack of moisture in the skin which is to be control by using cutaneous hydration. Mutation of filaggrin gene is responsible for decrease in the natural moisturizing factors in the skin. Filaggrin gene and eczema are much correlated.[23] cutaneous hydration helps to retain the moisture in skin, improve skin barrier functioning and gives relief from itchy sensations.[24] Emollients are used to reduce flare ups of eczema and they can reduce the use of topical steroids.[25,26] For hydration of stratum corneum bath for 5-10 minutes is recommended using warm water which removes scale, crust sweat, allergens and irritants.[27] While taking bath or shower, patients must use non-irritating, mild acidic soaps which are desirable and scrubbing soap on skin should be avoided. Care should be taken that emollients must be applied within 3 minutes after bath to avoid dryness of skin. And emollients should be applied twice a day on the skin. According to NICE (National Institute for Health and Clinical Excellence), 250gm per week can be used for an individual.[25] While, formulations which are used as moisturizer includes lotions, creams and

ointments. While in formulations the fragrances and preservatives used should not aggravate the skin condition of the patient.[28] Hence, the proper education and learning to be given to the patients who are having eczema. Proper cutaneous hydration methods to be explained and to be demonstrated to avoid worsening of condition. Dressing is also better method to prevent the scratching of the skin.[30]

Standard Medical Treatment

According to the patient's condition the choice of treatment is done. Mild eczema is treated using topical medications (If topical therapy fails then the systemic therapy is given). Cyclosporin and systemic glucocorticoids which are short in life are mostly used in eczema.

Alternative therapies

- Phototherapy
- Antimetabolites
- Interferon-gamma
- Allergen immunotherapy
- Biologics

Topical corticosteroids

First line treatment for eczema is mostly done of topical corticosteroids. Topical corticosteroids control the flare ups and gives anti-inflammatory, action reduces proliferation of the lesions and gives immunosuppressive action. Many topical corticosteroids which have low to higher potency available in in different concentrations, formulations and doses. Before using emollients, topical corticosteroids are applied on the inflamed skin which appears to be red. While in different formulations, ointments prove better uniformity and penetration ability over the creams. To control eczema the concentrations of the preparations must be least while using on the sensitive areas such as face, neck, groin and underarms. Mostly the low-potent preparation of hydrocortisone acetate 1% is generally used for face. Appropriate use of topical corticosteroids gives extremely safe and effective results. If topical corticosteroids are used for longer period of time it gives side effects such as stretch marks, small red or purple spots, telangiectasia (dilation of blood vessels on the surface of skin), thinning of skin, atrophy and acne. These effects are not usually appearing with low or moderate potency preparations. If the topical steroids are used for longer period of time on larger surface area of body it can cause rarely the systemic side effects. It is also suggested that prevention from

eczema using topical corticosteroids gives better result. From clinical studies, its indicted that the paediatric and adult patients reduce the risk of eczema by using topical anti-inflammatories with emollients for twice in a week.[37]

Topical calcineurin inhibitors (TCIs)

These are the agents which shows immunosuppressive activity and are shown to be safe and effectives for the better treatment of eczema.[33,38,39] It also reduces the flare of eczema which is preventive.[37] tracrolimus and pimecrolimus are both used frequently for the treatment of eczema while it cost much higher. Due to cost, it is reserved for patients with tenacious disease and continues flares which would have been requires continuous topical corticosteroids treatments and also the patients which are being affected severely in the sensitive skin areas. Sensitive areas such as around eyes, face, neck and genitals. While side effect of topical corticosteroids gives systemic absorption, it leads to skin atrophy risk which is concerning action. Skin burning and skin irritation are most commonly observed because of long term and continue use of TCI.

Treatment of skin infections

Patient having eczema is generally severely colonised of S. aureus, also in the areas which is not infected. Antibiotic therapy is recommended because of secondary bacterial infection. Relevant systemic antibiotics are referred for severe spread of secondary infection, 1st and 2nd generation cephalosporins or penicillin's (anti-staphylococcal) for 7-10 days gives effective treatment in managing the infection. Macrolides are not generally used due to erythromycin resistant organisms are commonly observed in patients of eczema.[36] patients with eczema are also susceptible to repetitive viral infections. Eczema is generally misdiagnosed as a bacterial superinfection by physicians. Hence if the condition of the person becomes extreme then they require antiviral treatment with antiviral agents like acyclovir or others.[36]

Systemic immunosuppressive agents

Short-term treatment with agents of systemic immunosuppressive such as methotrexate, cyclosporine and azathioprine show better effective results in comparing topical treatment while these agents are recommended for severe and stubborn eczema.[32,33] Patients being treated with immunosuppressive agents like cyclosporine and azathioprine should be observed for potential adverse effects, such as kidney or liver dysfunction with cyclosporine, and myelosuppression with azathioprine. Long term use of the immunosuppressive agents must not be recommended and should be reserved for extreme condition patients.[33]

Antihistamines

Even though, 1st generation antihistamines don't give effect on itching due to lesions but it helps in sedation of the patient which improves sleep. Antihistamines such as hydroxyzine, diphenhydramine, chlorpheniramine.[31,36] Antihistamines generally reduces REM sleep, impairment in learning and decreases working efficiency.[40] hence they are not commonly referred for patients with eczema. They are generally considered as the acute adjuvant therapy for the eczema patients who encounters severe eczema flareups. Use of these agents must not be done in day time and long term due to its sedative property. 2nd generation antihistamines which are associated with non-sedating property provides moderate effect over the eczema along with the allergic triggering of the disease.[31,36] Trails for the therapeutic activity may be considered in some of the clinical situations of patients.

Phototherapy

Sunlight might be beneficial to some of the patients with eczema, although it induces sweating and itching of skin. It can be the secondary therapy for patients with eczema. Use of Ultra-violet rays are also done. For acute severe lesions, UVA-1 is used wavelength about 340 o 400nm. For chronic lesions, UVB is used wavelength about 311nm.[41] Targets for UV light can be epidermal langerhans cells and eosinophils. Immunosuppressive effect is shown by UVB by inhibiting the function of antigen which presents lymphocytes and alteration in keratinocyte cytokine production.[42] This therapy needs to be carried out carefully and safely because it can lead to cutaneous malignancies as well as erythema, pruritus, pigmentation and skin inflammation/ pain.[43]

Allergen immunotherapy

Specific immunotherapies through subcutaneous and sublingual (SITs) part are alternative approach treatment of eczema. SITs against house dust mites, pollen or cow's milk protein. In addition, with immunotherapy, inhalant allergens for asthma and allergic rhinitis gives treatment but this experiment doesn't give effective results. Eczema patients who are sensitive to dust mite allergens, SITs can be effective those reports have been published.[44,45]

Biologics

Biologics have been used for treatment of eczema; hence many targeted biologics have been initiated and gives promising results and better therapies:

- Anti-CD20 therapy (Rituximab)[46]

- Anti-IgE (Omalizumab)[47-49]
- Anti-IL-4 receptor therapy (dupilumab)[50]
- Anti-TNFα therapy (infliximab)[50]
- Anti-IL-5 therapy (mepolizumab)[52,53]
- Anti-IL-6 receptor therapy (Tocilizumab or atlizumab)[54]
- Anti-IL-31 therapy[55]
- Anti-TSLP therapy[56]

Adjuvant treatment

Adjuvant therapies should be introduced if the eczema symptoms are not controlled by enough basic treatment.

- Primrose oil[57]
- Omega-3[57]
- Probiotics[58,59]
- Chinese herbal medicines[60,61]
- Oral vitamin D[62,63]

CONCLUSION

The aim of these review Is to compile the topic of eczema or atopic dermatitis from the various sources, this review includes different treatments of diseases and novel methods to manage the disease. This review also includes diagnosis and history of the disease. The treatment options for AE include (1) standard medical treatment with pharmaceutical agents such as topical steroids and topical immunomodulators, (2) adjuvant therapy, and (3) the following basic treatment such as using emollients. Also, the alternative therapies such as phototherapy, biologics, interleukin therapies, interferon therapies and many more.

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