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Short Communication Open Access

Applications of Moisturizers in Early Infancy and Neonates to Prevent Development of Atopic Dermatitis (AD)

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Chronic AD is a recalcitrant dermatosis which is suboptimal managed in the primary health care setting and has a significant disease burden to the society. The main pathogenesis is an innate or acquired epidermal barrier defects, immune function aberrancy with early stage Immunoglobulin E (IgE) sensitization and the cognitive itch – scratch viscous cycle. Topical corticosteroids, calcineurin inhibitors, systemic antibiotics, immunosuppressants and recently introduction of immune target specific biologics are considered to be the mainstay of treatments. Correct and accurate use of these armamentarium has evidence - based benefits and may provide adequate control of chronic AD. However, all these medicines are not without side effects and some of them could be of public health concern. For example, the injudicious use systemic antibiotics have produced the most widespread antibiotics resistance in the world which is especially worst in China, Korea and Hong Kong. Moreover, biologics are expensive; mostly unaffordable in less affluent geographies and the long- term consequences are still unknown.

Prevention is always better than treatment and this is true and applicable to the development of chronic AD in infancy. Currently, breastfeeding recommended by WHO at least for 6 months, administration of pro and prebiotics and early daily use of moisturizers to neonates with high risk positive family history of atopy has been shown to be efficacious in preventing the development of chronic AD in children and adult.

Application of moisturizers has gained increasing recognition by experts to prevent AD and exacerbation of AD. Early use of moisturizers daily during neonatal period especially in high risk infants have been shown by studies to reduce the occurrence of AD later in life. Simpson and colleagues reported in a randomized controlled trial in the United States and United Kingdom of 124 neonates at high risk of AD [1]. The high-risk infants were instructed to apply full-body emollient therapy at least once a day starting 3 weeks of birth. The outcome was measured by the clinical cumulative incidence of AD at 6 months. The result showed that the use of daily emollients has a relative risk of reduction of up to 50% on the incidence of AD. No adverse effects of emollients were reported. Similarly, Horimukai in Japan reported similar findings by performing a prospective, randomized controlled trial with daily application of moisturizers during the first 32 weeks of life to 59 of 118 neonates at high risk of AD reduced the risks of AD in infancy which is statistically significant [2]. Allergic sensitization based on IgE antibodies measurements during this period of time is associated with the presence of eczematous skin but not with moisturizers use. These data; albeit the relatively small sample size; suggested that use of moisturizers in early neonatal life in high risk AD subjects is a feasible, safe, acceptable to parents, cost-effective and evidence - based approach to the prevention of AD. Further confirmation of this simple effective skin care measure by large scale control studies would be a major public health prevention advancement in preventing a disease which have a major impact on Dermatology Quality of Life Index (DQLI) of patients and may reduce the incidence of methicillin resistant Staphylococcus aureus (MRSA) worldwide.

What is the reason behind the effective use of daily moisturizer in early neonate in the prevention of AD? This lies on the innate defensive nature of the skin barrier of our epidermis to environmental noxious stimuli especially pathogens and allergens. The skin epidermis is a complicated structure as illustrated by the mortar and brick model [3]. The maturation, physiological turnover and deficiency affect significantly the future course of AD. The outermost non-viable stratum corneum can reflect and imped penetration of ultraviolet radiation, chemicals, biofilms formations and potential allergens invasion. Inherited mutations of genes structural protein like filaggrin (filament -aggregating protein) will allow trans water epidermal loss (TWEL) from the inside of the body to the outside [4]. TEWL is characteristic of early AD with the result of skin dehydration, reduction of the intracellular natural moisturizing factor (NMF). Continuous TWEL will further impair the barrier and without correction, a dry skin phenotype will result. Innate and acquired deficiency of intercellular lipids like ceramides, cholesterol, fatty layers secondary to the irritating effects of soaps and detergents wash during bathing of neonates will damage the epidermal barrier structure and function further. The dry skin together with its micro fissures allow hapten exposure causing Th1 like reaction and sustained exposure to sensitising haptens will initiate a Th 2 response of T lymphocytes with the production of high IgE, IL-4, IL-13 and IL-31 mediated pruritus. Hence, filaggrin deficiency predisposes barrier dysfunction lead to Th2 skewing condition and later development of AD. In addition, the defects of the stratum corneum provide a leaky skin which allow invasion of environmental hostile agents to the inside of the body in contact with the skin dermis where there are various immune sensitive cells like Langerhan's cells, pruritogenic neurons, mast cells and T lymphocytes. At this early stage of high risk AD neonates, IgE sensitization will result if the dry and leaky skin are not well nurtured and protected by external agents; moisturizers. A vicious, complex interplay between epidermal skin barrier function, immunological reactions, pruritus and scratchings will be staged in later life of infancy.

Moisturizers can prevent, repair, protect AD epidermal barrier defects and calm skin inflammation during AD exacerbation. In year 2017, an advisory board meeting was organized locally in Hong Kong; comprising of private, public dermatologist, academic professors of universities, paediatrics and immunologists. A summary of guidelines on the "Current Management of Atopic Dermatitis and The Use of

Moisturisers" were formulated [5]. The booklet proposed a multifactorial approach against eczema using moisturisers: Hyaluronic acid and shea butter repair and hydrate the epidermal barrier by reducing TWEL loss and providing key physiologic lipids and hydration. Telmesteine, Vitamin C, E and Vitis vinifera (Grapevine) protect the epidermal barrier and manage the pruritus by its antioxidant action and limits the damage caused by elastase, collagenase and matrix proteinases. Glycyrrhetinic acid calm the inflamed AD by its anti-inflammatory action and inhibit 11-B-hydroxysteroid hydrogenase. The summary also recommended that the cleansers and moisturizers that contain irritating ingredients and additives like sodium lauryl sulphate, phenoxyethanol and other preservatives that may activate the protease enzymes in breaking down the epidermal barrier should be avoided in early neonates. The price should be affordable, clinically demonstrated efficacy, durable stability, effectively hydrates and enhance skin's natural moisturizing retention mechanism and reduces TEWL. In general, an at least once daily application emollient is an appropriate and recommended strategy to prevent and maintain the natural epidermal barrier function and development of AD under current evidences.

In sum, in the era of steroid -phobia and inadequate data to support using topical calcineurin inhibitor in the pro-active regime in the prevention of AD in neonates, full body emollient therapy daily application is a good candidate for the front -line physicians and parents to consider in the prevention and management of AD and the prevention of hapten IgE sensitization in the early stage of AD. More endeavour should be dedicated to have more information and data on the prevention strategy of AD which is of pressing public health concern.

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