

Clinical Research

Atopic Dermatitis and Breast Feeding/Weaning: Are they Related?

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Abstract

Background: Atopic Dermatitis (AD) is a very common polygenic chronic disease for which several environmental risk and protective factors have been considered, including breastfeeding and early weaning.

Methods: To determine the influence of breastfeeding and early weaning in the development of AD in a sample of Mexican children, one hundred patients with AD were selected (group I) and compared with one hundred non-atopic children (group II). The subjects in these groups were matched according to age and gender. The mothers of both groups completed a questionnaire that collected information on the length of breastfeeding, and the child's age at the time of weaning. Statistical analyses were performed and information was presented in percentages, X square, Odds Ratios (OR), and 95% Confidence Intervals (CI).

Results: The relationship between breastfeeding and AD was not statistically significant; however, we were able to demonstrate a close relationship between early weaning (before four months of age) and AD ($p < 0.0001$, OR=2.85, 95% CI: 1.15-5.3).

Conclusion: In a sample of the indigent pediatric population with Mestizo ancestry, AD is significantly related with early weaning. Infants who are weaned before four months of age have an almost three times greater risk than the general population of developing AD.

Keywords: Atopic dermatitis; Breastfeeding; Weaning

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Introduction

Atopic Dermatitis (AD) is a very common disease, particularly during pediatric age, characterized by a lowered threshold to pruritus and dermatitis (e.g., eczematous or lichenized plaques) of peculiar localization. Its etiology is unknown but is accepted as multifactorial [1,2]. Recently, some genes have been found to be related with an increased susceptibility to the inflammatory and immunological responses associated with AD; they are cytogenetically located at 3q21, 1q21, 17q25, y20p [3].

AD is a significant disease in pediatric dermatology as it is one of the most frequently occurring diseases in children. Specifically, AD is the most common reason for consultation at the Clinic for Pediatric Dermatology of the Hospital General de México "Dr. Eduardo Liceaga" (HGME); it accounts for 12.9% of all consultations [2]. There are similar figures at other institutions (not only in Mexico). Recently, its prevalence has been documented at 30% [3] This wearisome illness can seriously affect the child's quality of life and family environment.

Breastfeeding (BF) and Weaning (WN) are considered to be factors that can majorly influence the development of AD; however, there is no consensus among experts in this field. Regardless, it is widely accepted that BF and an appropriate diet during lactation are necessary to provide some protection for the infant against the development of AD. The proposal of the current study was to evaluate a sample of our infant population to observe if BF and/or WN affect the development of AD.

Methods

The present investigation is a prospective transversal case-control study performed at our Hospital. The cases were placed in group I, consisting of 100 patients with AD. The diagnoses were established according to internationally accepted criteria [1,2,4-6]. Their ages ranged from 2 to 15 years old and both genders were included. They were treated, studied and invited to participate between June 2017 and December 2019. They signed an informed consent.

The controls were placed in group II, consisting of 100 healthy children of either gender, with ages ranging from 2 to 15 years old. They did not have personal antecedents of AD and were paired accordingly with children of the same age and sex from group I (with no more than 3 months age difference). These children were not siblings of patients; they were selected from the same institution to which they attended for illnesses unrelated to dermatologic diseases (general pediatrics). They were invited to participate and also signed an informed consent.

In both groups, a clinical history was recorded, and a questionnaire was presented to the mother of each child. The questionnaire was partly oral and written. It was completed in a personalized and explicit manner with each mother, including questions related to the following: 1) the background and duration of BF; and 2) the child's age at the beginning of WN.

The mothers' ages ranged from 18 to 33 years old. They were of low socioeconomic background and were natives of Mexico City. An essential requirement was that they needed to have completed primary school education. Answers that were doubtful or probable were not accepted.

It was considered that the children from either group received adequate BF (ABF) when BF was the exclusive source of nourishment for at least the first four months of the child's life. This is in agreement with the World Health Organization (WHO), which accepts four to six months as the adequate length of BF. When this wasn't the case, it was interpreted as inadequate (IBF).

Likewise, Adequate WN (AWN) was accepted if nondairy products or cows' milk was introduced into an infant's diet after the first 4 months of life. When one of these incidents took place before the age of 4 months it was considered Inadequate (IWN). The mother's diet during pregnancy and lactation and the child's diet after weaning were not considered. The statistical analyses included percentages, χ^2 test, and Odds Ratios (OR). The sample was decided by convenience (100 per group), retrospectively power of this sample was calculated and is 0.80.

Results

In both groups there were 60 girls and 40 boys; ages ranged from 2 to 15 years, with mean 5.87 ± 4.10 SD and median of 9 years. The majority of the children were between 3 and 5 years old. The children were all of Mestizo ancestry and low socioeconomic background, and they had good psychomotor development.

The BF statuses of the group I children were distributed as follows: ABF (n=44) and IBF (n=56). In group II the distribution was: ABF (n=54) and IBF (n=46); a significant difference was not found between group I and II in relation to BF. Considering WN, it was found that in those patients with AD (group I), there were more children with IWN (n=70) than in group II (n=45). In short, group I: AWN 30 and IWN 70, versus group II: AWN 55 and IWN 45 ($p < 0.0001$, $OR = 2.85$, 95% CI: 1.15 to 5.3).

Discussion

The sex distribution in each group produced a slight majority in females (60%). The distribution of subjects in the age groups was similar to what is observed in practice [1-3,7]. The relationship between BF and AD was found to be insignificant in this current study. However, since the obtained numbers were so similar between the groups, the implementation of similar studies in the future, involving a larger number of cases in a multi-institutional manner, to explore this again would be beneficial.

Furthermore, it has been demonstrated that WN plays a significant role in the development of AD; the majority of children with AD had IWN. Therefore, considering the OR (2.85), those with IWN presented an almost three times greater risk of developing AD than those with AWN. As such, it is probable that AWN plays a preventative role against the development of AD.

These results allow us to reconsider our perspective in regard to the controversial effect that BF could have on AD development; the results suggest that BF does have a protective role against the disease. Our findings support observations made by other authors who favor

this hypothesis; although, they have not been able to demonstrate that BF is a protective factor [7,8].

Nevertheless, the role of genetics in the development of atopic disease is not under discussion. It does not explain the noted increase in the prevalence of allergic afflictions in developed countries over the last twenty years. Two hypotheses have been postulated. The first hypothesis suggests that nutritional patterns have changed and are causing exposure to new environmental toxins. The second hypothesis considers that certain aspects of modern life have decreased exposure to infectious agents or to their products, such as endotoxins (which are potent stimulants of Th 1), and this in turn favors Th 2-response to environmental allergens. However, an alternate hypothesis is that the population is greater; thus, there are more people consulting dermatologists who are able to diagnose these diseases, accounting for the increase in the documented number of cases.

In a recent study in Great Britain investigating the diverse environmental factors that may influence the development of AD, maternal lactation was not found to have influence; although, the effect of WN was not explored [9]. Therefore, it is convenient for us to extend our perspective in this field as BF alone cannot be a key factor; other fundamental factors, relating to BF (such as WN), must play a role. As such, if BF is continued adequately for least four to six months, consequently the introduction of other nourishment is delayed.

A study conducted by the GINI group in Germany, observing 3903 children fed exclusively with BF during the first four months, data did not collect that supported the exclusive BF hypothesis. Furthermore, it was found to be a risk factor for the development of AD; however, breast milk was found to have a protective effect when compared to conventional cows' milk [10].

If there is a risk of AD, due to an identified history of atopy in the biological parents or siblings of an infant, a pregnant woman who intends to breastfeed has at least two options: to minimize or eliminate the presentation of AD: 1) avoid exposure to allergens in food; and 2) increase the amount of long chain polyunsaturated fatty acids in the diet [11].

This present study aims to emphasize a central point in its attempt to improve the understanding of AD: to favor the promotion of BF, preferably in an exclusive manner. Specifically, delaying WN and/or the administration of cow's milk until after the sixth month of life (or after the fourth month if necessary) is beneficial.

It has been accepted that there are multiple factors involved in the appearance and development of AD. Among those, BF has been a point of current discussion.

Our findings favor delayed WN; it seems to provide protection for the child against exposure to allergens that could contribute to AD, via the digestive tract.

Furthermore, diverse studies have established that newborns who later develop AD exhibit a decrease in long chain polyunsaturated fatty acids at birth, according to umbilical cord samples assessed at the first and third month after birth [12]. Conversely, the content of linoleic acid was found in similar concentrations in the breast milk of mothers with healthy children and of mothers with children who have AD.

For this reason, the suppression diet during pregnancy is not supported by solid evidence [13,14]. However, it has been suggested, that women who have had children with AD should maintain an adequate suppression diet during lactation, respect to foods considered highly allergenic: cow's milk and its derivatives, fish, eggs, peanuts [15,16]. Nevertheless, in these studies, the role that WN may have had is not mentioned.

Interestingly, it has been shown that the early introduction of peanuts in diet, significantly decreased the frequency of the development of peanut allergy among children at high risk for this allergy [17].

In a systematic review and meta-analysis performed by Gdalevich, et al. in 2001, they found that exclusive BF during the first three months of life is associated with lower incidence rates of childhood AD in children with a family history of atopy [18].

Conversely, in 2009, Yang, et al. also performed a systematic review and meta-analysis; they found that there was no strong evidence that exclusive BF for at least three months had a protective effect against AD, even among children with a positive family history of AD [19]. Remarkably, a study by Ito and Fujiwara in Japan revealed that children who were breastfed were 1.26 times more likely to develop AD than those fed with formula [20]. Additionally, dermatologists in the United States do not favor BF in association with AD and do not recommend any specific diets for pregnant mothers with a family history of AD [21].

It seems that is not primarily BF that is noteworthy. The content of the mother's milk, including several molecules, may be of particular interest. Many authors have explored this field; they have assessed the amount and quality of CD14 soluble or membrane, either in the amniotic fluid, and consequently in the fetal digestive tract, or in the mother's milk; as well as lower vitamin-D levels. These could be relevant factors in the beneficial role of BF [22-25].

In conclusion, the current work supports the promotion of BF and AWN as existing evidence shows that there are multiple benefits for the nursing infant, the mother, and their environment. Although BF alone is not a sufficient protective factor, true ABF causes a delay in WN, allowing the infant to avoid exposure to allergens.

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