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Management of Atopic Dermatitis and Food Allergies in a Two-Year-Old Girl: A Case Report

Case Report

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Abstract

A two-year-old girl with refractory atopic dermatitis and multiple food allergies presented with elevated serum IgE (605 IU/mL). A six-week multidisciplinary intervention incorporating allergen elimination and nutritionally adequate dietary alternatives led to marked clinical improvement and reduction in IgE to 150 IU/mL. Most allergens could be reintroduced except milk. This case demonstrates that structured nutritional therapy, guided by a multidisciplinary team, can effectively manage pediatric atopic dermatitis associated with food allergies.

Introduction

Atopic dermatitis (AD) is one of the most burdensome chronic inflammatory skin diseases of early childhood, marked by intense pruritus, sleep disruption, and recurrent eczematous flares. Globally affecting up to 30% of children, AD poses a particularly significant challenge in low- and middle-income countries like India, where increasing urbanisation and lifestyle shifts have fuelled a rise in atopic diseases. Approximately one-third of children with moderate-to-severe AD have co-existing food allergies, most commonly to cow's milk, egg, and soy in infancy, progressing to wheat, fish, and tree nuts with age. [1,2] Diagnosis integrates clinical history, serum IgE, skin prick testing, and confirmation via elimination diets or oral food challenges. Targeted dietary avoidance remains a cornerstone of management when food triggers are identified. This case report highlights a successful multidisciplinary approach in a two-year-old girl with AD and multiple food allergies, emphasising the role of structured nutritional therapy in improving clinical outcomes in the Indian context.

Case Presentation

A two-year-old girl (weight: 9.2 kg) was referred by a dermatologist for persistent atopic dermatitis characterised by severe nocturnal pruritus and frequent crying episodes, often requiring her parents to scratch her entire body for relief. Initial laboratory work-up showed markedly elevated serum total IgE (605 IU/mL). Given the suspected food-related exacerbations, a food allergy panel was performed, which revealed sensitivities to banana, casein, chocolate, and milk. Although there was no history of milk intolerance in the first year of life, parents reported the onset of rashes following milk and egg consumption during the current presentation, supporting the role of food allergens in symptom aggravation.

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Timeline of Case Report	
Age	**Event**
2 years	• Referred by dermatologist for persistent atopic dermatitis and suspected food allergies. • Laboratory tests reveal elevated serum IgE levels (605 IU/mL). • Food allergy panel identifies allergies to banana, casein, chocolate, and milk; rashes noted with egg consumption. • Initiation of a six-week elimination diet excluding identified allergens.
After 3 weeks of intervention	• Significant reduction in nocturnal itching and sleep disturbances reported.
After 6 weeks of intervention	• Sequential reintroduction of allergens begins: banana, chocolate, casein (via dairy substitutes), and eggs. • Milk excluded from reintroduction due to persistent symptoms upon trial.
After 3 months of intervention	• Completion of reintroduction phase; patient tolerates all reintroduced foods except milk. • Serum IgE levels reduced to 220 IU/mL. • Patient's weight increased to 13 kg; atopic dermatitis symptoms well-controlled.
After 8 months on intervention	• Serum IgE levels reduced to 150 IU/mL.

Management

The dietary management of the patient was designed using evidence-based guidelines for food allergy and atopic dermatitis:

1. Elimination Phase: A six-week elimination diet was initiated to exclude all identified allergens (banana, casein, chocolate, milk, and eggs) from the patient's diet. This phase was grounded in recommendations from the European Academy of Allergy and Clinical Immunology (EAACI), which advocate for allergen elimination to reduce inflammatory responses.[3]

Nutritional adequacy was ensured using the following allergen-free substitutes:

- **Soy milk** – protein-rich and nutritionally balanced, widely recommended for children with cow's milk allergy (CMA).
- **Oat milk** – low-allergen and fibre-containing (β-glucan), increasingly recognised as a well-tolerated option in paediatric populations.[4]
- **Ragi (finger millet) milk** – naturally high in calcium, iron, and essential amino acids, providing bone and micronutrient support in plant-based diets.
- **Homemade allergen-free meals** – based on fresh fruits, vegetables, and whole grains to ensure adequate vitamins, minerals, and antioxidants while reducing exposure to processed food allergens; parents were counselled on safe preparation techniques.

2. Symptom Monitoring and Sleep Quality Assessment: Weekly follow-ups were conducted to monitor improvements in skin symptoms and sleep quality. Sleep quality was evaluated using a modified Sleep Disturbance Scale for Children (SDSC), which has been validated in pediatric populations. Scores indicated a significant reduction in nocturnal itching and sleep disruption by the third week of dietary intervention.[5]

The patient's mother reported marked symptom relief, corroborating findings in the existing literature on elimination diets and their impact on AD-related sleep disturbances.

3. Reintroduction Phase: Starting in week seven, allergens were reintroduced sequentially in controlled doses, following protocols described by Sicherer and Sampson (2018) for graded food reintroduction. Foods were reintroduced in order of increasing allergenicity: banana, chocolate, casein (via dairy substitutes), and eggs.[6]

Milk was excluded from reintroduction due to persistent symptoms upon trial, consistent with findings that CMA often persists longer than other food allergies in children.

4. Parental Education and Long-Term Dietary Strategies: Parents were provided with evidence-based guidelines on avoiding cross-contamination and recognizing early signs of allergic reactions. Research from Burks et al. (2012) highlights the importance of caregiver education in improving dietary adherence and outcomes. [7]

A balanced diet plan was devised to ensure continued growth and nutritional adequacy while avoiding high-risk allergens.

Outcomes: By the end of the intervention, the child's weight had increased to 13 kg. Her atopic dermatitis symptoms were well-controlled, IgE levels reduced to 150 IU/mL, and she could tolerate most previously identified allergens except milk. These results align with studies demonstrating improved growth and symptom management through tailored elimination and reintroduction strategies.

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Discussion

Atopic dermatitis (AD) with co-existing food allergies poses a multifaceted challenge where inappropriate dietary restriction risks malnutrition, while uncontrolled allergen exposure aggravates disease severity. While this case demonstrates successful implementation of a structured elimination and reintroduction diet, it is imperative to recognise that elimination diets are not universally effective. Several studies have reported failure rates ranging from 40% to 70%, particularly when empirical elimination (without confirmed allergen testing) is employed.[9] In such instances, despite strict food avoidance, patients continue to experience pruritus and eczematous flares, likely due to non-dietary triggers (e.g., aeroallergens, infections, stress, and climatic factors) or unavoidable cross-contamination. Long-term restrictive diets may also inadvertently induce sensitisation or increased reactivity upon re-exposure — a phenomenon described in delayed tolerance acquisition, particularly with egg and peanut allergens.

Additionally, elimination diets may negatively affect growth and development if not accompanied by dietetic supervision. Reports of growth faltering, micronutrient deficiencies (vitamin D, calcium, iron), and reduced bone mineral density have been documented, especially in children maintained on prolonged cow's-milk- and egg-free regimens without adequate substitutes. This case underscores the importance of integrating nutrient-dense alternatives (soy, oat, ragi milks) to maintain caloric and micronutrient sufficiency during exclusion phases.

The strategic use of such substitutes allowed the patient to achieve catch-up growth while maintaining allergen avoidance. The psychosocial impact of AD is often under-recognised. Severe nocturnal itching leads to sleep deprivation in both child and parents, contributing to behavioural problems such as irritability, attention deficits, and poor feeding. Parents frequently report emotional exhaustion, guilt, and anxiety over dietary choices and fear of inadvertent allergen exposure. Social constraints, including avoidance of gatherings, playdates, or preschool interactions, can impede normal childhood experiences. Furthermore, rigid meal preparation requirements and concern over cross-contamination create substantial caregiver stress, sometimes resulting in maladaptive feeding practices or strained family dynamics. In this case, the multidisciplinary team actively incorporated caregiver counselling and practical education on allergen-free meal preparation to reduce these psychosocial burdens. Therefore, Empowering caregivers through dietary guidance, psychological support, and practical strategies is therefore critical for sustaining long-term management and enhancing overall quality of life.

Validated tools such as the Sleep Disturbance Scale for Children (SDSC), Dermatology Life Quality Index (DLQI), and Parent-Reported Quality of Life (PRQL) questionnaires can be used longitudinally to capture these broader outcomes, allowing clinicians to tailor interventions more holistically.

Ultimately, long-term management should aim for *balance*: strict avoidance of confirmed allergenic foods during active disease while avoiding unnecessary dietary restriction. Gradual controlled re-exposure under supervision (tolerance induction approaches) may facilitate immune modulation for certain allergens such as egg and peanut. Empowering caregivers through education, access to nutritionists, and psychological support is crucial to ensure adherence and reduce distress. Continued research into biomarkers predicting dietary response would enable more personalised dietary strategies, thereby improving both clinical and quality-of-life outcomes in children with AD and food allergies.

Conclusion

The successful resolution of symptoms in this patient demonstrates the efficacy of personalized, evidence-based dietary strategies in managing pediatric AD with associated food allergies. Further studies are warranted to explore long-term outcomes and refine approaches to gradual allergen reintroduction.

Acknowledgments

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