Dear Doctor,

Greetings from Micro Labs. We are happy to bring you "Allergy Connection" which contains latest and interesting news in the field of Allergy.

This issue contains:

1. **Evaluation of the utility of different biomarkers to define the trajectories of Peanut allergic and peanut sensitized children**
2. **Exploring Leukotriene Antagonists as a Strategy to Decrease Seizure-Related Hospitalizations in Older Adults with Allergic Rhinitis or Asthma**
3. **Blood Profiles and Allergic Markers: Insights from Individuals with and without Allergic Rhinitis**
4. **A Case Report on Allergic Fungal Rhinosinusitis and Contralateral Chronic Granulomatous Invasive Fungal Sinusitis**

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Looking forward to your valuable feedback
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Medical Team, Micro Labs Ltd

Evaluation of the utility of different biomarkers to define the trajectories of Peanut allergic and peanut sensitized children

Introduction

Peanut allergy (PA) is one of the most prevalent food allergies in children in Western countries which frequently lasts a lifetime. Compared to other food allergies, PA usually manifests itself in early childhood and was linked to more severe symptoms. About 75–80% of children experience PA well into adulthood.[1] Peanut allergy (PA) affects 0.2% to 4.5% of children globally, with a prevalence of 2% in the UK. The oral food challenge (OFC) is the gold standard for diagnosing and assessing resolution of PA but is risky, time-consuming, and costly. Alternative various skin prick tests (SPT), specific-IgE (sIgE), and newer tests like the mast cell activation test (MAT) and basophil activation test (BAT), are used to diagnose and potentially predict PA resolution.[2] However, the use of MAT in the context of allergy persistence or resolution has not yet been studied. So, this study aimed to evaluate various biomarkers effectiveness in predicting PA persistence or resolution over a decade in children, comparing results from peanut allergic (PA) and peanut sensitised but tolerant (PS) children.

Methods

In this cohort study, participants were from the EAT and EAT-On studies. The EAT study focused on early introduction versus standard introduction of allergenic foods. The EAT-On study extended the follow-up to assess long-term effects. At 7–12 years, PA status was determined by a positive OFC or clinical history and SPT results. Peanut sensitisation was defined by a positive SPT or sIgE levels. Children were assessed at 3, 12, and 36 months, with the primary outcome being IgE-mediated food allergy between 1 and 3 years. Peanut sensitisation was identified by SPT ≥1 mm and/or peanut-sIgE ≥0.1 kUA/L.

Results

PA prevalence remained stable at 2.1% (20/947) at 7–12 years, like 1.9% (22/1189) at the end of the EAT study. PA children had higher rates of eczema and other atopic conditions. PA children had higher SPT and sIgE levels compared to PS children at all time points (12 months, 36 months, 7–12 years) (Figure 1, 2). Specifically, Ara h 2-sIgE levels were significantly higher in the PA group compared to PS children. MAT showed higher mast cell activation in PA children across all time points. Persistent PA children exhibited high SPT, peanut-sIgE, and Ara h 2-sIgE from 12 months onwards. New PA children showed rising levels of biomarkers over time, with delayed increases compared to persistent PA. Significant biomarkers for

predicting PA included history of eczema, SPT, peanut-sIgE, Ara h 2-sIgE, and MAT at 7-12 years.

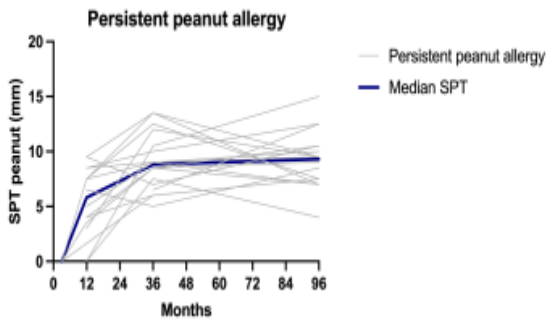

Figure 1. Changes in peanut SPT across time in persistent PA

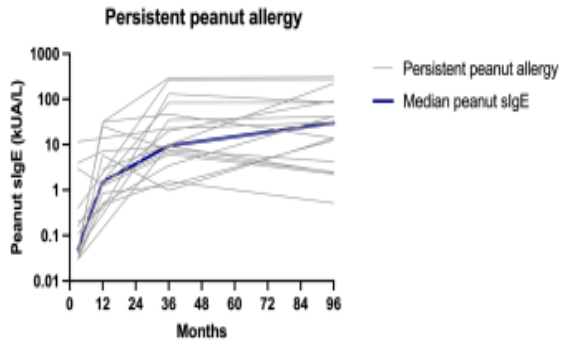

Figure 2. Changes in individual peanut-specific IgE across time in persistent peanut allergy

Discussion

The study highlighted the importance of biomarkers like peanut SPT, specific IgE (sIgE) levels, and Ara h 2-sIgE in predicting peanut allergy persistence in children. Elevated early levels of these markers were linked to a higher likelihood of ongoing allergy, whereas lower levels suggest a potential for developing tolerance. Incorporating these biomarkers into clinical assessments can improve prognostic accuracy and guide management strategies, underscoring the need for further research to refine predictive models and explore additional biomarkers.[2] These findings align with previous research, which demonstrated that skin prick tests (SPT), specific-IgE (sIgE) to peanut and peanut components, were more commonly used to help establish PA diagnosis.[3]

Conclusion

Children with persistent PA have raised SPT, peanut-sIgE, Ara h 2-sIgE and MAT evident from infancy that consistently increase over time. The study highlighted that high early biomarkers were indicative of persistent PA, while lower biomarkers and higher IgG4 ratios suggest tolerance.

Children with Peanut Allergy had significantly raised skin prick test, Peanut-sIgE, Ara h 2-sIgE and MAT which consistently increase over time.

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Exploring Leukotriene Antagonists as a Strategy to Decrease Seizure-Related Hospitalizations in Older Adults with Allergic Rhinitis or Asthma

Introduction

Epilepsy is a multi-factorial neuronal disorder. The abnormal jerky or quivering movements that epileptic seizures cause in the body are caused by abnormal neuronal activity and can cause harm to the brain or other parts of the body.[1] Older adults are more susceptible to epileptic seizures compared to other age groups. Data from Medicare administrative claims in the United States show that 2.4 out of every 1000 person-years among older persons experience epileptic seizures. Previous studies have shown that Leukotriene receptor antagonists (LTRAs) may exert an antiepileptic effect by suppressing inflammation in many diseases, including those of the central nervous system. But few population-based etiological studies on this topic have been available.[2] So, this study aimed to explore whether LTRAs reduce hospitalization risk associated with epileptic seizures in older individuals with asthma or allergic rhinitis.

Methods

This large population-based cohort study included all individuals aged 60-89 years who had at least one episode of allergic rhinitis or asthma during the study period. Further, this study compared individuals who newly started LTRAs with those who did not take LTRAs. Primary outcomes were time to hospital admission associated with an epileptic seizure and secondary outcome was the time to occurrence of an epileptic seizure, regardless of hospitalization.

Results

A total of 64724 patients were included for final analysis which had both LTRA-exposed vs unexposed groups. Following matching, there were 182 patients exposed to LTRAs (0.78/1000 person-years) and 308 patients unexposed to LTRAs (1.04/1000 person-years) who required hospital admissions for epileptic seizures and the Hazard ratios (HRs) was 0.75. Upon matching, 909 patients exposed to LTRAs (3.9/1000 person-year) had all new-onset epileptic seizures, compared to 1233 unexposed patients (1233/294891: 4.2/1000 person-year) and the HR was 0.96 in patients with epileptic seizures without relationship with hospitalization (Figure 1).

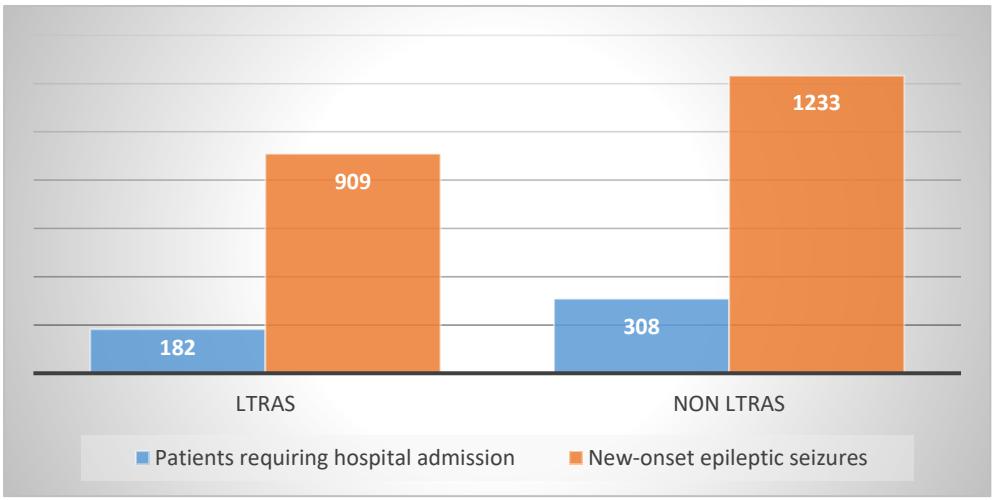

Figure 1. Results of proportion of patients requiring hospital admission and new onset epileptic seizures

Discussion

This study showed that LTRAs significantly reduced epileptic seizure-related hospitalization, but all forms of epileptic seizures were not suppressed by LTRAs. Previous reports have stated that LTRAs which bind to the leukotriene receptor were used to treat asthma and seasonal allergies, have been identified as a potential alternative treatment for epilepsy. LTRAs have anti-inflammatory effect which maintain the integrity of the blood-brain barrier (BBB) and incidence of epileptic seizures were reduced due to neuroprotective and antioxidant properties.[2] Previous study results align with the present study showing in patients with severe epileptic seizures, the LTRA pranlukast suppressed seizures in two-thirds of patients.[3]

Conclusion

Leukotriene receptor antagonists reduced risk of seizure-related hospitalization in older adult patients with allergic rhinitis or asthma other than those with diabetes.

Leukotriene receptor antagonists have neuroprotective and antioxidant properties which reduce the incidence of epileptic seizures.

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Blood Profiles and Allergic Markers: Insights from Individuals with and without Allergic Rhinitis

Introduction

Allergic Rhinitis (AR) is a prevalent chronic inflammatory condition driven by an Immunoglobulin E (IgE)-mediated hypersensitivity to allergens, leading to symptoms such as nasal itching, sneezing, congestion, rhinorrhoea, and ocular discomfort.[1] The global prevalence of AR affects 20-40% of the population, with high rates in the US, Canada, and increasing in China. The condition significantly impacts quality of life, disrupting daily activities and sleep. Lifestyle factors, especially diet, may influence AR progression, with dietary patterns potentially modulating inflammatory responses.[2] However, there is a scarce of studies on the association between the Dietary Inflammatory Index (DII) and the risk of AR. So, this study aimed to investigate the association between the Dietary Inflammatory Index (DII) and AR risk, focusing on how dietary patterns might affect the condition.

Methods

This case-control study included 332 participants, with 166 diagnosed with AR and 166 matched controls. Dietary intake was assessed using a Food Frequency Questionnaire (FFQ), and Energy-adjusted DII (E-DII) scores were calculated based on intake of various food parameters associated with inflammation. Participants were matched by age and gender. Covariates like age, gender, BMI, and lifestyle factors were collected through interviews. Statistical analyses involved comparing E-DII scores between cases and controls and assessing the association between E-DII and AR risk using logistic regression models.

Results

AR patients had significantly higher E-DII scores (0.36 ± 1.82) compared to controls (-0.91 ± 1.44), indicating a more pro-inflammatory diet. The highest E-DII tertile was associated with a 4.41-fold increased risk of AR compared to the lowest tertile. The study found that higher E-DII scores correlated with higher intakes of pro-inflammatory nutrients (total fat, saturated fatty acids (SFA), polyunsaturated fatty acids (PUFAs) and lower intakes of anti-inflammatory nutrients (fiber, vitamins, minerals) (Figure 1). The association between E-DII and AR risk was consistent across different AR types, durations, severities, and onset timings.

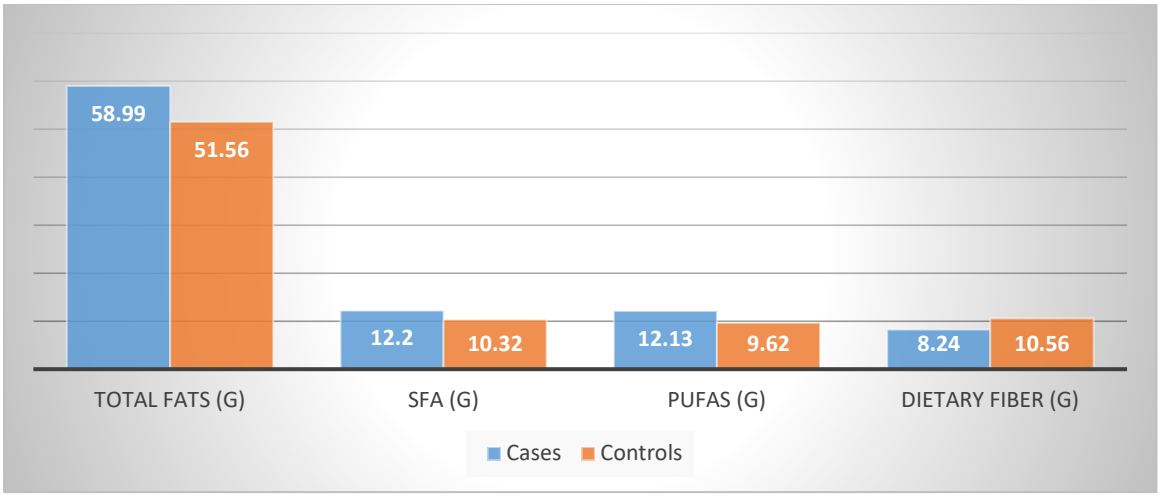

Figure 1. Proportion of dietary intake in the study participants

Discussion

This study highlighted the novel finding that higher dietary inflammatory potential, as indicated by elevated E-DII scores, was associated with an increased risk of AR.[2] The findings are consistent with other studies which indicates a positive correlation between a high DII score and an increased risk of AR, with a risk ratio reaching 2.23.[3] A diet high in total fat, SFA, and n-6 PUFAs was linked to increased AR risk, while higher intake of anti-inflammatory nutrients was associated with reduced risk. This supported the hypothesis that diet plays a significant role in AR pathogenesis through modulation of inflammatory processes. The results aligned with previous research suggesting that both specific nutrients and overall dietary patterns impact inflammatory responses.[2]

Conclusion

Higher E-DII scores, reflecting a more pro-inflammatory diet, were associated with an increased risk of AR. This suggested that dietary modifications could be a viable strategy for managing or preventing AR.

A diet with lower inflammatory potential may help reduce the risk of allergic rhinitis.

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Case Report on Allergic Fungal Rhinosinusitis and Contralateral Chronic Granulomatous Invasive Fungal Sinusitis

Introduction

Fungal sinusitis is classified into invasive and non-invasive types. Allergic fungal rhinosinusitis (AFRS) is a non-invasive mycosis often seen in South America, while chronic granulomatous invasive fungal sinusitis (CGIFS) is an invasive mycosis commonly found in dry climates such as India and Saudi Arabia.[1] Invasive mycosis typically affects immunocompromised individuals, whereas CGIFS occurs in healthy young adults. The presence of Aspergillus is common in CGIFS cases. Graft-versus-host disease (GVHD) post-transplantation can cause significant organ damage, including rhinosinusitis, but existing diagnostic criteria for GVHD do not specifically address rhinosinusitis.[2] This case report detailed the uncommon co-occurrence of CGIFS and AFRS in a 34-year-old woman who had both GVHD and acute lymphoblastic leukaemia following bone marrow transplantation.

Case Presentation

A 34-year-old woman with a history of acute lymphoblastic leukemia and bone marrow transplantation developed granulomatous inflammation due to GVHD, along with intravascular fasciitis and meningioma. Initially, patient experienced rhinorrhoea and nasal obstruction, which were managed conservatively. Over time, patient developed erosions in the left inferior turbinate and was suspected to have granulomatosis with polyangiitis. Endoscopic examination revealed scarring mucosa and mild erosion. In the right maxillary sinus, computed tomography (CT) revealed a soft tissue shadow surrounding a pale, high-density region; no bone loss or infiltrative shadows were seen nearby. Biopsy results ruled out leukemia relapse and vasculitis, diagnosing her with granuloma. Six months later, her nasal symptoms worsened, leading to a diagnosis of AFRS and CGIFS. Endoscopy showed erosions and a granuloma-like mass, with imaging indicating a soft tissue shadow in the right maxillary sinus. Blood tests showed eosinophil of 4% [248 cells (<0.5×109 /L)] with a slightly elevated total IgE level [610 IU/ml (<500 IU/ml)], with positive specific IgE antibodies to multiple fungi. Three months later, patient underwent right-sided endoscopic sinus surgery (ESS), left-sided submucosal turbinectomy, and septoplasty which showed Mucin and a fungus ball in the right maxillary sinus. Biopsy and culture identified Aspergillus fumigatus, confirming AFRS in the right maxillary sinus. The left inferior turbinate showed inflammatory granuloma and mild mycosis without invasive infection. Post-surgery, erosion in the left nasal mucosa worsened gradually (Figure 1A), and a rash appeared on the nose dorsum (Figure 1B). She developed pain and further erosion, with MRI suggesting CGIFS (Figure 1C). Genetic testing identified the fungus as belonging to the Dothideomycetes class. Voriconazole 400mg treatment improved her condition, and no relapse was observed after three years.

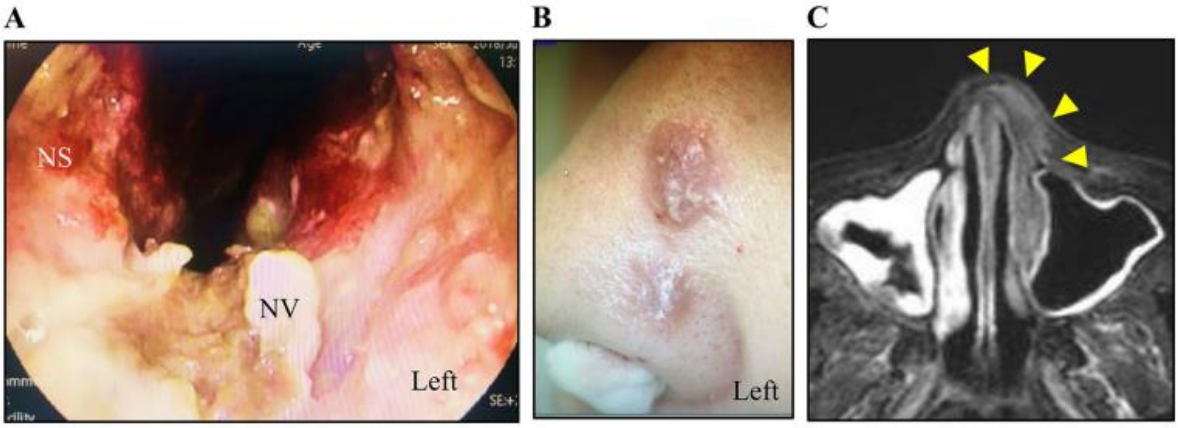

Figure 1. (A) Erosions in nasal cavity; (B) Rash on the left dorsum of nose; (C) MRI findings showing inflammation.

Discussion

AFRS and CGIFS can occur in immunocompetent individuals, with rare instances of AFRS complications after CGIFS treatment. GVHD, known to cause systemic inflammation and mucosal damage, may have contributed to the onset of AFRS. The patient's rhinosinusitis likely resulted from mucosal damage and impaired mucus clearance due to GVHD and surgical intervention. The presence of Didymellaceae in CGIFS and the typical association with dry climates are noted.[2] Alarifi et al. reported that 3 of 7 patients with CGIFS had a history of ipsilateral ESS, hence surgical history was important in fungal sinusitis condition could explain the concurrent development of AFRS and CGIFS.[3]

Conclusions

Chronic granulomatous invasive fungal sinusitis often presents with non-specific symptoms leading to diagnostic delays. The condition can be secondary to allergic fungal rhinosinusitis and may be influenced by factors such as graft-versus-host disease and surgical history. Effective management includes surgery and antifungal therapy, with voriconazole proving beneficial in this case.

Early diagnosis and targeted treatment are crucial for preventing severe complications and improving outcomes in Allergic fungal rhinosinusitis and Chronic granulomatous invasive fungal sinusitis.

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