

# The Importance of Radioallergosorbent - RAST Testing in the Management of Adults with Atopic Dermatitis

Al Abadie MS<sup>1\*</sup>, Al Rubaye M<sup>1</sup>, Oumeish F<sup>1</sup>, Al Abadie D<sup>2</sup>

<sup>1</sup>Department of Dermatology, The Royal Wolverhampton NHS Trust, Wolverhampton, UK

<sup>2</sup>Department of Health Promotion and Public Health, University of West London, London, UK

\*Corresponding author: Al Abadie MS, Department of Dermatology, The Royal Wolverhampton NHS Trust, New Cross Hospital, Wolverhampton, UK. Tel: +01902 695070; E-mail: [mohammed.abadie@nhs.net](mailto:mohammed.abadie@nhs.net)

Received: May 20, 2019; Accepted: May 31, 2019; Published: June 08, 2019

## Abstract

**Background:** Atopic dermatitis is a chronic itchy inflammatory skin condition. Adults account for about 10% of all sufferers. However, those patients usually have the more intense and complicated course. Their life is usually affected physically, and physico-socially. Radioallergosorbent testing (RAST) is a test to measure Immunoglobulin E (IgE) to possible trigger or contributing factors to flare up of atopic dermatitis.

**Aim:** The aim of this study is to evaluate the relevance of RAST testing in the management of adult patients with atopic dermatitis.

**Method:** Standard RAST testing was requested from 81 adult patients referred to the Royal Wolverhampton NHS Trust (Secondary Care). Allergens tested include house dust mite, dairy products, dog dander, cat epithelium, grass, pollens, nuts, seafood and cereals.

**Results:** 51 out of 81 patients (62.9%) showed a higher IgE Level. Results of individual specific IgE level among those patients who tested positive was as follows, starting with the highest, house dust mite (66.6%), grass (58%), cat epithelium (32.1%), dog dander (29.6%), nuts (11.1%), egg (9.8%), cow's milk/dairy (4.9%), wheat/soya (1.2%). As for the severity level of IgE measured for the scoring levels above 52.50 (IU/ml), Grade 5 and 6, house dust mite (19.7%) grass (5.8%). In the moderate grading of severity (3.5-52.49 IU/ml) Grade 3 & 4 cat epithelium (29.6%), house dust mite (18.5%), dog dander (20.9%), grass (9.8%), fish/seafood (4.9%) and nuts (3.7%).

**Conclusion:** RAST testing is a valuable tool in the management of adult atopic dermatitis and should be considered as part of the management plan.

**Keywords:** RAST Testing; Atopic Dermatitis; Allergy; IgE

**Citation:** Al Abadie MS, Al Rubaye M, Oumeish F, et al. The Importance of Radioallergosorbent-RAST Testing in the Management of Adults with Atopic Dermatitis. *Arc Clin Exp Dermatol.* 2019;1(1):101.

## **1. Introduction**

Atopic dermatitis (AD) is a common inflammatory skin disease which is associated with itching. It can affect infants, children and adults. It is more common in childhood and prevalence of about 10% of atopic dermatitis patients will continue on having the symptoms after the age of 10-12 years into adulthood. [1,2] It can affect any part of the body with involvement of the extensor and facial areas in childhood in general while flexural parts of the body prevalence increase with age into adulthood, often associated with dry skin with history or family history of atopy (asthma and hay fever) [1,2].

Although AD affects up to 20 percent of children it may persist into adulthood despite treatment or it even may directly start in adults as adult-onset AD [3]. Adult atopic dermatitis is usually more debilitating to the person as it has a major impact from a psychosocial aspect leading to difficulty with maintaining working abilities [4].

There is common belief that atopic dermatitis (AD) can be triggered by one or more than one allergen factor and in one study it showed a respiratory allergy is common for up to 70% of patients associated with patients with AD. Allergens include airborne like house dust mite, pollens, animal hair and dander, on the other hand it could be food like dairy products, nuts and seafood [5]. The clinical picture and presentation of AD in adults can be more complicated than those in children or infants. Factors involved include psycho-emotional, environmental and infection both viral and bacterial [6].

There are many tests advocated to be helpful in the diagnosis, identifying the triggering factor and grading of atopic dermatitis. These include skin Prick testing, RAST, Food Challenge and Patch Test. Other commercially available test not necessarily recommended by doctors due to the lack of scientific evidence supporting them include allergy testing kits, such as hair analysis tests, kinesiology tests and VEGA tests.

RAST (radioallergosorbent) test is a blood test used to confirm specific allergens causing a hypersensitive response. It is a radioimmunoassay test that detects specific IgE antibodies to known or already suspected antigens, confirming sensitization to specific antigen [7].

In the United Kingdom patients with atopic dermatitis are usually seen by their General Practitioners in Primary Care. Diagnosis and initial treatment is usually given. The ones who fail to respond are sent to secondary care for specialist assessment and management.

The objective of this study is to evaluate the importance and relevance of doing RAST (radioallergosorbent) testing for those patient referred with atopic dermatitis to the secondary care.

## **2. Aim of the Study**

To evaluate the importance and usefulness of Radioallergosorbent (RAST) testing as a tool for investigating those patients' where first line treatment by General Practitioners in the primary care has failed and sent for specialist opinion in Secondary Care hospitals in the UK. Treatment by primary care physicians was with regular emollients and mild to moderate potency topical steroids for 10 to 14 days.

### 3. Results

Fifty one out of 81 patients (62.9%) showed a higher IgE Level (FIG. 1). Results of individual specific IgE level among those patients who tested positive was as follows, starting with the highest, house dust mite 54 out of 81 (66.6%), grass 47 out of 81 (58%), cat epithelium 26 out of 81 (32.1%), dog dander 20 out of 81 (29.6%), nuts 9 out of 81 (11.1%), egg 8 out of 81 (9.8%), cow’s milk/dairy 4 out of 81 (4.9%), wheat/soya 1 out of 81(1.2%) (FIG. 2). As for the severity level of IgE measured for the scoring levels above 52.50 (IU/ml), Grade 5 and 6 , house dust mite 16 out of 81 (19.7%) and grass 5 out of 81 (5.8%) (FIG. 3). In the moderate grading of severity (3.5-52.49 IU/ml) Grade 3 & 4 cat epithelium 24 out of 81 (29.6%), house dust mite 15 out of 81 (18.5%), dog dander 17 out of 81 (20.9%), grass 8 out of 81 (9.8%), fish/seafood 4 out of 81 (4.9%) and nuts 3 out of 81 (3.7%) (FIG. 4). 6.1% of patients or 5/81 patients showed only single positivity. Two out of the five patients with single positivity (40%) were to nuts and another 40% were to dog dander. Only one of the five patients were to cat hair. Most patients 76/81 (93.8%) showed multiple positivity (FIG. 2).

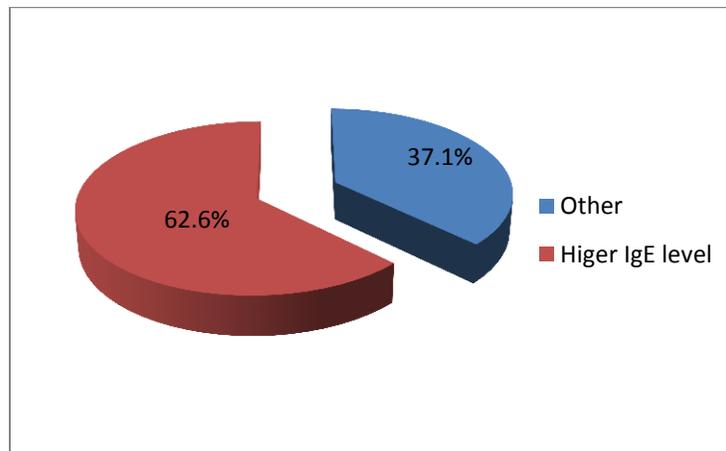


FIG. 1. Percentage of patients with atopic dermatitis showing high IgE level.

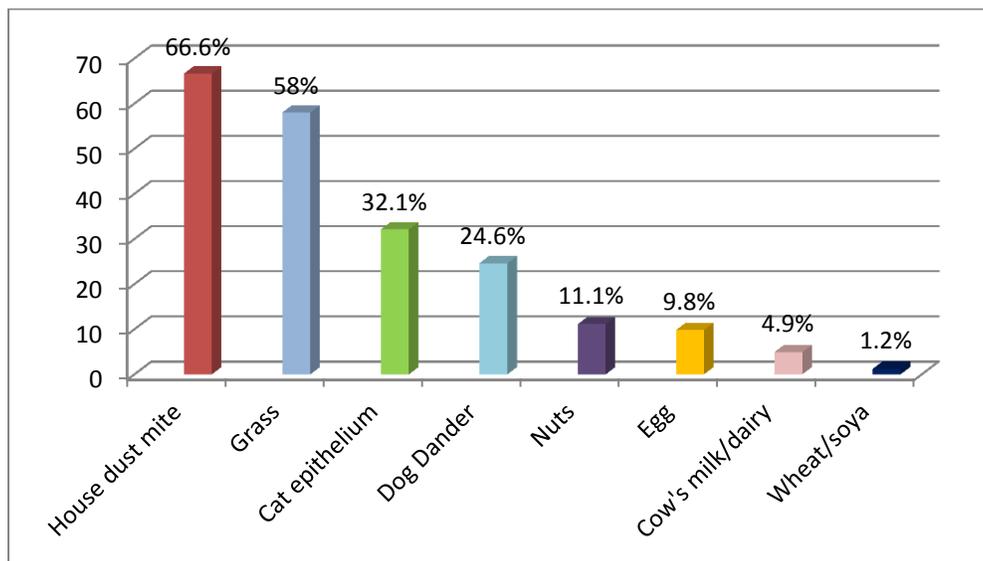


FIG. 2. Percentage of high IgE level for individual allergen item tested.

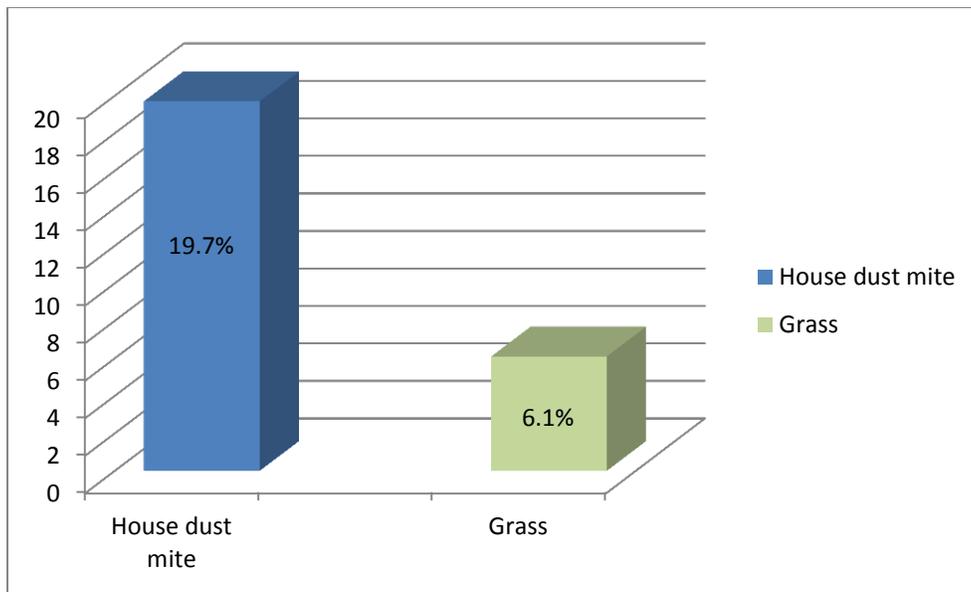


FIG. 3. Percentage of IgE level for various allergens tested scoring severe Grade 5 & 6 (RAST).

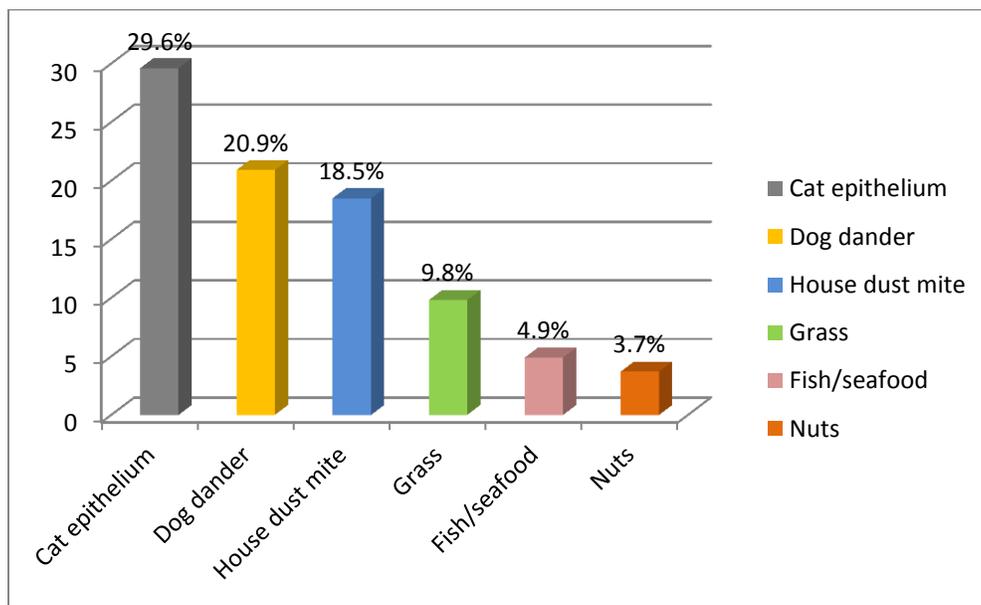


FIG. 4. Percentage of IgE level scoring moderate Grade 3,4 (RAST).

#### 4. Discussion

The relationship of atopy, IgE mediated allergy and skin manifestation i.e. dermatitis is still not clear in adults. Five types of immunoglobulin are well known to exist from IgA, IgM, IgD, IgG and IgE however the latter only makes up less than 0.001% of the total serum immunoglobulins in patients not affected with atopy. In patients suffering from atopic dermatitis a class switch in B cells takes place which is induced by allergen contact in conjunction with T-cell interaction and T-helper type 2 cell polarized cytokine micro-environment resulting in production of IgE [8]. This is done continuously in patients with atopy and results in an excessive IgE production compared with non-atopic individuals [9].

Although it is more defined in infants and children [10], 10% of atopic dermatitis patient's continue the suffering well into their adulthood. It usually has more intense symptoms and complications [11,12]. This is to include thick lichenification of the patches, worse severity when it is periorbital where treatment is limited and intense itching which may lead to nodular prurigo. Furthermore, frequent and widespread flare ups may lead to erythrodermic stage when patients need hospitalization due to possible complications secondary to infection and metabolic changes. It is difficult to measure the long term of impact of atopic dermatitis on an individual patient. Even beyond it is difficult to measure any long term control for atopic dermatitis in adults with measures for pruritus, quality of sleep, severity, body surface affected and global assessment score [13].

It is widely believed that atopic dermatitis in adults is an ongoing condition where it flares up every now and then. Hence, new guidelines of management introduced the proactive approach of treating the condition with the usage of topical treatment i.e. Calcineurin inhibitors twice a week or corticosteroid once or twice a week as maintenance to be used when the condition is not at a flare up stage [14].

Our research with 62.6% of patients referred to the secondary care hospital in the UK, to have high circulating Immunoglobulin E (IgE). Animals, house dust mite, grass and pollens seem to show significant factors to exacerbate the condition. The test gives a significant guideline to attending doctors in the management of the condition in the long term.

However, informing the group of patients about their pets is challenging especially in the adult populations, as some may have had their symptoms since childhood well before acquiring a pet or vice versa having had their pets for longer than the atopic dermatitis symptoms. The quantitative nature of RAST results help to address this aspect of patient rejection. Positive outcome may lead to reduce contact with pets in the living areas. This is important as complete removal of the pet is not always feasible. Further research in how we can reduce contact with pets is needed.

Atopic dermatitis is possibly associated with allergies to milk, eggs and wheat. It seems to resolve at childhood and does not carry on till adults with atopic dermatitis, while others like fish, seafood, peanuts and tree nuts tend to persist [15]. Furthermore, sensitisation to some allergens like birch, pollen related foods can cause late eczematous reactions in patients with atopic dermatitis [16].

There is still a debate about the specificity and sensitivity of RAST testing. However, it is still considered one of the reliable tools aiding clinicians to identify allergens contributing to the flare up of the condition. Hence, it should be read within the clinical context and full patient assessment. Furthermore, our research was for only those patients who had been referred for specialist opinion in the secondary care, so severity of the condition and patient selection for those who might benefit for the test is still an important factor in the management. The test is by no means advised to be used as a first line investigation for all patients.

## **5. Conclusion**

RAST testing is a valuable tool in the management of adult atopic dermatitis and should be considered as part of the management plan for at least those who fail with treatment in moderate -severe cases , who have frequent flare ups.

## REFERENCES

1. Kay J, Gawkrödger DJ, Mortimer MJ, et al. The Prevalence of Childhood Atopic Eczema in General Population. *J Am Acad Dermatol.* 1994;30(1):35-9
2. Eichenfield LF, Ellis CN, Mancini AJ, et al. Atopic Dermatitis: Epidemiology and Pathogenesis update. *Semin Cutan Med Surg.* 2012;31(3):S3-5
3. Megna M, Patrino C, et al. An Italian multicentre study on adult atopic dermatitis: persistent versus adult-onset disease. *Arch Dermatol Res.* 2017;309(6):443-52.
4. Napolitano M, Megna M, Patrino, et al. Adult atopic dermatitis: a review. *J Ital Dermatol Venerol.* 2016;151(4):403-11.
5. Sicherer SH, Sampson HA. Food Sensitivity and Atopic Dermatitis: Pathophysiology, epidemiology, diagnosis and management. *J Allergy Clin Immunol.* 1999;104(3):S114-22.
6. Williams HC. Clinical Practice. Atopic dermatitis. *N Engl J Med.* 2005;352(22):2314-24.
7. Bernstein IL, JT Li, et al. Allergy Diagnostic testing: an updated Practice Parameter. *Ann Allergy Immunol.* 2008;100(3):S148
8. Infuhr D, Cramer R, Lamers R, et al. Molecular and cellular targets of anti-IgE antibodies. *Allergy.* 2005;60(8):977-85.
9. Waldman TA, Iio A, Ogawa M, et al. The metabolism of IgE. Studies in normal individuals and in a patient with IgE myeloma. *J Immunol.* 1976;117(4):1139-44.
10. Hill DJ, Sporik RS, Thorburn J, et al. Association of atopic dermatitis in infancy with immunoglobulin E food sensitisation. *J Paediatric.* 2000;137(4):475-9.
11. Bruin Weller MS, Rockman H, Knulst AC, et al. Evaluation of the adult patients with atopic dermatitis. *Clin Exp Allergy.* 2013;43(3):279-91.
12. Ellis CN, Mancini AJ, Paller AS, et al. Understanding and managing atopic dermatitis in adult patients. *Semin Cutan Med Surg.* 2012;31(3):S18-22.
13. Barbarot S, Rogers NK, Abuabara K, et al. Strategies used for measuring long-term control in atopic dermatitis trials: A Systemic Review. *J Am Acad Dermatol.* 2016;75(5):1038-44.
14. Eichenfield LF, Tom WL, Chamlin SL, et al. Guidelines of care for the management of atopic dermatitis: section 1. Diagnosis and assessment of atopic dermatitis. *J Am Acad Dermatol.* 2014;70(2):338-51.
15. Longo G, Berti I, Burks AW, et al. IgE Mediated food allergy in children. *Lancet.* 2013;382(9905):1656-64.
16. Wassman-Otto A, Heralizadeh A, Wichmann K, et al. Birch pollen-related food can cause late eczematous reactions in patient with atopic dermatitis. *Allergy.* 2018;73(10):2046-54.