# Study of Immunoglobulin A (IgA) Deficiency among Patients with Food Allergy

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***Internal Medicine***

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# Abstract

**Background:** Immunoglobulin class A (IgA) is the main protein of the mucosal immune system**,** Also, Food allergy considered as a growing clinical problem that lack both effective prevention and treatment strategies. Developing a better understanding of risk factors or mechanisms for sensitization to foods is important to assist in the development of rational prevention strategies. Many studies indicate that individuals with immune deficiency disorders are at higher risk to develop food allergy. And as IgA deficiency (IgAD) is the most common form of immune deficiency so we performed a case control study to assess the association of immunoglobulin A (IgA) deficiency among patients with food allergy

**Patient and Methods**: The study was designed as a population-based case-control study, in which 100 patients (cases) diagnosed to have food allergy, all with positive skin prick test and underwent elimination diets and food challenge tests.They recruited from Allergy and Clinical Immunology outpatient clinic, Ain Shams University Hospitals. In addition (control group) consisted of 50 healthy recruited from the community. All control subjects with negative history of atopy and had no evidence of acute or chronic illnesses. All subjects are subjected to , Full history and clinical examination , Skin Prick test, using allergen extracts prepared at the allergy department at Ain Shams University Hospitals, Food elimination & Food challenge For those suspected to have food allery, and blood sample to measure serum IgE and serum IgA.

**Results:** The prevalence of IgA deficiency was estimated to be 67% among patients with food allergy. In this study, solancea, milk, wheat and Fish were found to be the most prevalent food allergies in adult patients with food allergy. The cutaneous symptoms was the most common accompanying allergic disease among 61% patients who had food allergy. We also noted that the diagnostic value of IgA deficiency was relatively higher for food allergy than total IgE food allergies in ROC curves.

**Conclusion:** Immunoglobulin A defects likely to be associated increased risk of Food Allergy. This lead to dysregulation of mucosal immune system leading to defective intestinal and systemic immune response and breakdown of tolerance to alimentary antigens.

**Keywords:** Food allergy, IgE mediated food allergy, mixed IgE mediated food allergy, Immunoglobulin A deficiency, selective IgA deficiency.

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# List of abbreviations

| | | |
|---|---|---|
| AD | : | Autoimmune disorders |
| AID | : | Activation-induced cytidine deaminase |
| ANA | : | Antinuclear antibodies |
| CD | : | Celiac disease. |
| CM | : | Cow's milk. |
| CMPA | : | Cow’s milk protein allergy. |
| CSR | : | Class switching recombination process |
| CVID | : | Common variable immune deficiency. |
| DPCFC | : | Double blind placebo-controlled food challenge |
| EG | : | Eosinophilic gastroenteritis. |
| EGIDs | : | Eosinophilic GI disorders. |
| EoE | : | Eosinophilic esophagitis. |
| EPIT | : | EPICUTANEOUS IMMUNOTHERAPY. |
| FPIES | : | Food protein induced enterocolitis syndrome. |
| GD | : | Graves’ disease. |
| GERD | : | Gastro esophageal reflux disease. |
| GIT | : | Gastrointestinal Tract. |
| HC | : | Heavy chains. |
| IBD | : | Inflammatory bowel disease. |
| IFN-γ | : | Interferon- γ. |
| IgA | : | Immunoglobulin A |
| IgAD | : | Immunoglobulin A deficiency |
| IgD | : | Immunoglobulin D |
| IgE | : | Immunoglobulin E |
| IgG | : | Immunoglobulin G |
| IgM | : | Immunoglobulin M |
| IL-10 | : | Interleukin 10 |
| ITP | : | Idiopathic thrombocytopenic purpura |
| IUIS | : | International Union of Immunological Societies |

# List of abbreviations (Cont.)

| | | |
|---|---|---|
| JRA | : | Juvenile rheumatoid arthritis. |
| LC | : | Light chains |
| LPS | : | Lipopolysaccharide |
| MG | : | Myasthenia gravis. |
| NIAID | : | National Institute of Allergy and Infectious Diseases |
| NK | : | Natural killer |
| NLH | : | Nodular lymphoid hyperplasia. |
| OAS | : | Oral allergy syndrome. |
| OIT | : | Oral Immunotherapy. |
| pIgR | : | Polymeric Ig receptor |
| PPI | : | Proton-pump inhibitor |
| RA | : | Rheumatoid arthritis |
| RF | : | Rheumatoid factor |
| RTIs | : | Respiratory tract infections. |
| SC | : | Secretory component. |
| SCIG | : | Subcutaneous immunoglobulin |
| sIgAD | : | Selective Immunoglobulin A deficiency |
| sIgE | : | Specific immunoglobulin E. |
| SLE | : | Systemic lupus erythematosus. |
| SLIT | : | Sublingual Immunotherapy. |
| SPT | : | Skin prick tests. |
| T1D | : | Type 1 diabetes mellitus. |
| TCR | : | T cell receptor |
| TGF-β | : | Tumor Growth Factor- β |
| αGLT | : | α germline transcriptase |

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# Introduction and Aim of the Work

# Introduction

Immunoglobulin class A is the main protein of the mucosal immune system **(Binek and Jarosz-Chobot, 2012).**

Secretory IgA appears to have prime importance in immune exclusion of pathogenic microorganisms and maintenance of intestinal homeostasis **(Yel, 2010)**

Immunoglobulin A (IgA) deficiency is the most common primary immunodeficiency defined as decreased serum level of IgA in the presence of normal levels of other immunoglobulin isotypes.

In general, Selective IgA Deficiency occurs once in every 400 to 2,000 individuals. However, its incidence varies across racial and ethnic lines. IgA is typically present at birth, though many cases are not discovered until much later in life **(Kukkonen et al., 2010).**

Most individuals with IgA deficiency are asymptomatic and identified coincidentally. However, some patients may present with recurrent infections of the respiratory and gastrointestinal tracts, allergic disorders, and autoimmune manifestations **(Yel, 2010).**

Several autoimmune diseases, such as systemic lupus erythematosus, diabetes mellitus type 1, Graves disease and celiac disease, are associated with an increased prevalence of IgA deficiency **(Binek and Jarosz-Chobot, 2012).**

For those IgA deficient patients with a history of recurrent infections, the most common presentation is ear infections, sinusitis, and/or pneumonia. Other infection sites can be the throat, the gastrointestinal tract or the eyes.

These infections may become chronic and may not completely clear up with a course of antibiotics, necessitating prolonged antibiotic therapy **(Cunningham-Rundles, 2001).**

Allergies are another common presentation of Selective IgA deficiency, and may be quite varied, ranging from mild to severe. Common allergic reactions include asthma and food allergies. Asthma in some IgA deficient patients may be severe and less responsive to drug therapy. Food allergies may result in symptoms such as diarrhea or abdominal cramps. A link between Selective IgA deficiency and allergic rhinitis or eczema is uncertain **(Loh et al., 2007).**

The mucosa of the gastrointestinal tract is the monitor of the particles that are absorbed into the systemic blood circulation. The secretory antibodies of IgA help prevent the absorption of allergens into the bloodstream. Other immunoglobulins (IgE, IgG, IgM) also play a role in the body's defense against food allergens and infectious agents (such as strep) that may enter the gastrointestinal tract **(Robbins, 2015).**

Individuals who are more susceptible to viral and other infections may have a hereditary predisposition related to an IgA deficiency. These individuals may also be more susceptible to food allergies.

IgA deficiency is much more common among those with celiac disease (gluten intolerance) than the general population **(Robbins, 2015).**

# Aim of the Work

To assess the association of immunoglobulin A (IgA) deficiency among patients with food allergy.

# Review of Literature