International Journal of
Immunology and Immunotherapy

Research Article : Open Access

Analyze the Levels of Immunoglobulins IgG and IgM in Elderly and Youngs

Sâmia Macedo Queiroz Mota Castellão Tavares*, Wilame de Lima Bravo Junior and Jéssica Lissandra Alves Leite

Federal University of Ceará, Brazil

*Corresponding author: *Sâmia Macedo Queiroz Mota Castellão Tavares, Master in Pathology, Federal University of Ceará, Brazil, Tel: 88-8822-8125, E-mail: novosamia@gmail.com*

Abstract

The aging process is complex and affects a variety of functions, including lower defense capability of the immune system. The immune activity, as most of physiological functions, decreases with age. The principal alterations in humoral immune response are associated with concentration of immunoglobulins, amount and activity of B cells and also the changes in the affinity of the antibodies. The current study aimed to analyze the levels of IgG and IgM antibodies of elderly and young people and to investigate the statistical difference between the groups. The research was a descriptive study and contained young people and elderly from Brazil. The participants of the study were selected randomly through an interview and received medical consultation because patients who presented any pathology that result in commitment of the immune system was excluded. In the present study were evaluated a total of 70 people. After dosing immunoglobulins, a significant decrease of immunoglobulin IgM and an increase of immunoglobulin IgG were observed in elderly. Therefore, we can conclude that this study was important since it was observed that the old individuals has a differences in the levels of IgM and IgG antibodies when it is compared with young people. Based on these facts, we can justify the inability of older people to respond adequately to new infections and their reduced capacity to be immunized against new antigens.

Keywords

Elderly, Immunoglobulins, Immune system

Introduction

The aging process can be defined as the progressive decay of tissue functions. These changes can be the result of loss of cell functions due to a decrease in cellular division and replication ability [1].

The immune activity, as most of physiological functions, decline with age, which also has been used as a theoretical basis for explaining the process of aging [2].

The adaptive immunity involves interactions between the T and B cell receptor and antibodies with antigenic structures present in pathogens and cells. Lymphocytes can be classified in two large populations: T lymphocytes and B according to their origins, evolution and activity [3].

T *lymphocytes* participate in what is named the *cell-mediated immune*. CD4 lymphocytes have a helper function in immune responses, since the CD8 lymphocytes destroy target cells and in this process and there is a small participation of antibodies [4].

Studies have shown that the absolute CD4+ count and CD8+ count suffer a decline primarily due to loss of naive LTs. Besides, the studies also report that the memory CD8+ T cells increase while virgin CD8+ T cells gradually decrease with aging [5].

The main alterations in the humoral responses are associated with the concentration of immunoglobulins, the amount and activity of B cells, as well as the changes in affinity and specificity of the antibodies [6].

Deficiency in B cells have been reported in the elderly, including reduction of co-stimulatory molecules, signaling deficiency on B-cell receptor and a decreased affinity immunoglobulin [7].

The loss of high affinity IgG antibodies during aging process contribute to increased susceptibility and severity of infectious diseases as well as in lower efficiency of vaccines in the elderly, since the high affinity IgG provides greater protection against diseases caused by bacteria and viruses [8].

Spezialiet al conducted a study using rats, they reported that there is an increase in serum levels of IgG and IgA with the older rats compared to the young, while IgM levels are unaltered [9].

Studies have shown that the immune system's defense mechanisms are gradually affected with aging and these changes contribute significantly to that older people are more likely to infections [10].

Study Goal

The current study aimed to analyze the levels of IgG and IgM antibodies of elderly and young people and to investigate the statistical difference between the groups.

ClinMed
International Library

Methods

It was a descriptive study conducted among young individuals and elderly from Fortaleza - Ceará, Brazil. Both groups were selected at the Walter Cantídio University Hospital of Federal University of Ceará.

The participants were randomly chosen. A group of interviewers visited many homes and invited the elderly toparticipate in the study. At the hospital doctors performed a clinical evaluation to choose the elderly with good health and soon after laboratory tests were performed. The group of young people were selected in the same way.

In clinical evaluation, the doctors requested biochemical tests to better assess each individual. These tests were: total cholesterol, triglycerides, glucose, creatinin. The consent was obtained from all participants and the study was approved by the Ethics Committee of the Federal University of Ceará.

After clinical and laboratory evaluation, 35 participants from both groups were selected.

Blood samples were collected using no anticoagulante for analysis of IgM and IgG antibodies. The determination of values was performed using the equipment manufactured by Dade Behring® whose methodology is nephelometry. It was added to the nephelometer the specific reagents for each immunoglobulin and then samples from patients.

The test used to evaluate the normal distribution of continuous variables was the D'Agostino & Pearson. The result comparison of the parameters with normal distribution were made using the Student's t-test and for the data whose distribution was non-normal it was used Mann-Whitney test.

The statistics analyze was perfomed by the program Graph Pad Prism (version 5.0). *The level of statistical significance for all the test was* p< 0.05.

Results

In the present study it was evaluated a total of 70 people, where (68.57%) were female and (31.43%) were male. The average values of immunoglobulins analyzed in this study are shown in Table 1. Once it was compared the group of young individuals with the group of the elderly, there was a significant difference in immunoglobulins IgM, where it was found p=0.0098. However, the immunoglobulin IgG showed no statistically significant difference between the groups, although we observed a trend of higher IgG serum levels in elderly patients. This trend can be observed in the mean values in Table 1, because the elderly had a higher value to the group of young people.

Analyzing separately IgG values, it was observed that 15 of 35 elderly used in the study had concentration of IgG above 1500 ng/mL and in the group of young people the increase was only found in 10 volunteers. When comparing the group, this data can also be evaluated with maximum values (Table 1).

Discussion

Sansoni [11] et al. conducted a study that showed that with the aging process there is an increase in the concentration of IgG. He explains that this fact could be associated with longevity, since the old people have had a higher number of bacterial and viral infections than the young ones.

In this study there was no statistically significant increase in IgG levels, but there was a trend towards increased the concentration of this immunoglobulin in the elderly people. This data can be observed when comparing the maximum and mean values between groups. According Bugatti [12], the incidence of some autoimmune disorders increases with age. Therefore, this increase may be due to auto antibody levels in elderly.

For immunoglobulin IgM, the levels in elderly patients were statistically lower. One possible explanation for understanding the decrease in the concentration of IgM can be found in theTagonski's work, which says that there is a reduction of new anti bodies in the aging process of the immune system due to a *decreased proliferative capacity* of the B cells [13].

Conclusion

With the present study it was observed that elderly individual showed differences in the levels of IgM and IgG antibodies when compared to young people. The evaluation results may justify the inabilityof older people to respond adequately to new infections and the reduction in the ability to be immunized against new antigens. This maybe the result of an increase in the proportion of memory cells IgG and decrease in IgM levels according with the age.

References

1. Aubert G, Lansdorp PM (2008) Telomeres and aging. Physiol Rev 88: 557-579.

2. AGOSTINHO P (2004) Perspectiva psicossomática do envelhecimento. Rev. Port. Psicol 6: 31-36.

3. JANEWAY CA, TRAVERS P, WALPORT M, SHLOMCHIK MJ (2005) Immuno biology: the immune system in health and disease. 6th ed. New York: Garland Science Publishing.

4. ABBAS AK, LICHTMAN AH, POBER JS (2000) Cellular and Molecular Immunology.4th ed. New York: Saunders.

5. Le Saux S, Weyand CM, Goronzy JJ (2012) Mechanisms of immunosenescence: lessons from models of accelerated immune aging. Ann N Y Acad Sci 1247: 69-82.

6. Weksler ME (2000) Changes in the B-cell repertoire with age. Vaccine 18: 1624-1628.

7. Aw D, Silva AB, Palmer DB (2007) Immunosenescence: emerging challenges for an ageing population. Immunology 120: 435-446.

8. Duchateau J (2003) [Immunosenescence and the lung]. Rev Mal Respir 20: 735-741.

9. Speziali E, Santiago AF, Fernandes RM, Vaz NM, Menezes JS, et al. (2009) Specific immune responses but not basal functions of B and T cells are impaired in aged mice. Cell Immunol 256: 1-5.

10. Gomez CR, Nomellini V, Faunce DE, Kovacs EJ (2008) Innate immunity and aging. Exp Gerontol 43: 718-728.

11. Sansoni P, Vescovini R, Fagnoni F, Biasini C, Zanni F, et al. (2008) The immune system in extreme longevity. Exp Gerontol 43: 61-65.

12. Bugatti S, Codullo V, Caporali R, Montecucco C (2007) B cells in rheumatoid arthritis. Autoimmun Rev 7: 137-142.

13. Targonski PV, Jacobson RM, Poland GA (2007) Immunosenescence: role and measurement in influenza vaccine response among the elderly. Vaccine 25: 3066-3069.

Table 1: Results of the tests for IgG and IgM levels in young and old individual

Serumlevel	Young		Elderly	
	IgM (mg/dL)	IgG (mg/dL)	IgM (mg/dL)	IgG (mg/dL)
Minimum	42,0	892,0	25,0	840,0
Maximum	364,0	1770,0	216,0	1880,0
Average ±	138,2 ±	1356,0 ±	94,46±	1446,0 ±
DP	73,77	227,1	47,35	254,8

The results were reported in mean values ± standard deviation.

Castellão Tavares et al. Int J Immunol Immunother 2015, 1:1

ISSN: 2378-3672 • Page 2 of 2 •