

To Study the Effect of Disodium Cromoglycate on Serum Immunoglobulin Levels in Bronchial Asthma Patients

Aashi¹, Saurav Kumar², Satyapal Singh Rana¹, Sagar³ and Gajendra Singh⁴

¹Department of Zoology, SMPGG(PG) College, Meerut UP-250002 India

²Department of Applied Chemistry, Delhi Technological University, Delhi-11042, India

³Department of Chemistry, MM (PG) College, Modinagar, Ghaziabad UP-201204, India

⁴Department of Chemistry, Deshbandhu College, Kalkaji, University of Delhi-110019, India

Corresponding author: gajendersinghdu@gmail.com (Gajendra Singh)

ABSTRACT

Two hundred asthmatic patients were selected for the study of their immunoglobulin level, out of these one hundred eighty three patients were receiving disodium cromoglycate (DSCG) as an anti-allergic drug. We found DSCG inhibit IgE production in the patients of bronchial asthma while the production of IgM, IgG and IgA was not affected. Our study proves that disodium Cromo glycate is very useful in lowering down the concentration of IgE level in asthmatic patients.

Keywords: Asthmatic, disodium cromoglycate (DSCG), IgE, IgG, bronchial asthma.

How to cite this article: Aashi, Saurav Kumar, Satyapal Singh Rana Sagar and Gajendra Singh. To Study the Effect of Disodium Cromoglycate on Serum Immunoglobulin Levels in Bronchial Asthma Patients. Int J Drug Deliv Technol. 2026;16(80s):73-76. DOI: 10.25258/ijddt.16.80s.6.

INTRODUCTION

Bronchial asthma is usually caused by allergic hyper sensitivity of the person to foreign substances in the air-especially to plants pollen. The typically allergic antibody called IgE and there antibody cause allergic reaction when they react with their complimentary antigens. The frequency of allergic disease such as asthma has increased rapidly during the past decade; however the exact mechanism has not been established. In this study we tried to establish an in vivo system to investigate improvement of allergic disease. (12-13)

Estimation of immunoglobulin (Igs) seems to be a more precise method for an overall estimation of the humoral immune system to an individual they are in fact the effectors molecules of the humeral limits of immunity. Except for the status of IgE antibodies, the role of other immunoglobulin in bronchial asthma has not been clearly established. Disodium cromoglycate has been shown to inhibit the release of various mediators triggered by specific allergens as well as non allergic chemical or physical stimuli (6). DSCG can prevent not only asthmatic attack but may also prevent an increase in bronchial hyper-reactivity caused by continuous exposure to allergens in these patients (4).

MATERIALS AND METHODS

The present study was carried out in 200 cases of bronchial asthma (study group) attending the outdoor and indoor of the department of medicine, SVBP Hospital, Meerut, U.P., India the laboratory investigations were carried out in the department of Biochemistry, L.L.R.M. Medical College, Meerut, U.P., India. Fifty age (10-65 years) and sex matched healthy subjects were included in the control group. Blood was drawn by the vain puncture method using all aseptic measures and collected in heparinised test tubes (100 units/ml final concentrations). A portion of this blood was centrifuged and thus obtained was used in the following estimation:

1. **Estimation of immunoglobulin (IgG, IgM, and IgA)** was carried out by the tri-partigon plate, Immuno diffusion plate technique. The diagnostic kits was provided by Behring Company (Germany) and supplied by Hoechst Pharmaceuticals, Bombay.
2. **Estimation of IgE** was carried out by enzyme immuno assay (EIA) method. The Diagnostic kits was supplied by Behring Company (Germany) and supplied by Hoechst Pharmaceuticals, Bombay.

RESULTS AND DISCUSSION

Immunoglobulin (IgG, IgM, IgA and IgE) were estimated in the blood of normal healthy volunteers and patients of bronchial asthma before and after treatment with disodium cromoglycate (DSCG).

Table 1 Serum IgG level of before and after treatment disodium cromoglycate (DSCG) in known cases of bronchial asthma

Group	No. of cases	Range	Mean $\pm$ S.D.	'p' value
Control	50	6.69-11.54	9.04 $\pm$ 1.3	
Before Treatment	200	7.69-12.64	9.93 $\pm$ 1.7	N.S.
After Treatment	183	8.16-11.89	9.90 $\pm$ 1.5	N.S.

N.S. - Non Significant

It is evident from the Table 1, the level of serum IgG was increased in patients of bronchial asthma. The IgG concentration values for the group with bronchial asthma were 9.93 $\pm$ 1.7 g/l (7.69-12.64) as compared to control 9.04 $\pm$ 1.3 g/l (6.69-11.54). Although the level of serum IgG concentration was elevated than the control subject but was insignificant, after treatment of disodium cromoglycate the values remained almost the same i.e. 9.9 $\pm$ 1.5 g/l. This shows that disodium cromoglycate has no effect on concentration of serum IgG. The difference between patients after and before treatment was non significant.

Table 2 Serum IgM level of before and after treatment disodium cromoglycate (DSCG) in known cases of bronchial asthma

Group	No. of cases	Range	Mean $\pm$ S.D.	'p' value
Control	50	1.19-1.67	1.28 $\pm$ 0.07	
Before Treatment	200	1.07-1.55	1.15 $\pm$ 0.06	N.S.
After Treatment	183	1.13-1.46	1.19 $\pm$ 0.04	N.S.

N.S. - Non Significant

It is evident from the Table 2, the level of serum IgM was found to be decreased in patients of bronchial asthma. The IgM concentration values for the group with bronchial asthma was 1.15 $\pm$ 0.06 g/l (1.07-1.55) as compared to control 1.28 $\pm$ 0.07 g/l (1.07-1.55)

although the level of serum IgM concentration was found to be decreased than the control subject but was non significant, after treatment of disodium cromoglycate the values remained almost the same i.e. 1.19 $\pm$ 0.04 g/l. This shows that disodium cromoglycate has no effect on concentration of serum IgM. The difference between patients after and before treatment was non significant.

Table 3 Serum IgA level of before and after treatment disodium cromoglycate (DSCG) in Known cases of bronchial asthma

Group	No. of cases	Range	Mean $\pm$ S.D.	'p' value
Control	50	1.86 - 2.79	2.12 $\pm$ 0.22	
Before Treatment	200	1.27 - 1.97	1.44 $\pm$ 0.15	0.05
After Treatment	183	1.25 - 1.85	1.40 $\pm$ 0.13	N.S.

N.S. - Non Significant

It is evident from the Table 3, the level of IgA is shown in the patients who had bronchial asthma was found to be decreased in the patients before treatment. The IgA concentration value for the group with bronchial asthma was 1.44 $\pm$ 0.15 g/l (1.27-1.97) as compared to control 2.12 $\pm$ 0.22 g/l (1.86-2.79) The difference between untreated patients and control was slightly significant (p<0.05). After the treatment of disodium cromoglycate the values remained almost the same i.e. 1.40 $\pm$ 0.13 g/l. This shows the difference between patients after and before treatment was non-significant.

Table 4 Serum IgE level of before and after treatment disodium cromoglycate (DSCG) in Known cases of bronchial asthma.

Group	No. of cases	Range	Mean $\pm$ S.D.	'p' value
Control	50	108.96 - 168.36	129.16 $\pm$ 14.5	
Before Treatment	200	125.91 - 365.75	308.31 $\pm$ 14.6	0.001
After Treatment	183	119.86 - 189.66	142.26 $\pm$ 16.1	N.S.

N.S. - Non Significant

It is evident from the table 4, the level of IgE in the patients of bronchial asthma was found to be increased in the patients before treatment. The IgE concentration value for the group with bronchial asthma was 308.31 ± 24.6 Ig/l (275.91-365.75) as compared to control 129.16 ± 14.5 Ig/l (108.96-168.36). The difference between untreated patients and control was highly significant ($p > 0.001$). After the treatment of disodium cromoglycate the level of serum IgE was returned to normal i.e. 142.26 ± 16.1 Ig/l (119.86-189.66). This shows the difference between patients after and before treatment was non significant. IgE was identified as an antibody responsible for the immediate type of immune response.

In the present study the level of serum IgG, IgM and IgA in asthmatic patients remained unaffected by disodium cromoglycate. DSCG reduces the elevated IgE serum level in the patient of bronchial asthma.(14) This was also supported by Chueg et al (9), Young et al (2), Flint et al (5), Martin et al (7), Seo et al (10) and Rabe et al (11). DSCG inhibit selectively only those immunologic reactions which involved reaginic antibodies and mast cells. According to Kimata et al. (8) DSCG is as well as prophylactic agent in the treatment of allergic disease of the respiratory tract and explained that DSCG selectively inhibited spontaneous IgE production in the patient of bronchial asthma in the presence of T cells and monocytes without affecting IgG, IgM, IgA production, it is possible that DSCG stimulated physical contact between cells which in turn inhibited IgE production. They demonstrated that DSCG inhibited IgE production in the patients of bronchial by the production of IgM, IgG, IgA was not affected. Diaz et al (3) explained that reduction of house dust mite (HDM) specific IgE was an important finding. This observation suggested that the drug might affect local IgE synthesis and/or transport and this possibility is currently being explored. It should be noted that the concentration of other immunoglobulin like IgG, IgM and IgA appeared to be unaffected by disodium cromoglycate.(1)

In conclusion our study proves that disodium cromoglycate is very useful in lowering down the concentration of IgE in asthmatics.

AUTHOR CONTRIBUTION

Aashi and Saurav Kumar contributed equally in this work.

REFERENCES

1. Cox J S G. Disodium cromoglycate mode of action and its possible relevance to the clinical use of the drug. *Brit. J. Dis. Chest.* 1971-65: 189.

2. Young K D and Church M K. Possible anaphylaxis in human lung fragments as a model for testing antiallergic drugs: its variability and constraints. *Int. Arch. Allergy Appl. Immunol.* 1983-70: 138.
3. Diaz P and Kay A B. Bronchoalveolar lavage in asthma, the effect of disodium cromoglycate on leukocyte counts, immunoglobulin and complements. *J. Allergy Clin. Immunol.* 1984-74: 41.
4. Lowhagen O and Park S, Modification of bronchial hyper- reactivity after treatment with sodium chromoglycate during pollen season. *J. Allerg. Clin. Immunol.* 1985-75: 460.
5. Flient K C, Leung B P and Pearce F L. Human mast cell recovered from broncho-alveolar lavage, their morphology, histamine release and effects of sodium cromoglycate. *Clin. Sci.* 1986- 65: 427.
6. Murphy S and Kelly H W. Cromolyn Sodium: a review of mechanism and clinical use in asthma. *Intell. Clin. Pharm.* 1987- 21: 22.
7. Martin K and Church M K. Reassessment of mast cell stabilizers in the treatment of respiratory disease. *Annals of Allergy.* 1989 -62: 213
8. Kimata H, Yoshida A, Ishioka C and Nikawa H. Disodium cromoglycate selectively inhibits IgE production and enhances IgG production by human B cells in vitro. *Exp. Immunol* 1991-84: 395.
9. Chueg Chen- Chen and Chain- Leun Bor. Allergens IgE mediators inflammatory mechanism. *J. Allerg. Clin. Immunol.* 1995- 95: 69.
10. Seo S B and Park S T. DSCG inhibits production of immunoglobulin. *Immunopharmacol Immunotoxicol.* 2001- 23(2): 229.
11. Rabe K F and Schmidt D T. Pharmacological treatment of asthma today. *European Respiratory Journal.* 2001-18: 345.
12. Miyatake, A., Fujita, M., Nagasaka, Y., Fujita, K., Tamari, M., Watanabe, D., Nakano, N., Hidari, K. I. P. J., & Suzuki, Y. The new role of disodium cromoglycate in the treatment of adults with bronchial asthma. *Allergology International* 2007- 56(3), 231-239.
13. Froidure A, Mouthuy J, Durham SR, Chanez P, Sibille Y, Pilette C. Asthma phenotypes and IgE responses. *European Respiratory Journal.* 2015-47(1):304-319.

14. Ganta S, Komaravalli PL, Gaddam SL. Evaluation of Total Serum Immunoglobulin E Levels in Asthma Patients. Asian Pacific Journal of Health Sciences. 2022-9(4):388–392.